



**IMPROVEMENT STANDARDS  
AND SPECIFICATIONS**

**AS ADOPTED 2007**

Adopted by Ordinance 07-06 and all changes became effective on October 10, 2007.

List of Subsequent Revisions:

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# SECTION I

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## GENERAL PROVISIONS

### 1.1 STANDARDS

The purpose of these Standards is to provide certain minimum requirements to be used in the design and drawing of plans for public improvements such as streets, stormwater, sewer and water facilities. In establishing such minimum requirements, these Standards can not anticipate every possible situation, exception and application by which a higher standard(s) that need be used as determined by good engineering practice by the Engineer of Record.

Additionally, adherence to these standards does not relieve or supersede a duty to comply with any and all development agreement conditions, conditions placed upon the map, conditions placed upon improvement plans, engineering bulletins and supplemental provisions as determined appropriate by the City Engineer.

Designs should strive to not only address initial functionality but to also consider ease of repair and long-term maintenance.

Required improvements shall be constructed in accordance with the applicable sections of these Improvement Standards including the latest edition of the California Standard Specifications, prepared by the State of California, Department of Transportation (hereinafter called "Standard Specifications"), applicable sections of the Hughson Municipal Code, and the special provisions prepared by the design engineer and approved by the City.

In case of conflict between the approved Special Provisions prepared by the design engineer and these Improvement Standards and/or the Standard Specifications, the approved Special Provisions shall take precedence and shall be used in lieu of such conflicting portions of these Improvement Standards and/or Standard Specifications. To supplement the above, the design engineer shall prepare necessary plans and profiles using accepted principles of civil engineering and using wherever applicable, the standard plans found in Section IV of these Improvement Standards.

The City may make modifications or additions to these standards when justified by special circumstances.

These Improvement Standards are published in accordance with Section 16.08.260 of the Hughson Municipal Code. All work done in the public rights of way shall conform to the current Improvement Standards.

**Undergrounding of Utilities.** Pursuant to HMC 12.08.030 and 12.08.100, all utilities of cable lines, phone lines, and electrical distribution lines shall be undergrounded. Above ground poles

shall not be allowed. All transformers and junction cabinets for electric, phone and cable shall be undergrounded in vaults.

All underground utilities shall be constructed prior to surfacing of streets or rights of way. The Developer shall be responsible for making payment as necessary with utility companies to insure that the necessary underground utilities are constructed.

Developers are advised to have their representatives contact the Engineer during design to insure conformance with these Improvement Standards.

Work requiring plans prepared by a registered engineer such as improvements for subdivisions, parcel maps and planned developments, shall conform to these Improvement Standards, even though reference to these Improvement Standards is not made on such plans. Work not requiring improvement plans prepared by a registered engineer shall conform to these Improvement Standards, and it shall be the responsibility of the Developer to determine such requirements.

Failure of the contractor to comply with the approved plans, specifications, or the procedures specified herein shall be deemed sufficient cause for the rejection by the City engineer of all or any portion of the work. The city engineer may cause rejected work to be remedied, removed or replaced, all at the sole expense of the contractor or developer.

## 1.2 PLANS AND SPECIFICATIONS

All improvement plans, specifications, and special provisions shall comply with the requirements of the approved or conditionally approved development plan and these Improvement Standards. Prior to beginning any construction and at least 60 days prior to the date on which a developer desires the City to present his/her final map of the development to the City Council, additionally the design engineer shall present completed improvement plans and specifications along with any required special provisions, to the City for approval.

Improvement Plans shall be the responsibility of the Developer and shall be submitted to and approved by the City prior to commencement of any work. The Improvement Plans shall be 24 inches by 36 inches in size. Review time will depend upon the nature, complexity, and completeness of submittals. Applicants are advised to allow at least 3 weeks on each submittal or resubmittals to receive review comments. Check lists are provided in Appendix B to aid in preparing complete submittals.. After approval, the Developer shall provide 3 sets of the approved plans to the City prior to commencement of work.

Changes to the signed Improvement Plans shall be permitted only upon prior approval of both the Design Engineer and the City Engineer. Reproducible (3 mil mylar or polyester) "As- Built" plans shall be furnished to the City upon completion of the work along with electronic copies in both Adobe PDF 200 dpi format and AutoCAD 2008 format or approved compatible format and their approval shall be prerequisite to final acceptance of the work by the City Council.

All "As-Built" or "Record" drawings shall be signed and sealed by the design engineer or land surveyor and shall be based upon a comprehensive physical land survey to verify the locations, completeness, and accuracy of all public improvements. This shall at a minimum include all inverts, top of rims, top of curb at all returns, low points, high points, grates, toe and top of bank on storm basins and as directed by the City Engineer.

The City of Hughson has established in December of 2006 a local Horizontal and Vertical Control. The datum used by the city is NAD83 and NAGVD29 is shown in the Horizontal and Vertical control Layout for the city of Hughson, California and will be the basis of all maps submitted to the city. A minimum of two (2) ties will be made to horizontal and vertical monuments.

### 1.3 DEFINITIONS

When used for the construction of any improvements within the City of Hughson, the appropriate definitions and terms listed in Section I of the Standard Specifications shall apply, with the following modifications.

Engineer The City acting either directly or through properly authorized agents.

Engineer's Estimate The list of estimated quantities of work to be performed in proposal form.

City Contractor The person(s), firm, partnership, or corporation entering into a contract with the City of Hughson for projects administered by the City.

Developers Contractor Means the Developer and his sub-contractors who have entered into an improvement agreement with the City of Hughson.

Standard Plans The standard plans of the City of Hughson.

Design Engineer The Civil Engineer retained by the Subdivider for the preparation of plans and specifications for the required improvement works.

Improvement Plans Plans of proposed improvements prepared by the design engineer, when they have been reviewed and signed by the City of the City of Hughson.

Specifications Directions, provisions and requirements contained herein as supplemented by the Standard Specifications and by such special provisions as may be necessary, pertaining to the method and manner of performing the work or to the qualities and quantities of materials involved. The special provisions of specific plans are instructions setting forth conditions or requirements peculiar to the project under consideration and covering work or materials not otherwise covered by the Standard Specifications or these Improvement Standards.

State As referenced to in the Standard Specifications shall mean the City of Hughson.

City The City of Hughson, located in Stanislaus County, California, and the City Council, employees or authorized agents acting for the City.

#### 1.4 CONTROL OF THE WORK

All work performed and all materials furnished under these Improvement Standards shall be subject to inspection and review by the City. Such inspection and review of work and materials shall not relieve the Contractor of any of his obligations to complete the work specified. Work and materials not meeting these requirements shall be made good, and unsuitable work and materials shall be rejected.

The City shall have access to the work at all times and shall be furnished every reasonable facility for ascertaining that the methods, materials and workmanship are in accordance with the requirements and intent of these Improvement Standards. The Contractor or his authorized agent shall be in charge of and responsible for all phases of work while it is in progress.

The City shall be notified and contacted by the Contractor at least forty-eight (48) hours (two consecutive City business days) prior to beginning or re-starting any of the following stages of work and shall be notified when each of the stages has been completed. Subsequent stages shall not begin without authorization of the City.

Should the Contractor fail to so notify and contact the City, or otherwise proceeds without first obtaining written authorization by the City Engineer allowing work to proceed, then the cost of all subsequent inspection and testing necessary to ascertain that the work has met all the specified requirements shall be born by the Contractor or the work shall not be approved.

1. Roadway and ditch excavation, including the preparation of embankment areas and the placement of embankment materials.
2. Subgrade for the roadbed, upon which pavement, base, subbase or other material is placed.
3. Structural Excavation.
4. Placing culvert pipes, storm drains, sanitary sewer and water lines.
5. Placing structural back fill material.
6. Construction of forms or setting guide wires for all concrete work including concrete curbs.
7. Placing concrete.
8. Placement of any layer of sub-base, base or surfacing material, including the preparation of the sub-grade.

9. Final cleanup.

Other inspections to cover special provisions shall be requested by the Developer or City Contractor as need.

In addition to the above, the Contractor shall notify the City **at least 72 hours prior** to the close of business Friday, whenever improvement work is to be performed on Saturdays, Sundays or holidays, in order to obtain approval or provide inspection for such work and provide inspection.

The source of materials used for work performed under these Improvement Standards shall be approved by the City before delivery is made. The Contractor shall give the City sufficient written notice of sources of material so that such tests and inspections as the City deems necessary can be performed to determine that the materials comply with the specifications. Such tests shall be paid for by the Contractor, however, the City retains the right to perform verification testing. If the source is not already approved, the notice shall be provided not less than 10 working days prior to delivery of the material to the project. Only approved material that meets the specifications shall be used in the work. After approval, no material, which has in any way become unfit for use shall be used in the work.

All tests of materials and work to determine compliance with the approved specifications shall be in accordance with City approved methods and procedures. The contractor shall furnish to the City, without charge, samples of all materials to be used in the work. Samples of material from which tests are to be made shall be delivered under the supervision of the City, to a recognized laboratory or Design Engineer retained by the contractor.

Warranty

The developer, City Contractor or Utility shall inspect and repair all defective work done in the public rights-of-way for a period of one year from the date the work is accepted as complete by the Engineer. If subsequent repairs are required, such repair shall be warranted for a period of one year from the date the subsequent repairs were accepted by the City.

All warranty periods shall commence upon the date of final acceptance of applicable improvements by resolution of the City Council.

## SECTION 2

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### TRAFFIC CONTROL

#### 2.1 GENERAL

This Section is intended to establish general principles of traffic control, worker protection and public safety measures to be taken in the performance of all work covered by these Improvement Standards.

No Specification contained herein shall be deemed to create a legal standard conduct or duty toward the public nor shall it limit the City in the exercise of powers conferred by law in modifying these Specifications under special conditions.

The requirements of the Manual of Uniform Traffic Control Devices (MUTCD), and California Supplement as most recently adopted by the State of California, herein referred to as the State Traffic Manual, shall take precedence over the requirements of this Safety Section.

#### 2.2 TRAFFIC CONTROLS

The safe movement of traffic through construction areas depends upon communicating concise and proper information to the public by signs, barricades, delineators, flagmen and warning lights. All such devices necessary during construction shall be furnished by the Developer or City Contractor.

The size, shape and color of such devices as shown herein shall be as required by the State of California, Department of Transportation.

#### 2.3 SIGNS

Warning signs used for night-time conditions shall be reflectorized or illuminated. The use of orange flags in conjunction with signs is permitted if they do not at any time interfere with a clear view of the sign face.

Reflectorized signs fastened to barricades or similar supports shall have the face of the sign vertical and normal to the direction of traffic for effective visibility.

Signs are to be used only as long as necessary and then removed. During periods when the signs are temporarily unnecessary, they shall be removed or have their message covered.

## 2.4 BARRICADES

Barricades are intended to impose an obstacle or close off, the normal flow of travel.

## 2.5 FLASHER SUPPORTS

Portable flasher supports shall be as required by the Standard Specifications.

## 2.6 DELINEATORS

The function of delineators is to channelize traffic. They shall consist of post and paddle type markers or cylindrical or cone shaped objects 18 to 48 inches in height.

Delineators should be uniformly positioned laterally and longitudinally relative to the line of traffic and they must be maintained in an erect position.

Delineators for night use shall be reflectorized or illuminated to be visible from 500 feet under normal conditions.

When placed in close proximity to the edge of a traffic lane, delineators shall be made of a material that will withstand impact without damage to them or the striking vehicle.

Consideration must also be given to the necessity for stability against knockdown from wind or from the wash of passing traffic.

## 2.7 FLAGMEN

A flagman is one of the oldest and most basic means of controlling traffic. He/she can observe changing conditions and transmit information to the motorist based on current conditions. He/she can also act as a guard in advance of a work party by observing approaching traffic and being prepared to warn the workmen. A flagman should be used only when such discretionary capability is required, and not as a substitute for other warning signs and devices.

When a flagman is necessary, he must convey a message and the message must be timely and accurate. His/her effectiveness and the safety of the traffic and his/her fellow workmen depend upon the way he/she works. Standard hand signals shall be used as shown in the State Traffic Manual.

## 2.8 WARNING LIGHTS

Warning lights shall be electric lanterns, electric markers or flashers provided to indicate an obstruction or restriction during periods of low visibility. Warning lights shall be placed to mark the location of obstructions. Motion may be imparted to warning lights.

Warning lights may be fastened to signs, barricades and portable flasher supports in a manner satisfactory to the Engineer.

## 2.9 STREET CLOSURE

During the period of construction, the Developer or City Contractor shall maintain the public way so as to not unreasonably hinder, render inconvenient or interfere with the public use thereof and shall erect such barriers, signs and other measures as may be necessary and proper to provide for the safety of persons, animals and vehicles using the public way. The City Public Works Director or designated representative shall be the sole judge of the interpretation of the provisions of this paragraph, and all decisions rendered regarding same shall be final. When safety measures are required, all construction shall immediately cease until such measures are provided to the satisfaction of the City Public Works Director or designated representative.

When partial temporary street closures are made, one lane for each direction of through traffic must be maintained except where flagmen are provided to control traffic, then one lane may serve both directions. When trenching is necessary across intersecting streets, the work shall be done in such a manner as to maintain two-way traffic on cross streets at all times.

Where a trench line crosses an entrance to private property, access to the property shall be maintained at all times by means of a suitable bridge, until the trench may be backfilled. Such bridges shall be properly guarded, barricaded and illuminated at night. Where any crosswalk is cut by the trench, suitable bridging shall be constructed. Such bridging shall be at least 4 feet in width, shall have suitable hand railing, shall be properly guarded and illuminated at night.

The complete closure of a street is allowed only when authorized by the City. Such closure shall be conditioned by the City.

## 2.10 RULES AND REGULATIONS

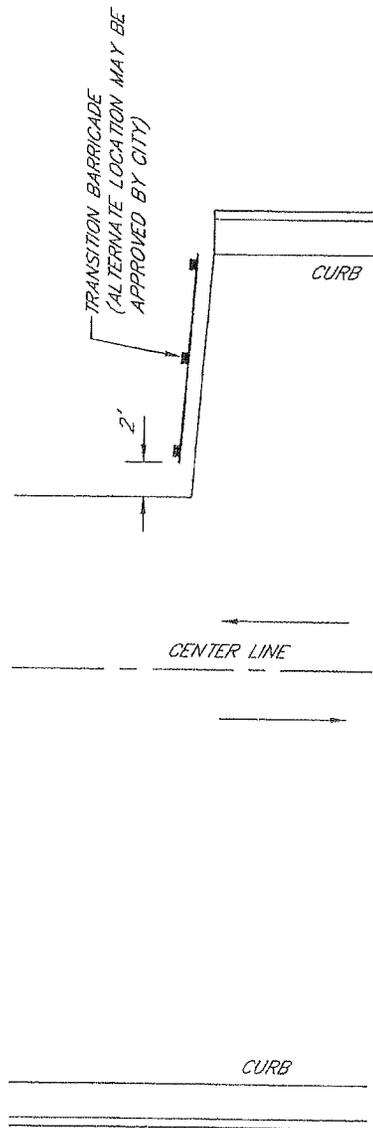
All work performed and all materials used by the Developer or City Contractor shall comply with the following: State Labor Code, California Administrative Code, Construction Safety Order, Title 8, Subchapter 4; and all other applicable Federal, State and local laws and regulations.

Specifically, the Developer or City Contractor shall furnish, install and maintain all shoring, bracing and sheeting, bracing or sheeting shall be repaired at the Developer's or City Contractor's expense.

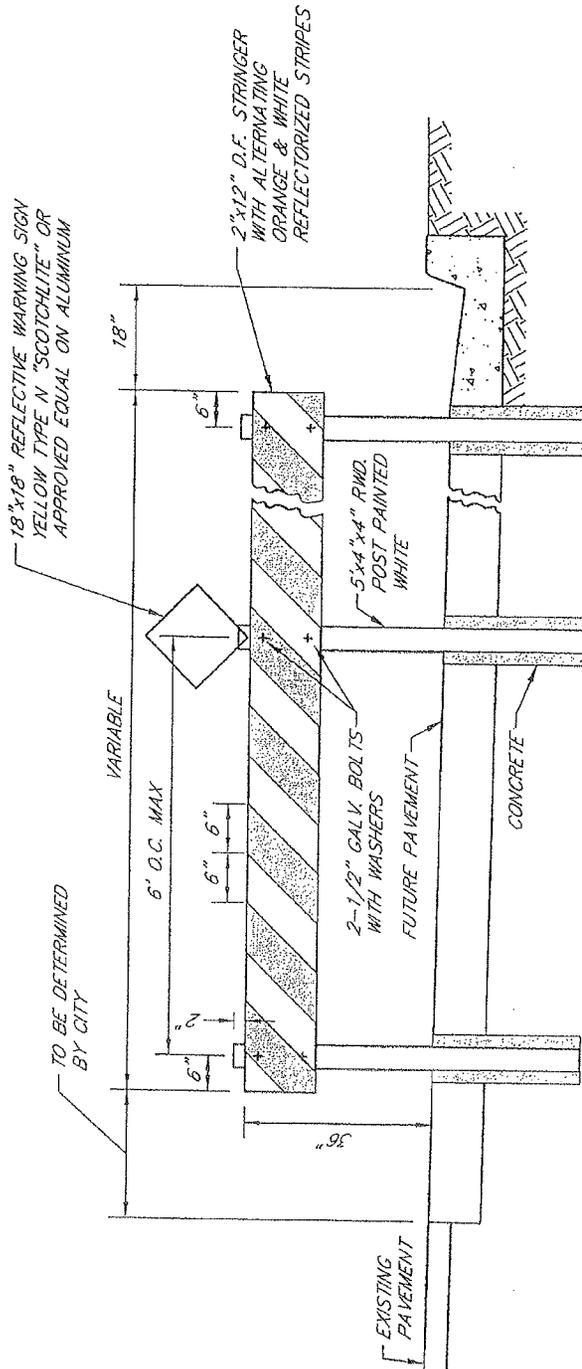
All excavation shall be in compliance with Section 1540(a) (1) of the Construction Safety Orders (Title 8, California Administrative Code Section 1540), which states:

1. "Prior to opening an excavation, effort shall be made to determine whether underground installations; i.e., sewer, water, fuel, electric lines, etc., will be encountered and, if so, where such underground installations are located. When the excavation approaches the approximate location of such an installation, careful probing or hand digging shall determine the exact location; and when it is uncovered, adequate protection shall be provided for the existing installation. All known owners of underground facilities in the area concerned shall be advised of proposed work at least 48 hours prior to the start of actual excavation."

THE DEVELOPER AND/OR CONTRACTOR SHALL BE RESPONSIBLE FOR PUBLIC SAFETY, THE PRESERVATION OF, AND ANY DAMAGE TO, BOTH PRIVATE AND PUBLIC PROPERTY, AND JOB SITE SAFETY IN ACCORDANCE WITH THE CURRENT STANDARD SPECIFICATIONS. SPECIAL ATTENTION IS DIRECTED TO SECTIONS 7-1.09, 7-1.11 AND 7-1.12 OF THE STATE STANDARD SPECIFICATIONS.



PLAN VIEW



TYPICAL BARRICADE WHERE PAVEMENT NARROWS

ALIGNMENT TO BE DETERMINED BY CITY



PARTIAL STREET BARRICADE

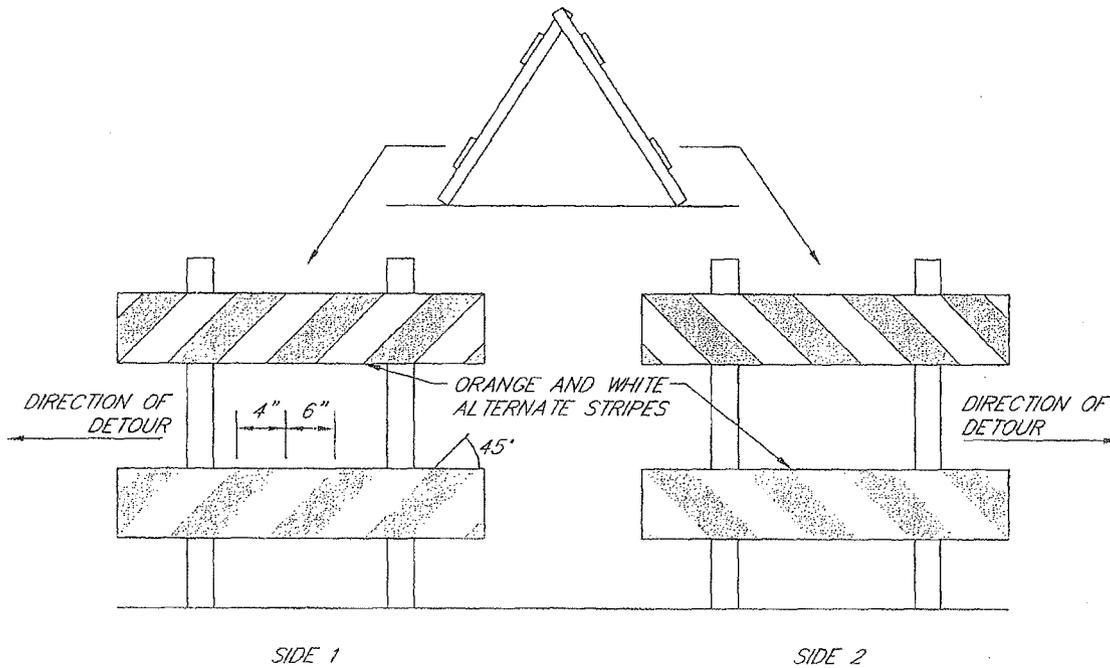
DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

CITY OF HUGHSON

STANDARD DETAIL

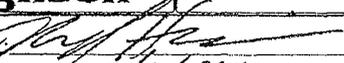
2-TR.1

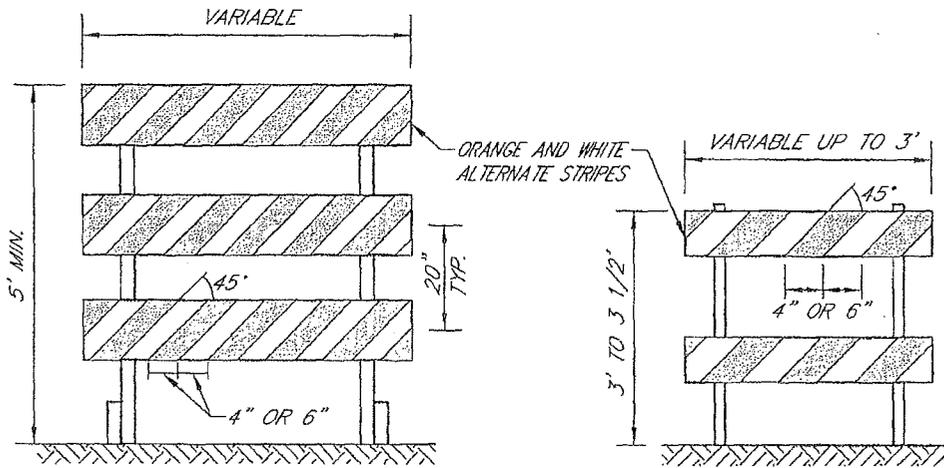


**BARRICADE USAGE (CLASS I OR CLASS II)**

1. WHERE CLASS I BARRICADES EXTEND ENTIRELY ACROSS A ROADWAY, IT IS DESIRABLE THAT THE STRIPES SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN IN DETOURING.
2. WHERE BARRICADES ARE USED TO MARK OBSTRUCTION OR TO GUIDE TRAFFIC THROUGH A WORK AREA, THE STRIPES SHOULD SLOPE DOWNWARD TOWARD THE SIDE WHERE TRAFFIC SHOULD PASS.

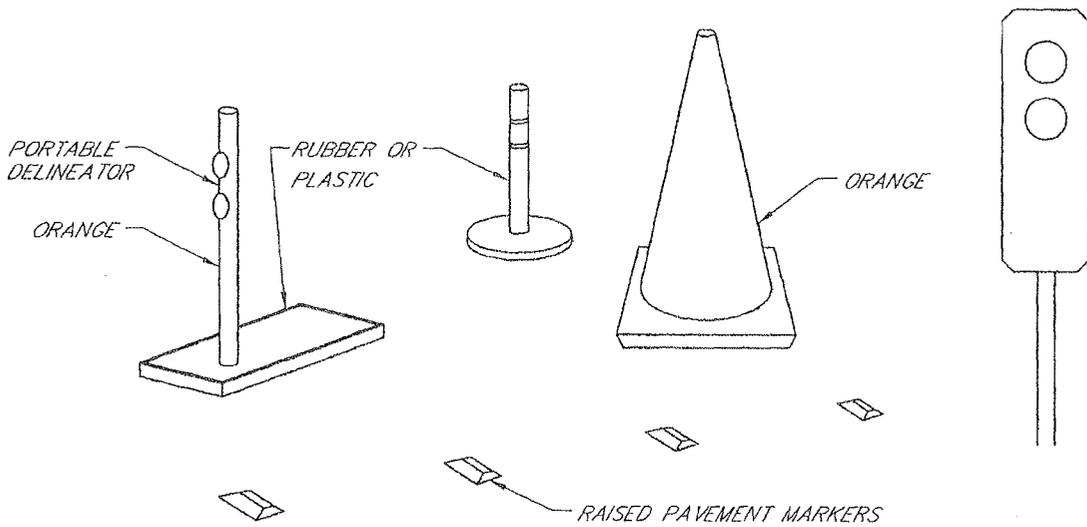
**TYPICAL CLASS II BARRICADE**

	<p><b>TYPICAL CLASS II BARRICADE</b></p>	<p>DRAWN BY: A.D.R.          CHECKED BY: R.H.H.          SCALE: NONE          DATE: 1/04</p>
<p>APPROVED BY:           DATE APPROVED: 5/1/04</p>	<p>CITY OF HUGHSON</p>	<p>STANDARD DETAIL          2-TR.2</p>



BARRICADE CHARACTERISTICS

CLASS	I	II
WIDTH OF RAIL	8" MIN. - 12" MAX.	8" MIN. - 12" MAX.
LENGTH OF RAIL	6' MIN. - 8' MAX.	3' MIN. - 4' MAX.
WIDTH OF STRIPES	6"	6"
HEIGHT	3' MIN.	3' MIN.
TYPE OF FRAME	DEMOUNTABLE OR HEAVY "A" FRAME	LIGHT "A" FRAME
FLEXIBILITY	ESSENTIALLY MOVABLE	PORTABLE



BARRICADES & DELINEATORS

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

CITY OF HUGHSON

STANDARD DETAIL  
 2-TR.3

## SECTION 3

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### STREETS

#### 3.1 GENERAL

Street Improvements in the public rights-of-way shall be constructed by a Developer or City Contractor in conformance to these Improvement Standards:

1. Only a Developer or City Contractor with an appropriate license and required insurance may perform the work described herein.
2. Any Street Improvement damaged by the Developer or City Contractor shall be repaired by the Developer or City Contractor at his expense as required by the City.

#### 3.2 GEOMETRIC DESIGN

The street widths shall conform to the standard details herein.

The design standard gutter slope shall not be less than 0.40% for new streets and not less than 0.20% for existing streets without special approval by the City. In problem areas, the gutter slope may be reduced to not less than 0.15% for residential areas.

The street cross slope grades shall be 2%. In special situations, the cross slope grade may be modified upon special approval by the City.

The street shall be designed to collect storm water at intersections whenever possible. Horizontal curves shall conform to the following criteria:

1. Minimum horizontal centerline curve radii shall be 250 feet.
2. Street intersections shall be as near right angles as practical. In no case shall the angle of intersection be less than 70 degrees. Streets located on opposite sides of an intersecting street shall have their centerline separated by not less than 10 feet.

#### 3.3 STRUCTURAL DESIGN

The R-value design method used by the California Department of Transportation shall be used as a basis to determine the structural section of the streets.

A 10-year design life shall be used.

The Traffic Index (TI) used to determine the structural section shall be as follows:

STREET	T. I.
Major	10
Collector or Industrial	8
Residential	6
Cul-de-sac	5
Park Strip	5

In no case shall the ultimate thickness of Asphalt Concrete be less than 3 inches for major streets nor less than 2 inches for all other streets.

The minimum structural section shall be 4 inches Concrete over 4 inches of Class II Aggregate Base for any street or paved area.

### 3.4 CLEARING

Clearing and grubbing shall be done in accordance with Sections 16.1.01 thru 16-1.04 of the Standard Specifications.

### 3.5 EARTHWORK

Earthwork shall be performed as set forth in Sections 19-1.01, 19-1.02, 19-1.03, 19-2.01, 19-2.02 and 19-2.05 of the Standard Specifications.

All embankment of fill materials shall be placed and compacted in accordance with Section 19-5.02, 19-5.03 and, 19-5.04 of the Standard Specifications; except that the City Contractor or Developer will only be required to strip the original ground of vegetation and compact the top 6 inches of original ground in place to not less than 95% relative compaction in accordance with California Test Methods No. 216 and 231-1978, a nuclear density moisture gauge, before the fill is placed.

### 3.6 SUBGRADE

All clods shall be broken and all rocks, hard ribs and earth lumps over 2 1/2 inches in greatest dimension and other unsuitable material such as roots shall be removed from the job site, The sub-grade material shall be compacted to a firm, stable condition with approved equipment until a relative compaction of not less than 95% has been obtained to depth of 6 inches. Special Provisions may require a greater depth for 95% compaction.

The finished sub-grade shall not vary more than 0.05 foot above or below the planned grade at any point. Care shall be taken to obtain compaction around existing manholes and water valves.

Relative compaction shall be tested in accordance with California Test Methods No. 216 and 231.

### 3.7 AGGREGATE BASE

The aggregate base material shall conform to the requirements of Section 26 of the Standard Specifications for Class 2, 3/4 inch maximum combined grading.

Motor graders may be permitted to spread and shape the aggregate base materials, provided this method does not result in segregation of material. The aggregate base shall be maintained in a well mixed optimum moisture condition.

### 3.8 PRIME COAT

A liquid asphalt prime coat shall be applied in conformance with Section 39 of the Standard Specifications. The liquid asphalt prime coat grade shall be approved by the City.

When directed by the City, a sand cover shall be spread over the prime coat at approaches and side streets in order to maintain use. Before through traffic is permitted on the prime coat, all wet spots shall be completely covered with sand. All loose sand shall be completely removed from the treated areas before the placing of any surfacing material.

If, in the opinion of the City, conditions are such that this work is not feasible, the prime coat may be deleted. The Contractor shall issue an appropriate credit for such deletion.

### 3.9 ASPHALT CONCRETE

The asphalt concrete shall conform to the requirements of Section 39 of the Standard Specifications. Asphalt concrete used in all but the final course shall be Type B with 3/4 inch maximum, medium grading. Asphalt concrete used in the final course shall be Type B as follows:

Major, Collector and Industrial Streets - 3/4 inch maximum  
Residential Streets - 1/2 inch maximum, medium grading

The asphalt grade shall be AR 4000 as specified by the latest revision of the Standard Specifications unless otherwise approved by the City.

### 3.10 ASPHALT PAINT BINDER

An asphalt paint binder shall be applied in conformance with Section 39-4.02 of the State Improvement Standards.

### 3.11 HEADER BOARDS

Header Boards shall be constructed to protect the edges of the asphalt concrete where streets are partially completed.

The boards shall be either pressure treated redwood or douglas fir with an American Wood Preservers Bureau Stamp indicating its use for ground contact and application of LP22 Water borne preservative or approved equal.

The boards shall be 2-inch x 4-inch minimum dimensioned of appropriate material.

### 3.12 CONCRETE

Portland cement concrete, unless otherwise specified in the Special Provisions, shall be Class B as defined in the Standard Specifications with a 28-day compressive strength of 2,500 pounds per square inch and a maximum slump of 3 inches. Concrete shall consist of Portland Cement, water and aggregate. Portland cement shall be Type II. Aggregate shall be washed before use and be free from any foreign matter.

The aggregates shall be graded to provide a plastic, workable mixture of maximum density with a maximum size aggregate of 3/4 inches. The water shall be potable and no admixtures shall be used without prior approval by the City.

The Cement, water and aggregates shall be combined at the batch plant and be thoroughly mixed. No water shall be added to the mixture after leaving the batch plant without approval by the City.

The concrete shall be consolidated by tamping or vibrating. Concrete which has rock pockets or honey combing after curing shall be removed and replaced.

All concrete shall be cured in accordance with Section 90-7.01B of the Standard Specifications.

### 3.13 CURBS AND SIDEWALKS

Curbs and sidewalks shall be constructed in accordance with these Improvement Standards and Section 73 of the State Improvement Standards.

Sidewalk shall have a cross slope toward the curb face of 1/8-inch per foot minimum to 1/4- inch per foot maximum, unless otherwise approved by the City.

Traffic, parking and street name signs on city streets which require relocation shall be relocated by the City. Contractor shall request any such sign relocation in writing at least two working days prior to the date the relocation is needed. Utility poles which require relocation because of the work: shall be relocated by the respective utility company owning the poles. The Contractor shall provide sufficient notice to the subject utility

company to accomplish relocation by the date required. The Developer or City Contractor shall be responsible for protecting the work against damage and insuring the safety of the public.

Sidewalks which are required against the property line shall be placed 1-inch from the property line to provide space for lot corner monuments.

### 3.14 DRIVEWAY APPROACHES

Driveway approaches shall be constructed in accordance with these Improvement Standards and Sections 73 of the State Standards.

Approaches shall be located so they will not interfere with intersecting sidewalks, traffic signals, light poles, fire hydrants, or other public improvements unless specific approval is given by the City and the necessary adjustments to the improvements are accomplished without cost to the City.

### 3.15 ALLEYS

Commercial alleys shall be constructed in accordance with these Improvement Standards. All residential alleys shall be constructed with a minimum 2 inch crown and surfaced with 2 inches of asphalt concrete.

The concrete gutter for commercial alleys shall be constructed as required in Section 3.12 of these Improvement Standards.

The subgrade shall be constructed as required in Section 3.6 at these Improvement Standards.

The aggregate base for the commercial alley shall be constructed as required in Section 3.6 and 3.7 of these Improvement Standards and shall be 4" minimum in depth.

### 3.16 VALLEY GUTTERS

Valley Gutters designed to permit drainage across a street shall be constructed as shown on Drawing No. C.2, C.6 and C.7.

### 3.17 CURB RAMPS

Curb ramps shall be constructed at all intersections as shown on Drawings No. HC.1 and HC.2.

Ramps shall comply with Section 19956.5 of the State Health and Safety Code and the requirements of Title 24 and the ADA for accessibility.

### 3.18 RAISING UTILITY BOXES

Utility boxes and manholes shall be raised by the Developer or City Contractor to conform to these Improvement Standards. Utility boxes include, but are not limited to, sewer manholes, sewer lampholes, water valves, storm drain manholes and survey monuments.

Where existing utility boxes are in the work area their frames and covers shall be removed before subgrade compaction is made and a cover shall be placed to prevent dirt and loose material from entering the facility.

Base and surface material shall be placed over the covers, after which the frames and covers shall be set to finish grade as shown in Drawing No. ST.7.

### 3.19 TESTING

Material Testing required by the City for work done under the provisions of these Standards shall be provided by the Developer and submitted to the City for review. Testing required on City contract projects shall be provided by the City or shall be as indicated under the "Special Provisions" section in the specifications for the project.

On City contract projects, the City shall provide for the final passing test, per test site for compaction. All other compaction tests shall be paid for by the City Contractor.

### 3.20 ACCESS CONTROL WALL

Access control walls shall be constructed on all major thoroughfares and as required by the City.

Design of access control walls shall be submitted to the City for approval.

The wall shall be constructed shown on the Improvement Plans and a building permit shall be obtained by the Developer from the Chief Building Official prior to commencement of work on the wall.

### 3.21 STREET MONUMENTS

Street monuments shall be placed on the centerline of each street at the following locations:

1. Intersections
2. Beginnings and ends of curves

3. Changes of direction
4. Other points deemed necessary by the Engineer

The monuments shall consist of durable new material. They shall be ¾-inch O.D. x 30-inch long galvanized iron pipe or approved equal. They shall be set in a monument well as shown on Drawing No. M.1.

### 3.22 BOUNDARY MONUMENTS

Boundary monuments shall be placed on the exterior boundary of the subdivision at the following locations:

1. Changes of direction
2. Beginnings and ends of curves
3. Other points deemed necessary by the Engineer

Boundary monuments shall be of the same material as street monuments except that in unpaved areas the top shall be 1 foot below the finished grade.

### 3.23 BLOCK CORNER MONUMENTS

Corner monuments shall be placed at all block corners and alley corners.

Block corner monuments shall be of the same material as street monuments except the top shall be set 1 foot below the ground surface.

### 3.24 LOT CORNER MONUMENTS

Lot corner monuments shall be of the same material as street monuments except that in unpaved areas the top shall be 1 foot below the finished grade.

Lot corner monuments shall conform to the basic criteria as follows:

1. Lots shall have a monument at each corner except as otherwise provided by this section.
2. Lots that are created with zero back or side yards may have lot corners under the building foundations deleted except those corners that are block or alley corners.
3. Lots that are created as a part of a townhouse condominium development where realty is to be owned in fee by the individual lot owner shall be monument using a minimum of monument for each contiguous group of lots. Contiguous groups of lots containing more than 10 lots shall have additional monuments as required by the City.

4. Condominium airspace developments where realty is not to be owned in fee by the individual lot owner shall have exterior boundary monuments as required for Boundary Monuments.

### 3.25 BENCHMARK

A minimum of one benchmark shall be established (on a brass cap) within each subdivision of twenty lots or more. The location, elevation and datum, shall be shown on an as-built plan provided in mylar form (see Section 1.2). As possible the benchmark shall be set at the base of a street light standard. National Geodetic Survey vertical datum, NAVD 1988 shall be used. A copy of the level loop establishing the bench and its elevation shall be provided to the City for review and recordation.

### 3.26 PAVE-OUTS

Pave-outs shall be required whenever new curb and gutter is not constructed adjacent to existing pavement.

Pave-outs are to be designed according to the traffic index assigned to the classification of the adjacent street.

If the adjacent road is sub-standard according to its classification, the pave-out shall be constructed to centerline.

If the adjacent road conforms to standards, the pave-out may extend to the existing edge of pavement.

### 3.27 PARKING LOTS

All parking lots shall be constructed in accordance with these Standards, paved with a minimum of 2" Type B asphaltic concrete and have adequate drainage facilities to dispose of storm runoff within the boundaries of the property.

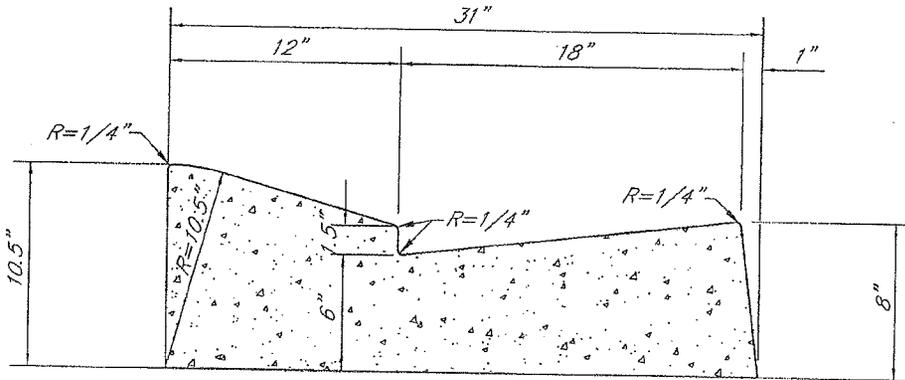
Surface slopes of parking spaces for the physically handicapped shall be the minimum possible and shall not exceed 1/4 in (6.35 mm) per foot (2.083% gradient) in any direction.

Each parking space reserved for the handicapped shall be identified by a permanently affixed reflectorized sign constructed of porcelain on steel, beaded test, or equal, displaying the International Symbol of Accessibility. The sign shall not be smaller than 70-in sq. (0.0452 m sq.) area and shall be centered at the interior end of the parking space at a minimum height of 36-in (914.4 mm) from the parking space finished grade, ground, or sidewalk.

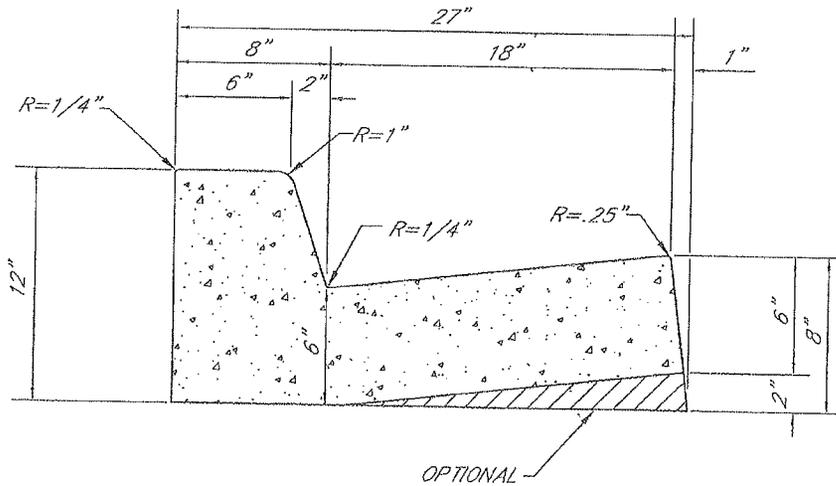
A sign shall also be posted, in a conspicuous place, at each entrance to the off-street parking facility, not less than 17-in x 22-in in height (431.8 x 558.8 mm), which clearly and conspicuously states the following:

"Unauthorized vehicles not displaying distinguishing placard or license plates issued for physically handicapped persons may be towed away at owner's expense. Towed vehicles may be reclaimed at \_\_\_\_\_ or by \_\_\_\_\_ telephoning \_\_\_\_\_." In addition to the above requirements, the surface of each parking place shall have a surface identification duplicating the symbol of accessibility in blue paint, at least 3 sq. ft. painted metal signs are acceptable whether they are steel or aluminum. Blue paint for the symbol of accessibility and curb markings should match color No. 15090 in the Federal Standard 595A as specified in Section 2-1720 of the regulations (similar to Royal Blue).

Entrances to and vertical clearances within parking structures shall have a minimum vertical clearance of 8 ft 2-in (2.489 m) where required for accessibility to handicapped parking spaces.



DRIVE-OVER CURB



VERTICAL CURB AND GUTTER



CURB AND GUTTER  
DRIVE OVER AND VERTICAL

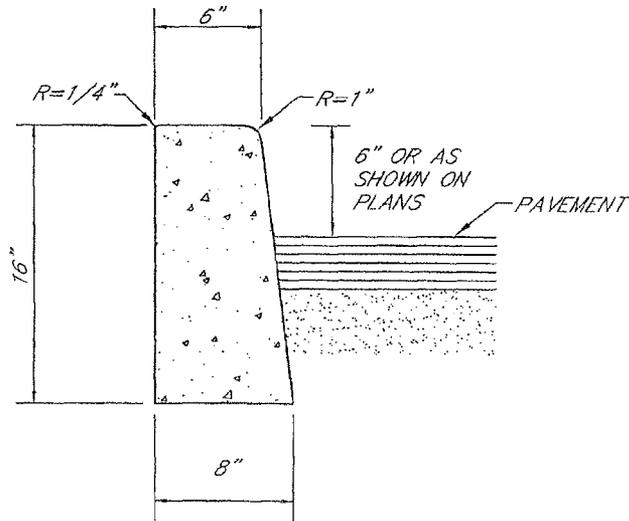
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CHECKED BY: R.H.H.  
SCALE: NONE  
DATE: 1/04

APPROVED BY: *[Signature]*  
DATE APPROVED: 8/13/07

CITY OF HUGHSON

STANDARD DETAIL

3-C.1

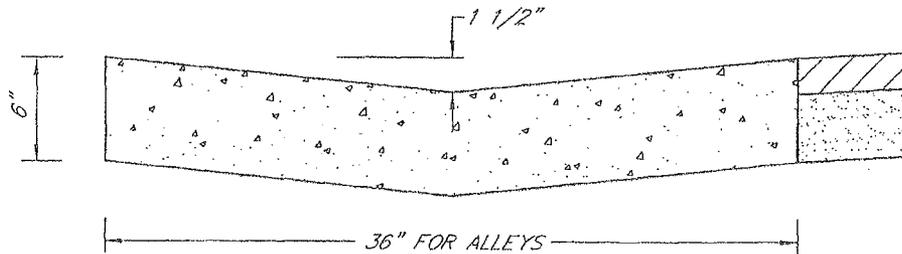


95% COMPACTION

*MEDIAN CURB*

NOTES:

1. A WEAKENED PLANE JOINT SHALL BE INSTALLED AT 10' INTERVALS
2. GUTTER FLOWLINES SHALL BE WATER TESTED FOR FLOW



95% COMPACTION

*VALLEY GUTTER*



*MEDIAN CURB AND VALLEY GUTTER*

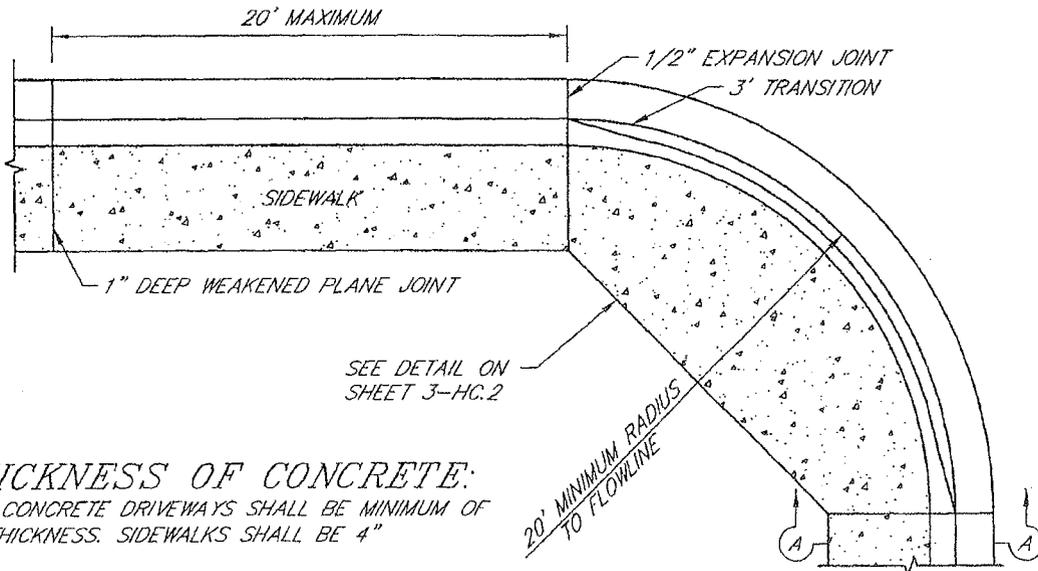
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 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

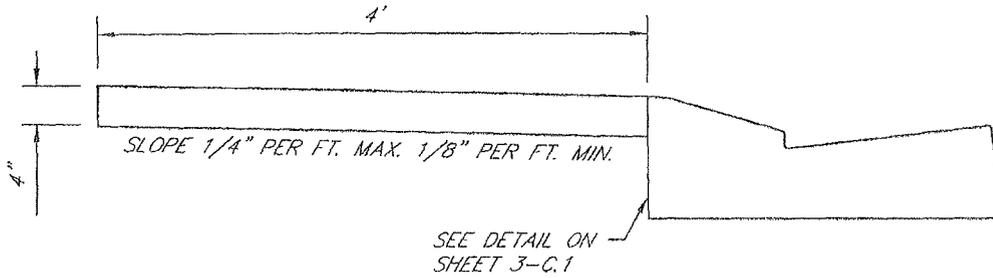
CITY OF HUGHSON

STANDARD DETAIL

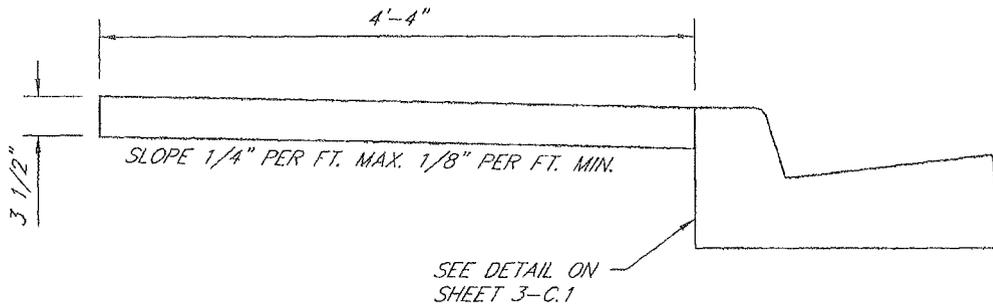
3-C.2



**THICKNESS OF CONCRETE:**  
 ALL CONCRETE DRIVEWAYS SHALL BE MINIMUM OF  
 6" THICKNESS. SIDEWALKS SHALL BE 4"



SECTION A-A DRIVE OVER CURB



VERTICAL FACE CURB & GUTTER



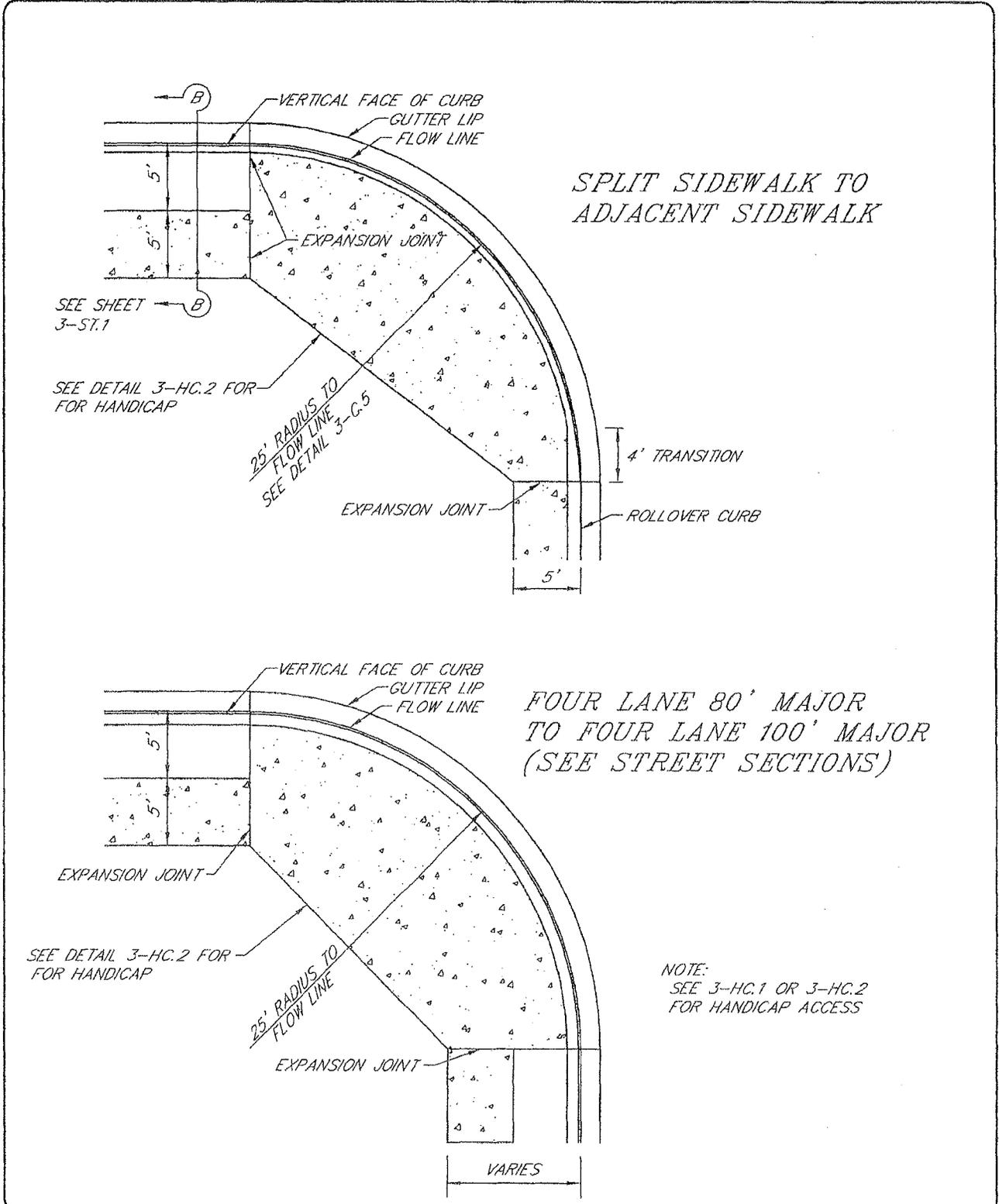
**CURB, GUTTER & SIDEWALK  
 PLAN AND SECTIONS**

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

CITY OF HUGHSON

STANDARD DETAIL  
 3-C.3



**SIDEWALK  
RETURN DETAIL**

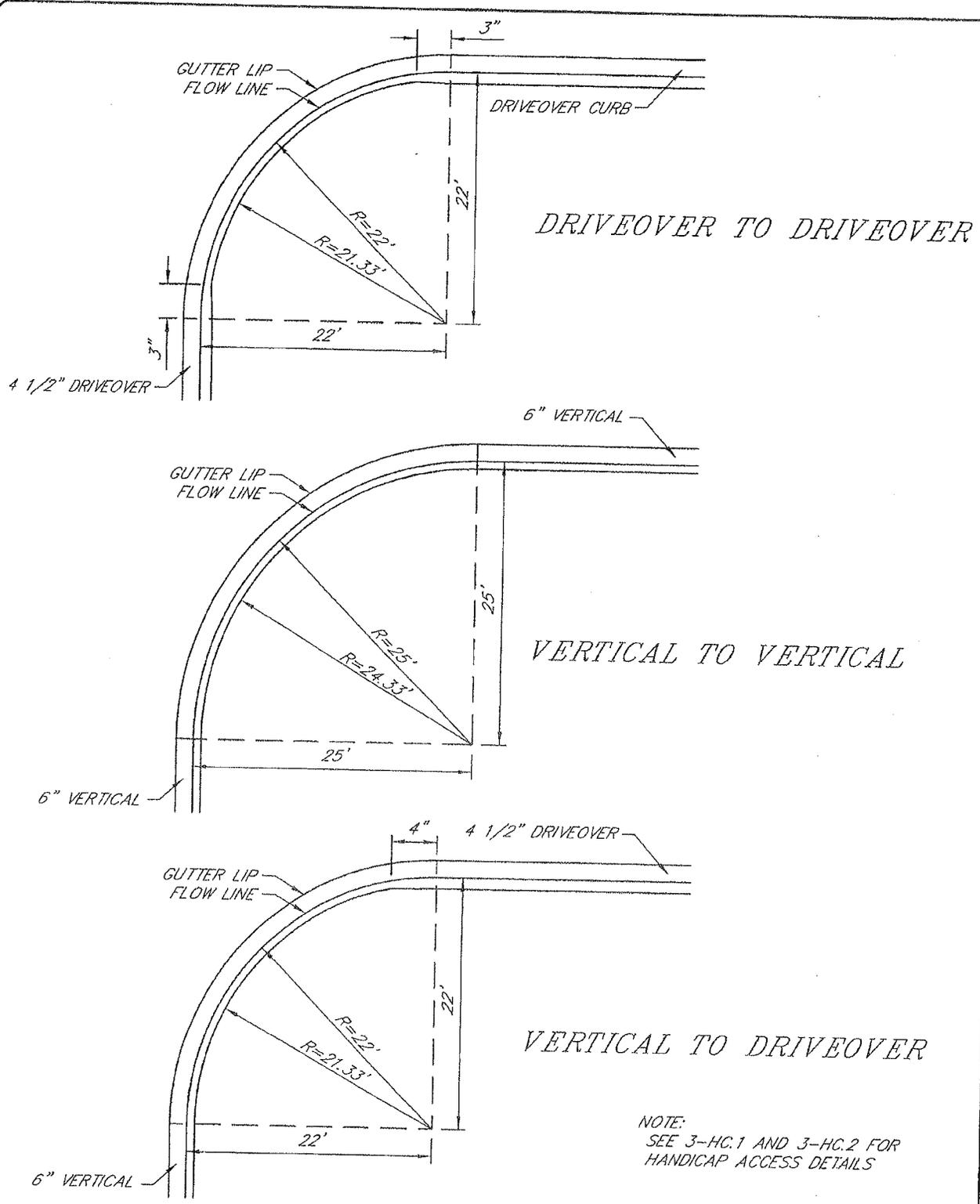
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 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

**CITY OF HUGHSON**

STANDARD DETAIL

**3-C.4**



**CURB RETURNS  
MINIMUM RADII**

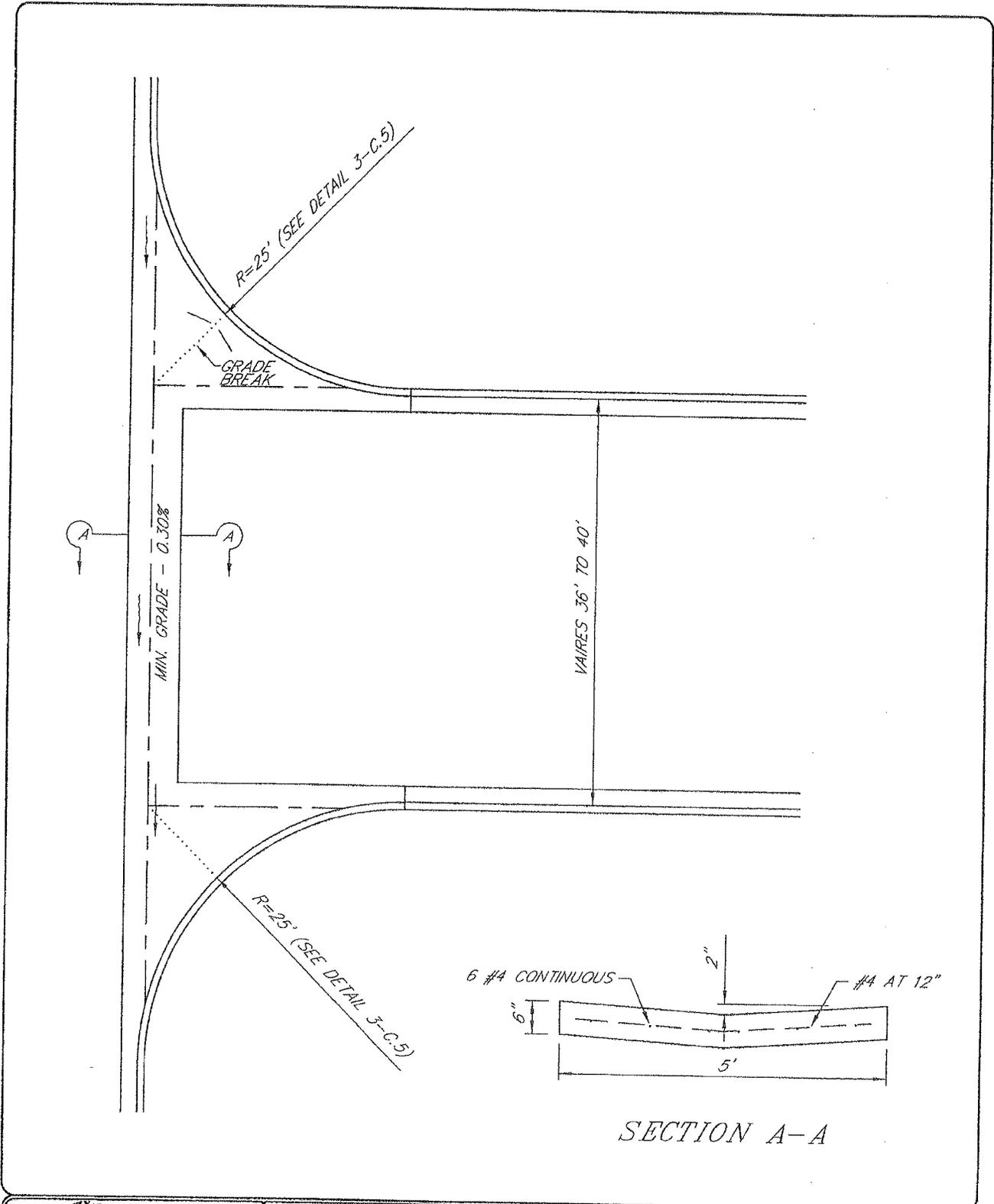
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DATE: 1/04

APPROVED BY: *[Signature]*  
DATE APPROVED: 5/1/04

**CITY OF HUGHSON**

STANDARD DETAIL

**3-C.5**



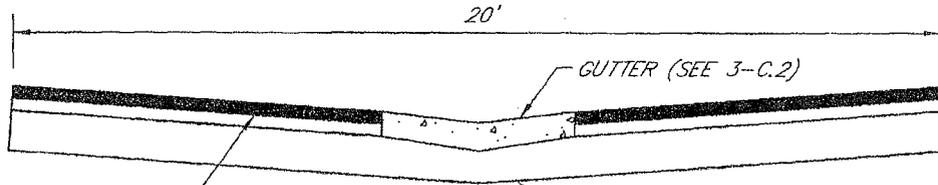
**STANDARD VALLEY GUTTER  
STREET CROSSING**

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

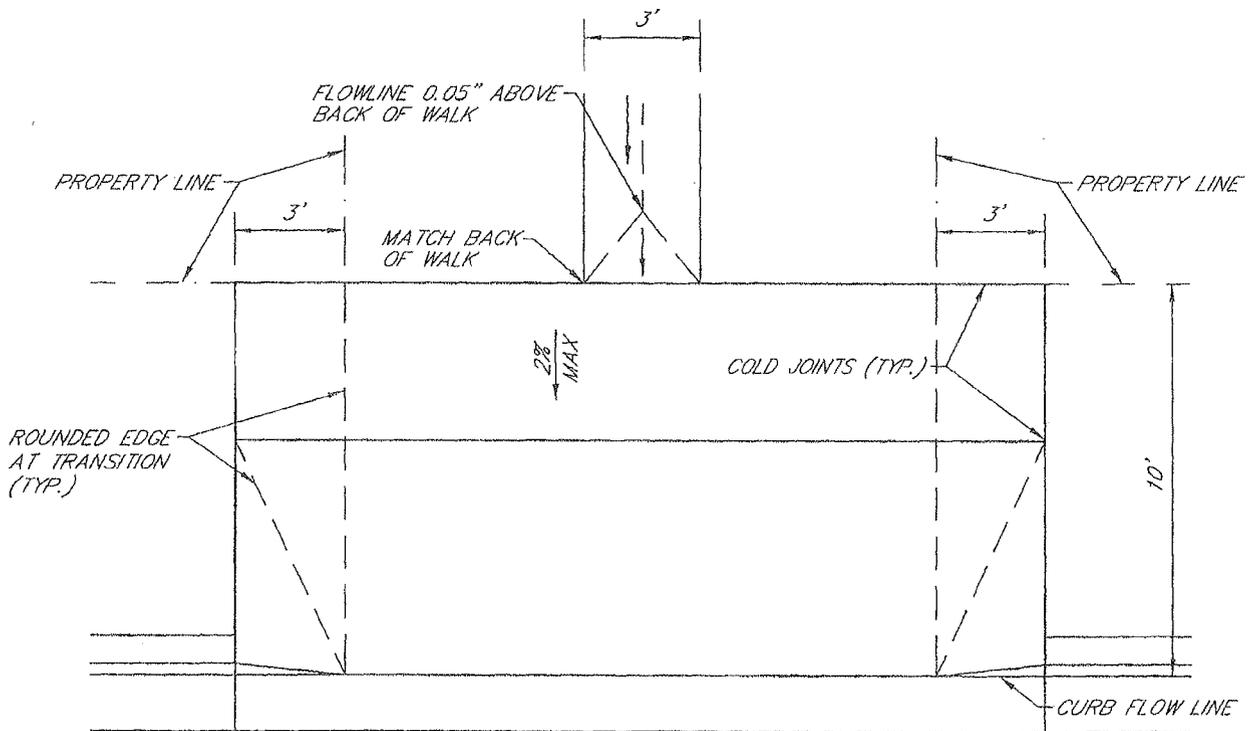
**CITY OF HUGHSON**

STANDARD DETAIL  
**3-C.6**



STRUCTURAL SECTION TO BE DESIGNED ACCORDING TO STANDARD SPECS. 3.3 AND 3.15

ALLEY SECTION



PLAN

CONSTRUCT APPROACH PER DETAIL 3-C.9, WITH #4 REBAR, 12" O.C. BOTH DIRECTIONS.



COMMERCIAL ALLEY DRIVEWAY

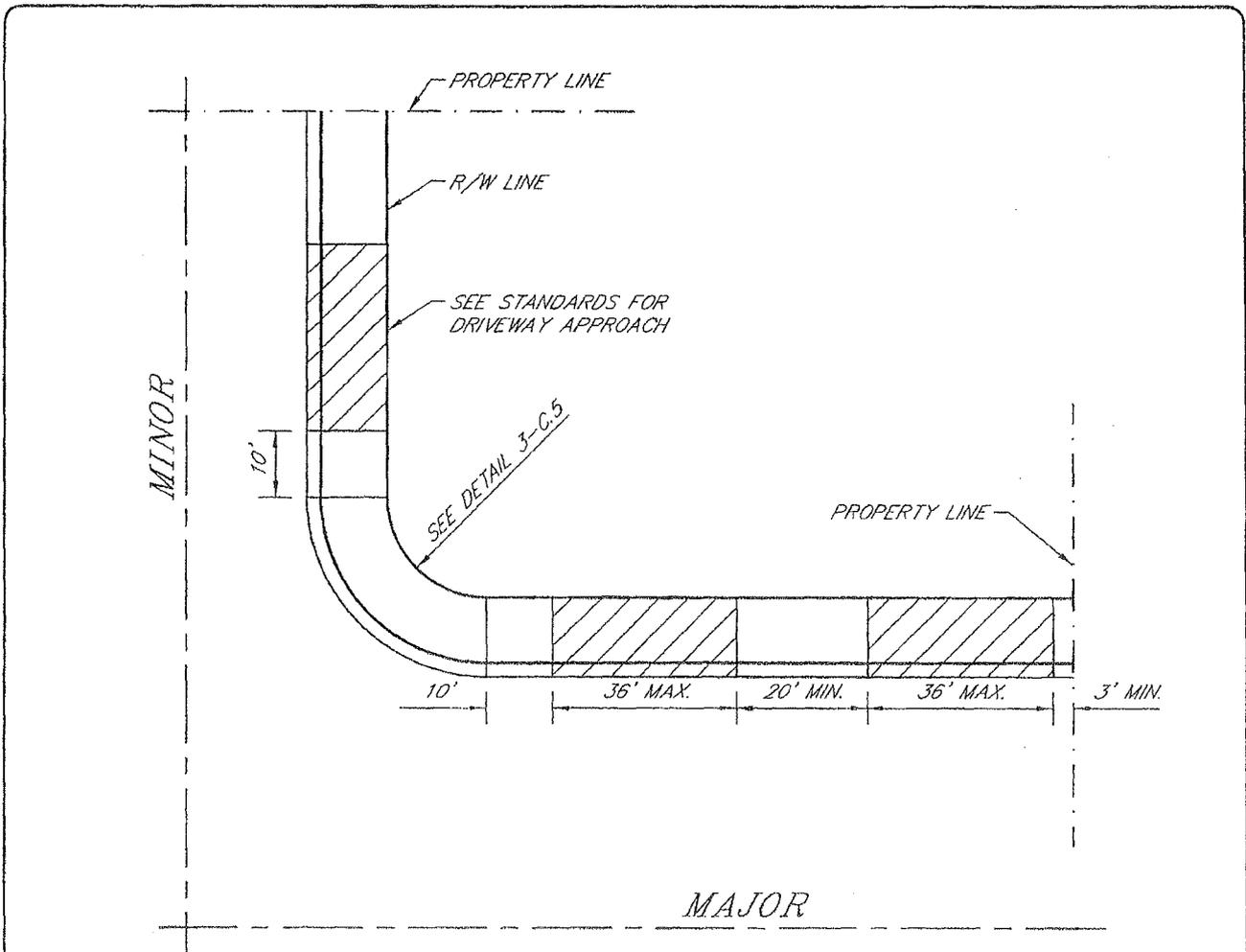
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APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

CITY OF HUGHSON

STANDARD DETAIL

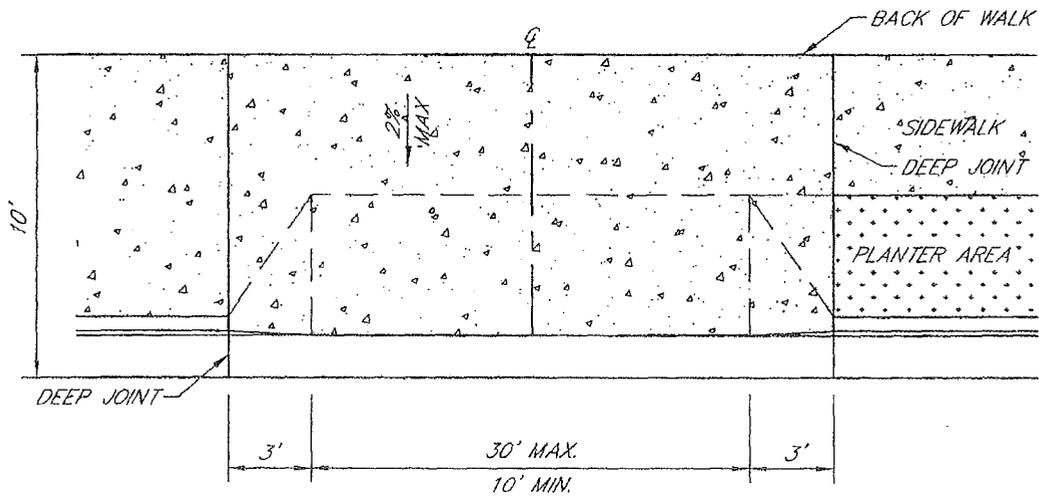
3-C.7



**GENERAL NOTES:**

1. FRONTAGE TO BE MEASURED ALONG THE STREET R/W LINE AND FROM THE INTERSECTION OF THE PROJECTED R/W TANGENTS ON CORNER LOTS.
2. DRIVEWAY FOR COMMERCIAL USES NOT PERMITTED WITHIN 10' FT. OF ADJACENT PROPERTY LINES AND/OR WITHIN 20' FT. OF INTERSECTION R/W TANGENTS WHOSE INTERIOR ANGLES OF INTERSECTION ARE GREATER THAN 70; ALL OTHER CASES TO BE SUBMITTED TO THE DIRECTOR OF PUBLIC WOKS FOR INDIVIDUAL APPROVAL.
3. 20' FT. MINIMUM ALLOWABLE DISTANCE BETWEEN DRIVEWAY FOR LESS THAN 200 FT. FRONTAGE AND 40 FT. MINIMUM ALLOWABLE DISTANCES FOR FRONTAGE OF 200 FT. AND OVER.
4. 30 FT MAXIMUM DRIVEWAY WIDTH MEASURED AT R/W LINE. NO MORE THAN 40% OF FRONTAGE CAN BE DRIVEWAY.

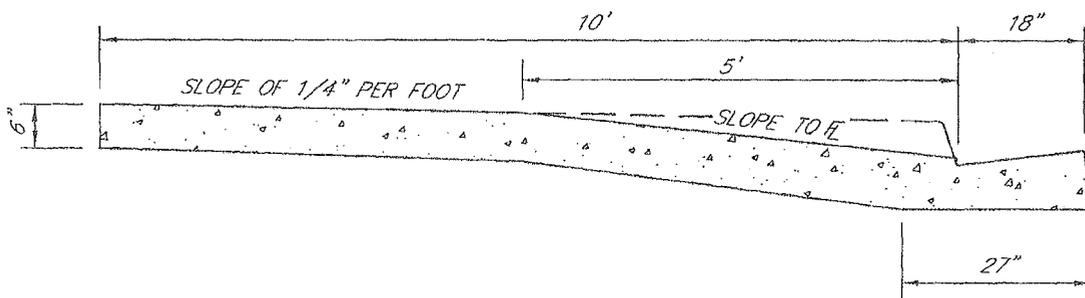
	<p><b>DRIVEWAY LOCATION</b></p>	<p>DRAWN BY: A.D.R.          CHECKED BY: R.H.H.          SCALE: NONE          DATE: 1/04</p>
<p>APPROVED BY: <i>[Signature]</i>          DATE APPROVED: 5/1/04</p>	<p><b>CITY OF HUGHSON</b></p>	<p>STANDARD DETAIL  <b>3-C.8</b></p>



COMMERCIAL DRIVEWAY STANDARDS

NOTES:

1. DRIVEWAYS SHALL BE CONSTRUCTED OF CLASS "B" PORTLAND CEMENT CONCRETE.
2. 6" DRIVEWAY SECTION REQUIRED FOR BOTH VERTICAL & ROLLOVER CURBS AT ALLEYS.



CROSS-SECTION OF DRIVEWAY APRON



COMMERCIAL DRIVEWAY APRON

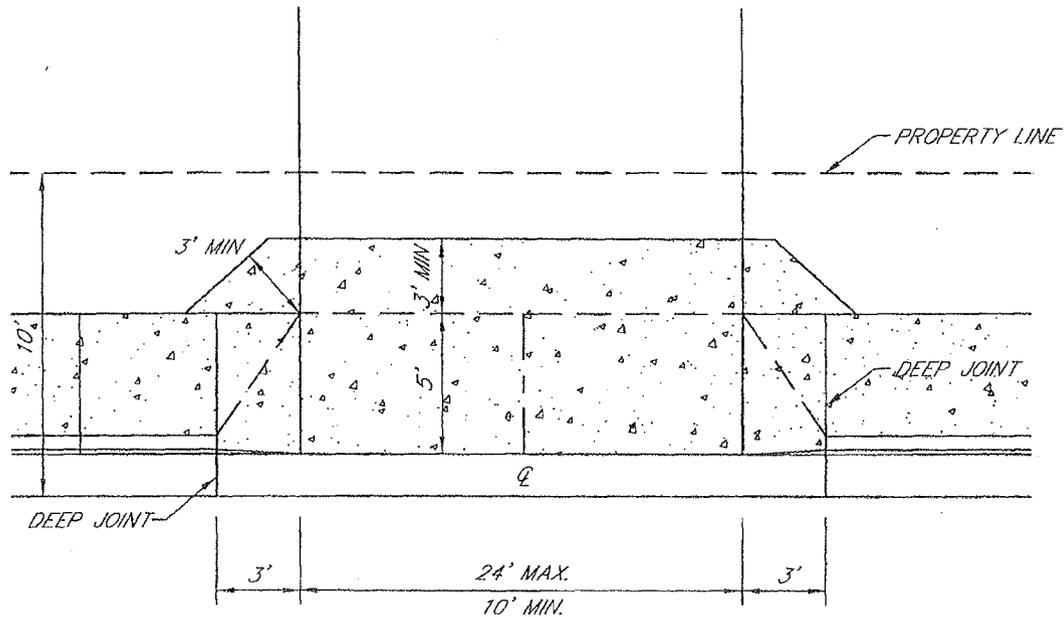
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APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

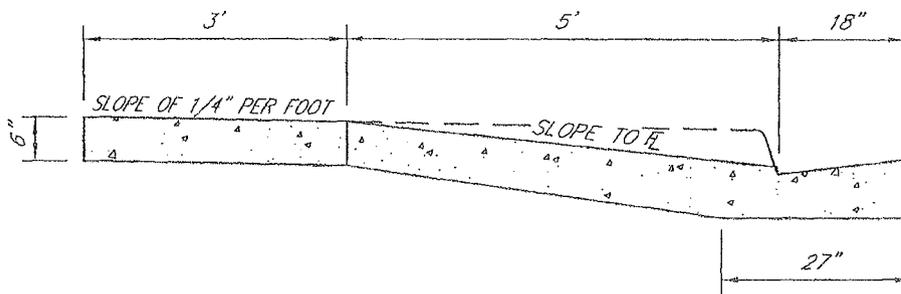
CITY OF HUGHSON

STANDARD DETAIL

3-C.9

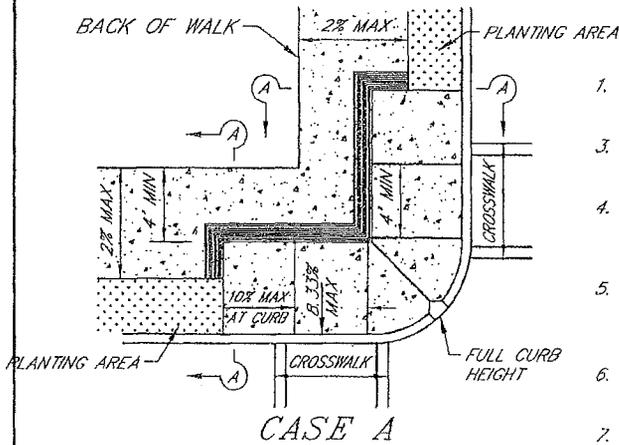


- NOTES:
1. DRIVEWAYS SHALL BE CONSTRUCTED OF CLASS "B" PORTLAND CEMENT CONCRETE.
  2. 6" DRIVEWAY SECTION REQUIRED FOR VERTICAL CURBS.

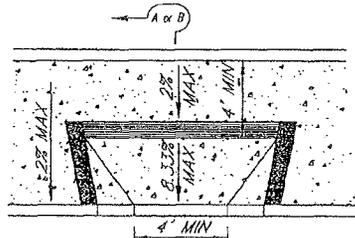


CROSS-SECTION OF DRIVEWAY APRON

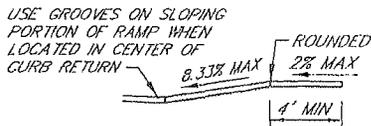
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APPROVED BY: <i>[Signature]</i> DATE APPROVED: 5/11/04	CITY OF HUGHSON	STANDARD DETAIL <b>3-C.10</b>



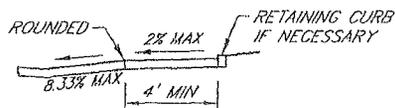
CASE A



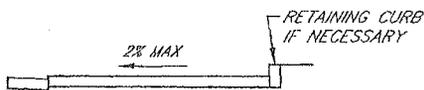
CASE B



SECTION A-A



SECTION B-B



SECTION C-C

NOTES:

1. IF SIDEWALK IS LESS THAN 5' WIDE, THE FULL WIDTH OF THE SIDEWALK SHALL BE DEPRESSED AS SHOWN IN CASE C.
3. AS AN ALTERNATE TO CASE A, ONE RAMP MAY BE PLACED IN THE CENTER OF THE CURB RETURN AS IN CASE D.
4. WHEN RAMP IS LOCATED IN CENTER OF CURB RETURN, CROSSWALK CONFIGURATION MUST BE SIMILAR TO THAT SHOWN ON THE PLAN TO ACCOMMODATE WHEELCHAIRS.
5. IF PLANTING AREA IS EQUAL TO OR GREATER THAN RAMP LENGTH, RAMP SIDE SLOPE 'X' DISTANCE = 3 (SEE CASE F).
6. FOR CASES E AND F, THE LONGITUDINAL PORTION OF THE SIDEWALK MAY NEED TO BE DEPRESSED AS SHOWN IN CASE B.
7. IF LOCATED ON A CURVE THE SIDES OF THE RAMP NEED NOT BE PARALLEL, BUT THE MINIMUM WIDTH OF THE RAMP SHALL BE 4'.
8. THE BOTTOM OF THE RAMP SHALL HAVE A 1/2" LIP AT 45°.
9. SIDEWALK AND RAMP THICKNESS, "T", SHALL BE 3 1/2".
10. THE RAMP SHALL HAVE A 12" WIDE BORDER WITH 1/4" GROOVES APPROXIMATELY 3/4" O.C. SEE GROOVING DETAIL. THE SURFACE OF RAMP SHALL HAVE A TRANSVERSE BROOMED SURFACE TEXTURE ROUGHER THAN THE SURROUNDING SIDEWALK EXCEPT WHEN LOCATED IN CENTER OF CURB RETURN.
11. WHEN RAMP IS LOCATED IN CENTER OF CURB RETURN, IT SHALL BE GROOVED IN A HERRINGBONE PATTERN WITH 1/4" GROOVES APPROXIMATELY 1 1/2" O.C.S. SEE GROOVING DETAIL. GROOVES SHOULD BE ALIGNED PARALLEL TO CROSSWALK STRIPES TO DIRECT BLIND PEDESTRIANS INTO THE APPROPRIATE CROSSWALK.
12. RAMP SIDE SLOPE VARIES UNIFORMLY FROM A MAXIMUM OF UP TO 12.5% AT CURB TO CONFORM WITH LONGITUDINAL SIDEWALK SLOPE ADJACENT TO TOP OF THE RAMP, EXCEPT IN CASES C & F.
13. RETROFITS -- WHEN A WHEELCHAIR RAMP IS ADDED TO AN EXISTING FACILITY, THE FOLLOWING CHANGES ARE PERMITTED.
  - (A) RAMP GRADE IN CASE MAY BE INCREASED TO 4
  - (B) OTHER RAMP GRADES MAY BE INCREASED TO A MAXIMUM OF 11.1%
  - (C) WHERE THE 4' PLATFORM IS NOT FEASIBLE, THE WIDTH MAY BE DECREASED TO 3'.
  - (D) THE PLATFORM MAY BE ELIMINATED IF THE GRADE DOES NOT EXCEED 8.33%



PEDESTRIAN RAMPS FOR THE HANDICAPPED

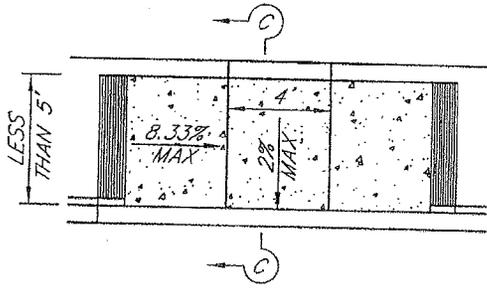
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 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 8/13/07

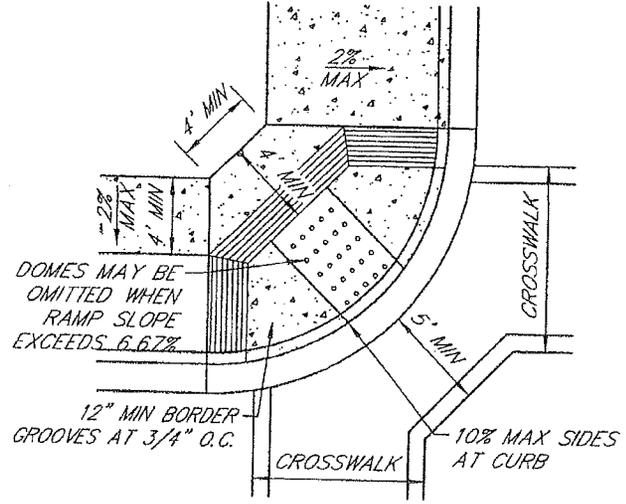
CITY OF HUGHSON

STANDARD DETAIL

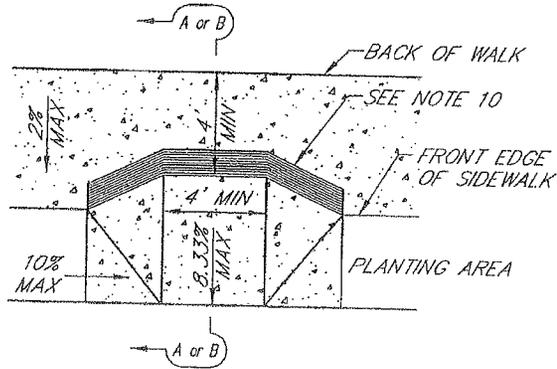
3-HC.1



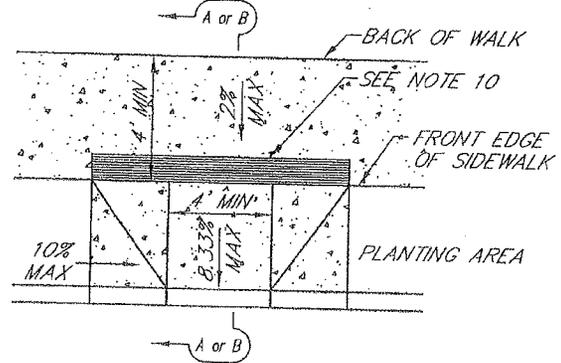
CASE C



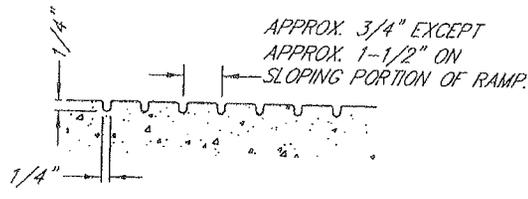
CASE D



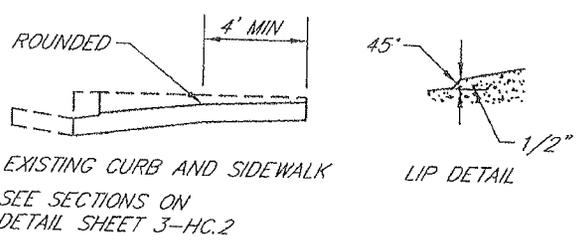
CASE E



CASE F



CASE G



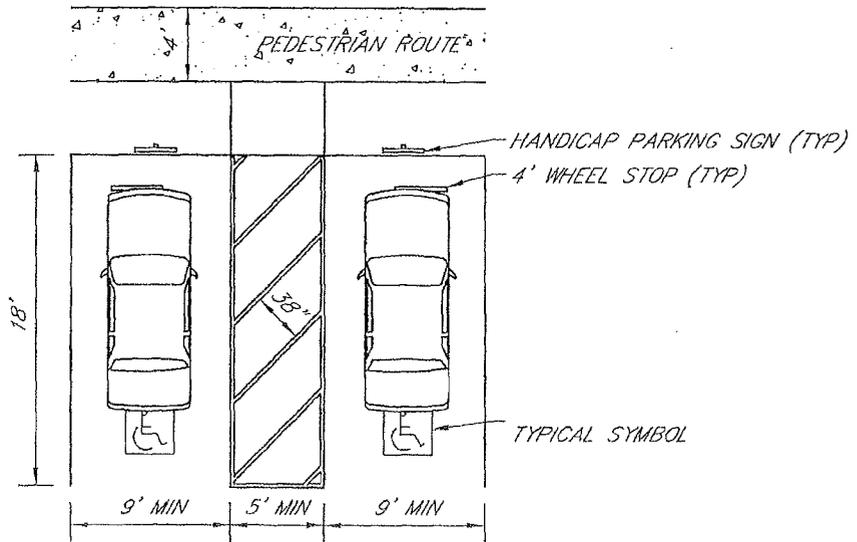
PEDESTRIAN RAMPS FOR THE HANDICAPPED

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

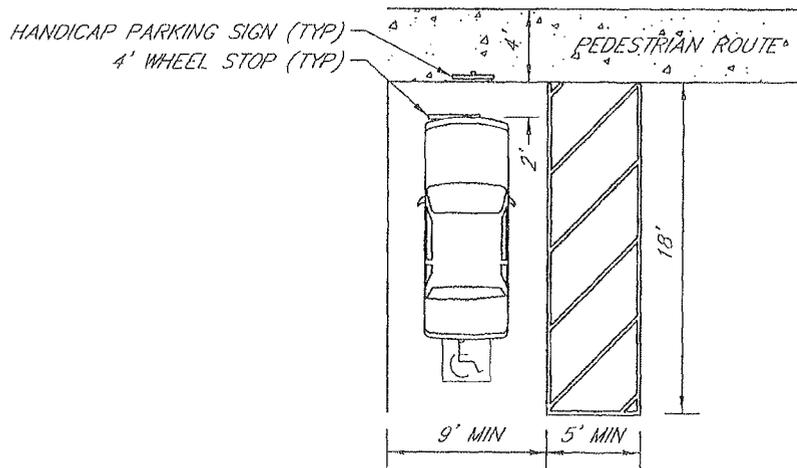
APPROVED BY: *[Signature]*  
 DATE APPROVED: 1/5/10

CITY OF HUGHSON

STANDARD DETAIL  
 3-HC.2



HANDICAPPED SPACES, DOUBLE TYPE



HANDICAPPED SPACES, SINGLE TYPE

	<b>HANDICAPPED PARKING REQUIREMENTS</b>	DRAWN BY: A.D.R. CHECKED BY: R.H.H. SCALE: NONE DATE: 1/04
APPROVED BY: DATE APPROVED: 8/13/07	<b>CITY OF HUGHSON</b>	STANDARD DETAIL <b>3-HC.3</b>

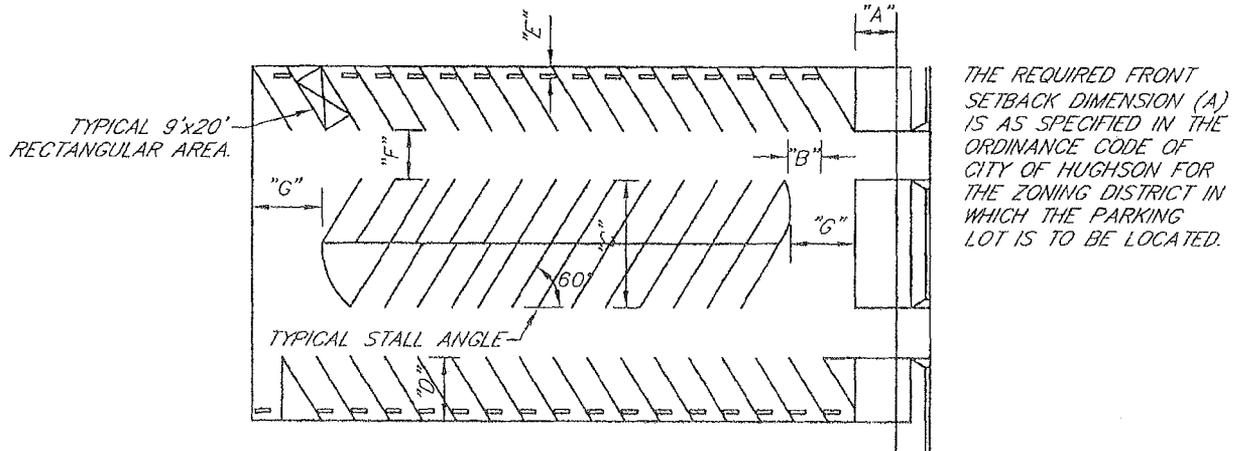
## OFF STREET PARKING STANDARDS

**SIZE AND ACCESS:**

EACH OFF-STREET PARKING SPACE SHALL CONTAIN AT LEAST A RECTANGULAR AREA OF A MINIMUM WIDTH OF NINE (9) FEET AND A MINIMUM LENGTH OF EIGHTEEN (18') FEET. IF DESIRED, ONE OF EACH FIVE REQUIRED PARKING STALLS MAY BE SO SIZED AND POSTED TO BE USED FOR PARKING SMALL CARS. SMALL CAR STALLS SHALL CONTAIN A RECTANGULAR AREA A MINIMUM OF SEVEN AND ONE HALF (7.5) FEET IN WIDTH AND A MINIMUM OF FIFTEEN (15) FEET IN LENGTH. SEE NO. P-4 FOR HANDICAPPED PARKING REQUIREMENTS. ANY DRIVEWAY USED FOR BOTH INGRESS AND EGRESS TO AND FROM A PARKING LOT AND NOT DIRECTLY SERVING PARKING STALLS SHALL HAVE A MINIMUM WIDTH OF 20 FEET. ANY DRIVEWAY USED ONLY FOR EITHER INGRESS OR EGRESS TO OR FROM A PARKING LOT AND NOT DIRECTLY SERVING PARKING STALLS SHALL BE A MINIMUM OF 10 FEET IN WIDTH. ALL DRIVEWAYS CONNECTING PUBLIC RIGHTS-OF-WAY TO OFF-STREET PARKING LOTS SHALL COMPLY WITH CITY OF HUGHSON DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATION.

THE FOLLOWING TYPICAL PARKING LOT DIAGRAM, PARKING STALL AND DRIVEWAY DIMENSION TABLE SHALL DETERMINE THE MINIMUM REQUIREMENTS FOR A PARKING LOT PLAN.

### TYPICAL PARKING LOT DIAGRAM



### PARKING STALL AND DRIVEWAY DIMENSION

		45°	50°	55°	60°	65°	70°	75°	80°	85°	90°
STALL WIDTH	B	12.7'	11.8'	11.0'	10.4'	9.9'	9.6'	9.3'	9.1'	9.0'	9.0'
STALL DEPTH	D	20.5'	21.1'	21.6'	21.8'	21.9'	21.9'	21.7'	21.3'	20.7'	20.0'
STALL DEPTH	C	34.7'	36.4'	40.1'	40.7'	41.0'	40.7'	41.0'	41.0'	40.7'	40.0'
DRIVEWAY WIDTH	F	13.0'	15.0'	17.0'	19.0'	21.0'	23.0'	25.0'	27.0'	29.0'	31.0'

FOR ANY GIVEN PARKING ANGLE BETWEEN 45° AND 90° NOT SPECIFICALLY LISTED IN THE ABOVE TABLE, USE A TABLE ANGLE NEAREST THE GIVEN ANGLE.

THE MINIMUM DRIVEWAY WIDTH (F) AT ANY PARKING STALL ANGLE LESS THAN 45°; INCLUDING PARALLEL STALLS, IS 13 FEET.

THE TURNAROUND OR END DRIVEWAY WIDTH (G) SHALL BE A MINIMUM OF 18 FEET. THE WHEELSTOP SET BACK DIMENSION (E) SHALL BE A MINIMUM OF 2 FEET FOR ANY PARKING PLAN.



### PARKING STANDARDS

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*

DATE APPROVED: 1/1/04

CITY OF HUGHSON

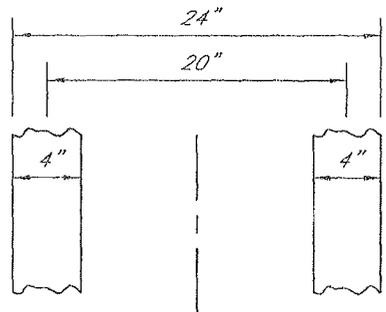
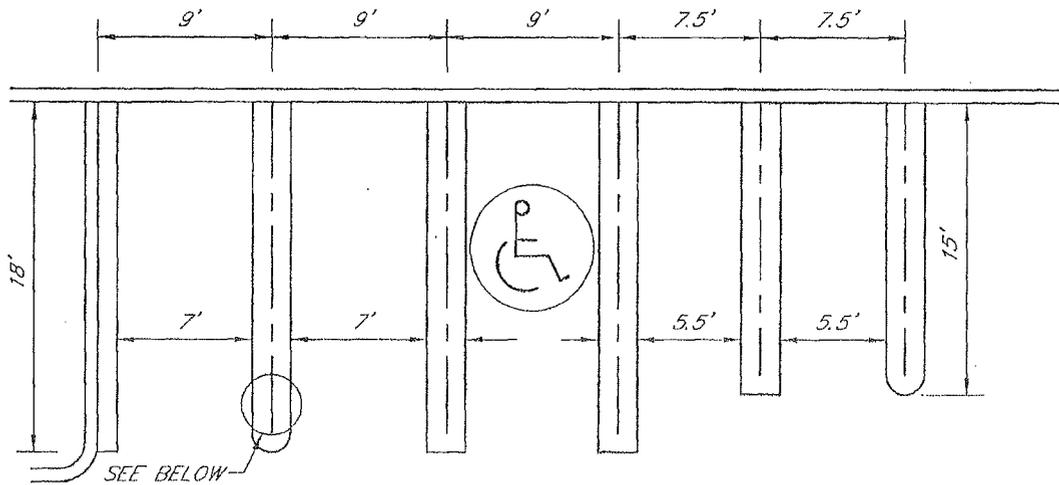
STANDARD DETAIL

3-P.1

PLANS: THE PLAN OF THE PROPOSED PARKING AREA SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT AT THE TIME OF THE APPLICATION FOR THE BUILDING PERMIT FOR THE BUILDING TO WHICH THE PARKING AREA IS ACCESSORY. THE PLANS SHALL CLEARLY INDICATE THE PROPOSED DEVELOPMENT, INCLUDING LOCATION, SIZE, SHAPE, DESIGN, CURB CUTS, LIGHTING, LANDSCAPING AND OTHER FEATURES AND APPURTENANCES OF THE PROPOSED PARKING AREA. SEE 3-HC.3 AND 3-HC.4 FOR HANDICAPPED PARKING REQUIREMENTS.

SURFACE OF PARKING AREA: PARKING AREAS SHALL BE PAVED WITH A MINIMUM OF TWO (2) INCHES OF ASPHALT SURFACING AND SHALL BE SO GRADED AND DESIGNED AS TO DISPOSE OF ALL SURFACE WATER IN ACCORDANCE WITH REQUIREMENTS OF THE CITY.

STRIPING OF PARKING AREA: PARKING AREAS SHALL BE MARKED BY EITHER STRIPING OR BUTTONS TO DELINEATE APPROVED STALLS AS SHOWN ON THE PLANS. SEE DIAGRAM BELOW.



STRIPING DETAIL

STRIPING SPECIFICATIONS:  
 STALLS SHALL BE DOUBLE STRIPED AS SHOWN IN THE DIAGRAM. PAINTED LINE WIDTH SHALL BE 4". IF BUTTONS ARE USED THEY SHALL BE 3-1/2 TO 4" IN DIAMETER, SPACED NO MORE THAN 3' ON CENTER. THE LINES SHALL BE LAID OUT AS PER DIAGRAM. EITHER SEMICIRCULAR CAP OR A STRAIGHT CAP MAY BE USED.

PAINT SPECIFICATIONS:  
 PAVEMENT MARKING PAINT SHALL BE READY-MIXED WITH PIGMENTS FULLY GROUND, MAINTAINING A SOFT PASTE CONSISTENCY. USE:

GLIDDEN: ULTRA HIDE WATERBASED TRAFFIC PAINT, MDF 7 MILS

SHERWIN WILLIAMS: SETFAST VINYL ACRYLIC WATERBORNTRAFFIC MARKING PAINT, MDF 7 MILS,

OR APPROVED EQUAL.



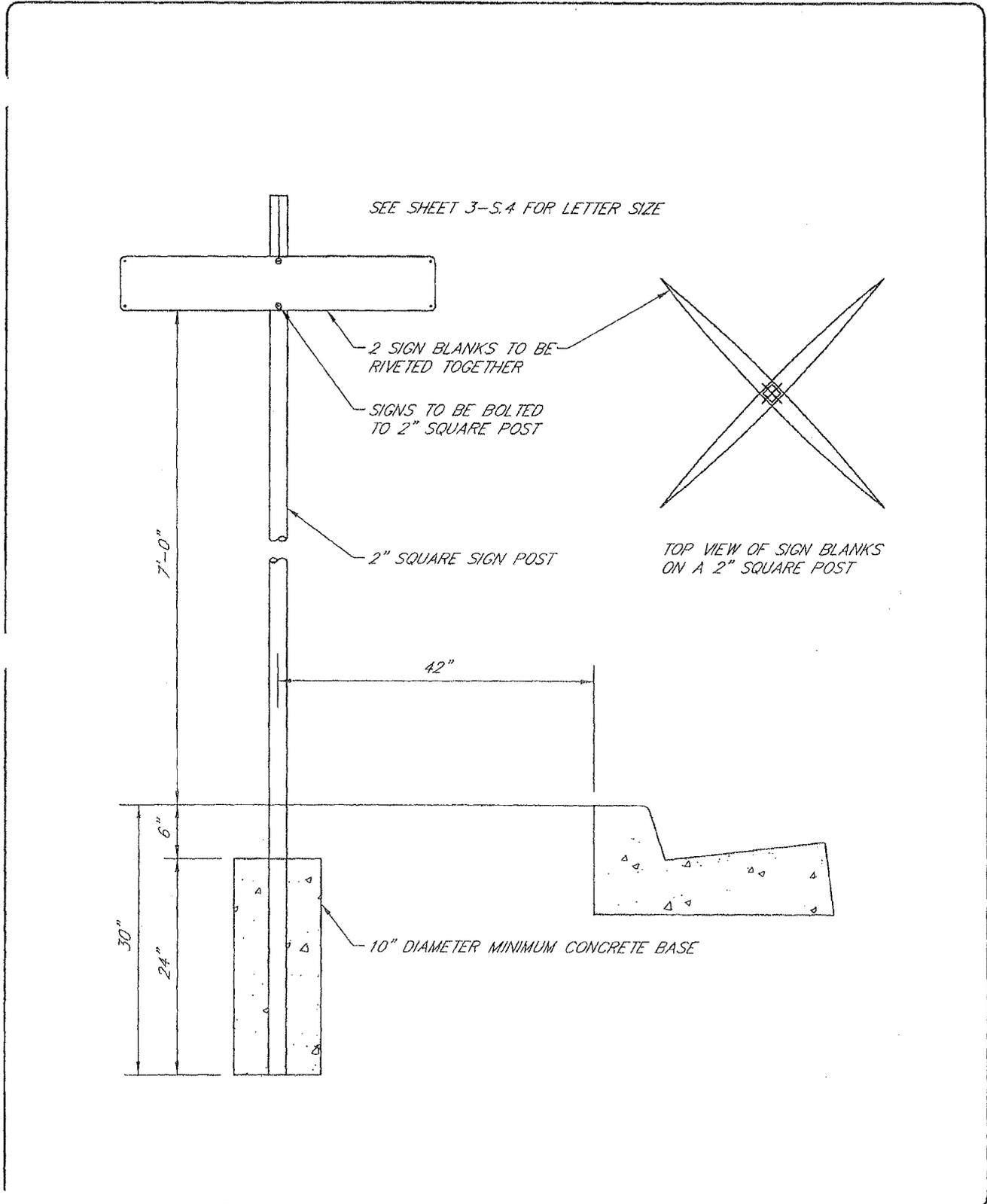
PARKING STANDARDS  
 STRIPING DETAIL

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 8/13/07

CITY OF HUGHSON

STANDARD DETAIL  
 3-P.2



**STREET SIGN STANDARDS**

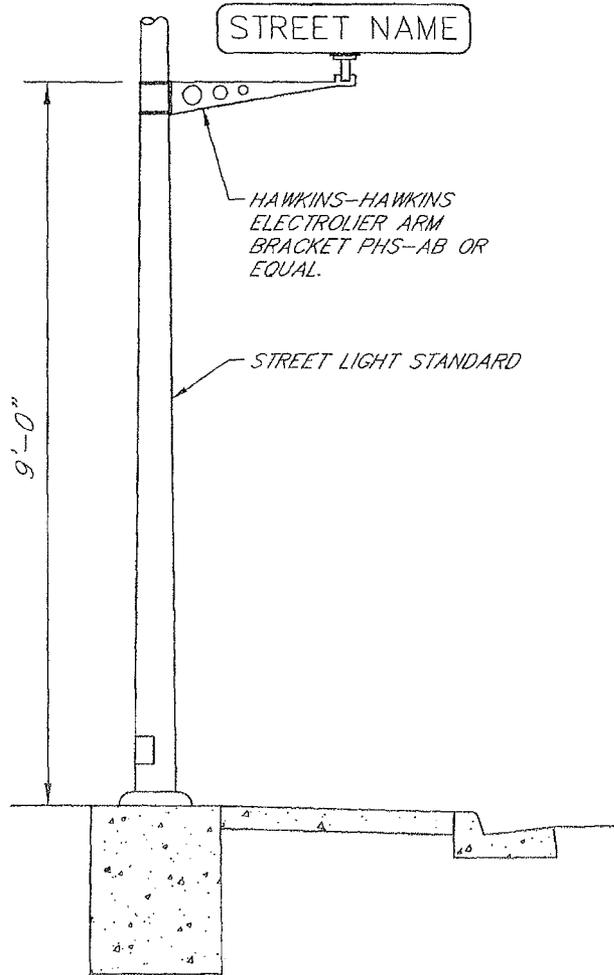
DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

**CITY OF HUGHSON**

STANDARD DETAIL

**3-S.1**



HAWKINS-HAWKINS PARTS LIST: THE FOLLOWING LIST IS OF THE ITEMS NEEDED FOR EACH UNIT. THE DESCRIPTION AND PART NUMBER ARE FROM HAWKINS-HAWKINS CO. BERKELEY, CALIFORNIA, OR APPROVED EQUAL.

PART NO.	QUANTITY	DESCRIPTION
V-14-PHS	1 EA.	ELECTROLIER ARM BRACKET
M2-202	2 EA.	ELECTROLIER SIGN MOUNTING SET
V14-PHS-1024P	1 EA.	1/2" CENTER ROD 4 PLATE 13 1/2" ALUMINUM
V14-PHS-103	2 EA.	6" FEMALE SEPARATOR ALUMINUM .080"
V14-PHS-105	2 EA.	6" MALE SEPARATOR ALUMINUM .080"
V14-PHS-101	1 EA.	ZINC 1/2" THEFT-PROOF CAP NUT



**ELECTROLIER  
S.N.S. ARM BRACKET**

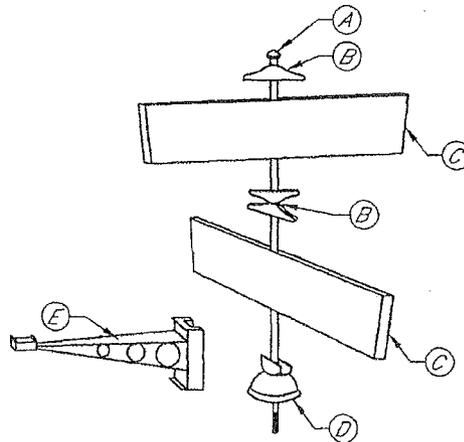
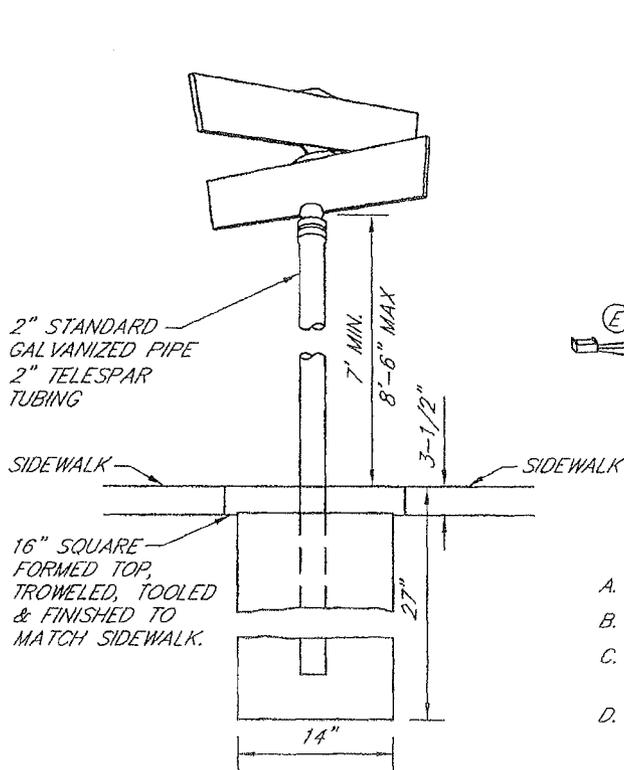
DRAWN BY: A.D.R.  
CHECKED BY: R.H.H.  
SCALE: NONE  
DATE: 1/04

APPROVED BY: *[Signature]*  
DATE APPROVED: 8/13/07

CITY OF HUGHSON

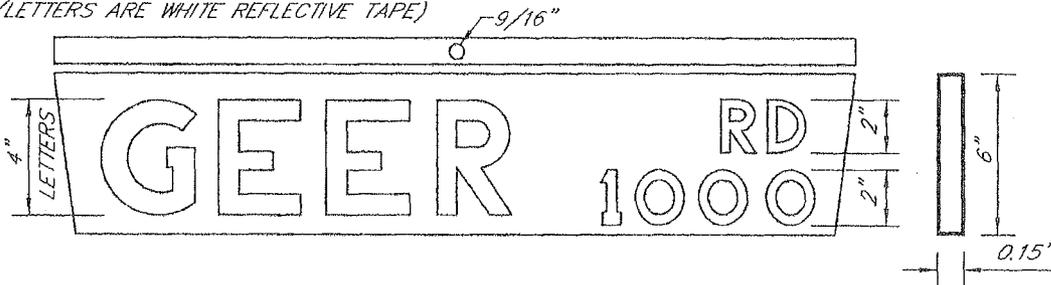
STANDARD DETAIL

3-S.2



- A. 1/2"x15" CADMIUM PLATED CARRIAGE BOLT.
- B. 14 GAUGE TOP & CROSS SADDLE OF
- C. SIGN PLATES (ANODIZE ALUMINUM EXTRUSION OF 6063 T-4 ALLOY MATERIAL.
- D. CAST ANODIZED ALUMINUM POST CAP W/ THREE 3/8" ALLEN HEAD STAINLESS STEEL SET SCREWS.
- E. ARM BRACKET FOR ELECTROLIER ATTACHED W/ TWO 3/4" STRAPS.

WHITE LETTERS ON BLUE BACKGROUND  
(LETTERS ARE WHITE REFLECTIVE TAPE)



NOTES:

- A. WHEN STREET SIGN IS LOCATED IN PLANTER AREA, TOP OF FOUNDATION SHALL BE 4" BELOW FINISH GRADE.
- B. STOP SIGN SHALL BE STANDARD SIZE AND COLOR. R-1, 24" MINIMUM.



STREET SIGN STANDARDS

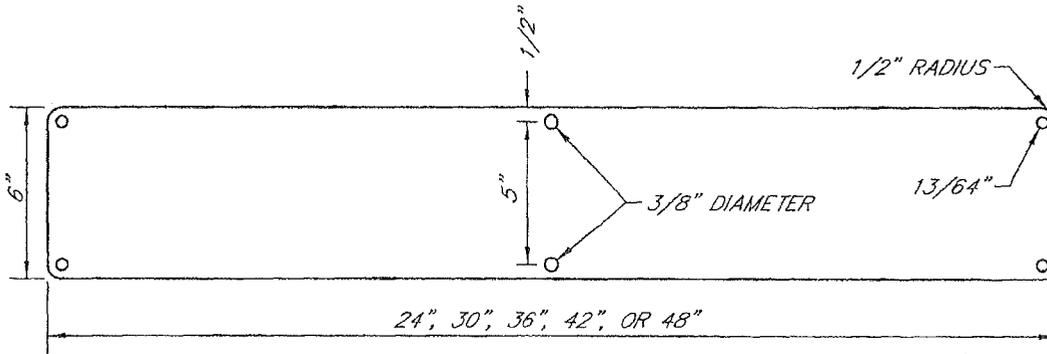
DRAWN BY: A.D.R.  
CHECKED BY: R.H.H.  
SCALE: NONE  
DATE: 1/04

APPROVED BY: *[Signature]*  
DATE APPROVED: 5/11/04

CITY OF HUGHSON

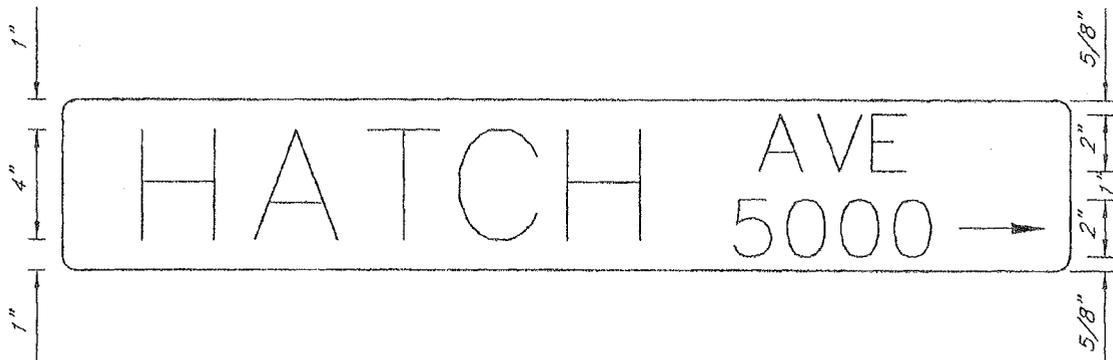
STANDARD DETAIL

3-S.3



1. ALL BLANKS TO BE .063 GAUGE ALUMINUM ALLOY (6061-TB OR 5155-H380), DEGREASED, AND TREATED WITH ALODINE 1200.
2. THE SIGN BLANKS SHALL CONFORM TO THE STANDARD B.P.R. SHAPES AND CORNER RADII, EXCEPT THAT HOLE PUNCHING, OR DRILLING, SHALL CONFORM TO THE HOLE SIZES AND LOCATIONS SHOWN HEREON. EACH CORNER SHALL HAVE A 13/64" DIAMETER HOLE.
3. ALL BLANKS SHALL BE 6" HIGH BY 24", 30", 36", 42", OR 48" WIDE. THE 3/8" HOLES SHALL BE CENTERED ON THE VERTICAL CENTERLINE OF EACH BLANK.

*ALUMINUM SIGN BLANK*



1. EACH SIGN FACE SHALL HAVE SUFFICIENT SPACING PROVIDED TO PERMIT APPLICATION OF A 4 DIGIT NUMBER AND ARROW.
2. NUMERICAL STREET NAMES SHALL BE SPELLED OUT INSTEAD OF USING THE NUMERAL LETTER TYPE ABBREVIATED LEGENDS.
3. ALL SIGN FACES TO BE "SCOTCHLITE" BRAND REFLECTIVE SHEETING--ENGINEER GRADE OR OF EQUAL QUALITY OR BETTER, WITH REFLECTIVE SILVER COPY ON REFLECTIVE GREEN BACKGROUND.

*NAME FACE*



*STREET SIGN STANDARDS*

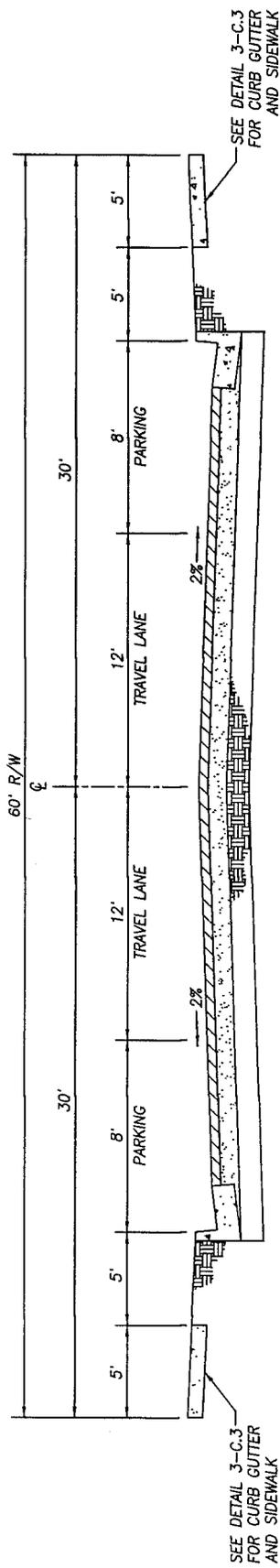
DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

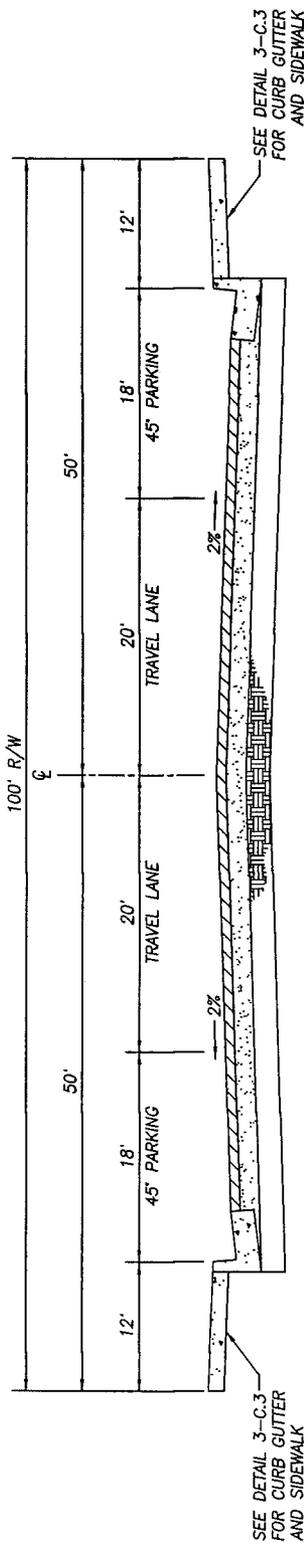
*CITY OF HUGHSON*

STANDARD DETAIL

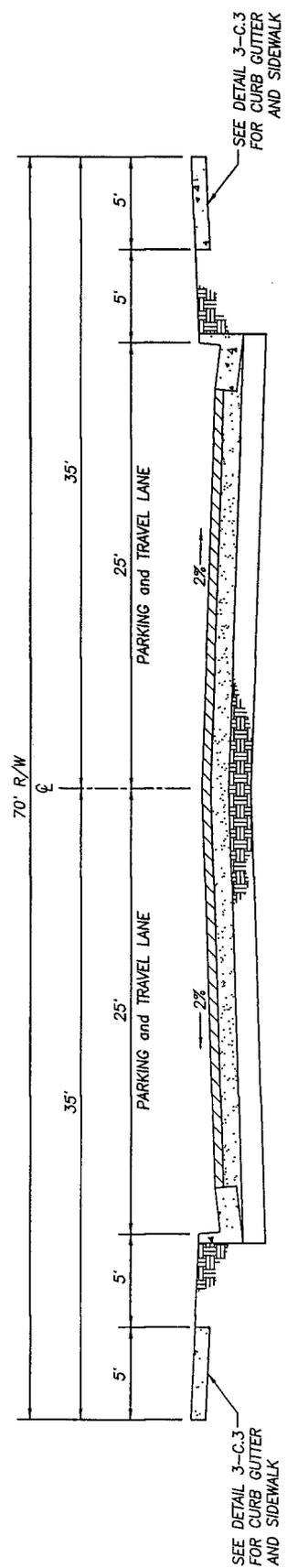
3-S.4



MINOR COLLECTOR STREET



DOWNTOWN COLLECTOR



INDUSTRIAL STREET



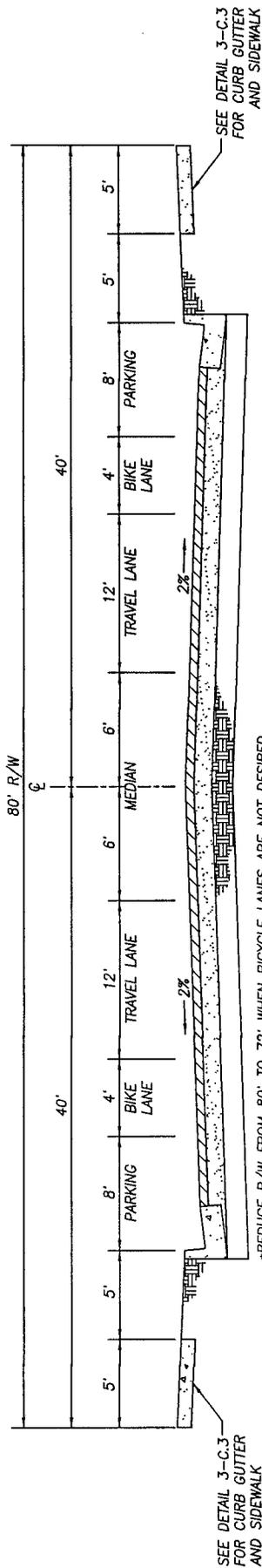
TYPICAL STREET SECTIONS  
COLLECTOR - MINOR, DOWNTOWN, & INDUSTRIAL

DRAWN BY: C.V.  
CHECKED BY: P.K.  
SCALE: NONE  
DATE: 7/07

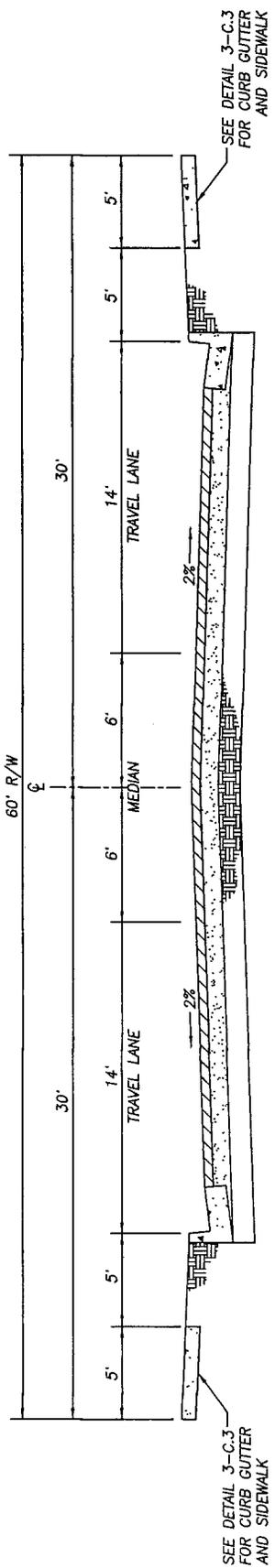
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DATE APPROVED: 8/13/07

CITY OF HUGHSON

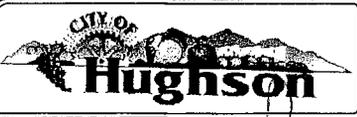
STANDARD DETAIL  
3-ST.1.1



MAJOR COLLECTOR STREET



CONSTRAINED MAJOR COLLECTOR  
(ON-STREET PARKING NOT PERMITTED)



TYPICAL STREET SECTIONS  
COLLECTOR - MAJOR & CONSTRAINED MAJOR

DRAWN BY: C.V.  
CHECKED BY: P.K.  
SCALE: NONE  
DATE: 7/07

APPROVED BY: \_\_\_\_\_  
DATE APPROVED: 8/13/87

CITY OF HUGHSON

STANDARD DETAIL  
3-ST.1.2

APPROVED BY:  
DATE APPROVED:

3/15/67

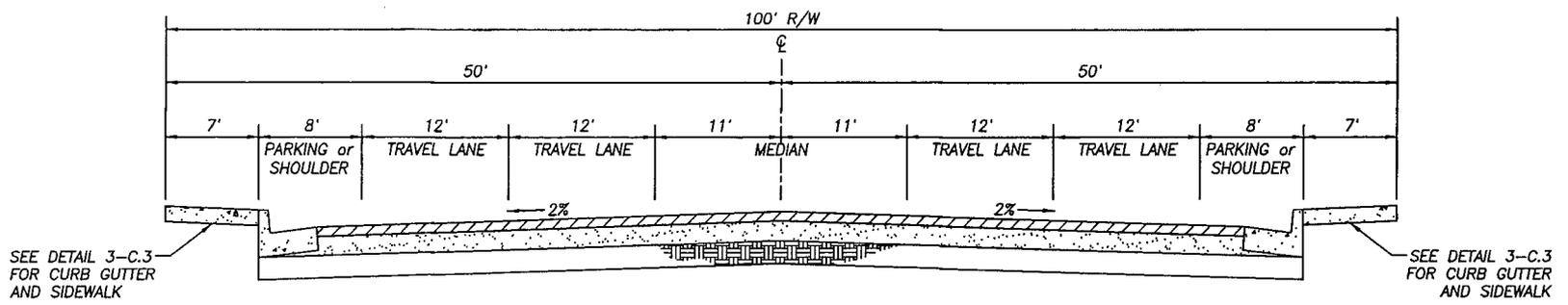


TYPICAL STREET SECTIONS  
EXPRESSWAY - FOUR LANE

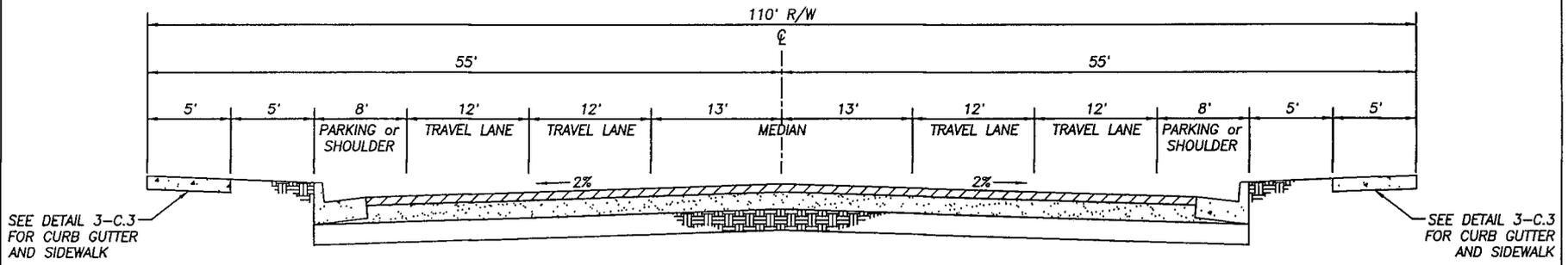
CITY OF HUGHSON

3-ST.2.1

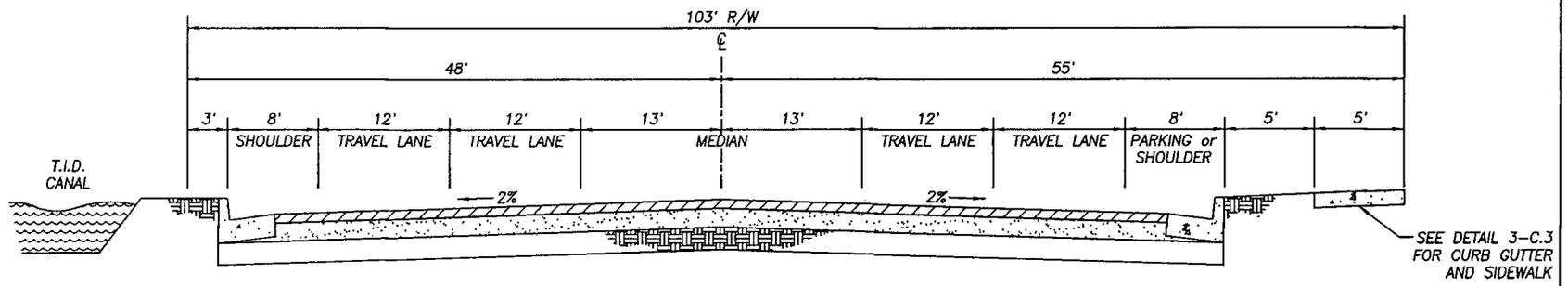
DRAWN BY: C.V.  
CHECKED BY: P.K.  
SCALE: NONE  
DATE: 7/07



FOUR LANE EXPRESSWAY WITH LIMITED 100 FOOT ROW



FOUR LANE EXPRESSWAY WITH 110 FOOT ROW



HATCH ROAD FOUR LANE EXPRESSWAY

APPROVED BY:  
DATE APPROVED:

8/13/07



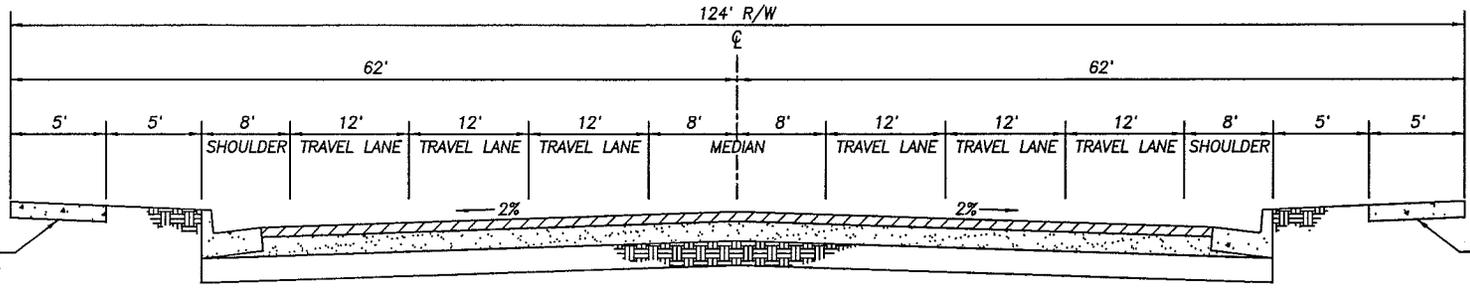
TYPICAL STREET SECTIONS  
EXPRESSWAY - SIX LANE

CITY OF HUGHSON

3-ST.2.2

STANDARD DETAIL

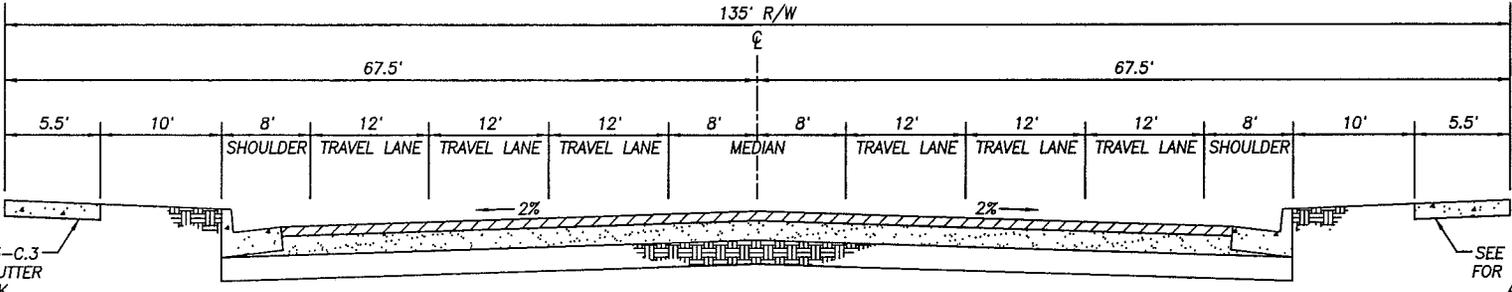
DRAWN BY: C.V.  
CHECKED BY: P.K.  
SCALE: NONE  
DATE: 7/07



SEE DETAIL 3-C.3 FOR CURB GUTTER AND SIDEWALK

SEE DETAIL 3-C.3 FOR CURB GUTTER AND SIDEWALK

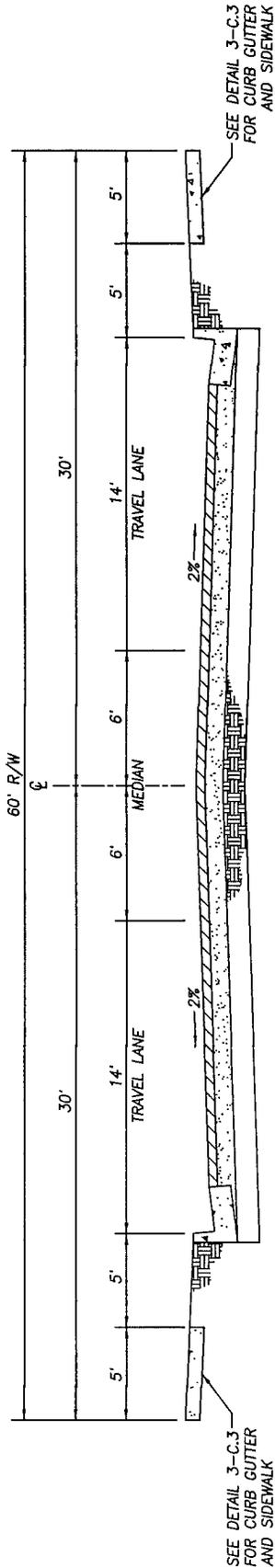
SIX LANE EXPRESSWAY WITH LIMITED 124 FOOT ROW



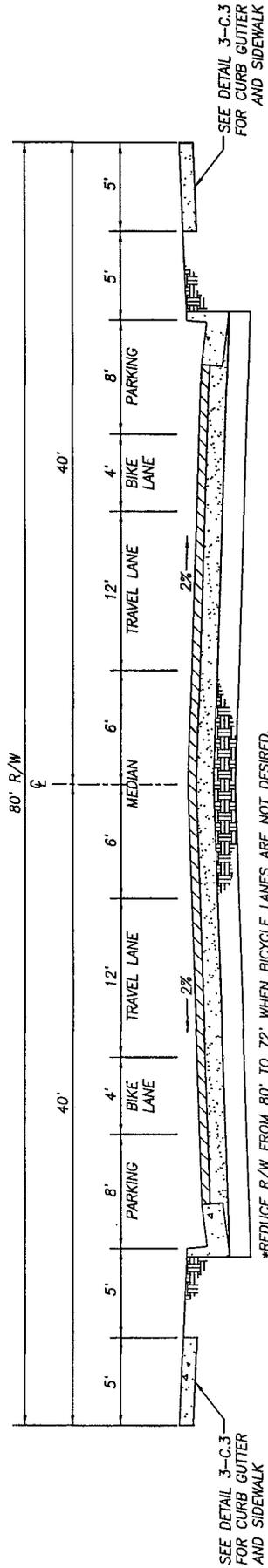
SEE DETAIL 3-C.3 FOR CURB GUTTER AND SIDEWALK

SEE DETAIL 3-C.3 FOR CURB GUTTER AND SIDEWALK

SIX LANE EXPRESSWAY WITH 135 FOOT ROW



TWO LANE ARTERIAL WITH NO PARKING  
(LIMITED RIGHT-OF-WAY)



TWO LANE ARTERIAL WITH PARKING



TYPICAL STREET SECTIONS  
ARTERIAL - TWO LANE NO PARKING & PARKING

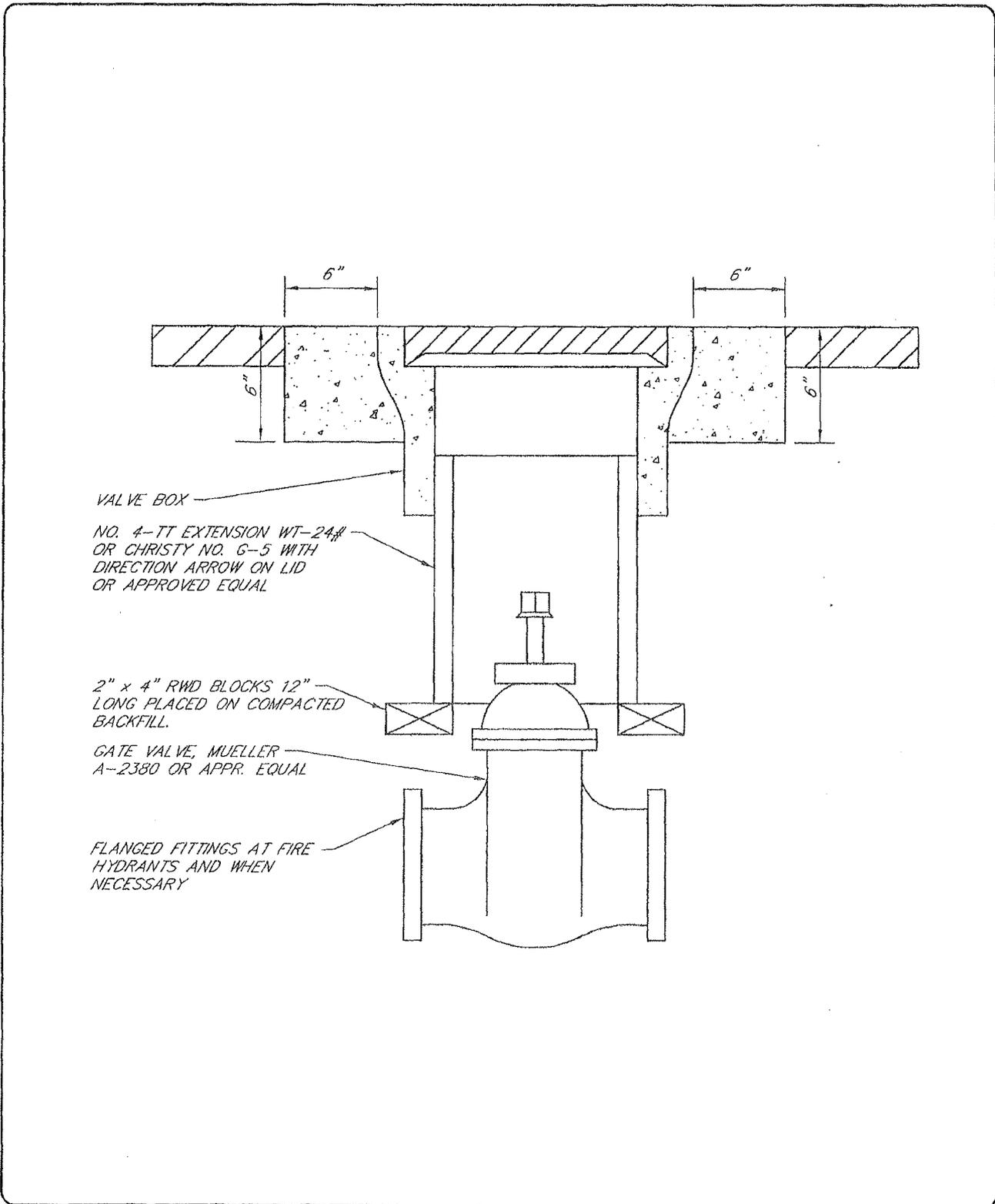
DRAWN BY: C.V.  
CHECKED BY: P.K.  
SCALE: NONE  
DATE: 7/07

APPROVED BY: *[Signature]*  
DATE APPROVED: 8/13/17

CITY OF HUGHSON

STANDARD DETAIL

3-ST.3.1



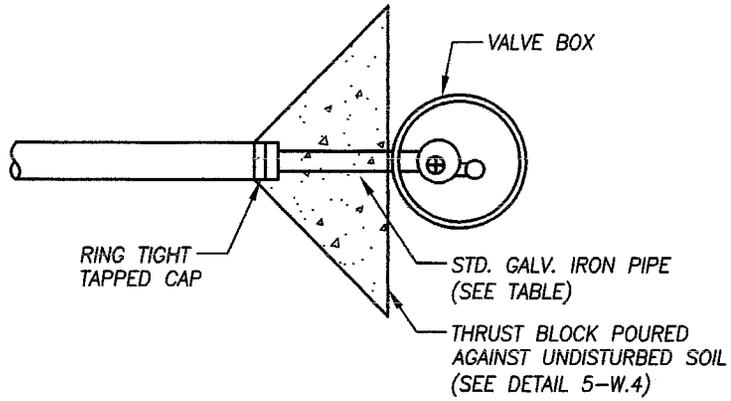
VALVE BOX  
 NO. 4-TT EXTENSION WT-24#  
 OR CHRISTY NO. 6-5 WITH  
 DIRECTION ARROW ON LID  
 OR APPROVED EQUAL

2" x 4" RWD BLOCKS 12"  
 LONG PLACED ON COMPACTED  
 BACKFILL.

GATE VALVE, MUELLER  
 A-2380 OR APPR. EQUAL

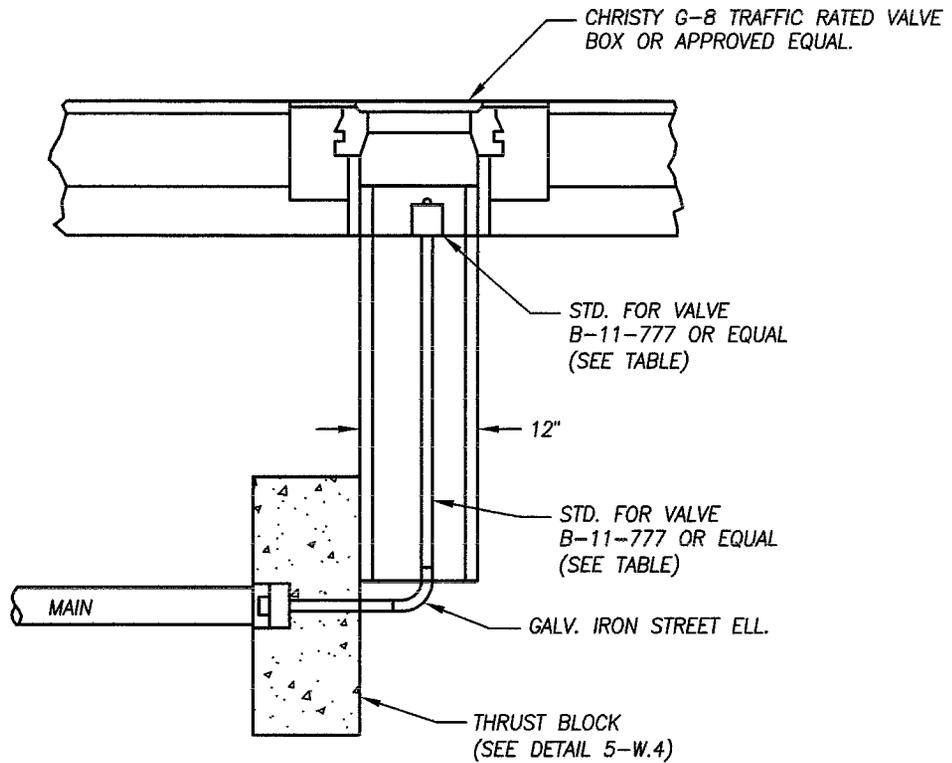
FLANGED FITTINGS AT FIRE  
 HYDRANTS AND WHEN  
 NECESSARY

	<b>WATERLINE GATE          VALVE ASSEMBLY</b>	DRAWN BY: A.D.R. CHECKED BY: R.H.H. SCALE: NONE DATE: 1/04
APPROVED BY: DATE APPROVED: 5/1/04	<b>CITY OF HUGHSON</b>	STANDARD DETAIL <b>5-W.1</b>



BLOW-OFF SIZE TABLE

PIPE DIAMETER @ MAIN	BLOW-OFF & VALVE DIAMETER
8-12 INCHES	2 INCHES
12-16 INCHES	4 INCHES
20-24 INCHES	6 INCHES
GREATER THAN 24 INCHES	8 INCHES



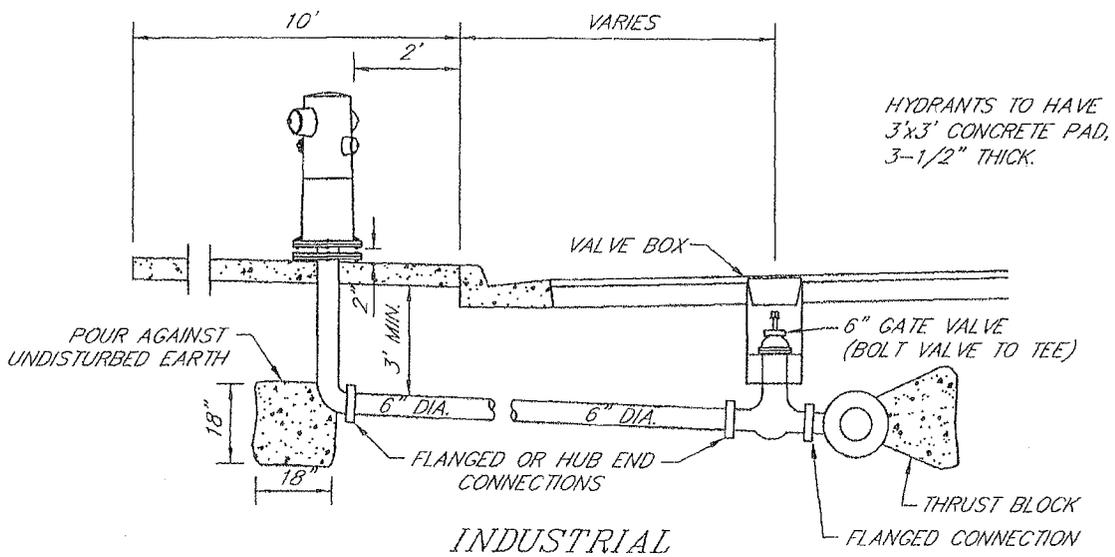
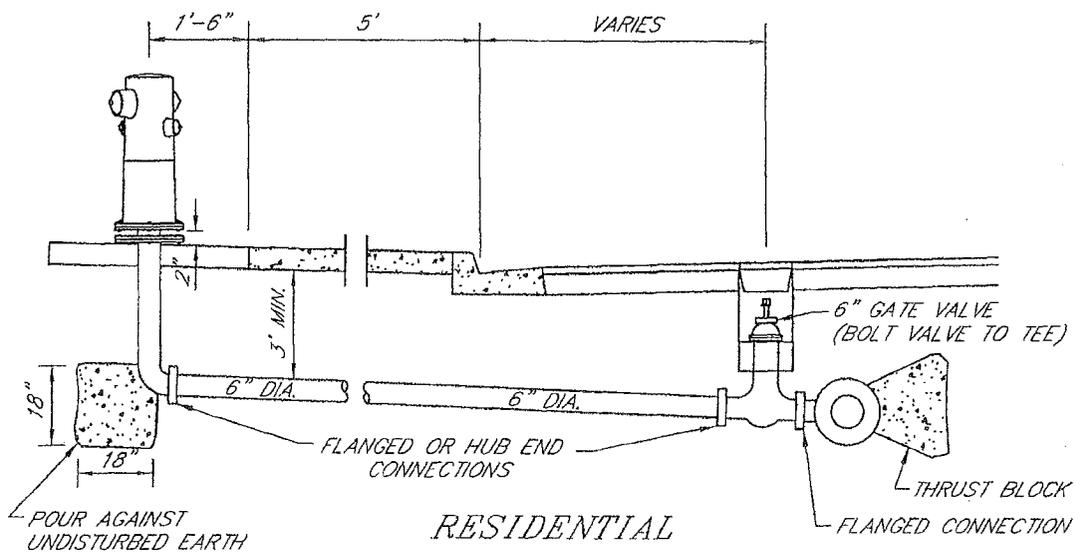
**WATERLINE BLOWOFF ASSEMBLY**

DRAWN BY: C.V.  
 CHECKED BY: P.K.  
 SCALE: NONE  
 DATE: 7/07

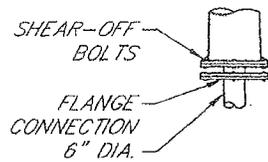
APPROVED BY: *[Signature]*  
 DATE APPROVED: 8/13/07

**CITY OF HUGHSON**

STANDARD DETAIL  
**5-W.2**



NOTES:  
 FIRE HYDRANTS SHALL BE RICH "RANGER SERIES" #945,  
 #950, #960 OR APPROVED EQUAL  
 FOR GATE VALVE & VALVE BOX SEE DETAIL SHEET 5-W.1



F.H. BASE DETAIL



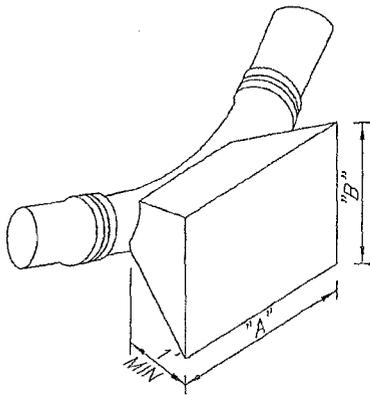
**FIRE HYDRANT ASSEMBLY**

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

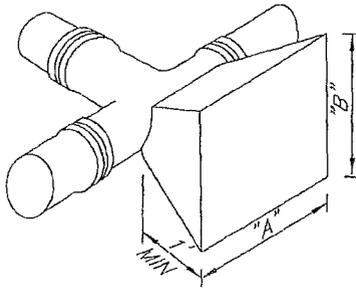
APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

**CITY OF HUGHSON**

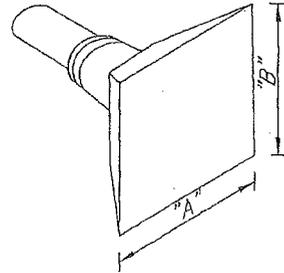
STANDARD DETAIL  
**5-W.3**



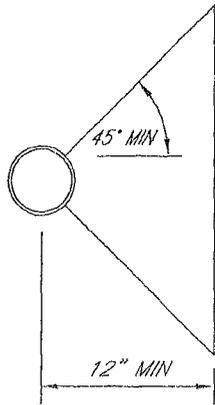
TYPICAL THRUST BLOCK  
(CAST IRON BEND)



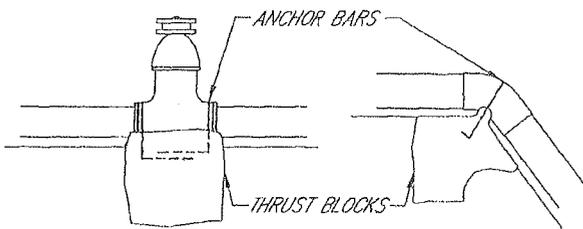
TYPICAL THRUST BLOCK  
(TEE OUTLET)



TYPICAL THRUST BLOCK  
(DEAD END)



TYPICAL SECTION THRU  
THRUST BLOCK



WHEN REQUIRED BY  
THE CITY ENGINEER

NOTE: ALL THRUST BLOCKS  
SHALL BE POURED AGAINST  
UNDISTURBED SOIL.

THRUST BLOCK AREA REQUIRED		
FITTINGS	ALLOWABLE SOIL BEARING VALUE	
	1,000 LBS. PER SQ. FT.	
6" LINE	"A"	"B"
22 1/2°	1'-6"	1'-6"
45°	2'-0"	2'-0"
90°	3'-0"	2'-6"
TEE OUTLET	3'-0"	2'-0"
DEAD END	3'-0"	2'-0"
8" LINE		
22 1/2°	2'-0"	2'-0"
45°	3'-0"	2'-6"
90°	4'-0"	3'-6"
TEE OUTLET	3'-6"	3'-0"
DEAD END	3'-6"	3'-0"
10" LINE		
22 1/2°	3'-0"	2'-0"
45°	4'-0"	3'-0"
90°	5'-6"	4'-0"
TEE OUTLET	4'-0"	4'-0"
DEAD END	4'-0"	4'-0"
12" LINE		
22 1/2°	3'-0"	3'-0"
45°	4'-6"	4'-0"
90°	8'-0"	4'-0"
TEE OUTLET	5'-6"	4'-0"



THRUST BLOCK DETAILS

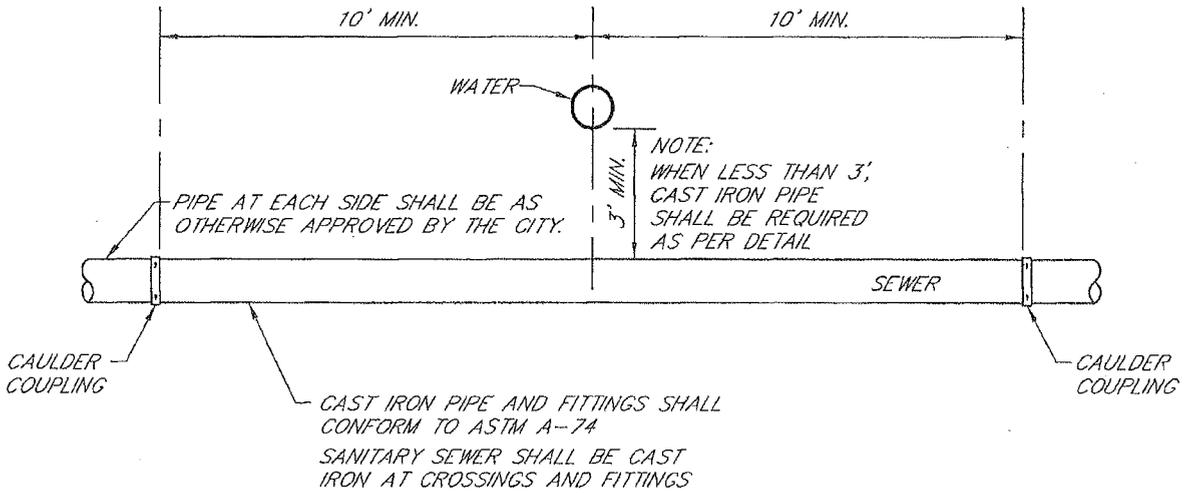
DRAWN BY: A.D.R.  
CHECKED BY: R.H.H.  
SCALE: NONE  
DATE: 1/04

APPROVED BY: *[Signature]*  
DATE APPROVED: 8/13/07

CITY OF HUGHSON

STANDARD DETAIL

5-W.4



- NOTES:
1. WATER MAINS AND SEWERS SHOULD BE SEPARATED AS FAR AS IS REASONABLE IN BOTH THE HORIZONTAL AND VERTICAL DIRECTIONS WITH SEWERS ALWAYS LOWER THAN WATER MAINS.
  2. THE HORIZONTAL DISTANCE BETWEEN PRESSURE WATER MAINS AND SEWER SHALL BE AT LEAST 10 FEET.
  3. ALL CONSTRUCTION SHALL MEET REQUIREMENTS SET FORTH BY THE STATE OF CALIFORNIA, DEPARTMENT OF HEALTH SERVICES.

**CITY OF Hughson**

APPROVED BY: *[Signature]*

DATE APPROVED: *8/13/07*

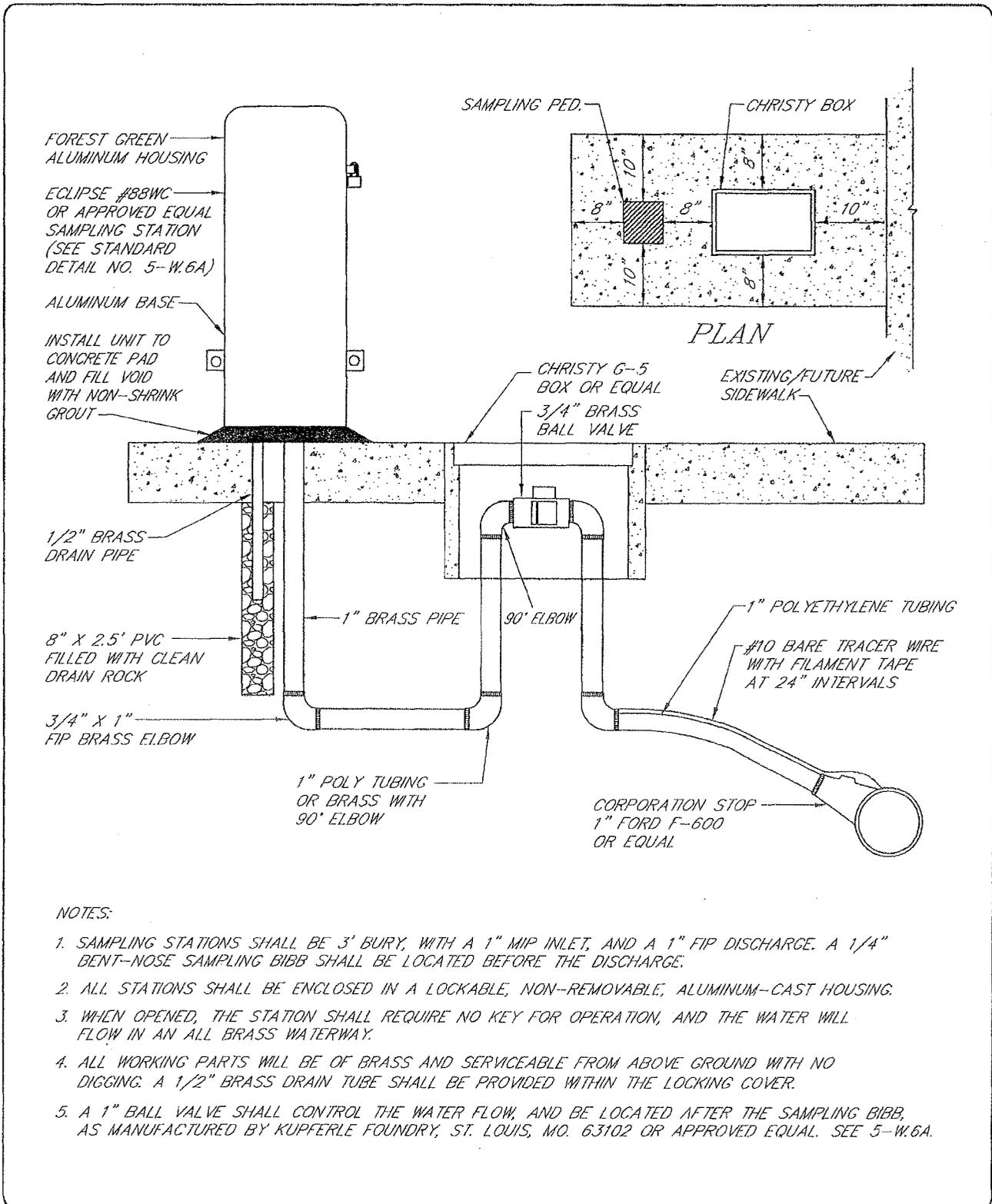
SEPARATION BETWEEN SEWER AND WATER MAINS

CITY OF HUGHSON

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

STANDARD DETAIL

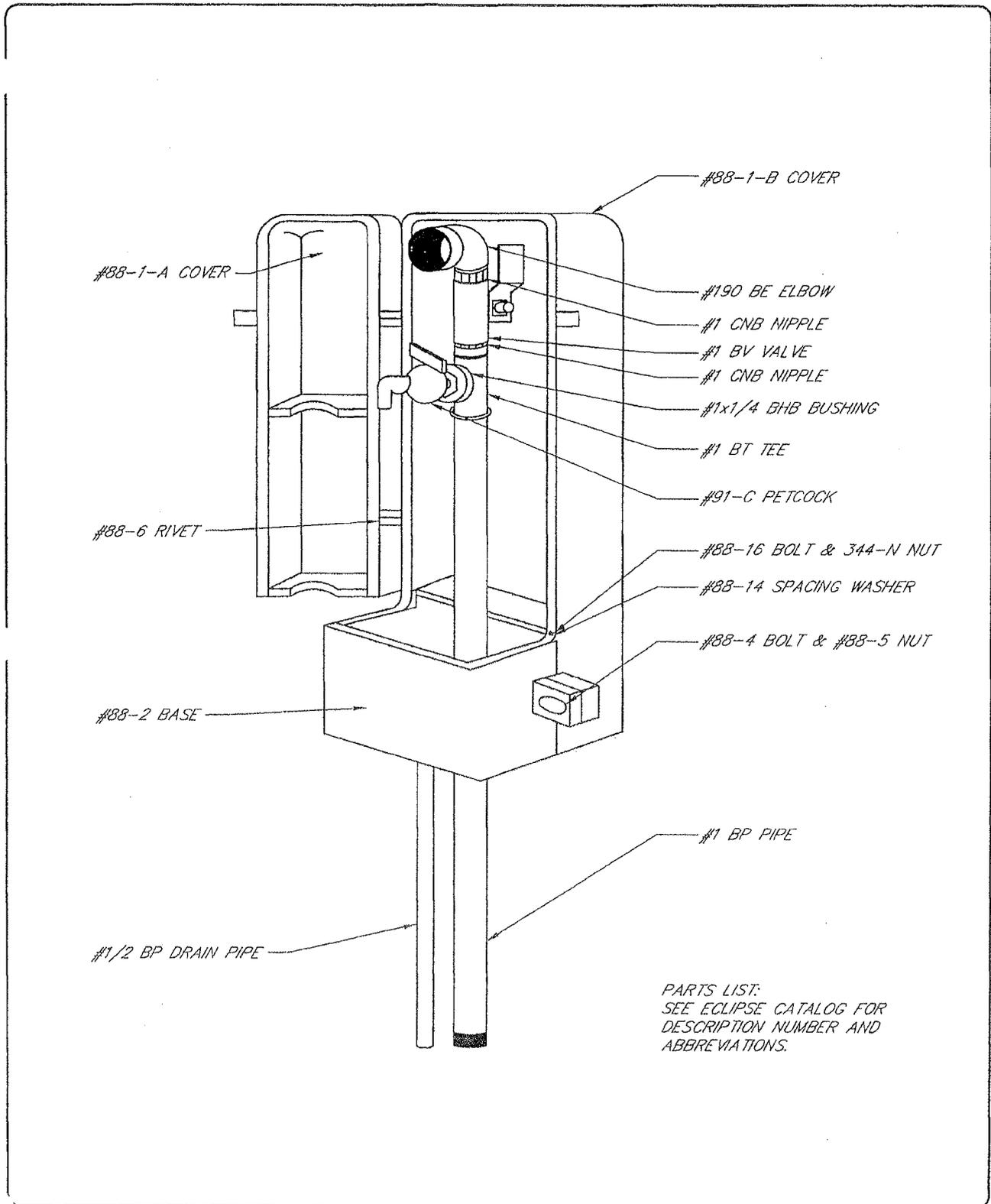
5-W.5



**NOTES:**

1. SAMPLING STATIONS SHALL BE 3' BURY, WITH A 1" MIP INLET, AND A 1" FIP DISCHARGE. A 1/4" BENT-NOSE SAMPLING BIBB SHALL BE LOCATED BEFORE THE DISCHARGE.
2. ALL STATIONS SHALL BE ENCLOSED IN A LOCKABLE, NON-REMOVABLE, ALUMINUM-CAST HOUSING.
3. WHEN OPENED, THE STATION SHALL REQUIRE NO KEY FOR OPERATION, AND THE WATER WILL FLOW IN AN ALL BRASS WATERWAY.
4. ALL WORKING PARTS WILL BE OF BRASS AND SERVICEABLE FROM ABOVE GROUND WITH NO DIGGING. A 1/2" BRASS DRAIN TUBE SHALL BE PROVIDED WITHIN THE LOCKING COVER.
5. A 1" BALL VALVE SHALL CONTROL THE WATER FLOW, AND BE LOCATED AFTER THE SAMPLING BIBB, AS MANUFACTURED BY KUPFERLE FOUNDRY, ST. LOUIS, MO. 63102 OR APPROVED EQUAL. SEE 5-W.6A.

	<h2 style="margin: 0;">BACTERIOLOGICAL SAMPLING STATION</h2>	DRAWN BY: A.D.R. CHECKED BY: R.H.H. SCALE: NONE DATE: 1/04
APPROVED BY: _____ DATE APPROVED: 8/13/01	CITY OF HUGHSON	STANDARD DETAIL 5-W.6



PARTS LIST:  
 SEE ECLIPSE CATALOG FOR  
 DESCRIPTION NUMBER AND  
 ABBREVIATIONS.



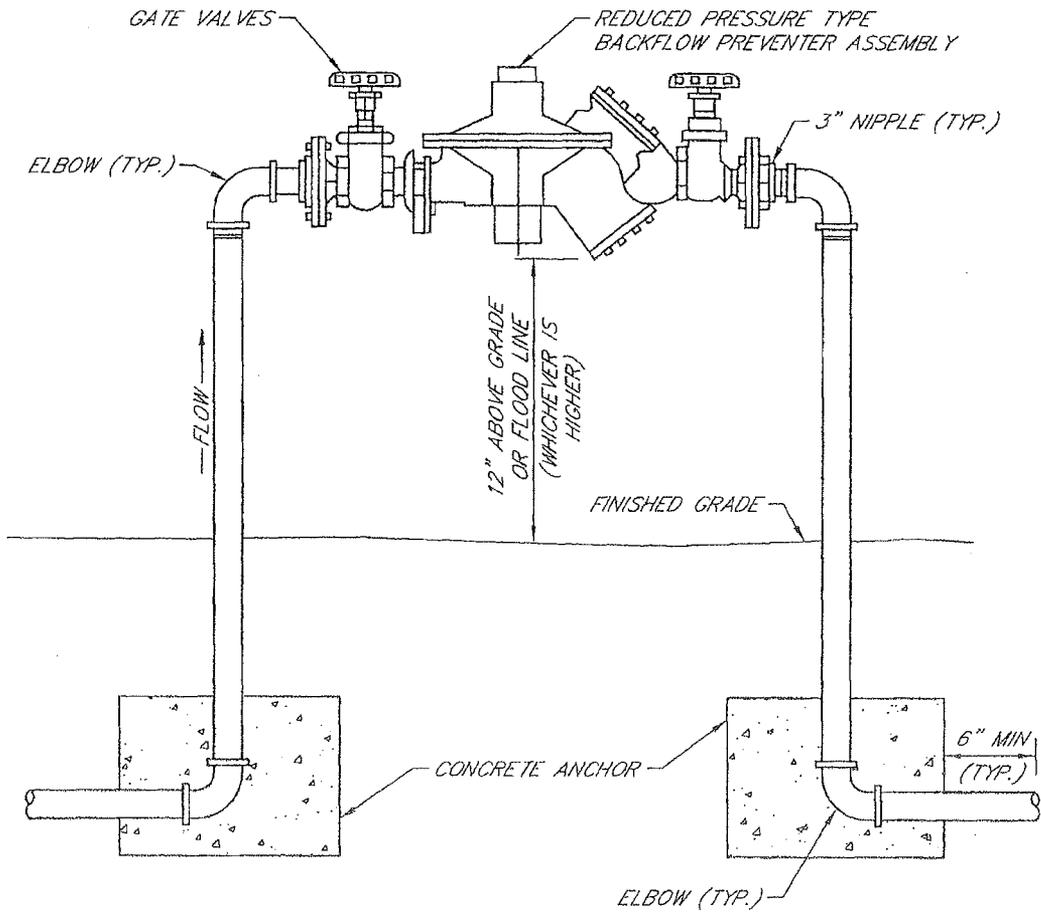
BACTERIOLOGICAL  
 SAMPLING STATION

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

CITY OF HUGHSON

STANDARD DETAIL  
 5-W.6A



1. ALL PIPE FITTINGS SHALL BE SCHEDULE 40, GALVANIZED STEEL UNLESS OTHERWISE SPECIFIED.
2. CONCRETE SHALL BE 420-C-2000.
3. THE BACKFLOW PREVENTER DEVICES AND INSTALLATIONS SHALL BE APPROVED BY A.W.W.A. AND THE CITY.
4. VALVE ASSEMBLIES MAY HAVE SCREWED OR FLANGED FITTINGS.
5. COAT ALL EXPOSED THREADS WITH AN APPROVED RUST INHIBITING SEALANT.
6. APPROVED PLASTIC TAPE 1/2" WIDE SHALL BE USED ON ALL THREADED CONNECTIONS.
7. DISSIMILAR METALS SHALL BE SEPARATED BY AN APPROVED DI-ELECTRIC COUPLING.
8. PLASTIC PIPE SHALL NOT BE USED ABOVE FINISHED GRADE.



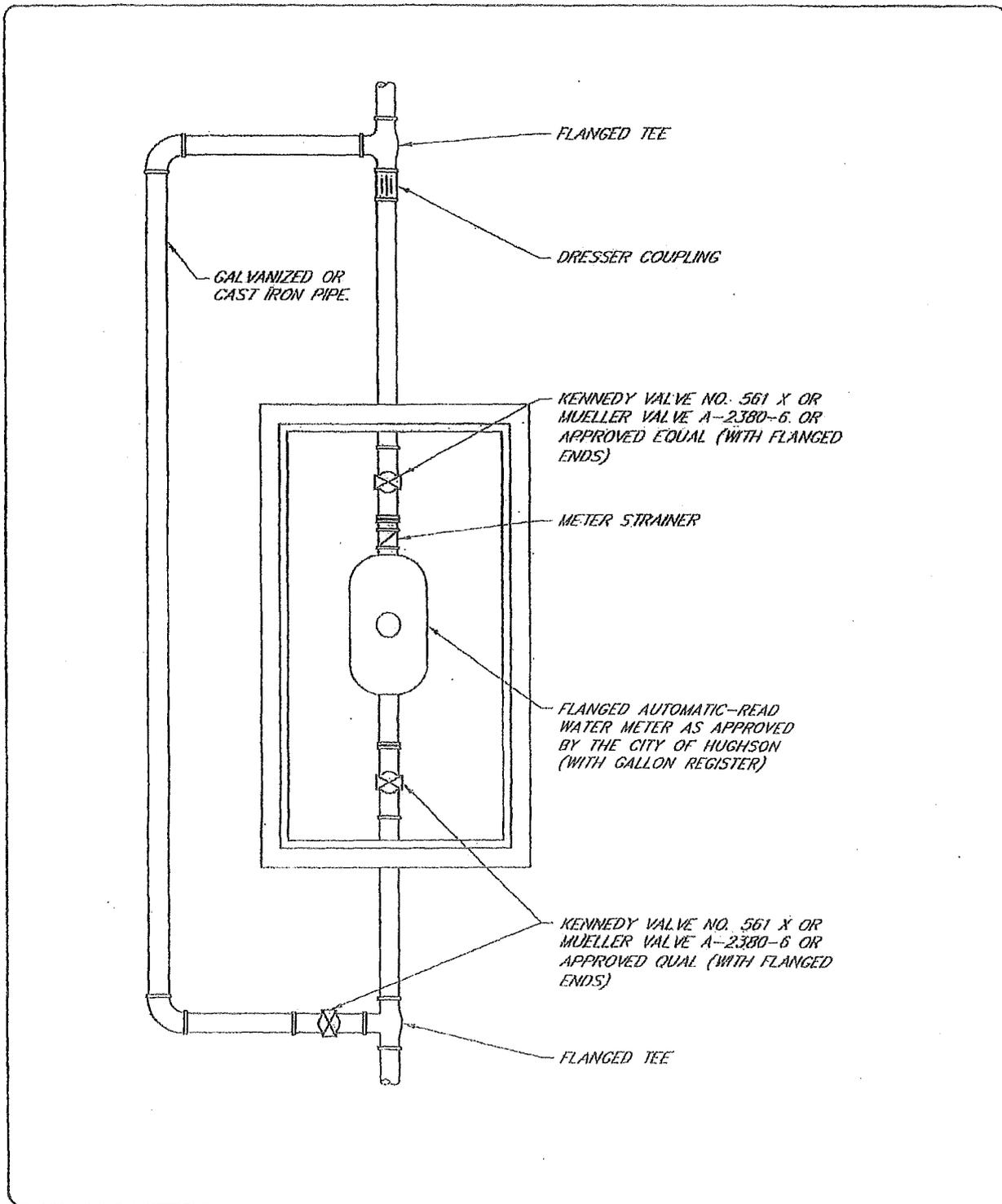
**BACKFLOW PREVENTER DEVICE**

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 15/1/04

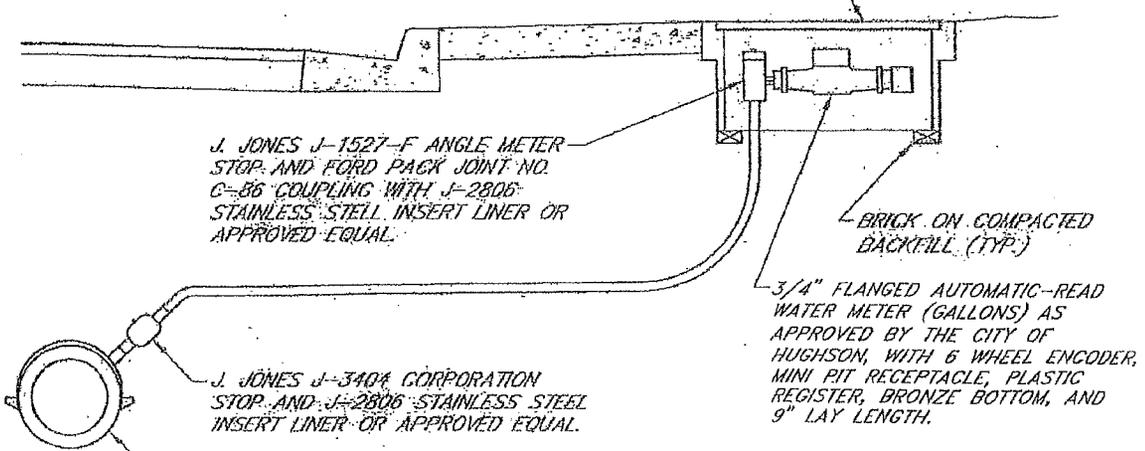
CITY OF HUGHSON

STANDARD DETAIL  
 5-W.7



	<b>WATER SERVICE LARGER THAN 2" DIAMETER</b>	DRAWN BY: A.D.R. CHECKED BY: R.H.H. SCALE: NONE DATE: 1/04
APPROVED BY: DATE APPROVED: 03/27/2006	<b>CITY OF HUGHSON</b>	STANDARD DETAIL <b>5-W.8</b>

METER BOX: CHRISTY B16 WITH B16-P LID OR BROOKS #37 WITH CONCRETE LID OR APPROVED EQUAL. (TRAFFIC LID REQUIRED IF LOCATED IN TRAVELED WAY)



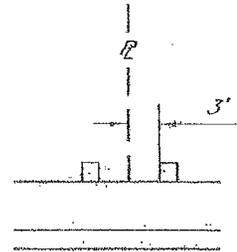
J. JONES J-1527-F ANGLE METER STOP AND FORD PACK JOINT NO. C-86 COUPLING WITH J-2806 STAINLESS STEEL INSERT LINER OR APPROVED EQUAL.

BRICK ON COMPACTED BACKFILL (TYP.)

3/4" FLANGED AUTOMATIC-READ WATER METER (GALLONS) AS APPROVED BY THE CITY OF HUGHSON, WITH 6 WHEEL ENCODER, MINI PIT RECEPTACLE, PLASTIC REGISTER, BRONZE BOTTOM, AND 9" LAY LENGTH.

J. JONES J-3404 CORPORATION STOP AND J-2806 STAINLESS STEEL INSERT LINER OR APPROVED EQUAL.

SERVICE CONNECTION TO WATER MAIN SHALL BE MADE WITH A SMITH BLAIR TYPE 371 SERVICE SADDLE OR APPROVED EQUAL WITH 1" IRON PIPE THREAD.



METER BOX LOCATION

**NOTES:**

SERVICE LATERAL SHALL BE POLYETHYLENE PLASTIC PIPE (PE3406, SDR7, PR160, P.O.E.) IN IRON PIPE SIZES AND SHALL BE SUITABLE FOR TRANSPORTING POTABLE WATER. POLYETHYLENE PIPE SHALL COMPLY WITH A.S.T.M. STANDARD D2239-73.

WHEN METER IDLER IS INSTALLED PRIOR TO METER, IT SHALL BE FORD NO. 3 OR APPROVED EQUAL 3/4" METER SIZE BY 19" LONG.



1 INCH WATER SERVICE

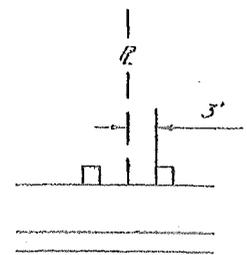
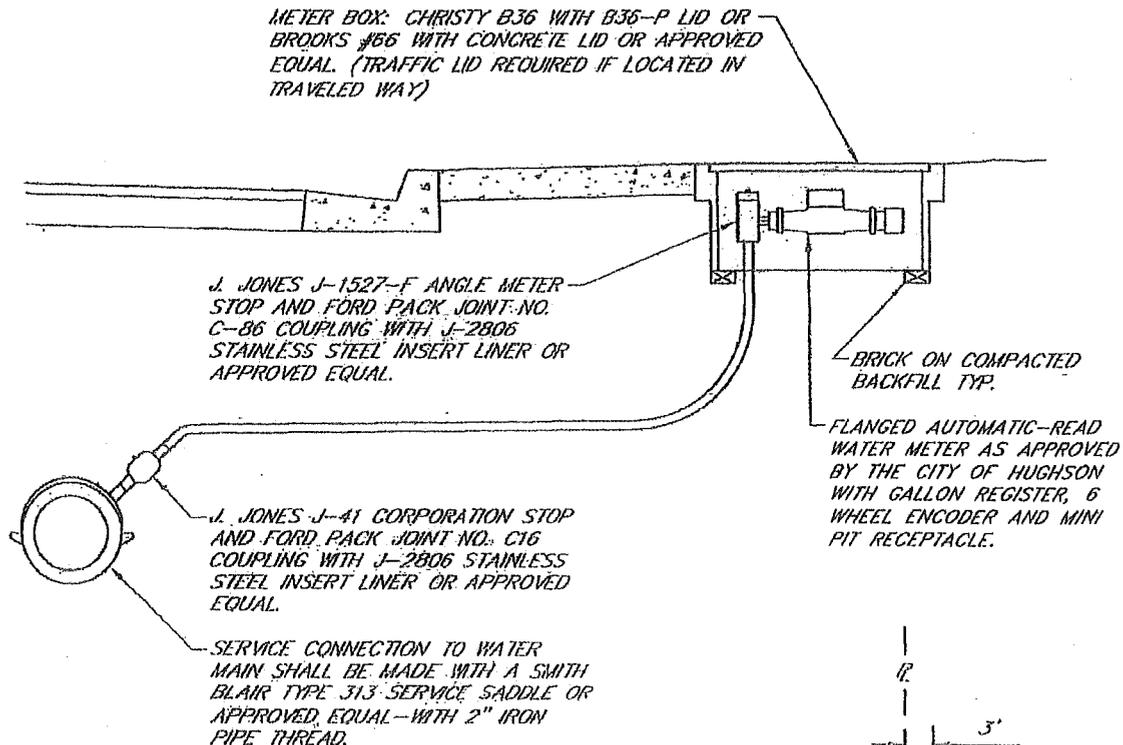
DRAWN BY: A.D.R.  
CHECKED BY: R.H.F.  
SCALE: NONE  
DATE: 1/04

APPROVED BY: *[Signature]*  
DATE APPROVED: 03/27/2006

CITY OF HUGHSON

STANDARD DETAIL

5-W.9



METER BOX LOCATION

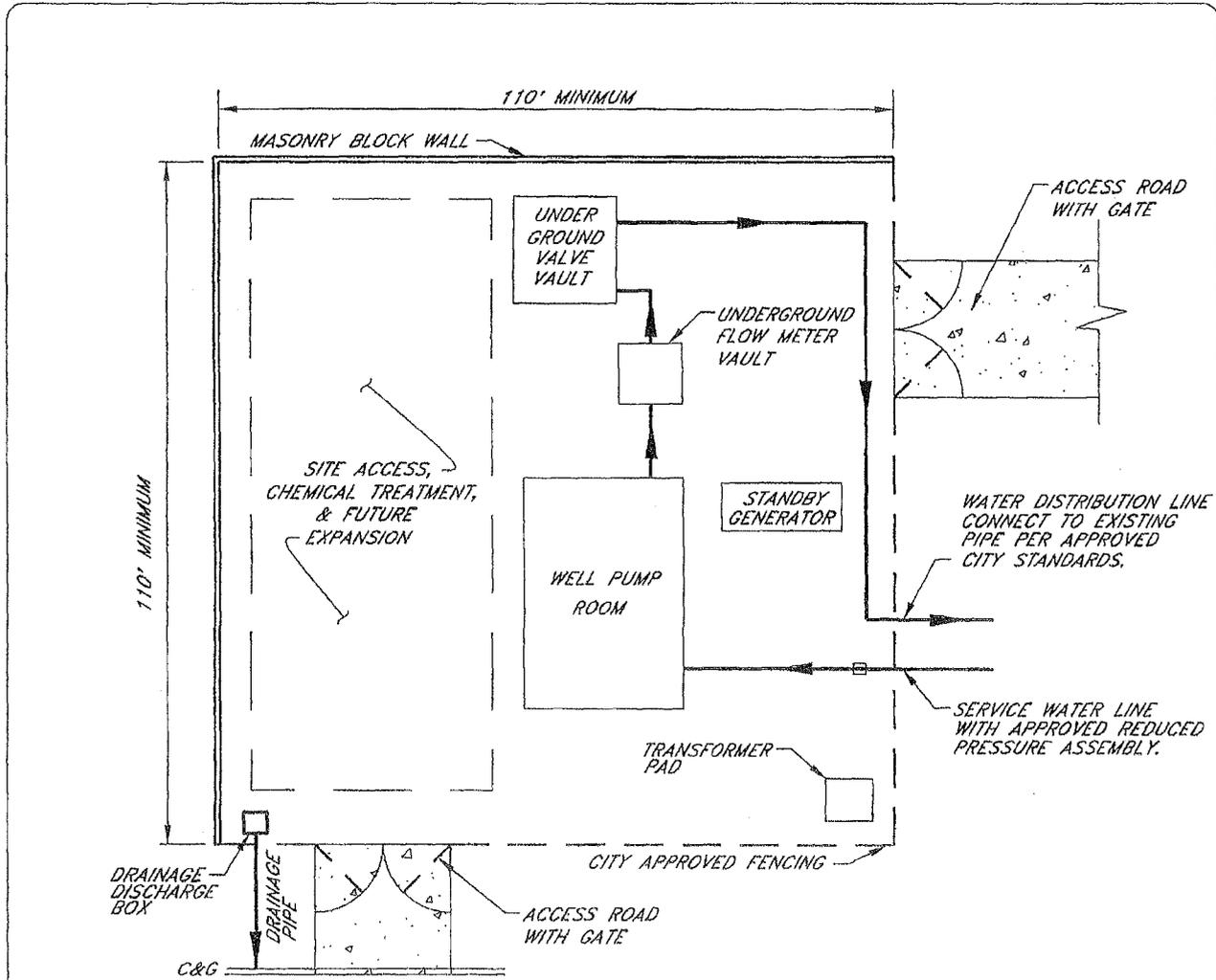
**NOTES:**

SERVICE LATERAL SHALL BE POLYETHYLENE PLASTIC PIPE (PE3406, SDR7, PR160, P.S.I.) IN IRON PIPE SIZES AND SHALL BE SUITABLE FOR TRANSPORTING POTABLE WATER. POLYETHYLENE PIPE SHALL COMPLY WITH A.S.T.M. STANDARD D2239-73.

WHEN METER IDLER IS INSTALLED PRIOR TO METER, IT SHALL BE FORD NO. 7 OR EQUAL 2" METER SIZE BY 17" LONG.

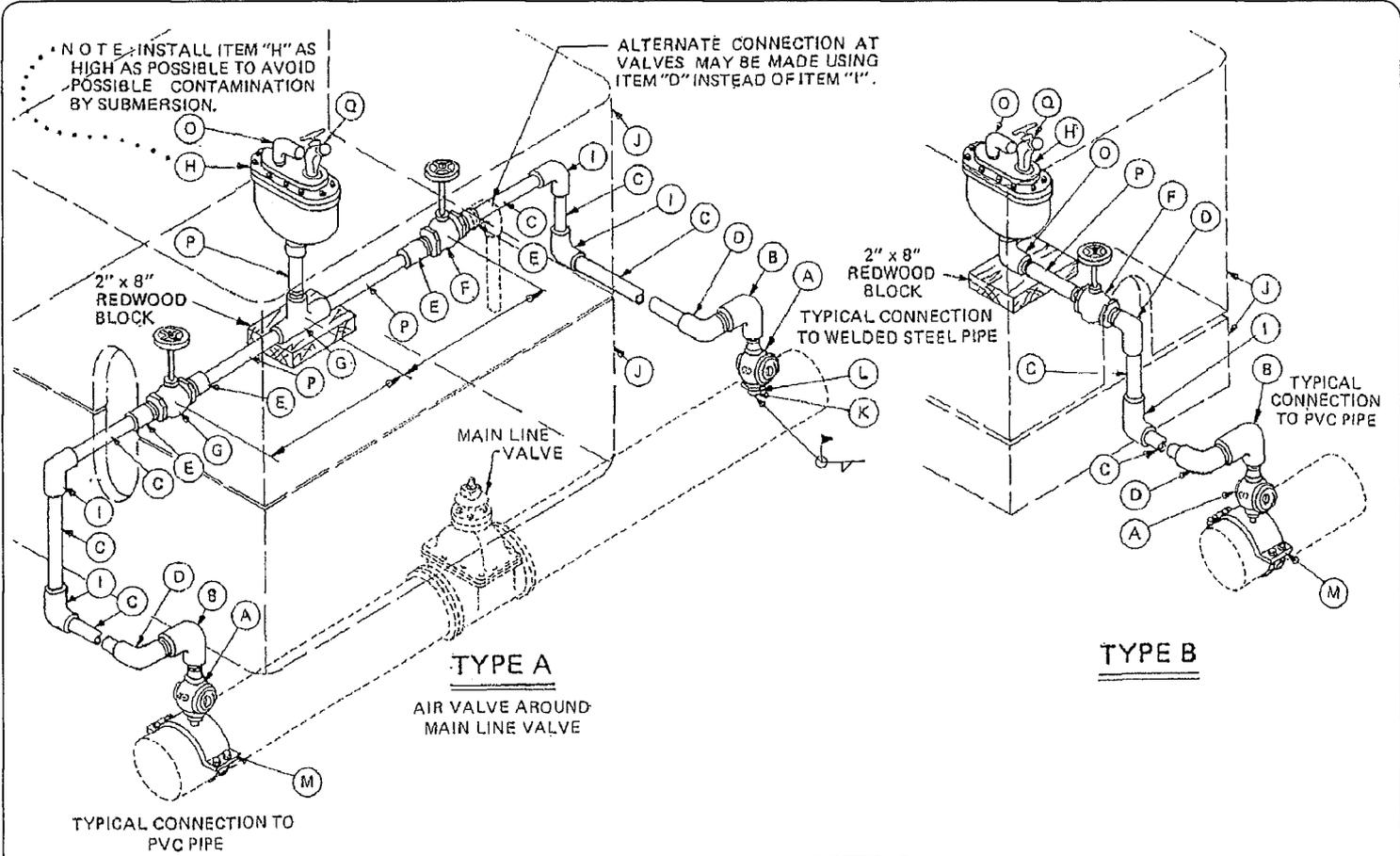
LATERALS SHALL BE TUNNELED UNDER CURB AND GUTTER.

	<p>2 INCH WATER SERVICE</p>	<p>DRAWN BY: A.D.R.          CHECKED BY: R.H.H.          SCALE: NONE          DATE: 1/04</p>
<p>APPROVED BY: <i>[Signature]</i>          DATE APPROVED: 03/27/2006</p>	<p>CITY OF HUGHSON</p>	<p>STANDARD DETAIL          5-W.11</p>



1. ALTERNATIVE SITE LAYOUTS MAY BE APPROVED BY THE CITY ENGINEER FOR BOOM TRUCK ACCESS, CHEMICAL TREATMENT, AND FUTURE SITE EXPANSION.
2. PERIMETER FENCING SHALL BE MASONRY WALLS OR CITY APPROVED ORNAMENTAL FENCING SPECIFIED BY SITE CONDITIONS AND CITY ENGINEER APPROVAL.
3. BUILDING FEATURES AND ARCHITECTURE SHALL BE DETERMINED AND APPROVED BY THE CITY ENGINEER.
4. SITE SHALL BE SURFACE GRADED TO DRAIN AWAY FROM ALL CONCRETE PADS AND TO COLLECT ALL DRAINAGE ONSITE, CONVEYED THROUGH ONSITE DISCHARGE BOX, AND INTO APPROVED EXISTING DRAINAGE SYSTEM PER CITY STANDARDS.
5. ALL PAVEMENT SECTIONS SHALL HAVE AN ASPHALT STRUCTURAL SECTION AS DETERMINED BY A GEOTECHNICAL ENGINEER.
6. ALL OFFSITE REQUIREMENTS AND CONDITIONS MUST BE APPROVED BY APPROPRIATE REGULATORY AGENCIES.
7. WELL PUMP ROOM WILL INCLUDE, BUT NOT BE LIMITED TO, AN EYEWASH STATION, AN APPROVED ROOF HATCH FOR ACCESS REMOVAL OF WELL HEAD, A DECHLOR DRAIN BOX, A CHLORINATION STATION, AND ELECTRICAL CONTROL PANELS.
8. SITE SPECIFIC DESIGN SHOULD INCLUDE, BUT NOT BE LIMITED TO, INTERIOR AND EXTERIOR LIGHTING, SAMPLE TAPS, EQUIPMENT SIZING AND ORIENTATION, AND SIGNAGE.

	TYPICAL WELL SITE LAYOUT	DRAWN BY: JDR CHECKED BY: DMC SCALE: NONE DATE: 3/06
APPROVED BY: DATE APPROVED: 03/27/2006	CITY OF HUGHSON	STANDARD DETAIL <b>5-W.12</b>



ITEM	MATERIAL	NO. REQ'D EA.	TYPE A			NO. REQ'D EA.	TYPE B		
			PVC MAINS	WELDED STEEL MAINS			PVC MAINS	WELDED STEEL MAINS	
			SIZE OF VALVE				SIZE OF VALVE		
			1"	1"	2"		1"	1"	2"
A	CHABOT COCK	2	1"	1"	2"	1	1"	1"	2"
B	ELL, 90°, BRASS	2	1"	1"	2"	1	1"	1"	2"
C	TUBING -- RIGID COPPER	LGTH REQ'D	1"	1"	2"	LGTH REQ'D	1"	1"	2"
D	ELL, 90° COPPER TO IPT M	2	1"	1"	2"	2	1"	1"	2"
E	COUPLING, COP. TO IPT M	4	1"	1"	2"	-	-	-	-
F	GATE VALVE -- NONRISING STEM -- BRONZE SCREW	2	1"	1"	2"	1	1"	1"	2"
G	TEE, BRASS, COP. TO COP. TO IPT F	1	1"	1"	2"	-	-	-	-
H	VALVE -- AIR AND VACUUM AND AIR RELEASE, EPOXY LINED	1	1"	1"	2"	1	1"	1"	2"
I	ELL, 90° COP. TO COP.	4	1"	1"	2"	1	1"	1"	2"
J	METER BOX (DOUBLE STACKED OR WITH A 8" HIGH REDWOOD BOX EXTENSION)	2	NO. 8	NO. 6	NO. 6	1	NO. 5	NO. 5	NO. 6
K	HALF NIPPLE, STEEL	1	-	1" x 2"	2" x 2"	1	-	1" x 2"	2" x 2"
L	SEE NOTE 10	2	-	1"	2"	1	-	1"	2"
M	SERVICE -- CLAMP	2	2 STRAP x 2"	-	-	1	2 STRAP x 2"	-	-
O	PVC, SCREW, SCHED. 80 ELL	1	1"	1"	2"	3	1"	1"	2"
P	NIPPLE, SCHED. 80 PVC OR RIGID COPPER TUBING	2	LGTH REQ'D	LGTH REQ'D	LGTH REQ'D	1	LGTH REQ'D	LGTH REQ'D	LGTH REQ'D
Q	HOSE BIBB	1	1/2"	1/2"	1/2"	1	1/2"	1/2"	1/2"

- NOTES:
- USE 1" AIR VALVE ASSEMBLIES FOR 6" THROUGH 16" PIPE. USE 2" AIR VALVE ASSEMBLIES FOR 20" PIPE AND LARGER OR AS DESIGNATED BY THE ENGINEER.
  - MAINTAIN A GRADE UPWARD FROM CHABOT COCK TO AIR VALVE. (NO TRAPS)
  - THE COPPER TUBING SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT AMERICAN SOCIETY FOR TESTING MATERIALS STANDARD SPECIFICATIONS FOR COPPER WATER TUBE (SERIAL DESIGNATION 888) TYPE K, AND SHALL BE DRAWN AND HAVE A HARDNESS (ROCKWELL) WITHIN THE RANGE OF 87F TO 97F.
  - REFER TO DWG. 5-W.9 FOR DETAILS OF METER BOX INSTALLATION.
  - COAT ITEMS K, M AND H WITH MASTIC.
  - SUPPORT AIR VALVE BODY ON FIRMLY COMPACTED EARTH, AS SHOWN.
  - TAPE WRAP REDWOOD BLOCKING OR COVER WITH TWO LAYERS OF POLYWRAP.
  - REFER TO DWG. 5-W.14 FOR METAL ENCLOSURE.
  - USE "DELTRIN" INSULATING COUPLING, OR INSULATING DIELECTRIC UNION.



# 1" & 2" AIR VALVE INSTALLATION

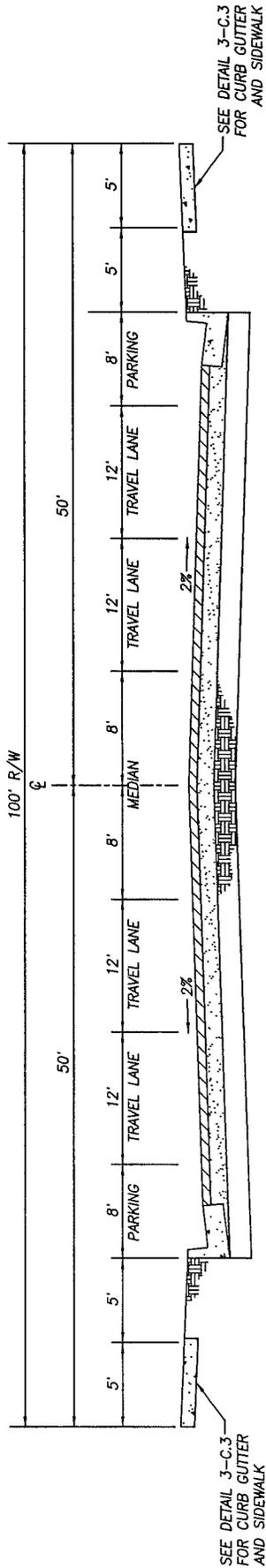
## COMBINATION AIR, VACUUM, & AIR RELEASE VALVE

DRAWN BY: C.V.  
 CHECKED BY: P.K.  
 SCALE: NONE  
 DATE: 7/07

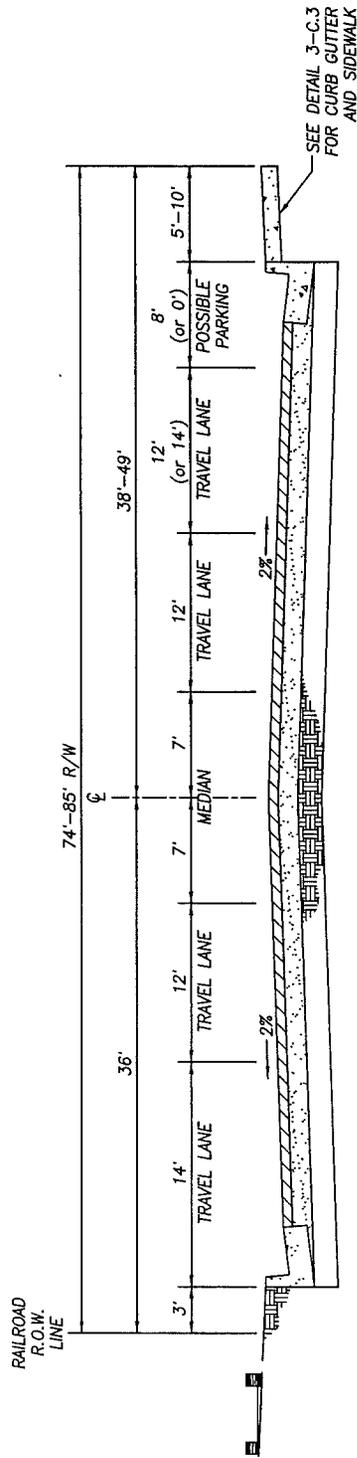
APPROVED BY: \_\_\_\_\_  
 DATE APPROVED: 8/13/07

CITY OF HUGHSON

STANDARD DETAIL  
 5-W.13



FOUR LANE ARTERIAL WITH PARKING



SANTA FE AVENUE CONSTRAINED ARTERIAL CORRIDOR



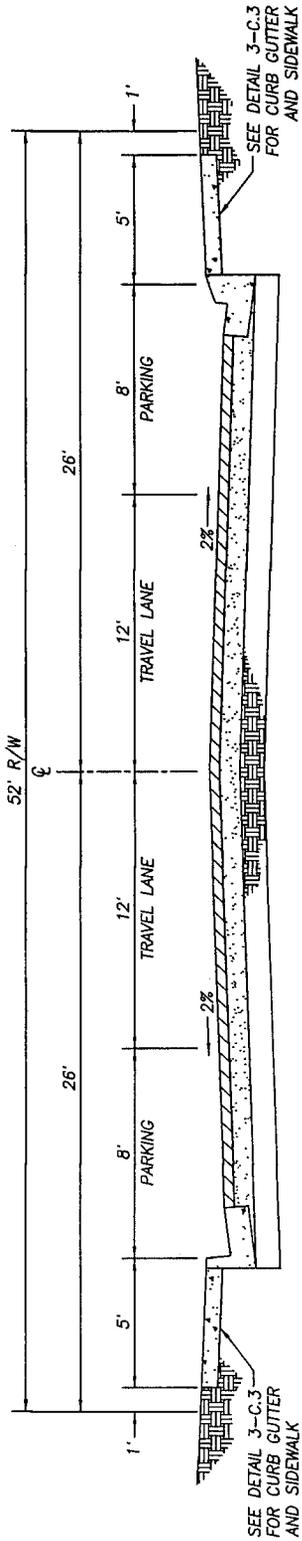
TYPICAL STREET SECTIONS  
 ARTERIAL - FOUR LANE & CONSTRAINED CORRIDOR

DRAWN BY: C.V.  
 CHECKED BY: P.K.  
 SCALE: NONE  
 DATE: 7/07

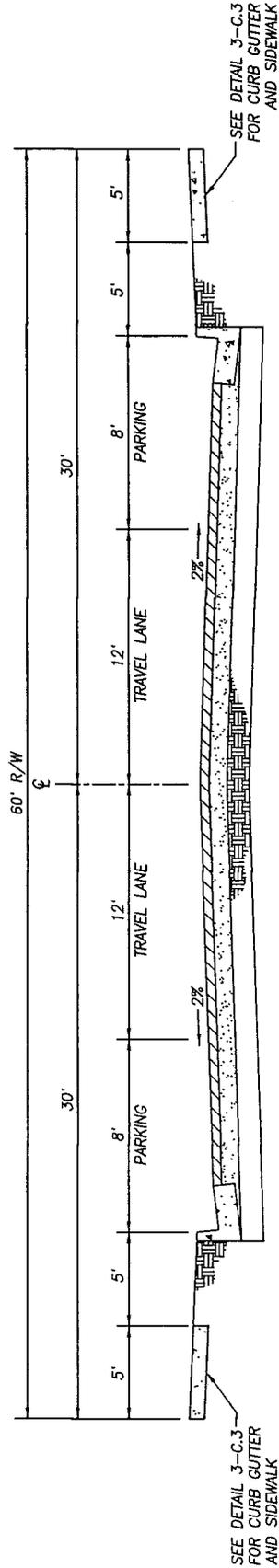
APPROVED BY: [Signature]  
 DATE APPROVED: 8/13/07

CITY OF HUGHSON

STANDARD DETAIL  
 3-ST.3.2



LOCAL RESIDENTIAL STREET WITH ROLLOVER CURB OR VERTICAL CURB



LOCAL COMMERCIAL STREET



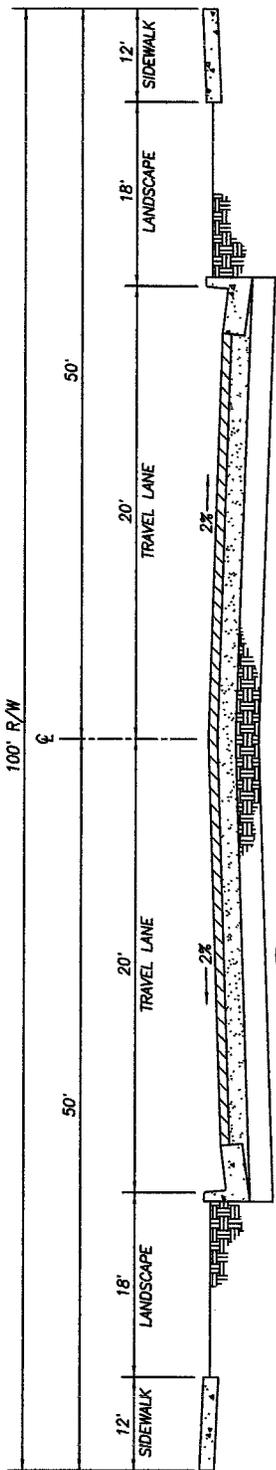
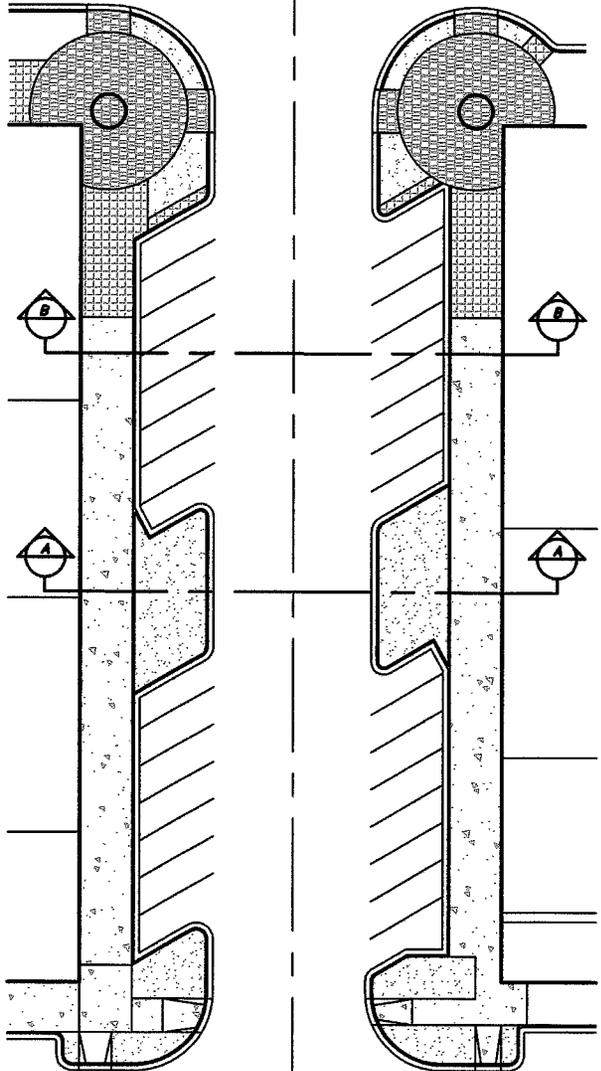
TYPICAL STREET SECTIONS  
LOCAL - RESIDENTIAL & LOCAL

DRAWN BY: C.V.  
CHECKED BY: P.K.  
SCALE: NONE  
DATE: 7/07

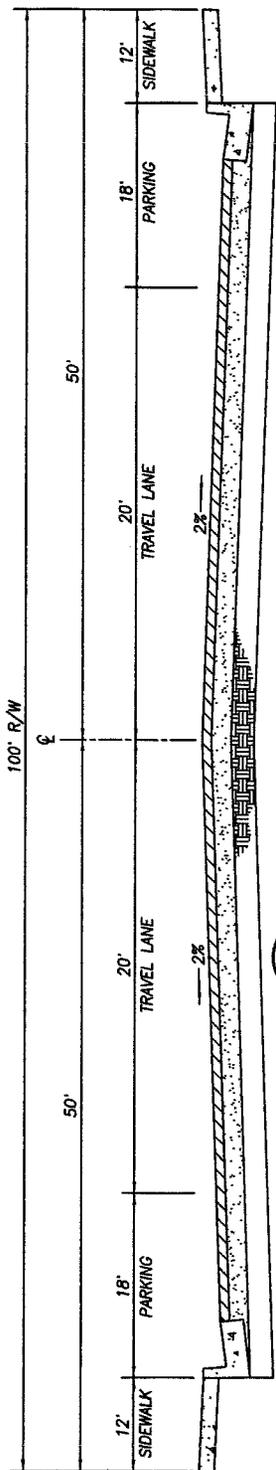
APPROVED BY: [Signature]  
DATE APPROVED: 8/13/07

CITY OF HUGHSON

STANDARD DETAIL  
3-ST.3.3



**A** STREET SECTION  
NO SCALE



**B** STREET SECTION  
NO SCALE



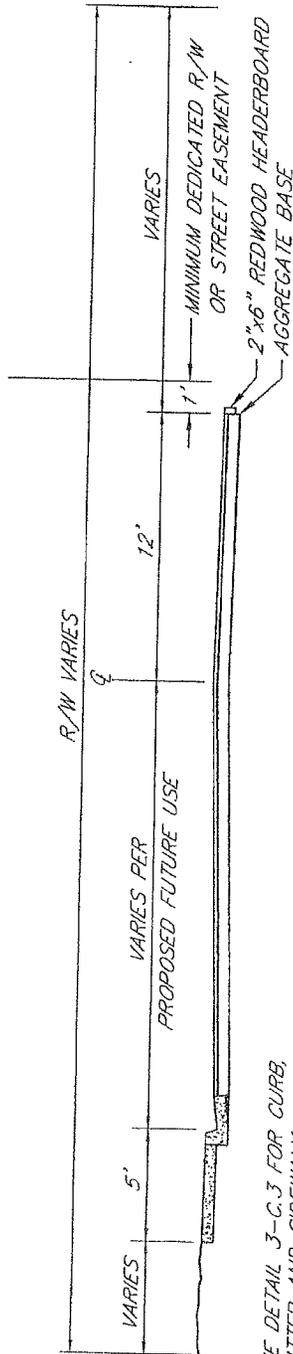
**TYPICAL STREET SECTIONS**  
CENTRAL TRAFFIC DISTRICT - STREET PLAN & PROFILE

DRAWN BY: C.V.  
CHECKED BY: P.K.  
SCALE: NONE  
DATE: 7/07

APPROVED BY: *[Signature]*  
DATE APPROVED: 8/18/07

CITY OF HUGHSON

STANDARD DETAIL  
3-ST.3.4



PARTIAL WIDTH STREET IMPROVEMENTS



PARTIAL WIDTH STREET IMPROVEMENTS

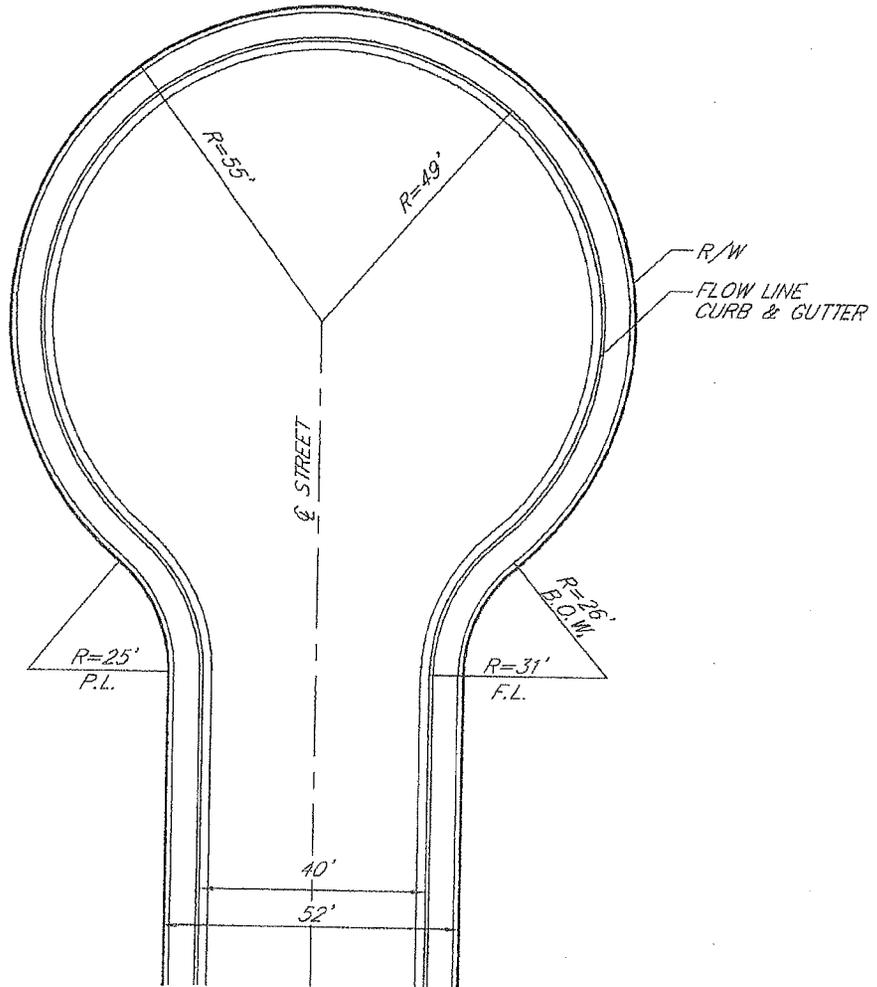
DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/11/04

CITY OF HUGHSON

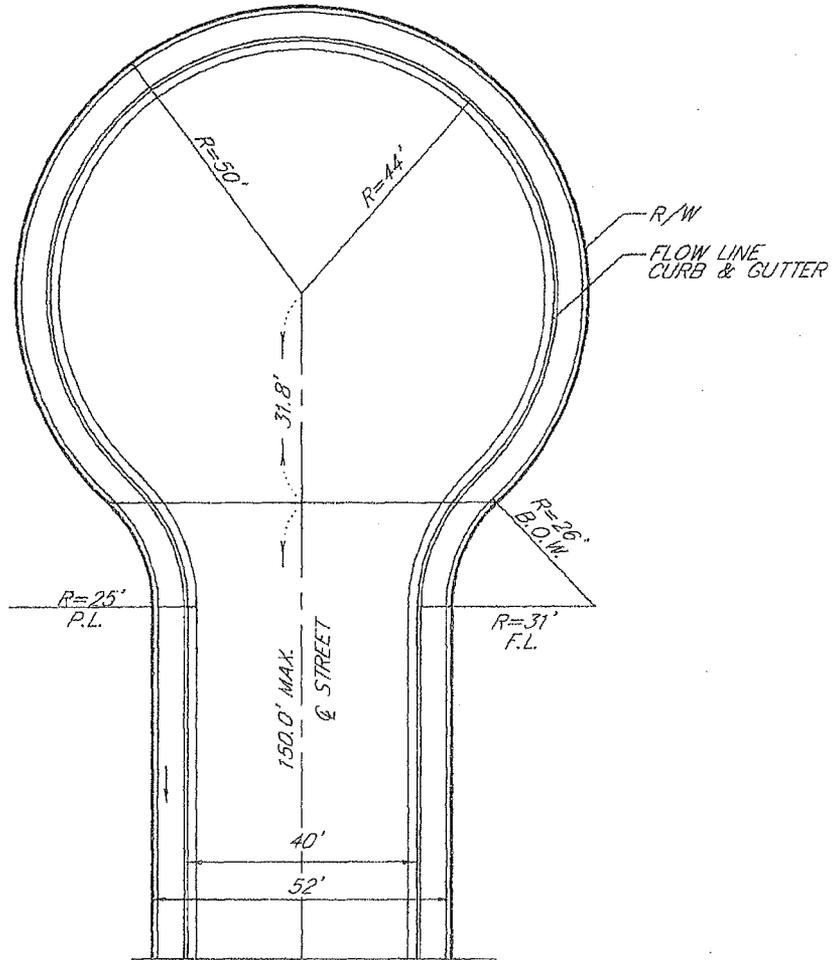
STANDARD DETAIL

3-ST.4



STANDARD CUL-DE-SAC, MAXIMUM DEPTH 500'  
 FROM INTERSECTING STREET RIGHT-OF-WAY  
 TO POINT OF REVERSE CURVE AT BULB.

	<b>CUL-DE-SAC          DESIGN REQUIREMENTS</b>	DRAWN BY: A.D.R. CHECKED BY: R.H.H. SCALE: NONE DATE: 1/04
APPROVED BY: DATE APPROVED: 8/13/17	<b>CITY OF HUGHSON</b>	STANDARD DETAIL <b>3-ST.5</b>



STANDARD FOR CUL-DE-SAC 150' AND LESS  
IN LENGTH TO POINT OF REVERSE CURVE.



150' CUL-DE-SAC  
DESIGN REQUIREMENTS

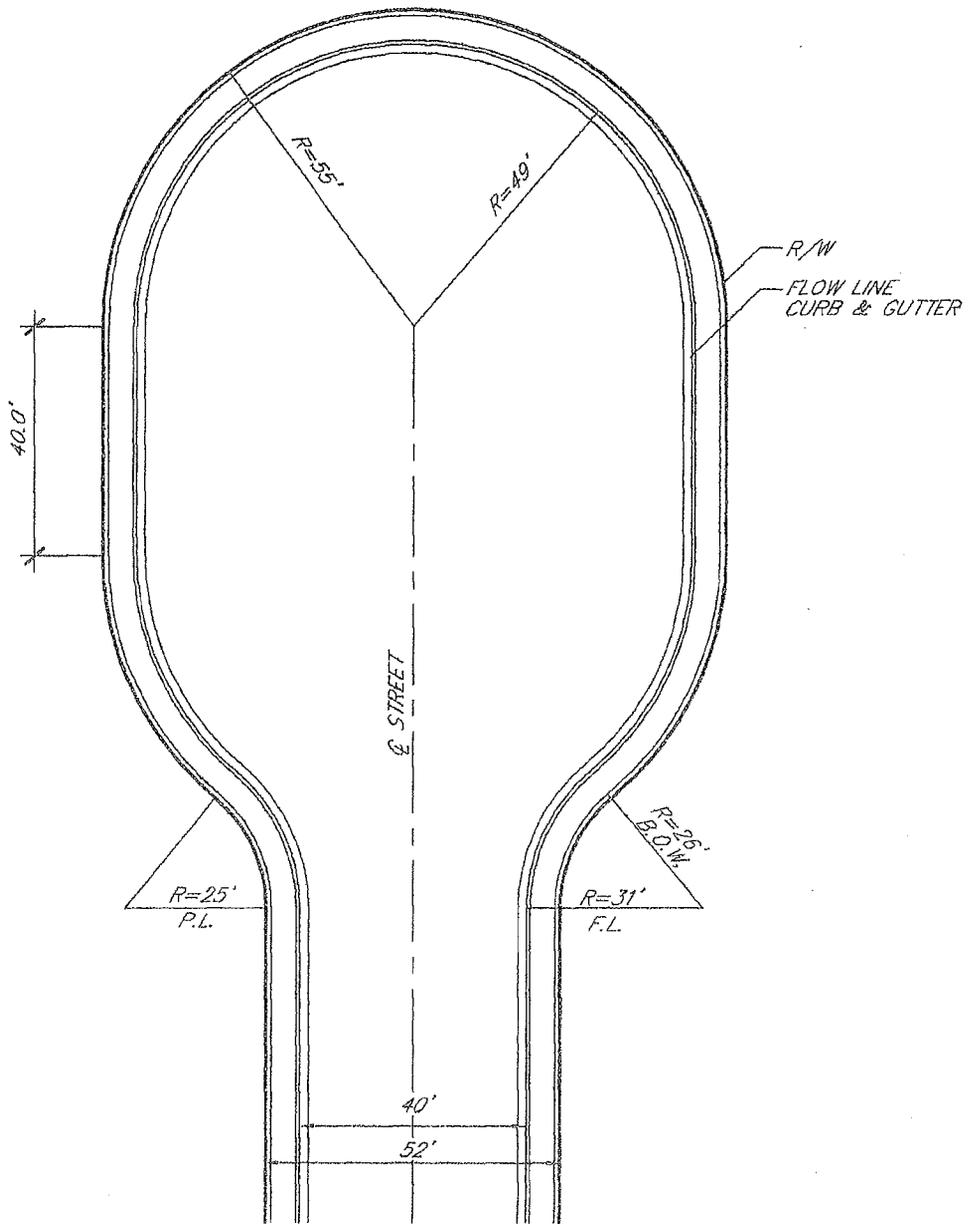
DRAWN BY: A.D.R.  
CHECKED BY: R.H.H.  
SCALE: NONE  
DATE: 1/04

APPROVED BY: *[Signature]*  
DATE APPROVED: 8/13/07

CITY OF HUGHSON

STANDARD DETAIL

3-ST.5a



STANDARD CUL-DE-SAC, MAXIMUM DEPTH 500'  
 FROM INTERSECTING STREET RIGHT-OF-WAY  
 TO POINT OF REVERSE CURVE AT BULB.



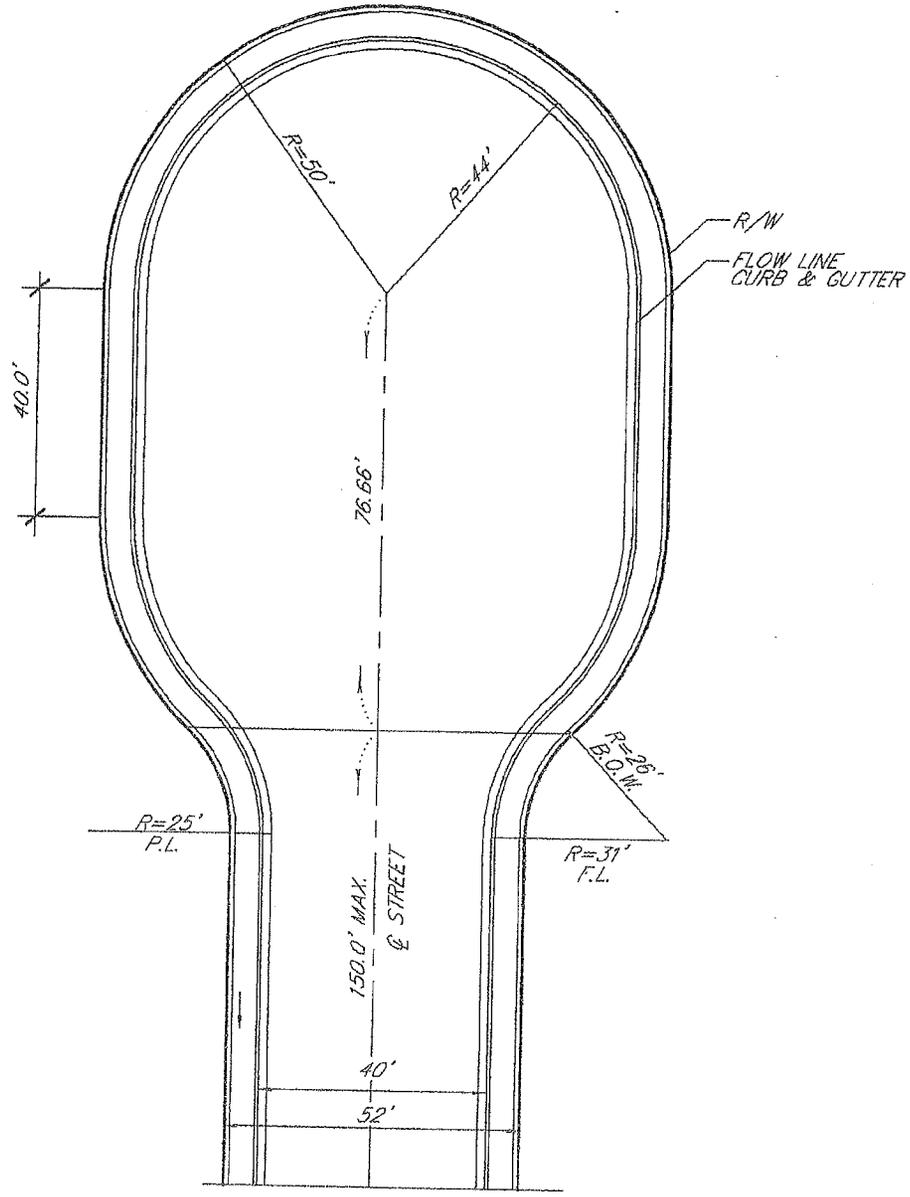
**CUL-DE-SAC  
 DESIGN REQUIREMENTS**

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 8/15/07

**CITY OF HUGHSON**

STANDARD DETAIL  
**3-ST.56**



STANDARD FOR CUL-DE-SAC 150' AND LESS  
IN LENGTH TO POINT OF REVERSE CURVE.



150' CUL-DE-SAC  
DESIGN REQUIREMENTS

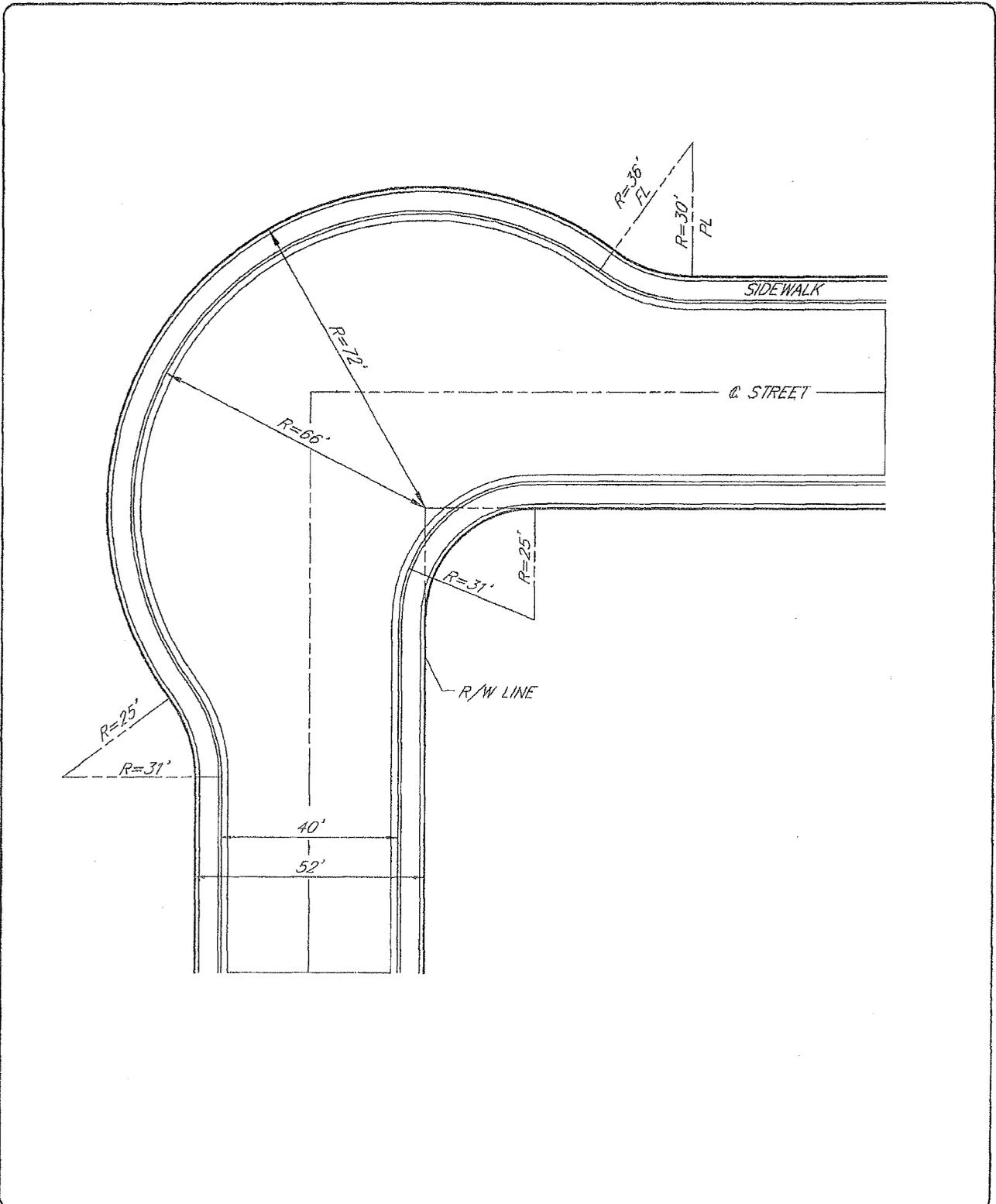
DRAWN BY: A.D.R.  
CHECKED BY: R.H.H.  
SCALE: NONE  
DATE: 1/04

APPROVED BY: *[Signature]*  
DATE APPROVED: 8/15/07

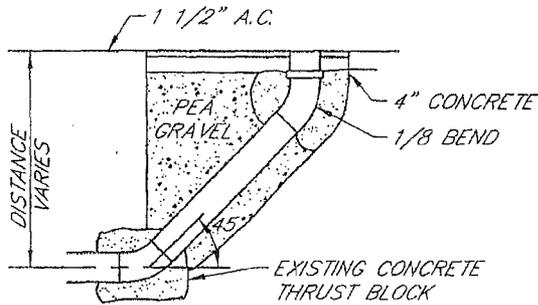
CITY OF HUGHSON

STANDARD DETAIL

3-ST.5c

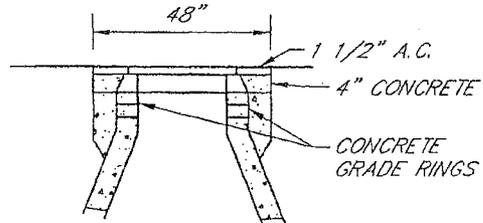


	<b>INTERSECTION BULB</b>	DRAWN BY: A.D.R. CHECKED BY: R.H.H. SCALE: NONE DATE: 1/04
APPROVED BY: DATE APPROVED: 8/18/07	<b>CITY OF HUGHSON</b>	STANDARD DETAIL <b>3-ST.6</b>



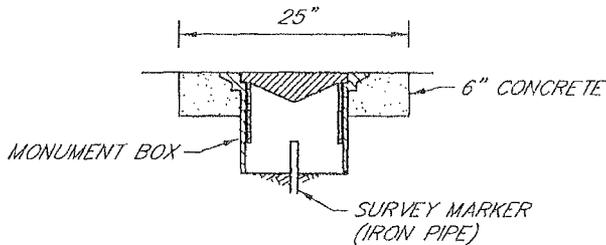
REMOVE CASTING COVER AND ONE JOINT OF PIPE BEFORE EXCAVATION. KEEP SEWER PLUGGED TO KEEP OUT DIRT. RESET TO GRADE AFTER A.C. IS LAID.

LAMPHOLE



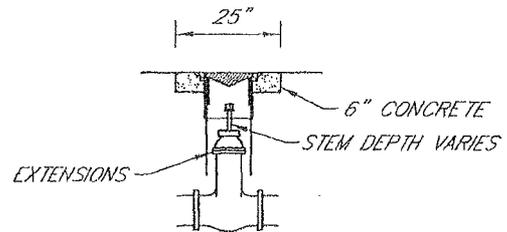
REMOVE CASTING, COVER AND ADJUSTING RINGS TO TOP OF CONCRETE COVER TO KEEP OUT DIRT AND ROCKS WHILE WORKING OVER MANHOLE. IF TOP OF CONE IS LOWER THAN BOTTOM OF 6" COMPACTION, THEN CASTING AND RINGS SHALL BE REMOVED BEFORE STARTING 6" COMPACTION.

MANHOLE



REMOVE CASTING, COVER AND NECESSARY EXTENSIONS BELOW COMPACTION. CAUTION SHALL BE TAKEN SO AS NOT TO DISTURB MONUMENT. RESET TO GRADE AFTER A.C. IS LAID.

MONUMENT BOX



REMOVE VALVE BOX AND EXTENSIONS BELOW COMPACTION. PROTECT VALVE STEM WHEN IN CONSTRUCTION AREA. AFTER A.C. IS LAID, CLEAN OUT REMAINING EXTENSIONS SO STEM IS CLEAR OF DIRT, AND RESET TO GRADE.

VALVE BOX



ADJUSTMENT OF  
FRAMES & COVERS

DRAWN BY: A.D.R.  
CHECKED BY: R.H.H.  
SCALE: NONE  
DATE: 1/04

APPROVED BY: *[Signature]*  
DATE APPROVED: 5/1/04

CITY OF HUGHSON

STANDARD DETAIL  
3-ST.7

# SECTION 4

---

## LIGHTING

### 4.1 GENERAL

Street lighting shall be installed to conform to these Improvement Standards by the Developer or City Contractor holding an appropriate license for such work under the provisions of the State of California Business and Professions Code. The Design Engineer shall also consult and coordinate design drawings for lighting with the Turlock Irrigation District.

Electrical equipment shall conform to the requirements of the National Electrical Manufacturers Association and material and work shall conform to the requirements of the National Electrical Code, the Electrical Safety Orders of the Division of Industrial Safety, Department of Industrial Relations of the State of California. Public Utilities Commission, the Improvement Standards of the American Society for Testing Materials and the American Improvement Standards Association.

### 4.2 DESIGN

The lighting system shall be designed to best serve the area and to minimize the length of service reins from the points of connection to the street lights.

All street lights to be installed shall be shown on the improvement plans. The location of the power source and all conduit runs shall be shown on the improvement plans.

The minimum spacing and location for electroliers shall be as shown on Drawings No. L.3 and L.4.

### 4.3 CONDUIT

Conductor shall be run in conduit except when run inside poles. Conduit and fittings shall be rigid metal, intermediate or schedule 40 pvc conduit in locations where approved by National Electric Code. Conduit shall be 1-inch minimum diameter.

Conduits shall be bound together in pull boxes and pole bases as shown in Drawing No. L.1, with not less than No. 8 A.W.G. copper wire.

Where factory bends are not used, conduit shall be bent without crimping or flattening using the longest radius practicable. In no case shall the bend radius be less than six times the inside diameter of the conduit.

#### 4.4 CONDUCTORS

Conductors shall be No. 10 copper or larger, TRW single conductor, Underwriters Laboratory approved.

No conductors shall be drawn into the conduit until the conduit run is complete and the conduit is free of debris. If the conduit is installed in a pole foundation, the conductors shall not be drawn into the conduit for at least 3 days after placement of the foundation concrete.

Conductors shall not be spliced except in pole bases (or in pull boxes when approved by the City). The splices shall be made as shown and specified on drawing number ES-B of Department of Transportation Standard Plans and in Section 86-2.04D of the Standard Specifications.

#### 4.5 PULL BOXES.

Pull boxes shall be size Christy N-16 concrete or approved equal, and shall be furnished by the developer or City Contractor. The pull box shall be installed as shown in Drawing No. 4-L.6

Traffic lids shall be used when boxes are placed in areas traveled by vehicles. The traffic lids shall be 1/4-inch galvanized steel plate with 1/2-inch diameter lift hole and bolt bores to match standard stud bolts.

#### 4.6 FOUNDATIONS

Foundations for poles shall be constructed of concrete and shall be located as shown on Drawing No. 4-L.2 and 4-L.6 depending upon the type of light fixture.

Foundations shall be placed monolithically to within 4-inches of sidewalk grade. After pole is installed, a 36-inch square cap shall be placed to bring the foundation to sidewalk grade.

#### 4.7 ANCHOR BOLTS

Anchor bolts shall be as shown on the respective standard drawings.

#### 4.8 POLES

Poles shall be 30 foot poles hot-dip galvanized steel with 15 foot arms and shall be Ameron Catalog No. N-3015-2, Pacific Union Metal Manufacturing Company Catalog No. FS 1130 P15 or an approved equal, or 25 foot poles with 12 foot arms shall be Ameron Catalog No. N-2512-2, Pacific Union Metal Manufacturing Company No.

71041-Y3-12 or an approved equal, as required per 4-L.1 and 4-L.2. Poles shall not be installed until the foundation has set at least 5 days. Poles shall be plumbed by adjusting the leveling nuts; leveling shims shall not be used. The poles shall be grounded to conform to the provisions of the National Electrical Code. Subdivision poles shall be as required by 4-L.5 and 4-L.6.

Poles shall have hand-holes near their bases facing the street.

#### 4.9 ELECTROLIERS

The electroliers shall be located according to size as shown on Drawings No. L.3 and L.4. The luminaries shall be as follows or an approved equal:

200 watt	I.E.S. Type III	G.E. C798N806 (100 volt lamp) Landmark 25-62J3
150 watt	I.E.S. Type III II I1-4	C760N510 (55 volt lamp) Landmark CD56262-00C
100 watt	I.E.S. Type II	G.E.C760N526 (55 volt lamp) Landmark CD5621.2-00C
70 watt		For subdivisions see 4-L.5

Luminaries shall have high pressure sodium vapor lamps, glass refractors, built-in receptacles for photoelectric cells, and regulator or auto-regulator type ballasts with a power factor of not less than 92%. House side shields shall be installed in all residential areas to prevent light from illuminating residential properties.

#### 4.10 PHOTOELECTRIC CELLS

Photoelectric cells shall be adjustable, compatible with related equipment and adequate for the load. They shall be General Electric C402G400 or an approved equal.

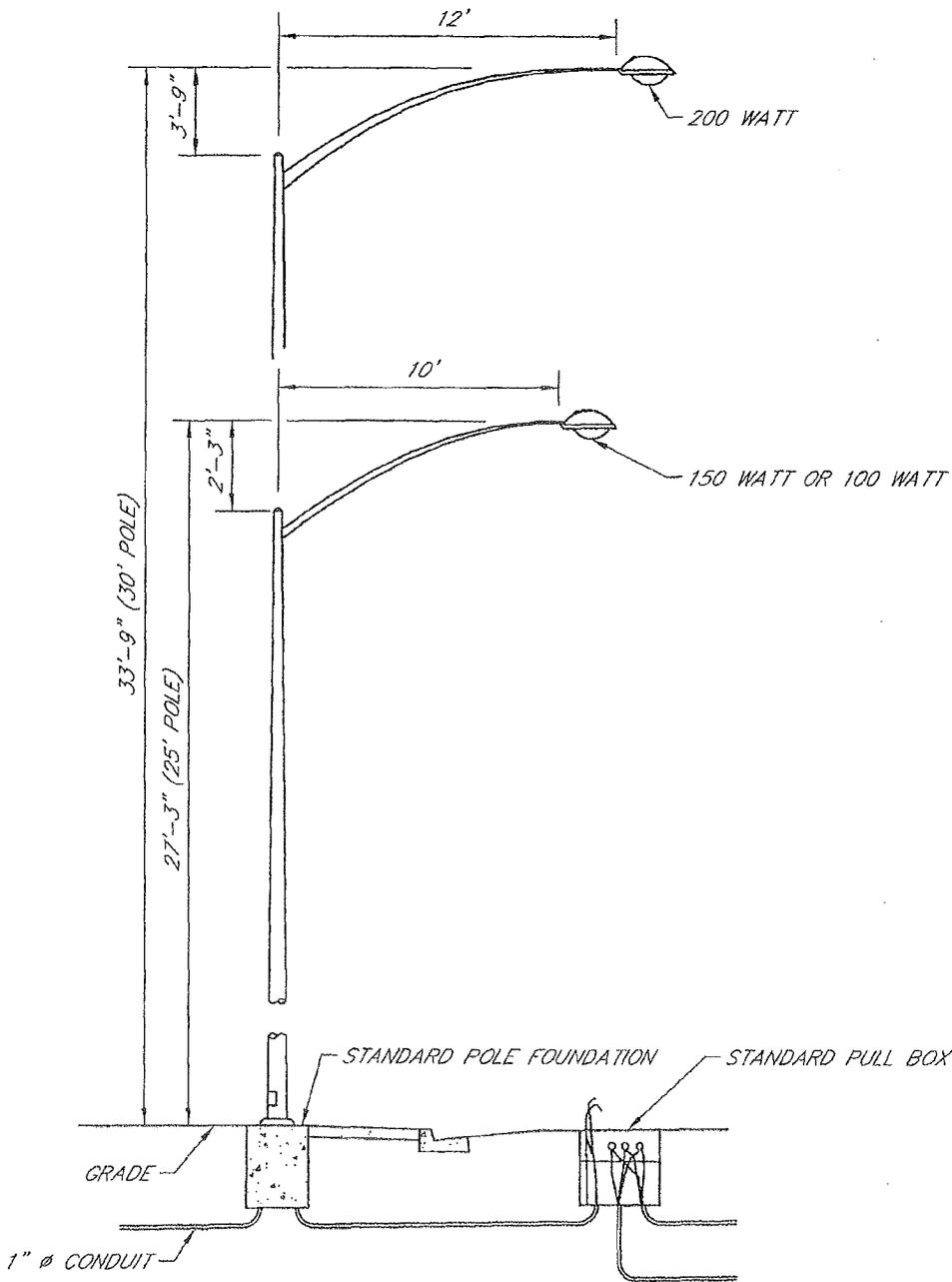
#### 4.11 TESTING

The street lights on City Contract projects shall be tested a minimum of 48 hours before acceptance by the City.

#### 4.12 CONFLICT WITH UTILITIES

Developer or City Contractor shall be responsible for contacting Utility Companies to determine that locations for foundations and conduit runs are clear.

Where conflicts exist, the locations may be altered with approval of the City.



1. LUMINAIRE TO BE 120 VOLT AND SHALL HAVE HIGH PRESSURE SODIUM VAPOR LAMPS, BUILT-IN PHOTOELECTRIC CONTROL.
2. METAL POLE TO BE HOT DIP GALVANIZED.



**ELECTROLIER**  
25' AND 30' POLES

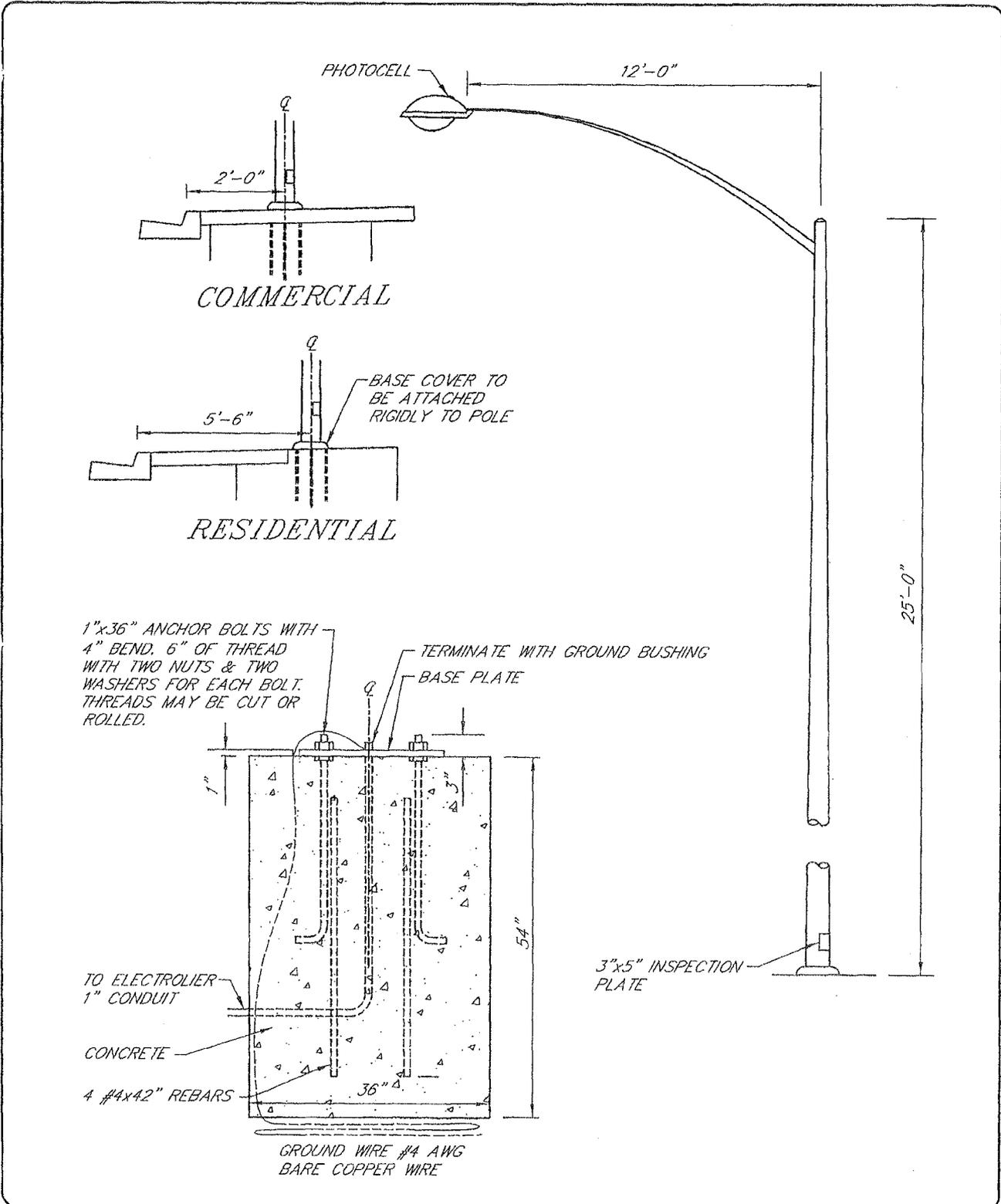
DRAWN BY: J.M.  
CHECKED BY: R.H.H.  
SCALE: NONE  
DATE: 1/04

APPROVED BY: *[Signature]*  
DATE APPROVED: 5/1/04

CITY OF HUGHSON

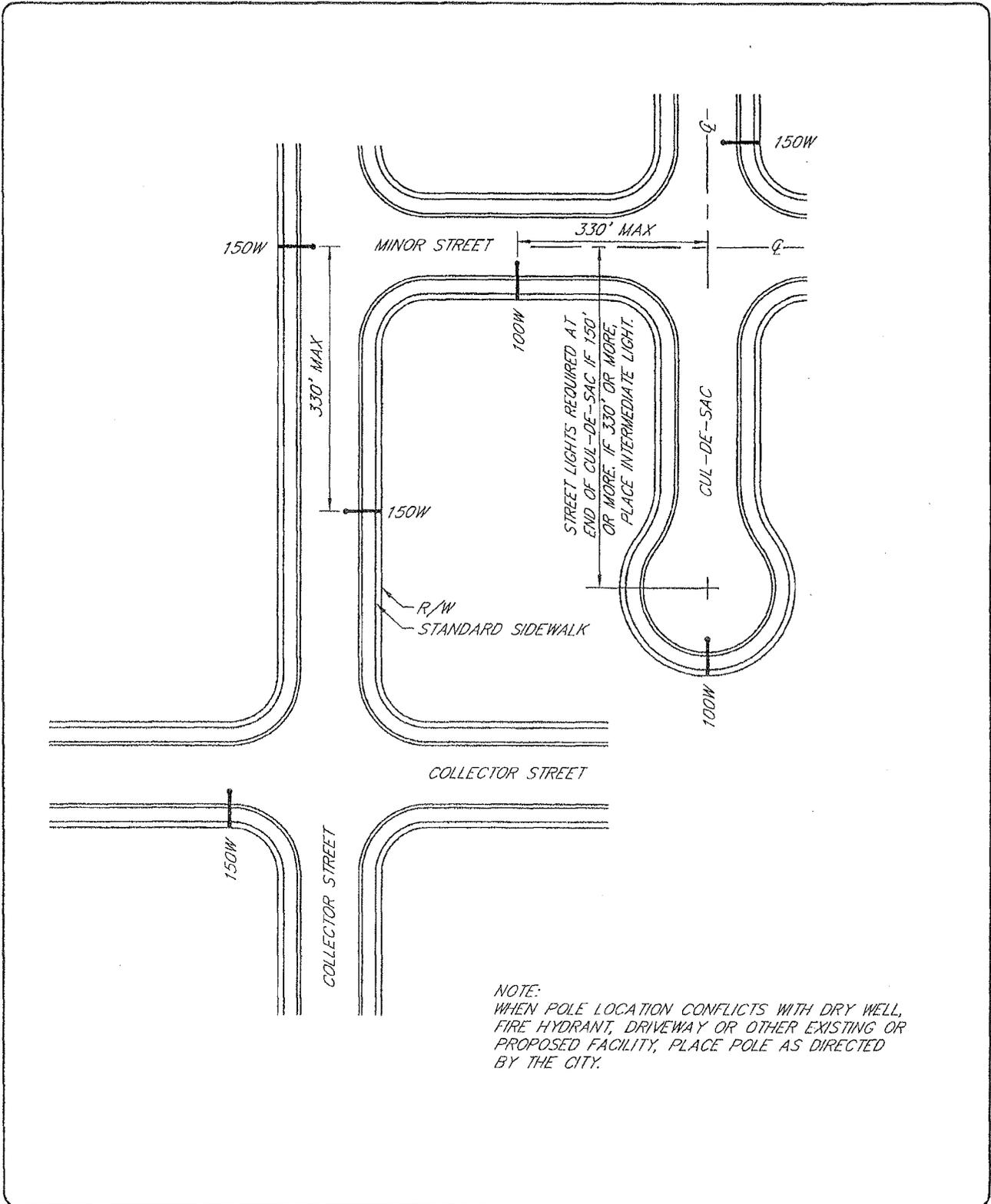
STANDARD DETAIL

4-L.1

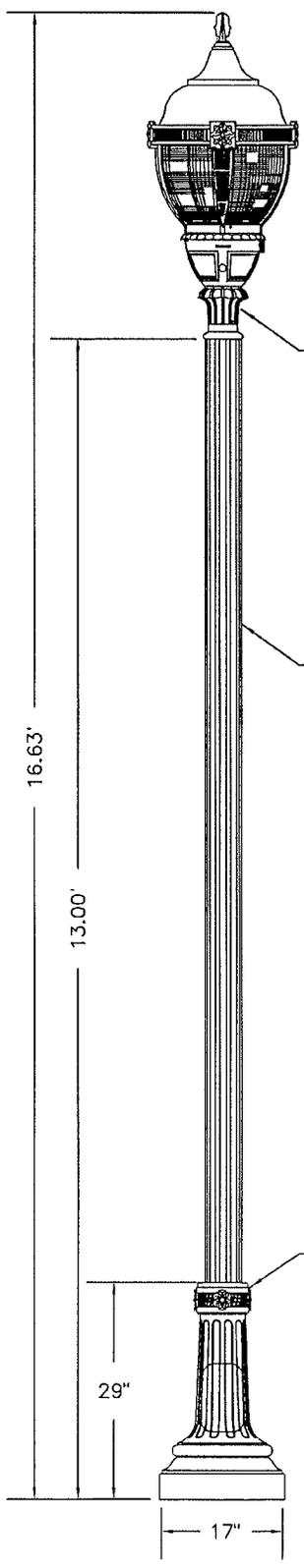


	<b>ELECTROLIER FOOTING DETAIL</b>	DRAWN BY: A.D.R. CHECKED BY: R.H.H. SCALE: NONE DATE: 1/04
APPROVED BY: <i>[Signature]</i> DATE APPROVED: 5/1/04	CITY OF HUGHSON	STANDARD DETAIL 4-L.2





	<b>ELECTROLIER LOCATIONS COLLECTOR AND MINOR STREETS</b>	DRAWN BY: A.D.R. CHECKED BY: R.H.H. SCALE: NONE DATE: 1/04
APPROVED BY: <i>[Signature]</i> DATE APPROVED: 1/1/04	<b>CITY OF HUGHSON</b>	STANDARD DETAIL <b>4-L, 4</b>



STAINLESS STEEL ALLEN FASTNERS

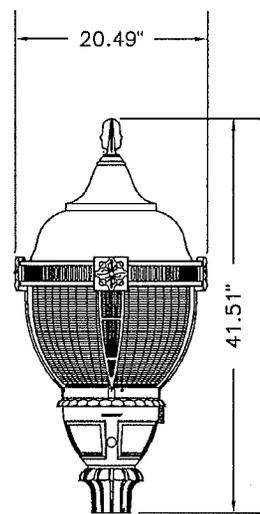
POLE: 5" STRAIGHT FLAT FLUTED W/ 3" TENON .188" WALL THICKNESS 6005-T5 ALUMINUM ALLOY WITH GREEN POWDER COATING

HADCO—ORDERING GUIDE:  
 C2349: LUMINAIRE  
 CP2349: POLE  
 www.Hadcolighting.com

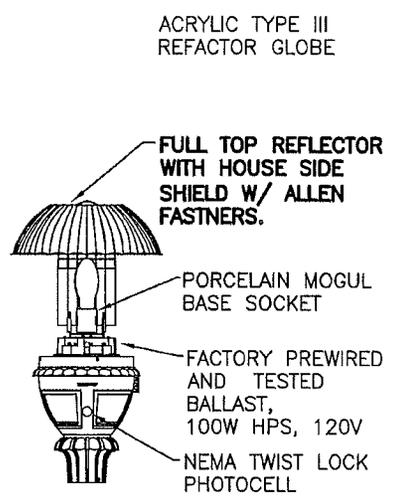
SHALL BE HADCO OR AN APPROVED EQUAL

BASE: CAST #356HM ALUMINUM ALLOY, W/ ACCESS DOOR & COVER

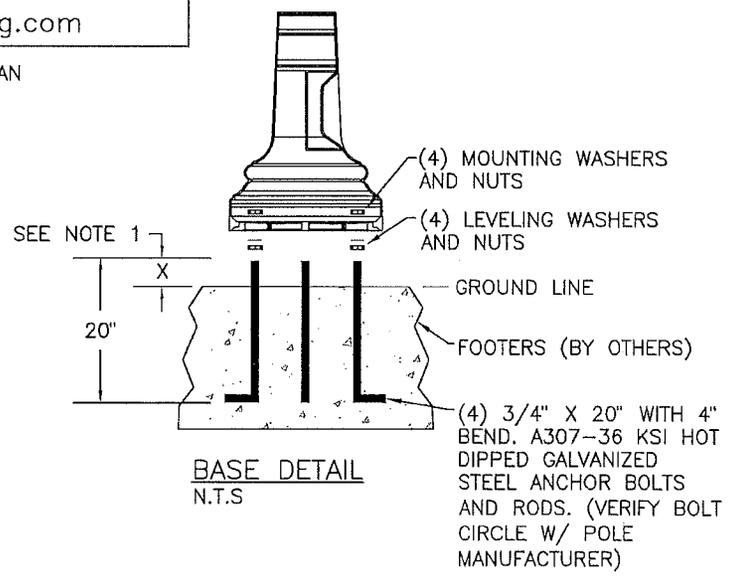
BASE DETAIL: REFERENCE TEMPLATE #T01000345



LAMPING & REFLECTOR DETAIL  
 N.T.S



- NOTES:
- 1) HADCO STRONGLY RECOMMENDS USING LEVELING NUTS TO MOUNT THE POST BASE. IF FOUNDATION IS NOT LEVEL INCREASE "X" DIMENSION ACCORDINGLY WHEN USING LEVELING NUTS WITH WASHERS.
  - 2) SHIELDING TO CONTROL NUISANCE LIGHTING MAY BE REQUIRED BY CITY.



BASE DETAIL  
 N.T.S



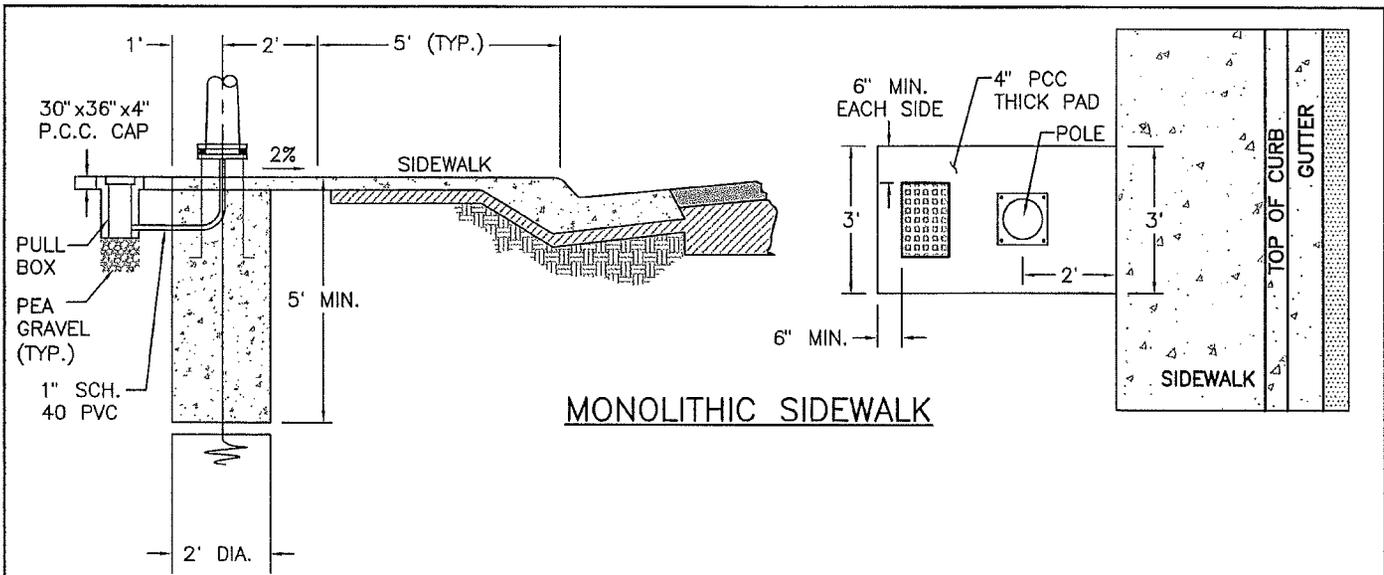
PUBLIC WORKS DEPARTMENT

DRAWN BY: CV  
 CHECKED BY: PK  
 SCALE: N.T.S.  
 DATE: 13 JUNE 07

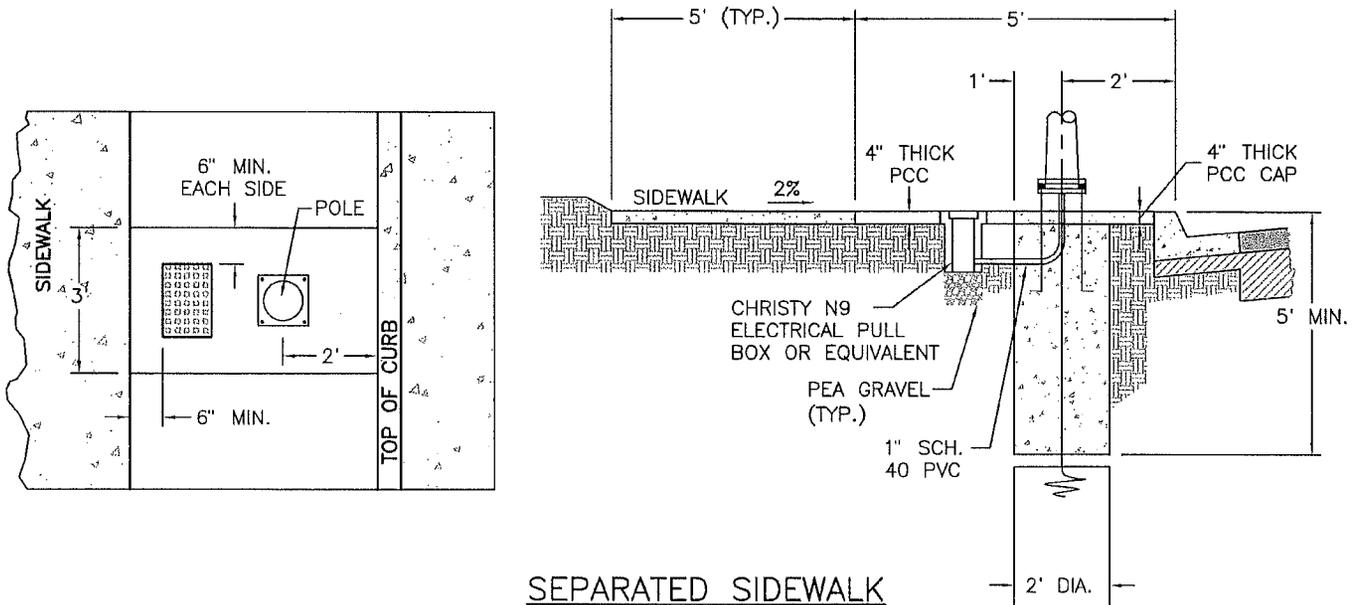
APPROVED BY: *[Signature]*  
 DATE APPROVED: 8/13/07

SUBDIVISON DECORATIVE LIGHT

STANDARD DETAIL  
 4-L.5



**MONOLITHIC SIDEWALK**



**SEPARATED SIDEWALK**

**NOTES:**

1. SECURE ELECTROLIER TO GROUNDLED STUD.
2. 15' #6 BARE COPPER GROUND WIRE OR 5/8" X 10' COPPER WELD GROUND ROD SHALL BE COVERED WITH 2" OF SOIL PRIOR TO POURING BASE.
3. BASE SHALL BE CLASS 'B' CONCRETE FIELD CAST 4500 P.S.I. MINIMUM.
4. 3/4" X 20" W/ 4" BEND GALV. ANCHOR BOLT (VERIFY BOLT CIRCLE W/POLE MANUFACTURER).
5. INSTALL RODENT SCREEN AT THE BOTTOM OF THE PULL BOX.
6. INSTALL ONE FOOT MIN. THICK LAYER OF PEA GRAVE (BELOW THE RODENT SCREEN).
7. REINFORCED CONCRETE LID, BOLT DOWN.



**PUBLIC WORKS DEPARTMENT**

DRAWN BY: CV  
 CHECKED BY: PK  
 SCALE: N.T.S.  
 DATE: 13 JUN 07

APPROVED BY: *[Signature]*  
 DATE APPROVED: 8/13/07

**SUBDIVISON DECORATIVE  
 LIGHT FOUNDATION**

STANDARD DETAIL

**4-L.6**

# SECTION 5

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## WATER

### 5.1 GENERAL

Water system improvements proposed for inclusion into the City shall be designed in accordance with the criteria set forth herein, and pursuant to the current Water System Master Plan, unless otherwise approved in writing by the City Engineer. Maps and Plans for developments for which the City Engineer deems there to be insufficient water supply shall not be approved.

The design shall take into consideration physical conditions known to exist at the time and place of each installation and the probable operating requirements. Where such conditions render sections of these Specifications inapplicable, alternative methods of design may be substituted to the City, and upon written approval by the City Engineer thereof, may be incorporated in the plan.

Water mains and services shall be installed by a Developer or City Contractor holding the appropriate license for such work under the provisions of the State of California Business and Professions Code.

### 5.2 DESIGN

Permanent dead ends over 300 feet in length shall have circulating ties on twenty foot easements through side lot lines, unless modified at the option of the City.

Pipelines 8-inches and smaller shall be installed with a minimum of 36-inches of cover between the top of the pipe and the finished grade. Pipelines 12-inches or greater shall be installed with a minimum of 48-inches from the top to the finished grade.

For single family residential areas, all water mains shall be sized to provide 1000 gallons per minute fire flow from each of 2 adjacent fire hydrants flowing simultaneously with 20 pounds per square inch residual pressure. Size of water mains in high density residential, commercial, and industrial developments shall be designed by the design Engineer and approved by the City.

This fire flow can generally be obtained using the following design standards:

- 1/2 mile looped grid - 10 inch mains or larger
- 1/4 mile looped grid - 8 inch mains
- Dead end mains with a fire hydrant - 8 inch mains
- Distribution system, looped -8 inch mains

The distribution layout shall be a looped grid insofar as possible. Dead-ends shall have blowoff assemblies installed for flushing mains as shown on Drawing No W.2.

Water mains shall be 5' from centerline, as measured from centerline to the nearest side of the pipe. Water mains shall be on the opposite side of the centerline from the sewer line.

There shall be a minimum of three valves at tees and four valves at crosses. Valves on transmission mains should be spaced a maximum of 800 feet apart in residential areas and 500 feet in commercial areas.

**Main Valves:** Main valves shall be located so that any section of water system can be controlled by operating a maximum of 3 valves. In addition, valves shall be spaced so that a maximum of 1,000 feet of water main is controlled by the valves. When a butterfly valve is used, butterfly operator shall be toward nearest property line.

**SYSTEM PRESSURE** - Water distribution systems shall be designed so that normal operating pressure at service connections to the distribution system are no less than 40 pounds per square inch (psi) and no more than 90 psi under normal demand conditions. During periods of maximum day plus fire flow demand, the pressure shall not be less than 20 psi near the flowing hydrants that supply the fire flow demand.

**RELIEF VALVES** - Appropriately sized air vacuum release valves shall be located at all high points along the pipeline alignment and at all "dead ends" that occur at a high points. Air/Vacuum shall be located at points of excess negative pressure. And combination valves may be applied where appropriate. Refer to AWWA Manual M51 for further design guidelines.

Additionally, for all pipelines of 16-inch diameter and greater, an air vacuum valve shall be located on the downstream side of all mainline valves.

On arterial streets, air vacuum valves are to be placed prior to the curb radius with service in perpendicular with the mainline. All air vacuum valves shall be constructed per City Standards.

**SYSTEM DEMAND CRITERIA** - shall be in accordance with the water demand factors and peaking factors defined in the most recent City of Hughson Water Master Plan.

**PIPE SIZING CRITERIA** - The standard water pipeline sizes allowed in the City for new developments shall be 8-inch, 12-inch, 16-inch, 20-inch, 24-inch, 30-inch, 36-inch, and 42-inch in diameter.

Pipeline velocities shall not exceed 5 feet per second (fps) during peak hourly flow and not exceed 10 fps during maximum day plus fire flow.

In commercial and industrial areas, the standard minimum pipe size shall be 12-inches in diameter.

The City reserves the right to require 12-inch diameter minimum size pipelines in residential

areas, with no incremental diameter upsizing cost to the city, when necessary, as determined by the City.

The City may require pipe sizing in excess of the minimum size as determined by the design criteria herein when the facilities being constructed will serve, or may be extended to serve, additional lands.

**POTABLE PIPELINE LOCATION** - Installation of potable water lines adjacent to existing or proposed sewer lines, recycled water lines, and storm drains shall be in accordance with the Department of Health Services regulations, or City requirements, whichever is greater. The separation of water and sewer mains shall be in conformance with City Standard Drawing No. W-5. Generally, potable water pipelines shall be located above sewer lines and recycled water lines, preferably with a minimum clearance of 3 feet for perpendicular pipes, and parallel with a clearance of at least 10 feet (O.D. to O.D.) away from sewer lines.

When cover cannot be provided, concrete encasements or protective slab construction over the pipeline may be substituted. City staff shall be consulted, as special approval is required.

**BACKFLOW PREVENTION** - A backflow prevention device shall be required on domestic water service connections and irrigation water service conditions on all industrial or commercial buildings.

Backflow prevention devices shall be required on domestic water connections where water from other sources may become cross-connected to other water supplies or sources as determined by the City.

An approved backflow prevention device is required by Title 17, Drinking Water Supplies, of the California Administrative code, and shall be installed in conformance with City Standard Drawing No. W-7.

Water meters shall not be installed until after an approved backflow prevention device is installed.

**WATER SAMPLING STATIONS** - Where water sampling stations are required, as determined by the City, the stations shall be constructed in accordance with City Standard Drawing No. W-6 and No. W-6A.

Sampling stations shall be located at least 100 feet from a fire hydrant

Sampling stations shall not be placed past the last service connection on a dead end main.

For each water source, there shall be one sampling station located where raw (untreated) water from the source can be sampled.

**WATER SYSTEM FACILITY DESIGN** - The City will provide design oversight for new water system facilities design for facilities such as wells, treatment, storage tanks, or pressure reducing stations.

Site selection of all water system facilities shall be approved by the City and meet the requirements of the State Department of Health Services.

The layout of new well sites shall be in accordance with Standard City Drawing No. W-12 and AWWA Standard A100-06.

### 5.3 PIPE

Pipe used in construction of water distribution systems shall be either ductile iron pipe (DIP) or plastic pipe (PVC) and shall meet the standards of the American Water Works Association (AWWA), where applicable.

#### A. Ductile Iron Pipe (D.I.P.)

Ductile Iron Pipe shall have "Tyton Joints", "Ty-Seal Joints", or approved equal and shall conform to the current standard specifications of A.W.W.A Standard C-151/A21.59. Fittings shall conform to A.W.W.A. Standard 0110, joints shall conform to A.W.W.A. C111/A21.11 for rubber gasket joints.

#### A. Poly-Vinyl Chloride Pipe (PVC)

Poly-Vinyl Chloride Pipe shall conform to A.W.W.A. C900 Class 150 for up to 10 inches and C-905 for pipes 12 inches and larger for use in municipal water systems and fire protection lines. Rubber rings shall conform to manufacturers' recommendation.

Poly-Vinyl Chloride Pipe shall be suitable for the purpose intended and shall be installed as per manufacturer's recommendations, and these Standards.

#### B. Water Lines

All mains shall include #12 copper tracer wire. The wire shall be connected to all valves and fittings.

### 5.4 FITTINGS

Bends, tees and other fittings shall be Cast Iron, Class 150 A.W.W.A. C-900 or C-905 for use with Poly-Vinyl Chloride. Cast Iron Pipe and Ductile Iron Pipe fittings shall be manufactured by Olympic Foundry, Phoenix Iron Works, or approved equal.

All fittings for use with PVC C900 pipe shall be cast-iron outside diameter push-on or mechanical joint fittings with exception of fittings with valves which shall be push-on or mechanical joint by flange. Ductile iron fittings shall be classified as "compact ductile iron fittings" and shall be produced in accordance with ANSI/AWWA A21.53/C153. Unless otherwise specified, the interior of ductile iron fittings shall be lined with uniform thickness of cement mortar "double thickness" then sealed with a bituminous coating in accordance with AWWA C104. the outside surfaces of the DIP fittings shall be coated with a bituminous coating in accordance with ANSI A21.6 or A21.51.

All ductile iron fittings shall be polyethylene encased at the time of installation. Polyethylene encasement and installation shall be in accordance with AWWA C105.

Fittings shall be handled and jointed as specified for pipe installation herein. Reaction or thrust blocking shall be constructed at bends, tees, dead ends and where changes in pipe diameter occur, Blocking shall be made of Class B concrete, and shall be placed between undisturbed ground and the fitting to be anchored. The area of bearing on the pipe and on the ground shall be that required by Standard Drawing No. W.4, The blocking shall be placed so that the joints of the pipe fittings will be accessible for repair.

## 5.5 VALVES AND VALVE BOXES

Valves shall be located on the discharge side of pipe connections; minimum 4 at crosses, 3 at tees, and always at the beginning of dead end mains. The City may require additional valves on critical sections or where the proposed valves requires closing more than 3 valves to isolate a section of pipeline.

Valves on transmission mains should be spaced a maximum of 800 feet apart in residential areas and 500 feet in commercial areas.

Isolation valves shall be flanged to the tee or cross within the street intersection. All isolation valves shall be direct buried (no vaults are required).

Valves and valve boxes shall be installed at the locations shown on the plans.

All valves shall be Dresser "450" Gate or Mueller A-2380 gate valve, or approved equal and shall be the rubber-seated, tight-closing type conforming to the current A.W.W.A. Specification C-504. Valves shall open left and be equipped with a 2-inch A.W.W.A. approved operating nut.

Valves boxes shall be Christy G5 with Christy Iron cover or approved equals. The following materials may be used for extensions: 8" Poly-Vinyl Chloride Pipe, (with a minimum 50 foot head); or approved equal. All valve boxes shall be installed to finished grade as per City Standard Drawing No. W-1.

## 5.6 WATER SERVICE MATERIALS

Each individual property shall have a separate water service complete from the water main to the property. The minimum size water service is 1-inch.

For properties other than single family residential, and for non-typical single family residential, the Design Engineer shall determine the water service size. For making such determination the Design Engineer shall take into account the anticipated water use, water pressure requirements, and property size. Concerns for fire water service shall also be considered.

Polyethylene Pipe may be used for all 1-inch through 2-inch water services.

Cast Iron, Ductile Iron or Galvanized Steel Pipe shall be used for all water services larger than 2 inches.

If abnormal or unusual conditions exist, the City may approve alternative pipe materials.

All water services, including meter boxes, shall be installed in accordance with City of Hughson's Standard Drawings No. W.8, W.9, W.10, or W.11.

Service and meters shall be sized in accordance with the provisions of Section 1009 of the uniform Plumbing Code, using minimum pressure expected in the system.

Minimum meter size shall be 5/8" x 3/4".

All water service connections shall be metered with Badger Radio Read Meters with Pit Orion Recordall Transmitter Register or Approved Equals.

In addition, to a domestic water service meter, all commercial/industrial/municipal projects shall be required to provide a separate landscape irrigation meter.

#### 5.7 MATERIALS TO BE FURNISHED AND INSTALLED BY DEVELOPER

The Developer or City Contractor shall furnish all labor, material, equipment and appliances required to complete the water mains and services specified.

#### 5.8 STAKING OF WATER MAINS AND SERVICES

The water lines and services shall be staked by the Developer's Engineer on the project and installed by the Developer. Staking will be provided by the City on projects installed by City.

#### 5.9 EXCAVATION

The Contractor shall perform all excavations necessary or required to construct all pipelines and structures. Excavation shall include the removal and disposal of all materials of whatever nature encountered. Trenches shall be excavated in open cut, following neat parallel lines equidistant from the centerline; such line shall be staked as set-forth in Section 5.8. No tunneling or jacking will be permitted without written permission from the Engineer. Trenches will be sufficient width to provide clearance for bracing, support and working space.

Care shall be taken to preserve all surface and subsurface facilities in the work area.

The trench shall be excavated to a minimum of 2 inches below the grade of the bottom of the pipe and 2 inches below couplings and bells. If any of the trench bottom is in material too hard to permit proper bedding of the pipe, excavation must be carried to a depth at least 4 inches below the grade of the bottom of the pipe, and this over-excavation shall then be brought to grade with approved material compacted in place. Should the trench bottom at any location be of material which will not afford a sufficient sound foundation,

it shall be excavated to a depth not greater than 2 feet below grade as directed by the Engineer and refilled to grade with approved materials compacted in place.

Excess and/or rejected material shall be disposed of by the Developer or City Contractor at their expense.

#### 5.10 SHORING, BRACING AND SHEETING

The Contractor shall furnish, install and maintain such shoring, bracing and sheeting as required.

After the pipeline has been installed and sufficiently backfilled to protect the pipe, all shoring, bracing and sheeting shall be removed. All voids left by the removal of such bracing shall be carefully filled with suitable material compacted in place.

#### 5.11 DISPOSAL OF SEEPAGE, STORM WATER, OR SURFACE WATER

The Contractor shall remove any seepage; storm water, or surface water that may be found or may accumulate in the excavation during the progress of the work. He shall furnish all pumps and other equipment necessary and shall keep all the excavation entirely free from water at all times during the construction of the work. When pipe-laying is in progress, the open ends of the pipe, shall be closed by approved means to prevent entrance of water or dirt into the line. Whenever water is excluded from the pipe, adequate backfill shall be deposited on the pipe to prevent floating. Any pipe which has floated shall be removed from the trench and re-laid as directed by the City.

#### 5.12 PREPARATION OF TRENCH AND LAYING OF PIPE

All pipe for water mains and laterals shall be placed to line and grade as shown on the approved plans and at such depths as to provide 36 inches minimum cover from the top of the pipe to ultimate finish street grade. The Contractor shall be responsible for verifying ultimate finish grade.

When water lines are being installed in new subdivisions, mainline pipe and fire hydrant runs shall be installed prior to the installation of curb, gutter and sidewalk. The services shall be installed after the curb, gutter, and sidewalks. All pipe shall be installed as per manufacturer's recommendations and these Improvement Standards.

#### 5.13 HANDLING OF PIPE ACCESSORIES

Proper implements, tools, and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and efficient execution of the work. All pipe, fittings, valves, hydrants, and accessories shall be lowered into the trench in such a manner as to prevent damage to pipe fittings. Under no circumstance shall pipe or accessories be

dropped or dumped into the trench. All foreign matter or dirt shall be removed from the interior of pipe before lowering into position in the trench. Pipe shall be kept clean by means approved the Engineer during and after laying. All pipe and accessories shall be inspected for defects prior to lowering into trench. Any defective, damaged or unsound pipe or accessory shall be repaired or replaced at the Contractor's expense.

#### 5.14 SERVICE INSTALLATION

The services shall be installed as per Standard Drawing No. W.8 through W.11. Curb to be marked by stamping or chiseling a "W" on the curb face.

The curb stop, stainless steel insert, meter, meter adapter service plug for SP3 unit, meter box with a brick at each corner, and lid to be placed at correct depth and distance from sidewalk.

Plastic service pipe shall not be heat-flared. Because of the variation in the outside diameter of the pipe, a saddle tap in lieu of the Quiktap is required.

Special care shall be exercised to insure proper compaction is made under curb stop so it is vertical and the meter is level. Compaction shall be made under and around the meter box so it remains level and at the finish grade of the sidewalk.

Water services shall not be connected to 20-inch diameter or larger mains, unless specifically permitted by the City.

#### 5.15 FIRE HYDRANTS

Fire hydrants shall be installed at the locations shown on the plans in conformance with City Standard Drawing No. W.3.

Hydrants shall be Clow 900 Series Wet Barrel Hydrant or approved equal, and shall conform to A.W.W.A. Standard C-503 for wet barrel hydrants. Hydrant color shall be safety yellow #1245 Ellis Paint Company Hy-Lux 1200 Waterborne Industrial Enamel.

Fire hydrants shall be installed with a minimum separation of 5 feet from any driveway, street light, power pole, sign, fence, walls, etc. and a minimum of 15 feet from any dry utility pole, vault or transformer.

Fire hydrants shall be installed 12-inches behind the sidewalk when sidewalk is adjacent to curb and 20-inches behind curb face when sidewalk is not adjacent to curb. All fire hydrants piping shall be the same size as the main and installed with a break-off check valve. No obstructions shall be permitted within 36 inches of the center of a hydrant, to ensure adequate access and operation.

All water lines service any hydrant that is located outside of the Right-of-Way, or on private property shall be metered.

Fire hydrant location shall be at ends of curb returns or at lot lines.

Fire hydrant spacing shall be, at minimum, 400 feet in residential, areas and 300 feet in commercial areas, or at intersections whichever is closer; in no case should the average coverage of each hydrant be more than 120,000 square feet. Insofar as possible, fire hydrants shall be located at street intersections rather than in the middle of blocks. Final fire hydrant locations are subject to the approval of the Fire Chief.

A blue reflectorized marker shall be permanently placed on the paving surface along street centerlines offset to the fire hydrant side opposite fire hydrant locations.

The plans shall show the centerline station for each hydrant along with the adjacent top of curb elevation.

#### 5.16 TEMPORARY AND PERMANENT BLOW-OFFS

Appropriately sized blow-offs shall be located at all low points along the pipeline alignment and at all "dead end" locations. Additionally, for all pipelines 16-inch in diameter and greater, a blow-off shall be located on the upstream side of all mainline valves. All blow-offs shall be constructed to City standards.

Blow-offs should be located as near to storm drain catch basins whenever possible. On arterial streets, blow-offs are to be placed prior to the curb radius with the service line perpendicular with the mainline.

The size of blow-offs shall be based on the mainline pipe diameter as follows:

- 8-inch to 16-inch diameter mains: 4-inch diameter blow-offs
- 20-inch to 24-inch diameter mains: 6-inch diameter blow-offs
- Greater than 24-inch diameter mains: 8-inch diameter blow-offs

A 4-inch diameter blow-off shall be installed at the end of each segment of pipeline that is installed for future use. If the section of pipeline installed is creating a high point, an air vacuum valve will also be required.

Temporary and permanent blow-offs shall be installed at the locations on the plans in conformance with City Standard Drawing No. W.2. The final length of pipe, prior to the blow-off, shall be 18 to 39 inches.

All salvaged temporary blow-offs shall become the property of the Contractor and shall be removed from the job site before completion.

## 5.17 CONNECTIONS WITH EXISTING WATERLINES

The Developer or City Contractor shall make all excavation for connection to existing waterlines. Connections shall be made to existing water lines in the presence of the City.

The Developer or City Contractor shall furnish, install and maintain such shoring, bracing and sheeting necessary for connections as set forth in Section 5-10.

Existing valves shall not be operated unless qualified City personnel are present. Arrangements for operating existing valves shall be made with the City Director of Public Works at least 48 hours of consecutive city business days prior to scheduled operations.

Connections shall be made at such times as designated by the Engineer and in such a manner as to insure the least inconvenience to water users. No connection shall be made until the new work has been tested and disinfected as specified hereinafter. The Developer or City Contractor shall be responsible for safeguarding the existing system from all damage and possible contamination and be liable for impacts/cost associated with measures to immediately restore services.

The contractor shall furnish the pipe and materials necessary to make the tie-in to the existing system.

## 5.18 INSPECTION

### A. INSPECTION

All water lines shall be inspected for proper installation by the City, prior to backfilling of trenches.

### B. HYDROSTATIC TEST

After installing pipe and prior to complete backfilling of trenches the entire length 26 of each line shall be subjected to a hydrostatic pressure of not less than 200 psi for a period of not less than 1 hour. The pressure shall not be allowed to drop below 190 PSI. Curb stops, idler fittings and Sri units shall also be included in the hydrostatic test. At the end of the 1 hour pressure test the water pressure shall be bled clown to 150 PSI and a 1 hour leakage test performed, the contractor shall have all necessary equipment on hand to pressurize the piping and to measure the losses as the pump is operating. No pipe installation will be accepted if leakage for the section tested exceeds a rate in gallons per hour per 1,000 feet of pipe multiplied by  $\frac{1}{4}$  of the pipe diameter in inches.

The Developer or City Contractor shall perform the test prior to connecting to the existing system. The Developer or City Contractor shall furnish and install temporary caps, plugs far SP3 units, thrust blocks, and other necessary materials needed to hold pressures on sections of line being tested.

Water for testing may be taken from the nearest blow-off, fire hydrant or other approved source. All pipe, fittings, valves, couplings and other materials needed to fill the test lines with water shall be supplied and installed by the Developer or City Contractor. Care shall be taken not to contaminate the existing system.

The pump, gage, pipe connection and all necessary apparatus and equipment needed for the test shall be supplied by Contractor.

The Contractor shall permanently stop all leaks. Repair clamps shall not be used, a full length section of pipe shall be installed to repair leaks. All defects occurring shall be tested again to determine final acceptability of the installation.

#### C. DISINFECTING WATER MAINS

Water mains shall be disinfected in conformance with the procedure specified in the current Standard Specifications for A.W.W.A. C651-99.

#### 5.19 BACKFILLING OF TRENCHES

After the pipe has been properly laid and inspected, backfill material shall be placed around the pipe at a depth of 12 inches above the top of the pipe and shall be thoroughly compacted to final density of at least 90 percent. This shall be done in such a manner as to not injure or disturb the pipe. All excavation within the existing street roadbed shall be backfilled and compacted until the relative compaction is not less 95 percent. Backfill material shall be placed in layers not to exceed 8 inches in depth and moistened as necessary before compaction. Each layer shall be thoroughly tamped, rolled or otherwise compacted and brought to grade. Backfill in trenches between the back of the curb and property lines shall be thoroughly consolidated to a final density of at least 90 percent of maximum density. Compaction of backfill material by ponding or jetting will not be permitted. Field density may be determined by any method accepted by the City Engineer.

#### 5.20 RESTORING SURFACE

The surface off all trenches shall be filled and compacted so that the surface will conform to the condition of the surrounding ground. The repaving requirements of the plans shall be met regardless of type of existing surfacing.

Existing pavement shall be cut in neat parallel lines as shown on City Standard Drawing No. SS.7.

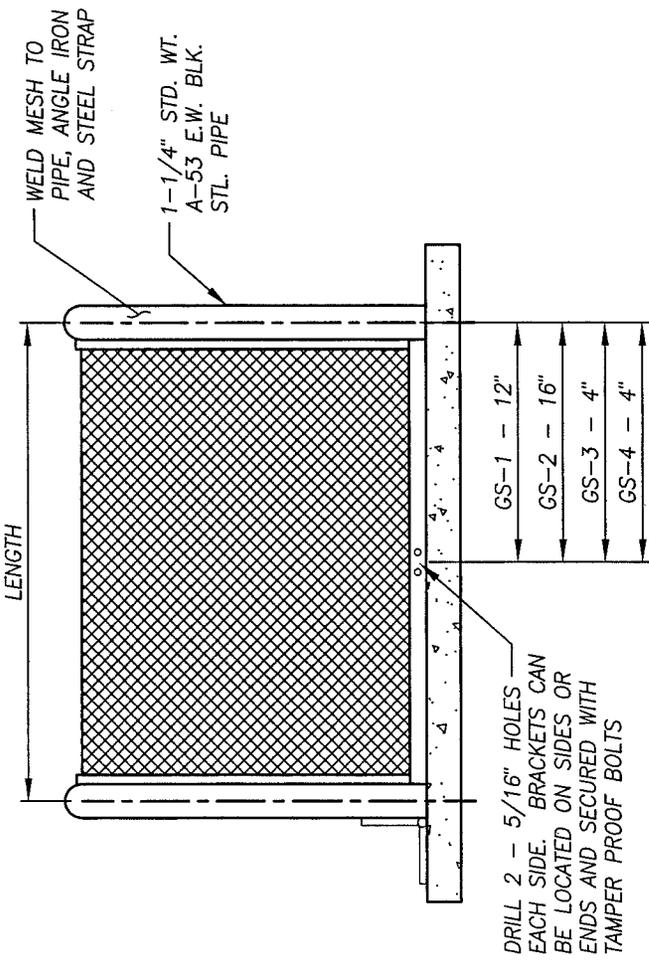
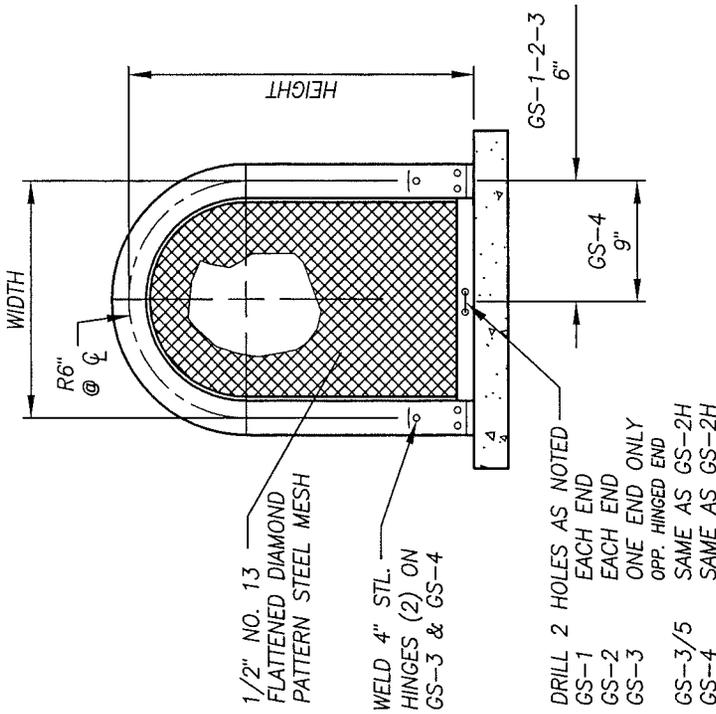
Aggregate base shall be Class II compacted to 95% relative compaction. Aggregate base shall have ¾-inch maximum combined grading.

Asphalt concrete shall be Type B, AR 4000 with ½-inch maximum aggregate, medium grading.

A paint binder of asphaltic emulsion shall be applied to all surfaces in conformance with Section 39-4 of the State Improvement Standards.

GUARDSHACK -  
 STANDARD SIZED "POWDER COATED" METAL ENCLOSURE  
 MODELS GS-5 TO GS-2 FOR 1/2" - 2" BACKFLOW ASSEMBLIES  
 www.DPDI.com

SHALL BE DPDI OR APPROVED EQUAL



DRILL 2 - 5/16" HOLES EACH SIDE. BRACKETS CAN BE LOCATED ON SIDES OR ENDS AND SECURED WITH TAMPER PROOF BOLTS

- 1/2" NO. 13 FLATTENED DIAMOND PATTERN STEEL MESH
- WELD 4" STL. HINGES (2) ON GS-3 & GS-4
- DRILL 2 HOLES AS NOTED EACH END
- GS-1 EACH END
- GS-2 ONE END ONLY
- GS-3 OPP. HINGED END
- GS-3/5 SAME AS GS-2H
- GS-4 SAME AS GS-2H

NOTE:  
 ALL WELDED AREAS SHALL BE A MINIMUM OF 1/4" BEAD EVERY 4"  
 AFTER ALL WELDING, ENTIRE UNIT SHALL BE PROCESSED WITH IRON PHOSPHATE PRETREATMENT. ELECTROSTATIC APPLICATION OF POWDER SHALL BE FUSION BONDED - PRS-8-4004-C (BEIGE) OR PRS-8-4003-C (LEAF GREEN) OR APPROVED EQUAL.  
 ALL UNITS ALSO AVAILABLE IN 304 SS.  
 GS-3.5 AVAILABLE IN 304 S.S. ONLY.  
 ALL BOLTS FOR HINGES AND HASPS SHALL BE ZINC PLATED TAMPER PROOF, EXCEPTION - USE SS HARDWARE FOR SS UNITS.

STD. SIZE	CENTERLINE DIMENSIONS	WEIGHT	
		GS	CGS
GS-5	12"W x 18"H x 12"L	35	30
GS-1	12"W x 24"H x 24"L	35	34
GS-2	12"W x 24"H x 32"L	45	40
GS-3	12"W x 24"H x 42"L	51	46
CGS-3.5	12"W x 30"H x 42"L	N/A	55
GS-4	18"W x 30"H x 48"L	67	60

NOTE:  
 GS = POWDER COATED STEEL GUARD SHACK  
 CGS = STAINLESS STEEL COAST GUARD SHACK W/ SAND BLASTED STAIN FINISH



# AIR RELEASE VALVE ASSEMBLY METAL ENCLOSURE

DRAWN BY: C.V.  
 CHECKED BY: P.K.  
 SCALE: NONE  
 DATE: 7/07

APPROVED BY: \_\_\_\_\_  
 DATE APPROVED: 8/15/07

CITY OF HUGHSON

STANDARD DETAIL  
 5-W.14

# SECTION 6

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## SEWERS

### 6.1 GENERAL

Sewers shall be installed by a Contractor holding the appropriate license for such work under the provisions of the State of California Business and Professions Code. Maps and Plans for developments for which the City Engineer deems there to be insufficient sewer treatment or conveyance capacity shall not be processed or approved.

### 6.2 DESIGN

Eight inch sewers not less than 0.40%, ten inch sewers not less than 0.30%, twelve inch sewers not less than 0.25%.

The minimum sewer grades set forth above may be modified only with the written approval of the City.

Normal practice is that sewers shall have a minimum cover of 3 feet from the top of the pipe to finished paving grade. Sewer with less than the minimum cover, if approved, shall be cast iron or ductile iron and shall require special written approval by the City.

Sewers within 100 feet of domestic wells shall be cast iron or ductile iron, with special seals similar to those crossing domestic water lines.

Where a sewer line crosses a water line, the sewer line shall be designed in accordance with these Improvement Standards and State Health Department Standards.

Sewer mains shall be 5' from centerline as measured from centerline to the nearest side of the pipe. Sewer mains shall be on the opposite side of the centerline from the water line.

### 6.3 MANHOLES

Manholes as shown in Drawings No. SS.1 and SS.2 shall be constructed at all changes in vertical or horizontal alignment and at all pipe intersections. The maximum distance between manholes shall be 400 feet. A terminal manhole as shown in Drawing No. SS.3 shall be constructed at all dead ends,

When a line is to be extended at a future date, a temporary lamphole as shown in Drawing No. SS.4 may be installed when approved by the City.

Elevation differentials of manhole inlets and outlets must conform to the improvement plans. The channel through the manhole shall be formed by laying the pipe through the manhole and removing the upper half of the pipe after the concrete is set. Special care

shall be taken in the finishing of the interior of all manholes to obtain the best hydraulic characteristics. All rough edges shall be chipped away and plastered to leave a smooth surface. Where called for on the plans, stubs shall be installed and plugged in a manner approved by the City.

Manholes shall be constructed of precast reinforced concrete sections which conform to A.S.T.M. specifications C478.

The frame and cover shall conform to the elevation of the adjacent ground or pavement as shown in Drawing No. ST.7.

#### 6.4 PIPE FOR SEWER MAINS

Sewer pipe shall be Cast Iron Pipe, OVC – SDR35 or Ductile Iron Pipe.

Compression joints shall be used for all pipe and shall conform to the current standard specifications of the A.S.T.M. - C425-77.

Cast Iron Pipe shall conform to the current standard, specifications of the American National Standards Institute (A.N.S.I.) - A21.6, and shall be Class 150, with bell and spigot joints, Cast Iron fittings shall conform to A.N.S.I./A.W.W.A. CI 10-77.

Ductile Iron Pipe shall be Class 50 and shall conform to the current standard specifications of the American National Standards Institute (A.N.S.I.) A21.51. All fittings shall conform to A.N.S.I./A.W.W.A. - 0110-77.

Polyvinyl Chloride Gravity Sewer Pipe (SDR 35) and fittings shall meet or exceed the requirements of ASTM D 3034 (SDR 35). The installation of all PVC pipe shall conform to ASTM D2321. The maximum deflection shall not exceed 5% of the inside diameter of the pipe. If deflection exceeds 5% the pipe shall be removed and replaced by the Developer or City Contractor at his/her expense.

#### 6.5 STAKING OF SEWER MAINS AND SERVICES

The sewer mains and services shall be staked by the Developer's engineer on projects installed by the Developer

#### 6.6 EXCAVATION

Excavation shall include the removal of all materials encountered. All trenches shall be excavated in open cut following neat parallel lines distant from the pipe centerline as shown in Drawing No. ST.7. Maximum width of the trench at the level of the top of pipe shall not exceed the outside diameter of the pipe barrel plus 24 inches.

At no time shall there be more than 300 feet of trench open per trenching machine, including the section opened ahead for pipe laying and the section behind which is not completely backfilled, unless otherwise specified by the City.

Excavation shall be made at least 4 inches below the grade of the bottom of the pipe in areas where the material is too hard to permit proper bedding. This over-excavation shall be brought to grade with approved material compacted in place. Said material shall be a Sand Equivalent value of not less than 20 and shall conform to the following grading:

<u>Sieve Sizes</u>	<u>Percentage Passing</u>
3"	100
No. 4	35-100
No. 30	20-100

Pipeline bedding and backfill to 12" over the pipe shall conform to the manufacturer's requirement limiting the pH value of such materials, to minimize potential for corrosion.

Excess and/or rejected material shall be disposed of by the Developer or City Contractor at their expense.

No tunneling or jacking will be permitted without written permission from the City.

#### 6.7 SHORING, BRACING AND SHEETING

The Contractor shall furnish, install and maintain such shoring, bracing and sheeting as required in these Improvement Standards, and by the State of California, Division of Occupational Safety and Health.

After the pipeline has been installed and sufficiently backfilled to protect the pipe, all shoring, bracing and sheeting shall be removed. All voids left by the removal of such bracing shall be carefully filled with suitable material compacted in place.

#### 6.8 SEEPAGE, STORM WATER OR SEWAGE

The Developer or City Contractor shall remove from the trench any seepage, storm water, or sewage that may have accumulated during the progress of the work, and shall furnish all pumps and other equipment necessary. The Developer or City Contractor shall also keep his completed work reasonably free from accumulation of water and sewage and shall free it entirely at such times as may be required by the City for the purpose of inspection. The removed material shall not be discharged into the sewer.

## 6.9 LAYING PIPE

The pipe shall be laid to conform with the prescribed lines and grades. All adjustments of pipe to the line and grade shall be made by scraping away or filling in and tamping under the body of the pipe, not blocking or wedging.

Manufacturer's recommendations on proper procedure for laying pipe shall be followed.

All pipe shall be laid with bell end upstream and shall be laid upstream from structure to structure. A minimum of three grade stakes per 100 foot interval shall be provided, and each stake shall be used in establishing the grade and alignment for the sewer.

## 6.10 SEWER SERVICE MATERIALS

- A. Each individual property shall have separate sewer service(s) complete from the sewer main to the property. The minimum size sewer service lateral is 4 inch. Sewer services are not permitted in easements without prior written approval of the Engineer. This approval will be given only when insufficient grade makes it impossible to service the property directly from a sewer main in the right of way.

For non-typical single family residential, the Design Engineer shall take into account the anticipated sewer use, and service lateral length to size and grade the lateral.

If abnormal or unusual conditions occur, the City may allow alternative pipe materials. All service connections shall be installed with wye fittings.

All sewer services, including risers, wyes, tees, tee saddles and wye saddles, shall be installed in accordance with City of Hughson Standard Drawings No. SS.5 and SS.5a.

### B. PVC SDR35

Materials for Public Sewer Lines. Pipe and fittings, jointing materials, and appurtenant materials shall be shown on the drawings and as specified herein.

- a. PVC PIPE - PVC pipe and fittings shall be permitted for sewers up to 27 inches in diameter. The use of PVC pipe for sewers larger than 27 inches in diameter will be considered on a case by case basis. PVC pipe shall meet either the sewer pipe specifications or the pressure pipe specifications listed below depending upon the depth of sewer installed.
1. For Gravity Sewers Up to 15 Feet Deep. At a minimum the gravity sewer pipe shall be SDR 35 PVC. Pipe up to 15 inches in diameter shall conform to ASTM Specification D-3034 (latest revision). Pipe with a diameter 18 inches or larger shall conform to ASTM Specification F679 (latest revision). The use of pipe conforming to ASTM F-794 and ASTM F-1803 will be considered on a case-by-case basis for pipe sizes 12 inches to 27 inches in diameter. Joints shall comply

with the specifications below. Pipe embedment and backfill shall be in accordance with the Embedment of Pipe Standard Detail.

2. For Gravity Sewers Deeper Than 15 Feet but Less Than 30 Feet Deep. At a minimum the gravity sewer pipe shall be SDR 26 heavy wall gravity sewer pipe. Pipe up to 15 inches shall conform to ASTM Specification D-3034 (latest revision). Pipe with a diameter 18 inches or larger shall have a minimum stiffness of 115 psi and conform to ASTM Specification F679 (latest revision)

PVC pressure rated pipe shall be permitted as follows. PVC pipe shall meet AWWA Specification C900 (latest revision), or AWWA Specifications C909 (latest revision), or AWWA specifications C905 (latest revision), or ASTM Specification D2241 (latest revision) SDR 26.

Joints shall comply with the specifications below. Pipe 505-2 embedment and backfill shall be in accordance with the Embedment of Pipe Standard Detail.

3. For Gravity Sewers Installed Deeper Than 30 Feet Deep. Gravity sewers installed deeper than 30 feet deep shall only be approved on a case by case basis.

#### Jointing Materials

Ordinary joints	ASTM D3212, integral bell push-on type elastomeric gasket joints .
Field cut joints and connections to other piping materials	Can-Tex "C-T Adapters"; Dickey "Plastic Pipe Adapters"; Fernco "PVC Donuts"; "Flexible Couplings"; Mission "Eastern Standard Band-Seal Couplings" with stainless steel shear rings; Nashua Pre-Cast Corporation "Flex-O-Joint"; or equal.

- b. DIP - Ductile iron pipe (DIP) shall be used for sanitary sewer in areas where the minimum 30 inches of cover over the top of pipe cannot be met, under creek crossings, deep gravity sewer applications, or as specified on the Contract plans. Pipe embedment and backfill shall be in accordance with the Embedment of Pipe Standard Detail.

<u>Pipe</u>	Ductile iron, ANSI A21.51; ASTM A536, Grade 60-42-10; thickness, class 52
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#### Fittings

Material	Gray iron, ANSI A21.10. 250 psi pressure rating, except shorter laying lengths will be acceptable or ductile iron, ASTM A536, Grade 80-60-03 or 70-50-05, ANSI A21.10, 350 psi pressure rating
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<u>Push-on Joints</u>	ANSI A21.11, except gaskets shall be neoprene or other synthetic rubber. Natural rubber will not be acceptable
Flanged Joints	ANSI A21.15
Flanges	ANSI B16.1, 125 lb or U.S. Pipe "Flange-Tyte"
Bolts	ASTM A 307, chamfered or rounded ends projecting 1/4 to 1/2 inch beyond outer face of nut
Nuts	ASTM A307, Hexagonal, ANSI B18.2, heavy semifinished pattern 505-3
Gaskets	ASTM D1330, Grade I rubber, ring type, 1/8-inch thick; or U.S. Pipe "Flange-type", 1/8-inch thick
Mechanical Joints	ANSI A.21.11
Wall Castings	Mechanical joint with waterstop and tapped holes, single casting or fabricated cast iron Midwest Pipe Fabricators "Adjustable Wall Pipe." All holes shall be plugged with plastic plugs.

Plastic Plugs Protective Closures "Caplug Series WW"

Mechanical Joints  
with Tie Rods

Tie Rods	TM A 307
Steel Pipe	STM A210, standard weight
Washers	NSI B27.2, plain steel
Mechanical Couplings	
Couplings	Dresser Style 38 or Rockwell/Smith-Blair 441 or 411 Flexible Coupling; without pipe stop
Gaskets	Oil-resistant synthetic rubber
Shop Coating and Lining	
Cement Lining	ANSI A21.4
Bituminous Coating	Manufacturer's standard

Rust-  
Preventative  
Compound

Houghton "Rust Veto 344" or Rush-Oleum "R9"

Field Coating

Heavy coal tar paint, MIL-C-18480; Koppers  
"Bitumastic No. 50", or Mobil "35-J-10 Hi-Build  
Bituminous Coating"

- c. RCP - RCP shall be permitted for gravity sewers with a diameter of 30 inches and larger. RCP shall conform to ASTM C76 (latest revision) Class III, Wall B. Pipe embedment and backfill shall be in accordance with the Embedment of Pipe Standard Detail.
1. Joints ASTM C-361, Bell and Spigot compressive type with resilient seals embedded in both ends and joined with O Ring rubber gaskets.
  2. All rubber and rings shall be extruded or molded and cured in such a manner that any cross section will be dense, homogeneous, and free of porosity, blisters, pitting and other imperfections. The basic polymer shall be EPDM hydrocarbon.

The compound shall conform to the following requirements: The rubber EPDM material shall meet ASTM C-443 with the exception of the 40-60 duro hardness. For resilient interlocked end seals the hardness duro A shall be 40 to 70 + 5.

3. Each concrete pipe section shall be tested at the project site with low pressure air or equivalent vacuum test. The test shall be conducted in a manner using a cap, plug and gasket of the type and size to be used in the field to include the tongue and bell sealing surface. End to end testing using foam plates is not acceptable. Reference ASTM C924. Pipe passing the test shall be clearly marked "Air Tested."

Materials for Private Service Laterals. Pipe and fittings, jointing materials, and appurtenant materials shall be shown on the drawings and as specified herein. Private service laterals shall be a minimum of 4 inches in diameter.

1. Pipe and fittings for private service laterals that connect to the public sewer main at a depth of 15 feet or less shall at a minimum be SDR 35 solid wall PVC sewer pipe and shall conform to ASTM Specification D-3034 (latest revision).
2. Pipe and fittings for private service laterals that connect to the public sewer main at a depth deeper than 15 feet but less than 20 feet shall at a minimum be SDR 26 heavy wall PVC gravity sewer pipe and conform to ASTM Specification D-3034 (latest revision).
3. Private service laterals shall not be connected to public sewers that are deeper than 20 feet.

Manhole Connections. The Contractor shall use precast manhole base sections with integral circular flexible gasket as specified in the sewer manholes section of these specifications, plain end pipe shall be installed through the gasket in accordance with the instructions of the gasket manufacturer.

Drawings and Data. Drawings and data shall be submitted in accordance with the submittals section. Drawings and data shall include but not limited to the following:

Details of joints

Gasket material

Pipe length

Certification

Affidavit of Compliance. An affidavit shall be submitted to the Engineer certifying that pipe, fittings, and jointing materials are in compliance with the governing standards and specifications.

#### C. Cast Iron Pipe (C.I.P.)

All Cast Iron Pipe shall conform to the current standard specifications of the American National Standards Institute (A.N.S.I.) - A21.6 and shall be Class 150, with bell and spigot joints.

##### 1. Connections

Only Cast Iron wyes and tees shall be used for connections to Cast Iron Sewer Mains, and shall conform to the current standard specifications of the A.N.S.I. - CI 10-77.

Only Class 50 Cast Iron straight pipe, elbows and fittings shall be used from the sewer main to the right of way line. Cast Iron Pipe shall be furnished with "Tyton Joints", "Ty-Seal Joints", or approved equal. Cast Iron transition couplings shall be installed in accordance with the manufacturer's specifications for each pipe size.

When connecting a sewer lateral directly from the manhole to the right of way line, Cast Iron Pipe shall be inserted into the manhole and brought to the right of way line.

#### D. Ductile Iron Pipe (D.I.P.)

All Ductile Iron Pipe shall be Class 50 and shall conform to the current standard specifications of the American National Standards Institute (A.N.S.I.) - A21.51 - 19756.

All Ductile Iron Pipe shall have a polyethylene encasement which shall conform to the current standard specifications of the A.N.S.I. - A21.5 (A.W.W.A. C105-72).

1. Connections

Connections to Ductile Iron Pipe sewer mains shall be at manholes only.

Only Cast Iron straight pipe, elbows and fittings shall be used from the sewer main to the right of way line. Cast Iron pipe shall be furnished with "Tyton Joints", "Ty-Seal Joints", or approved equal. Cast Iron transition couplings shall be installed in accordance with the manufacturer's specifications.

When connecting a sewer lateral directly from the manhole to the right of way line. Cast Iron Pipe shall be inserted into the manhole and brought to the right of way line.

6.11 MATERIALS TO BE FURNISHED AND INSTALLED BY DEVELOPER

The Contractor shall furnish all labor, materials, equipment and appliances required to complete the sewer mains and sewer services specified.

6.12 SERVICES INSTALLATION

The services shall be installed as per Standard Drawings No. SS.5 and SS.5a.

No direct connections are permitted on 15 inch or larger sewer mains without prior approval by the City. A service lateral may be connected to these mains, upon approval of the Engineer, when using one of the following methods:

1. A lateral (Min. 6 inch), may be extended from an existing manhole to the property, parallel to the main line.

The lateral extension shall end in a terminal manhole.

The building lateral shall be connected from the lateral extension to the right of way line.

Construction plans of the lateral shall be prepared by a registered civil engineer licensed in the State of California and shall be submitted to the City for approval.

2. If no manhole exists immediately adjacent to the property, a manhole may be placed over the main.
3. If manhole exists immediately adjacent to the property, the building lateral may be connected directly from the existing manhole to the right of way line.

6.13 BACKFILL

After the sewers and appurtenances have been properly constructed and inspected, (see Section 6.14 Inspection), the trench be backfilled and compacted as shown on Drawing No. E-1 and shall conform to Section 19-3.06 of the State Standards. The pipe shall be backfilled by hand shovel method to 1 foot over the pipe where clods exist in the spoil pile which may damage the pipe. (See note limiting pH in backfill, Section 6.6.) Above this hand placed backfill, all clods of any kind shall be removed which are larger than 4 inches in diameter.

Compaction tests on City contracts will be performed by the City. Compaction tests on other contracts shall be performed by a testing laboratory retained at the Developer's expense.

6.14 INSPECTION

All sewer lines shall be inspected for proper installation by the Engineer prior to backfilling of trenches.

All new sewer mains are to be inspected by television and videotaped at the contractor's expense.

The Contractor shall clean all lines of dirt and other debris, clean manholes, remove broken pipe, compact trench, raise manhole rims to grade, and correct all visible infiltration, leaks and deficiencies prior to inspection. Areas adjacent to manholes shall be leveled and made accessible to the television trailer. All inspection, including repeat work because the lines have not been cleaned, will be charged to the Developer on subdivision projects based on the time required of the crew and equipment.

All sewer mains and laterals shall be air tested as per the following paragraph.

Air tests shall be applied to length between adjacent manholes, and procedure shall be as follows:

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

<u>Size</u>	<u>Minimum Time in Seconds</u>
8"	254
10"	310
12"	450

If the time for the pressure to drop 0.5 psi is 125% or less of the time indicated, the line shall immediately be re-pressurized to 3.0 psi and the test repeated. If, during the 5 minute

saturation period, the pressure drops less than 0.5 psi after the initial pressurization and air is not added, the section undergoing the test shall have passed.

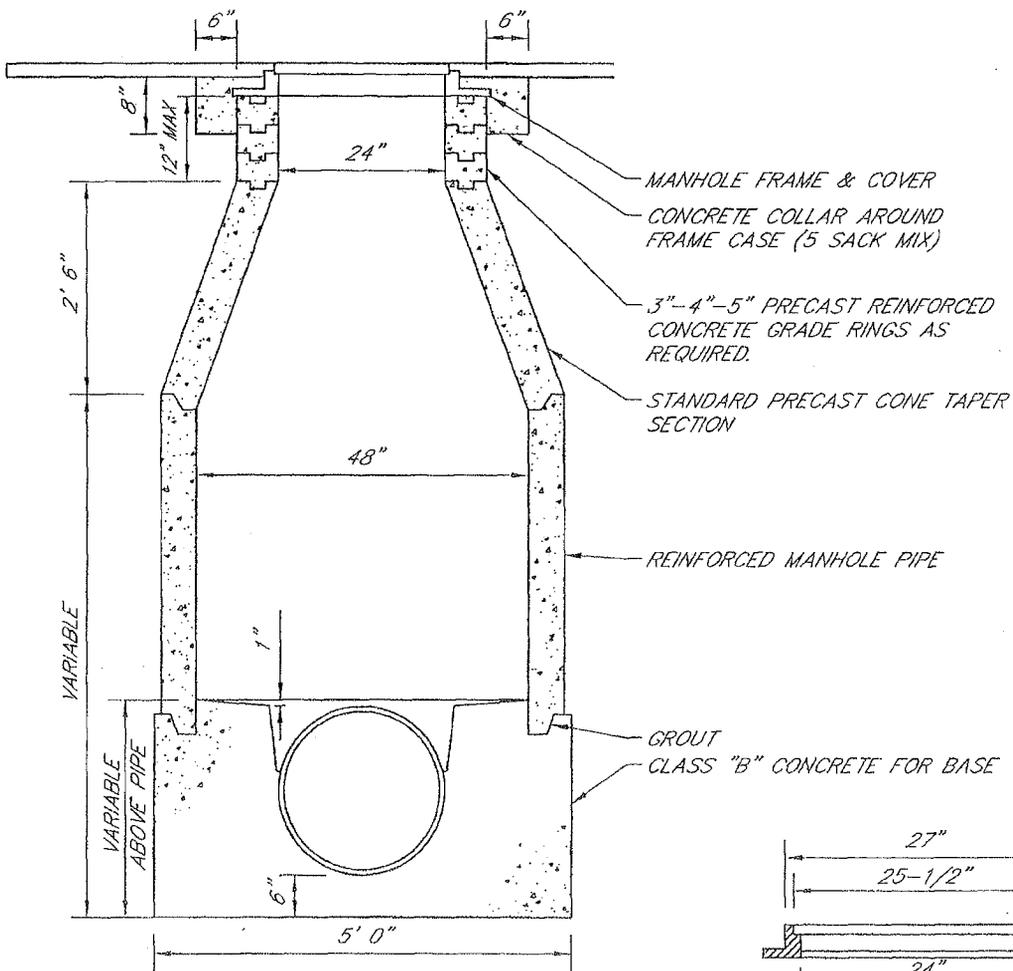
If the test is not passed, the leak shall be found and repaired to the satisfaction of the City, and the section retested.

#### 6.15 GREASE TRAPS

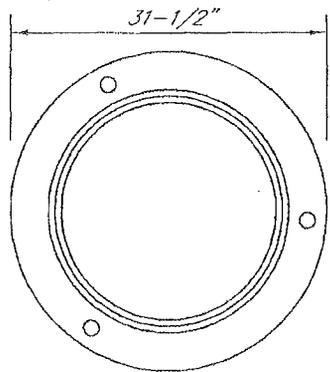
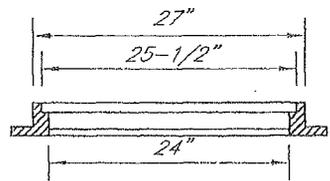
Grease traps and interceptors shall be constructed by the Developer on private property 35 on the sewer service lateral for any facility whose operation will result in oil, grease, sand or other solids being discharged into the City's sanitary sewer system.

The traps or interceptor shall conform to Section 708 and 711 of the Uniform Plumbing Code, 1995 Edition, and it shall be constructed where it can be easily inspected for proper operation by the City.

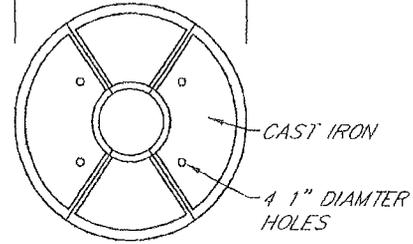
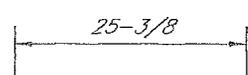
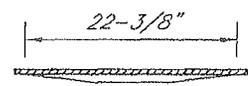
For additional information regarding specific requirements for grease traps, contact the Building Official. A typical detail is shown herein as Detail SS.6.



MANHOLE FRAME & COVER  
 CONCRETE COLLAR AROUND  
 FRAME CASE (5 SACK MIX)  
 3"-4"-5" PRECAST REINFORCED  
 CONCRETE GRADE RINGS AS  
 REQUIRED.  
 STANDARD PRECAST CONE TAPER  
 SECTION  
 REINFORCED MANHOLE PIPE  
 GROUT  
 CLASS "B" CONCRETE FOR BASE



**FRAME**  
 SOUTH BAY FOUNDARY NO. A-25  
 OR APPROVED EQUAL, LABELED SEWER



**COVER**



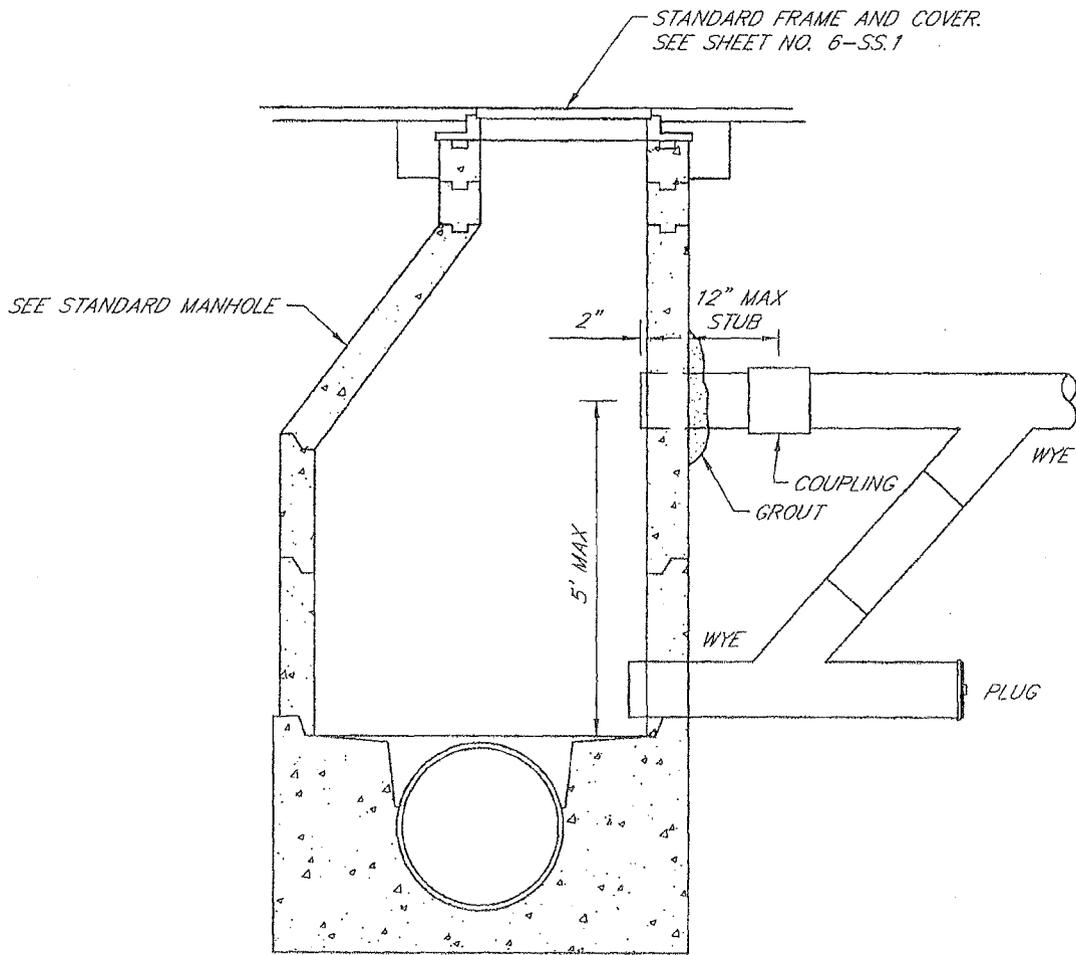
**SANITARY SEWER MANHOLE**

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: \_\_\_\_\_  
 DATE APPROVED: 2/12/07

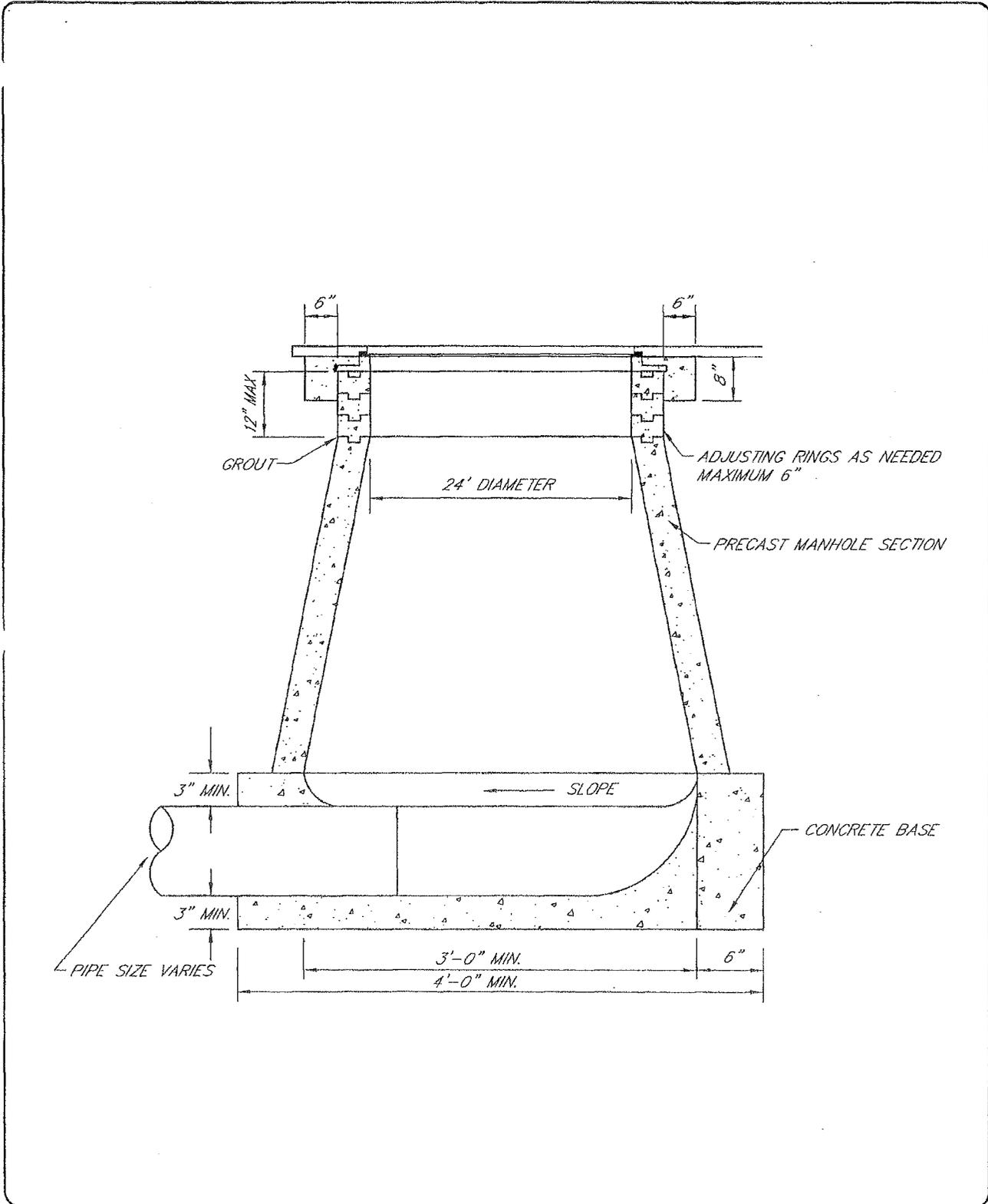
**CITY OF HUGHSON**

STANDARD DETAIL  
**6-SS.1**



NOTE:  
 THIS TYPE MANHOLE SHALL BE USED WHERE  
 DIFFERENCE IN INVERT ELEVATIONS AT  
 MANHOLE EXCEED 24".

	<p>SANITARY DROP MANHOLE</p>	<p>DRAWN BY: A.D.R.          CHECKED BY: R.H.H.          SCALE: NONE          DATE: 1/04</p>
<p>APPROVED BY: <i>[Signature]</i>          DATE APPROVED: 5/1/04</p>	<p>CITY OF HUGHSON</p>	<p>STANDARD DETAIL          6-SS.2</p>



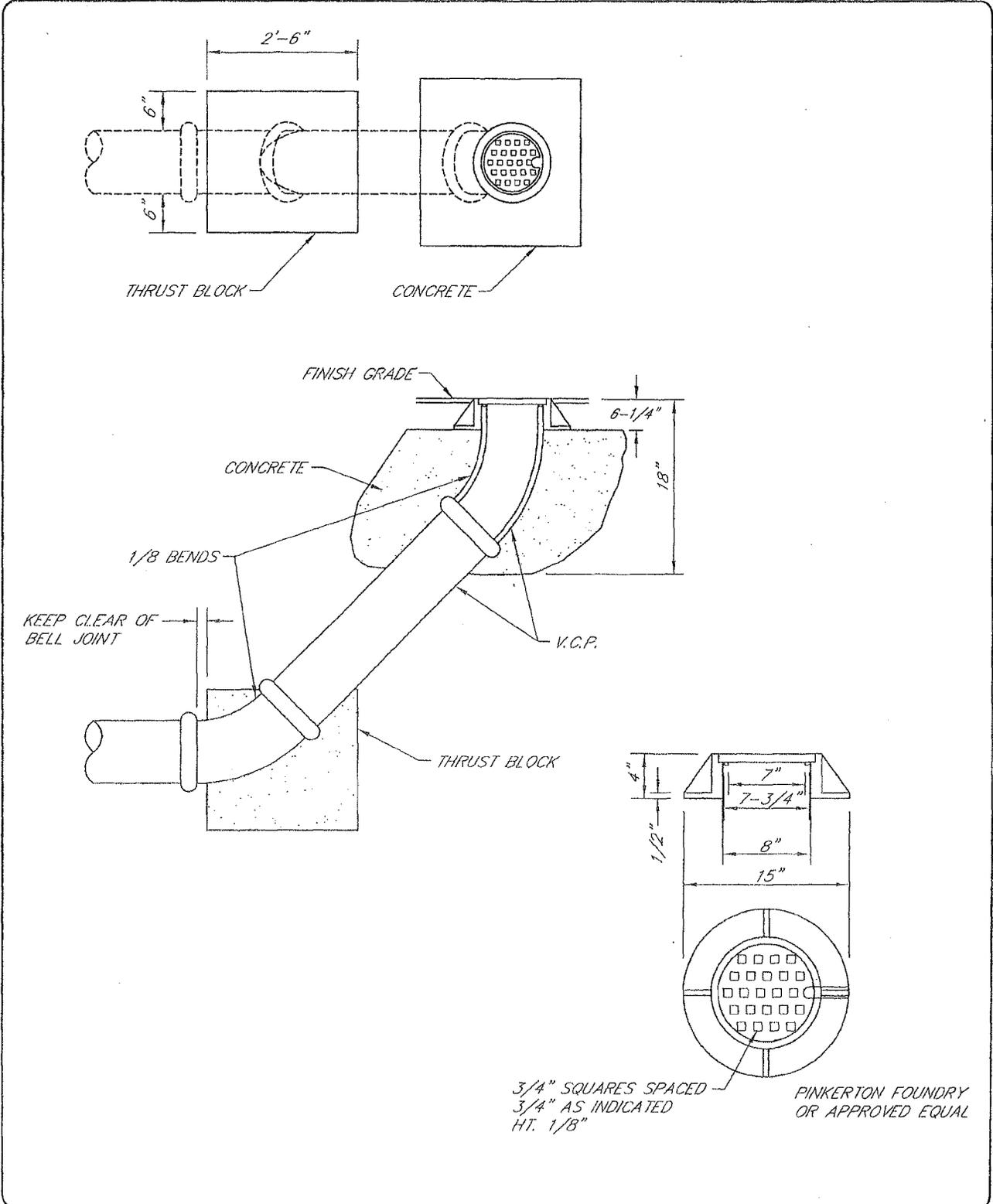
SANITARY TERMINAL MANHOLE

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

CITY OF HUGHSON

STANDARD DETAIL  
 6-SS.3



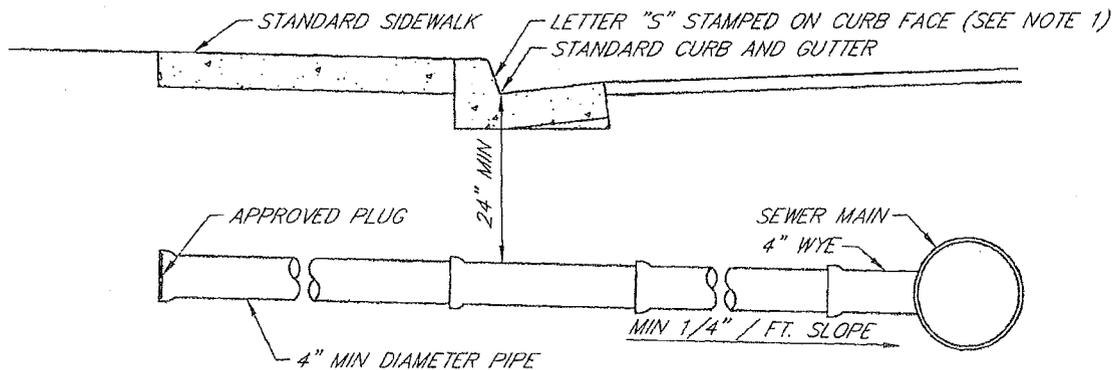
SANITARY SEWER LAMP HOLE

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

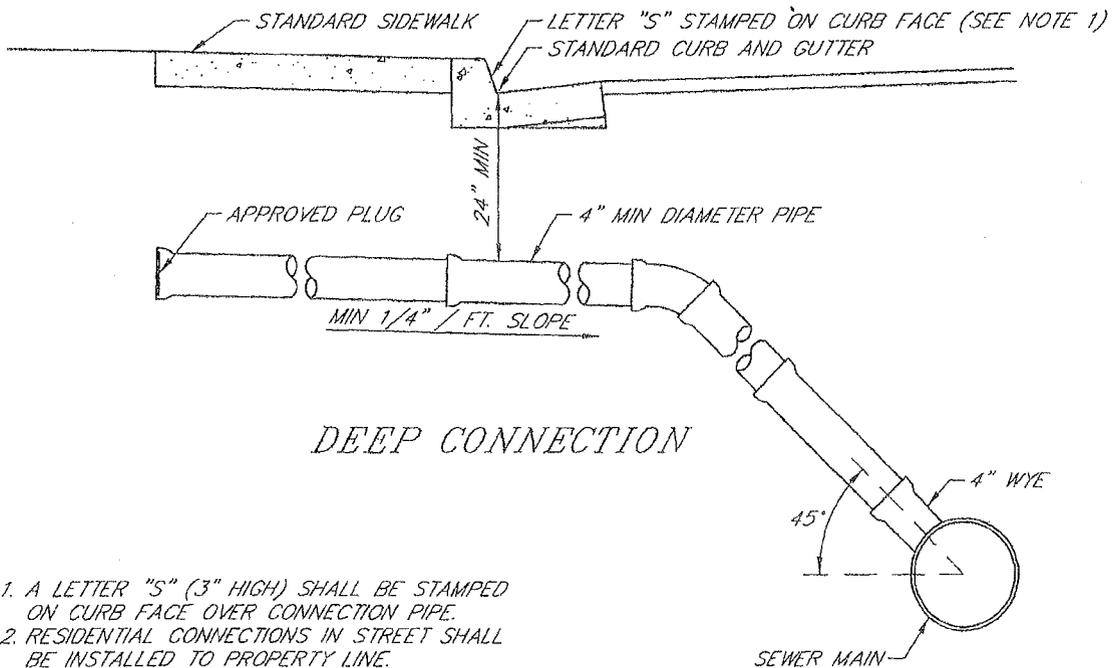
APPROVED BY: *[Signature]*  
 DATE APPROVED: 6/12/07

CITY OF HUGHSON

STANDARD DETAIL  
 6-SS.4



STANDARD CONNECTION



DEEP CONNECTION

1. A LETTER "S" (3" HIGH) SHALL BE STAMPED ON CURB FACE OVER CONNECTION PIPE.
2. RESIDENTIAL CONNECTIONS IN STREET SHALL BE INSTALLED TO PROPERTY LINE.
3. CONNECTION IN ALLEYS SHALL BE INSTALLED TO PROPERTY LINE.



HOUSE SERVICE LATERAL

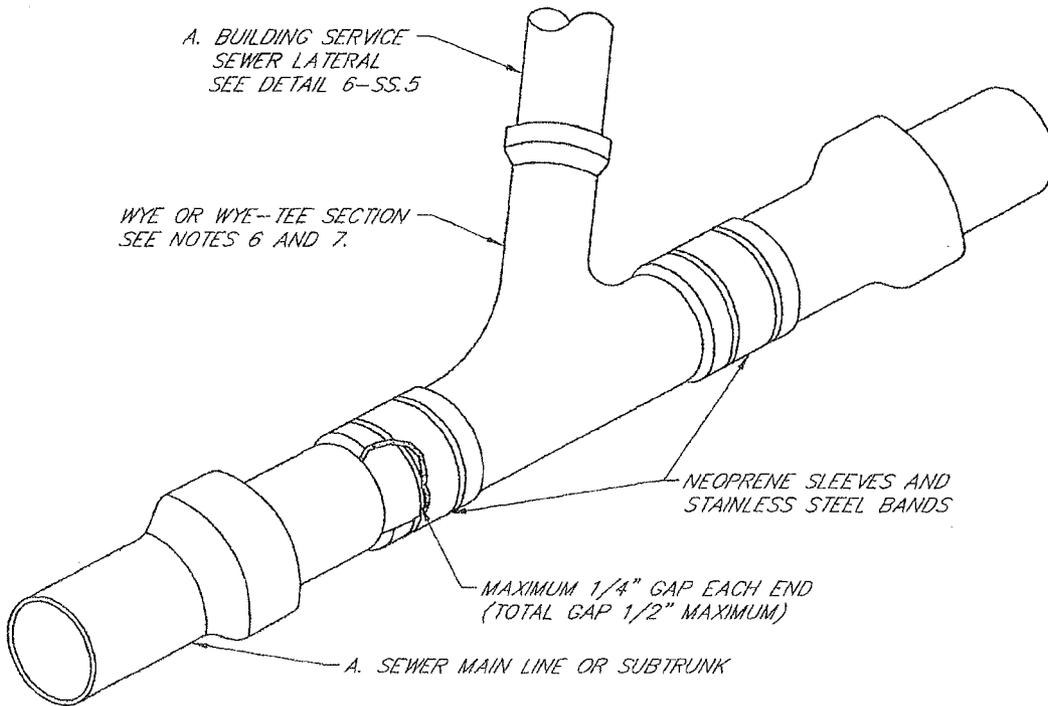
DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

CITY OF HUGHSON

STANDARD DETAIL

6-SS.5



CASE A. - BUILDING SERVICE TO SEWER LATERAL CONNECTION  
 CASE B. - SEWER LATERAL TO SEWER MAIN CONNECTION

NOTES:

1. A SYNTHETIC RUBBER WEDGED INSERTED TEE, "TOP-TITE", MAY BE SUBSTITUTED FOR THE ABOVE PROCEDURE.
2. CUTS ARE TO BE MADE WITH A PIPE CUTTING TOOL.
3. THERE SHALL BE NO MORE THAN TWO BANDS IN FIVE FEET LENGTH OF SUBTRUNK RUN.
4. THERE SHALL BE NO MORE THAN TWO BANDS IN FIVE FEET LENGTH OF SEWER MAIN.
5. A MANHOLE SHALL BE REQUIRED TO CONNECT A SEWER LATERAL LARGER THAN 4" DIAMETER TO A SEWER MAIN, UNLESS OTHERWISE APPROVED BY THE CITY.
6. WYES SHALL BE INSTALLED WHEN CONNECTING TO 10" DIAMETER LINES OR SMALLER.
7. WYE-TEES CAN BE USED WHEN CONNECTING TO SEWER MAINS 5' OR DEEPER.



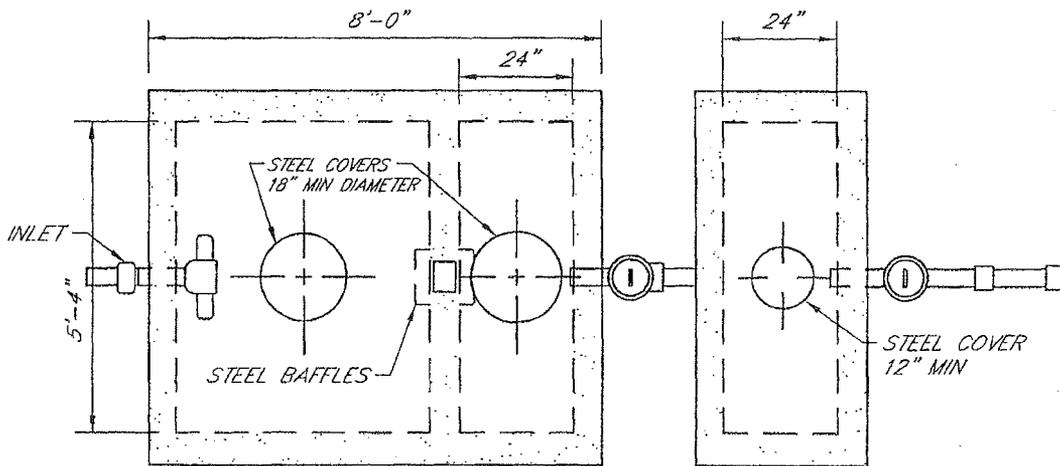
SEWER WYE CUT-IN DETAIL

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

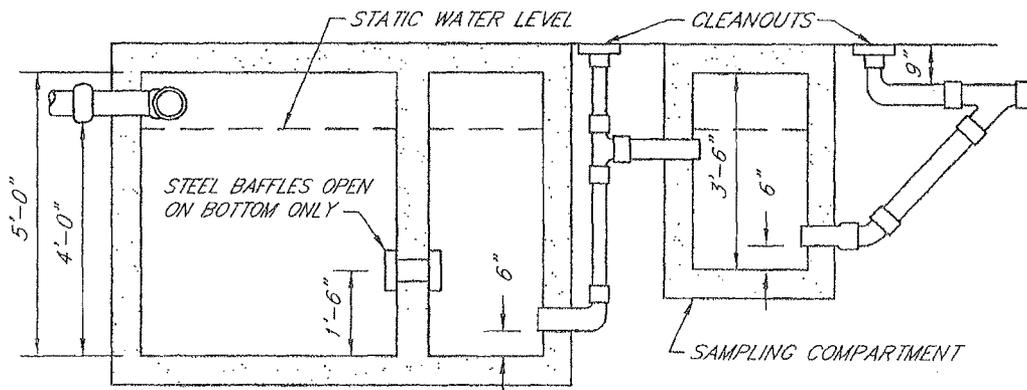
APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

CITY OF HUGHSON

STANDARD DETAIL  
 6-SS.5A



PLAN



SECTION

1. SUGGESTED DETAIL. EACH UNIT SHALL BE DESIGNED BY A REGISTERED CIVIL ENGINEER AND APPROVED BY THE CITY.
2. DIMENSIONS SHOWN ARE FOR A MINIMUM SIZE (750 GALLON) TRAP.
3. CONCRETE SHALL BE MINIMUM 3000 PSI AT 28 DAYS.
4. ON 750 OR 800 GALLON TRAPS, SAMPLE BOX MAY BE ELIMINATED.
5. COVERS SHALL BE STEEL AND SHALL BE GAS TIGHT.
6. ALL WASTE SHALL ENTER TRAP THROUGH THE INLET PIPE ONLY.
7. REINFORCEMENT SHALL BE ADEQUATE FOR TRAFFIC CONDITIONS IN AREA WHERE TRAP IS LOCATED.



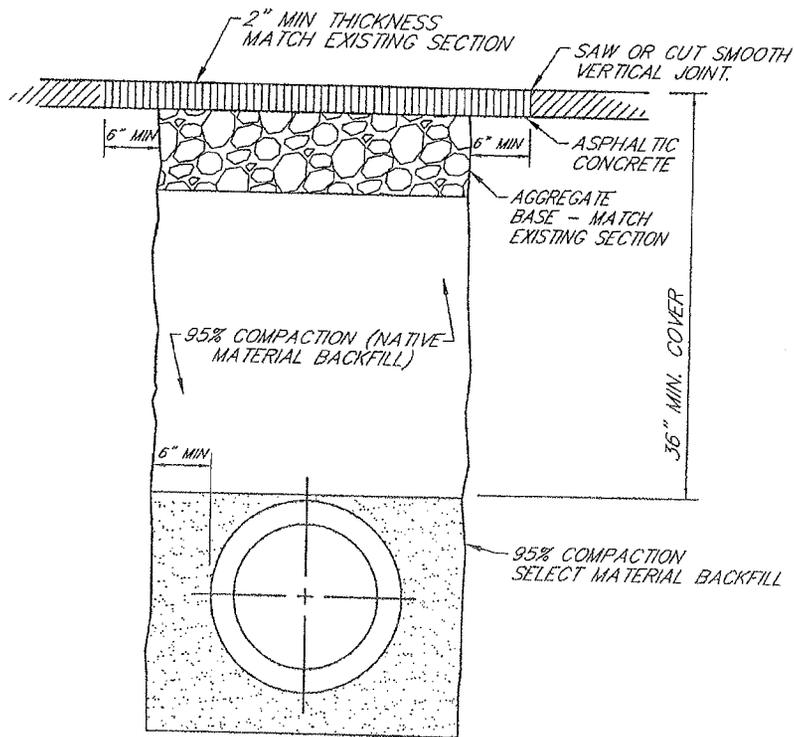
GREASE & SAND INTERCEPTOR

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

CITY OF HUGHSON

STANDARD DETAIL  
 6-SS.6



**BACKFILL AND  
STREET EXCAVATION**

DRAWN BY: A.D.R.  
CHECKED BY: R.H.H.  
SCALE: NONE  
DATE: 1/04

APPROVED BY: *[Signature]*  
DATE APPROVED: 5/11/04

**CITY OF HUGHSON**

STANDARD DETAIL

**6-SS.7**

## SECTION 7

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### STORM DRAINS

#### 7.1 GENERAL

All drainage designs shall be in accordance with the accepted principles of Civil Engineering, the City Storm Water Master Plan and these Improvement Standards.

Public rights of way for residential, commercial and industrial developments will have surface drainage disposal accommodated in one of the following ways:

Method A. Positive drainage directly to an existing storm drain system available to area proposed for development.

Method B. Drainage to a detention facility that can be in turn drained to other drainage systems in a controlled manner. Design calculations and plans prepared by the Design Engineer showing adequacy of the proposed system and how the design will integrate into future stormwater facilities.

Onsite drainage for commercial, industrial and residential projects not covered by the above shall be contained within the property unless offsite disposal is approved by the City and the Developer participates in the costs of an approved drainage system that is sized to accommodate said on-site drainage.

#### 7.1.1 STORMWATER QUALITY

Stormdrain discharges for all projects, commercial, industrial, or residential, regardless of the project size, shall include stormwater quality control measures. All stormwater generated from a site must be adequately treated before discharge. Stormwater management systems, which can include both structural and non-structural controls and best management practices, shall be designed to remove 80% of the average annual (post-development) total suspended solids (TSS) load, as well as any additional watershed or site-specific stormwater quality requirements, as determined by the City.

To the maximum extent possible; the development project shall implement pollution prevention practices during and after development of the site. Plans to control construction site wastes shall be included in an "Erosion Prevention and Sediment Control Plan" developed for the site in a Stormwater Pollution Prevention Plan.

## 7.1.2 STORMWATER MANAGEMENT PLAN

New developments and redevelopments shall prepare a Stormwater Management Plan for the City's review. Approval of this plan will shall be obtained, prior to the start of the development.

Stormwater management plans shall include the design calculations for any new subdivision or development. Submittals shall include the following:

- A Topographic map showing the relationship between the proposed development and the remainder of the watershed, including acreage of all sub-areas.
- Hydrology calculations for 10-year, 24-hour duration storm with the design basin at capacity and hydrology calculations a 100-year storm.
- A 1"=100' scale plan, showing the proposed street system, existing and proposed drainage system, tributary sub-areas, off-site drainage, the flow and flow direction in each pipe and flow to each structure contributed by its tributary area. All flows shall be noted in cfs.
- The hydraulic calculations shall show as a minimum the HGL, the proposed storm drain, including slopes and sizes, the flow in the pipes, the velocities in the pipes, elevations of pipe inverts at structures, top of structure elevations, and top of curb elevations.
- Stormwater shall be modeled on a system wide basis that includes all tributary flows and all downstream areas up to the final point of system discharge (e.g. TID Canal) Modeling shall use a Dynamic Model such as the EPA SWMM version 5 or approved alternate.

## 7.2 FLOW VOLUMES

The 100-year storm is to be contained within the top of curb grade. The hydraulic grade line for a 10-year 24-hour duration storm shall be below the gutter pan (flowline). The engineer shall assume that the storm basins are full when modeling these criteria.

In establishing the layout of stormwater networks, it is essential to ensure that flows will not discharge onto private property during times when stormwater flows are equal or exceed the major system design capacity.

## 7.3 DETENTION BASINS

Detention basins when proposed for individual development shall conform to the minimum standards outlined below:

- A. Capacity shall be large enough to entrap the total runoff from a 10 year frequency - 24 hour duration storm.
- B. Basins to be designed in such a manner that the highest design water elevation will be 6 inches below the lowest gutter elevation.
- C. Maximum allowable depth of basin to be ten feet below the lowest gutter flow line with the bottom shaped to concentrate the water at the outlet.
- D. Basin will be fenced using six (6) foot chain link fence with plastic or redwood slats or other approved material, a twelve (12) foot gate, and the fence may be located on the property line on all but exterior lots.
- E. There will be a 5 foot wide (min) unimproved walkway adjacent to the inside of the fence around the top of the basin.
- F. There will be a 10 foot wide unimproved ramp to the bottom of the basin with a max slope of 6 to 1.
- G. Other requirements for safety, aesthetics, maintenance and special conditions may be imposed by the City.
- H. Alternative basin design may be allowed upon approval by the City.

The design of all culverts, levees, detention basins, spillways, and other applicable structures shall comply with the latest FEMA and DWR Division of Safety of Dam regulations.

#### 7.4 PIPE MATERIALS

Storm drain pipe may be reinforced concrete pipe, cast-in-place concrete pipe or PVC (SDR 35) or H.D.P.E.

The used must conform to the minimum standard requirements for the type of pipe use by accepted engineering practice and must be approved by the City. The class of pipe to be used shall be shown on the plans or specified in the special provisions.

Reinforced concrete pipe shall conform to Sections. 65 of the Standard Specifications.

Cast-in-place concrete pipe shall conform to Sections 63 of the Standard Specifications and these Improvement Standards. Use of cast-in-place pipe shall be only as approved by the City.

Polyvinyl Chloride Gravity Sewer Pipe (SDR 35) and fittings shall meet or exceed the requirements of ASTM D 3034 (SDR 35). The installation of all PVC pipe shall conform to ASTM D2321. The maximum deflection shall not exceed 5% of the inside diameter of the pipe. If deflection exceeds 5% the pipe shall be removed and replaced by the Developer or City Contractor at his expense.

High Density Polyethylene (HDPE) profile wall sewer pipe 18" and larger shall conform to ASTM F 894-85 and shall have gasketed or welded joints. Pipe fittings shall also conform to ASTM F 894-85 and have a hydrostatic design basis (HOB) of not less than 1250 psi for water at 73.4° per ASTM D 2837. Installation of HDPE pipe shall conform to ASTM D 2321.

Under special conditions and as approved by the City and Director of Public Works, Poly-Vinyl Chloride Pipe may be used for stormwater mains.

**PIPELINE SIZING** - At intersection of pipes, the downstream pipe shall have a crown elevation which is less than or equal to the crowns of all upstream connecting pipes. Pipe diameters shall not decrease in the downstream direction.

The minimum allowable inside diameter of any storm drain pipe shall be 12 inches and designed to flow with a minimum velocity of 2 feet per second when flowing full.

## 7.5 DRAIN INLETS

Drain inlets shall be constructed as shown on Drawing No. SD.5 and SD.6.

The structural channel iron shall be galvanized to conform to the requirements of Section 75-1.05 of the State Standards.

All storm drain inlets shall be protected from surface water contamination in conformance with the City of Hughson Storm Water Management Plan S.W.M.P. and the required project Storm Water Pollution Prevention Plan (SWPPP). In conformance with the State General Permit Requirements.

**Catch Basins** - Catch basins shall be designed according to the specifications listed in City Standard Drawing No. SD-3 and SD-4. Catch basins shall be designed and spaced such that they intercept and fully contain the 10-year storm. Under no circumstances shall the spacing of catch basins exceed 500 feet.

## 7.6 MANHOLES

Storm drain manholes shall be constructed on storm drain trunk lines and lateral lines as shown on Drawing No. SD.1. Manholes on cast-in-place pipe shall be constructed as shown on Drawing No. SD.2.

The manhole castings shall be raised to finish street grade by the Developer or City Contractor. In easement areas, the casting grade shall conform to the surrounding surface unless special elevations are required because of irrigation or future street grades.

Manholes shall be constructed at changes in horizontal alignment or slope, at intersections of trunks or laterals, at drain inlet connections, at 400 foot maximum spacing unless greater spacing is approved by the City and at all storm drain ends.

## 7.7 EXCAVATION

Excavation shall include the removal of all materials encountered. All trenches shall be excavated in open cut following neat parallel lines equidistant from the centerline as staked.

Maximum width of the trench at the level of the top of pipe shall not exceed the outside diameter of the pipe barrel plus 24 inches, unless otherwise approved by the City.

Excavation shall be carried at least 4 inches below the grade of the bottom of the pipe in areas where the material is too hard to permit proper bedding. This over-excavation shall be brought to grade with approved material compacted in place. Any areas which do not provide a sound foundation shall be over-excavated as directed by the City and filled to grade with approved materials compacted in place. Excess and/or rejected material shall be disposed of by the Contractor at his/her expense.

Erosion prevention and sediment control practices shall be utilized during the construction phase or during any land disturbing activities.

## 7.8 LAYING

The pipe shall be laid in conformity with the prescribed lines and grades. All adjustments of pipe to line and grade shall be made by scraping away of, filling in, and tamping under the body of pipe and not by blocking or wedging. All pipe shall be laid with bell end and upstream and shall be laid upstream from structure to structure.

All stormdrain pipe alignments shall be designed to allow a minimum of 36 inches of cover as measured from finished grade to top of pipe or 1 foot below subgrade, whichever is greatest. If, for sound engineering reasons, 3 feet of cover can not be obtained, the pipe shall either be encased in concrete or provided with a concrete cover as specified by the City Engineer.

## 7.9 INSPECTION

All storm drain lines shall be inspected for proper installation by the City prior to backfilling of trenches.

## 7.10 BACKFILL

After the drain pipe and appurtenances have been properly constructed and inspected and the joints have set, the trench shall be backfilled and compacted until the relative compaction is not less than 90% to within 24 inches to finish grade or to finish grade in an area outside the roadway. All material in the remaining 24 inches shall be compacted to 95% relative compaction (in maximum lifts of 8") as shown on Drawing No, SS.7 and shall conform to Section 193.06 of the State Standards.

Ponding or jetting may be permitted when specifically approved by the City, if this method does not hinder subsequent operations.

## 7.11 TESTING

Testing for proper compaction and for control of the concrete shall be performed by the City unless otherwise specified on the plans.

Certificates of compliance, weighmaster tags or other standard design data may be required by the City.

On subdivision projects the cost of the above testing shall be added to the inspection costs which are paid by the Developer.

## 7.12 DRAINAGE PUMPS

Drainage pumps shall be of the non-clog type and each installation shall have two pumps that automatically operate regularly on an alternating basis with both pumps operating together during times of heavy flow. The capacity of the system shall be such that each individual pump can efficiently handle 100% of the design storm runoff for they are being drained.

Each pumping plant installation shall be designed for the purpose intended and shall be approved by the City.

Storm Drain Lift Station shall be a Storm Drain Duplex Pump Station. The System shall include two submersible pumps, and a quick disconnect system which permits installation and removal of each pump without the need for personnel to enter the Wet Well. All components of the pumping system must be listed and labeled by Underwriter's Laboratory for Operation in a Class I, Group D. Division 1 location as defined in the National Electric Code.

**OPERATING CONDITIONS:** Pump shall be designed so that the motor will not overload at a minimum static head of zero (0) feet. Pumps shall be designed to pass a three (3) inch diameter solid. For maximum system efficiency, each pump impeller shall be trimmed to meet the specified system flow and head conditions.

**PUMP CONSTRUCTION:** The volute casing, impeller and motor enclosure shall be cast iron. The motor shaft on which the impeller is mounted shall be stainless steel. The impeller shall be slip-fit to the shaft, key driven, and attached with stainless fasteners.

All electrical parts shall be housed in an air-filled watertight enclosure. Tandem lapped-face seals shall be provided on the rotating motor shaft. The inner seal shall operate in a sealed, chamber containing two moisture sensing-probes, capable of detecting any influx of conductive liquid past the outer seal. The probes shall be connected to a relay and signal device in the pump control panel, providing the operator with an indication of impending seal failure.

Automatic Reset, normally closed thermostats shall be provided in two adjacent phases of the motor winding. The thermal protection system shall limit motor skin temperatures to 80% of Group D gas ignition temperatures under all electrical conditions, including single

phasing or locked rotor. The motor enclosure shall be listed and labeled by Underwriter's Laboratory as suitable for use in Class I, Group D, Division 1, hazardous location.

The pump and motor assembly shall be listed by Underwriter's Laboratory as "portable utilization equipment," permitting the use of flexible power and control cable in the wet well. The cable entry point at the top of the pump motor shall be epoxy sealed to prevent entrance of moisture into the motor enclosure.

Pump Station access doors shall be of ¼" diamond plate aluminum able to withstand a live load of 300 lbs. per square foot and have a lifting handle and locking post. The cover shall open to 90° and lock automatically in that position. The lid shall be Bilco, type J-AL, USEMCO or approved equal. Doors may be hydraulically assisted when approved by the City. In areas of exposure to traffic, lids shall withstand an H20 load rating.

**DISCONNECT SYSTEM:** The design of the Disconnect System shall permit easy removal of each pumping unit for inspection or service. The pumps, when lowered into place, shall be automatically connected to the discharge piping there shall be no need for personnel to enter the Wet Well to inspect or service the pumps.

Each pump shall be securely attached to a sliding guide bracket designed for use with at least two guide rails. Guide rails shall be stainless steel, schedule 40. Each sliding Guide bracket shall have non-sparking material at the point of contact with the guide rails to prevent spark ignition of explosive wet well gases during pump installation and removal.

A cast iron discharge elbow, located on the floor of the wet well, will receive the pump discharge when the pump is lowered into place. The receiving edge of the discharge elbow shall be fitted with a non-sparking material to prevent spark ignition and removal. The pump discharge shall be fitted with a resilient seal which provides a positive hydraulic seal for maximum pump system efficiency. The lower guide rail brackets for each pump shall be mounted by the pump manufacturer on a steel base plate. The base plate shall be aligned to allow for proper operation of the disconnect system. The base assembly shall provide stable, three-point support of the pumping unit during pump operation.

The entire quick disconnect pumping system must be listed and labeled by Underwriter's Laboratory (UL) as suitable for operation in Class I, Group D, Division I location as defined in the National Electric Code.

**ELECTRICAL CONTROLS - DUPLEX SYSTEM:** All controls shall be mounted in a free standing self contained NEMA 3R metal enclosure. The control panel and all electrical components shall bear the Underwriter's Laboratory (UL) label. All electrical work shall comply with the rules and regulations of the National Electrical Code and State of California electrical safety orders. All circuit breakers shall have operators extending through the door of the enclosure. All motor starter overload resets, selector switches, push buttons and pilot lights shall be mounted on the door of the enclosure.

The control for each pump shall include a thermal magnetic circuit breaker, rotary handoff-automatic switch, and magnetic motor starter with ambient compensated overload relays and quicktrip heaters. The pump control circuit shall include a door interlock switch to de-

energize the control circuit when the enclosure door is open, a control circuit transformer with fused 115 volt secondary and grounding type duplex convenience outlet. Pump operation shall be controlled by three (3) bulb type liquid level sensors. An intrinsically safe pilot circuit shall be provided for each level sensor to reduce the power to the sensor to a level incapable of releasing sufficient electrical or thermal energy to ignite explosive gases. All wiring shall be copper.

The controls shall provide for lead/lag sequencing of the pumps. The pumps shall operate singly or in parallel. An automatic alternator shall alternate the lead/standby on each succeeding pump cycle. An outer pump seal leakage detection system shall be included in the control enclosure. When the motor probes sense the presence of moisture in the oil seal chamber, a relay coil will illuminate a panel mounted indicating lamp to indicate possible outer motor seal failure.

A fourth level sensor, with intrinsically safe circuit, shall be furnished for indication of a high water alarm condition. High water alarm shall be indicated by an external red light and, an external audible alarm with silence button.

**PIPING AND VALVES:** All pump station piping shall be ductile iron with 125 pound flanged connectors. Gate valves in the discharge lines shall be A.W.W.A. approved with 125 pound flanges. Check valves in the discharge lines shall be full opening, with outside lever and spring, stainless steel hinge pins and "0" ring seals.

**WARRANTY:** All material including pumps, valves, electrical controls, etc. shall be guaranteed for a one-year period from the date of final acceptance by the City.

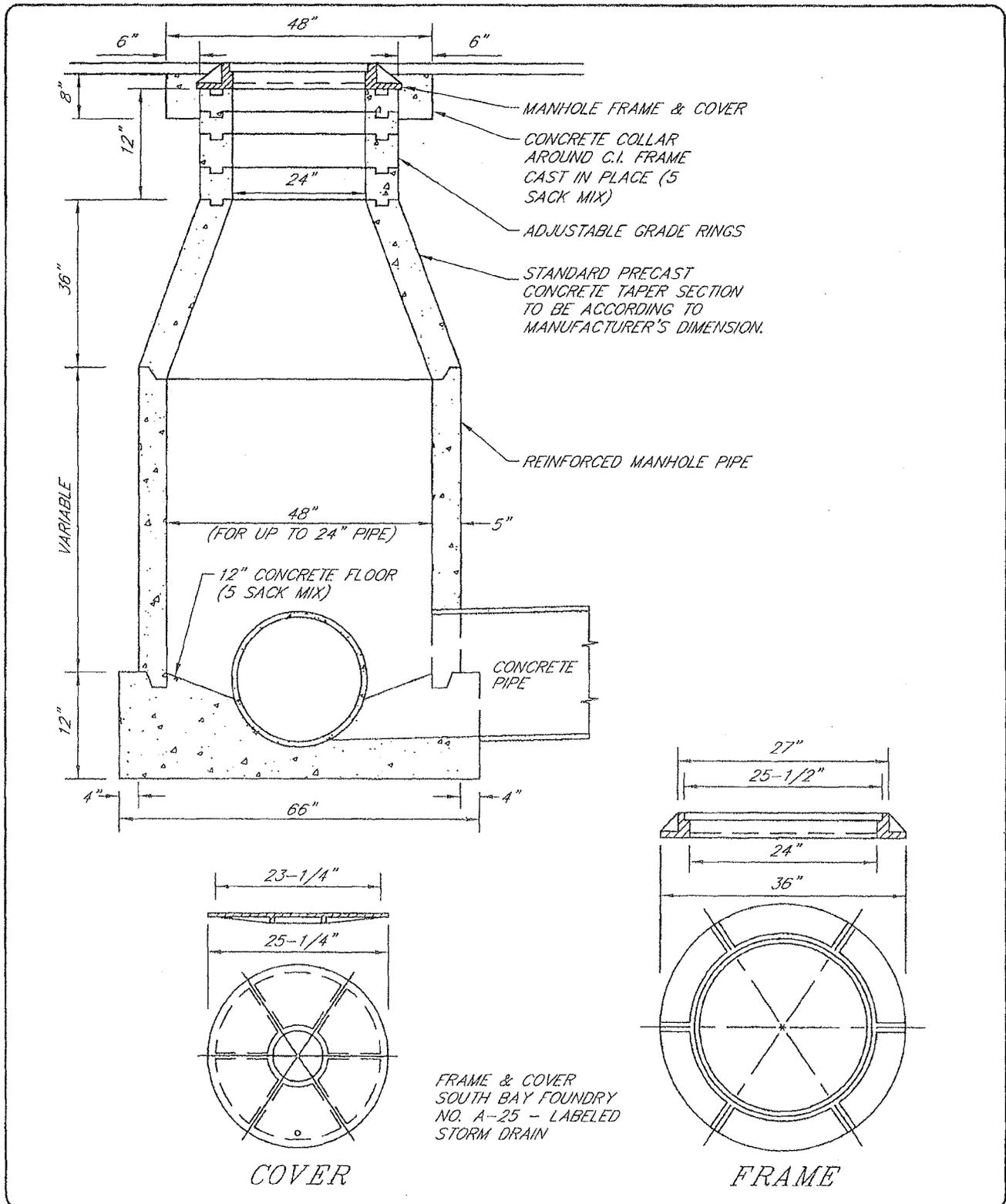
**OPERATION AND MAINTENANCE:** Prior to installation the Contractor shall furnish the City with a complete set of manufacturer's operation, maintenance, and parts manuals for all equipment installed and provided in a form easily reproducible and understood by Operations & Maintenance staff. He/she shall also provide the City with the name, address and phone number of the nearest local distributors for all parts. A complete wiring diagram shall also be furnished to the City and an additional copy to the Engineer.

**TESTING:** The entire installation shall be successfully tested at a time acceptable to the City in the presence of the Engineer and City Operations & Maintenance staff. Panel and circuits shall be tested for shorts and grounds with mains and disconnects from feeders. Each individual circuit shall be tested at the panel with all equipment connected for proper operation. Training for operation of the installation shall be provided to Operations & Maintenance personnel.

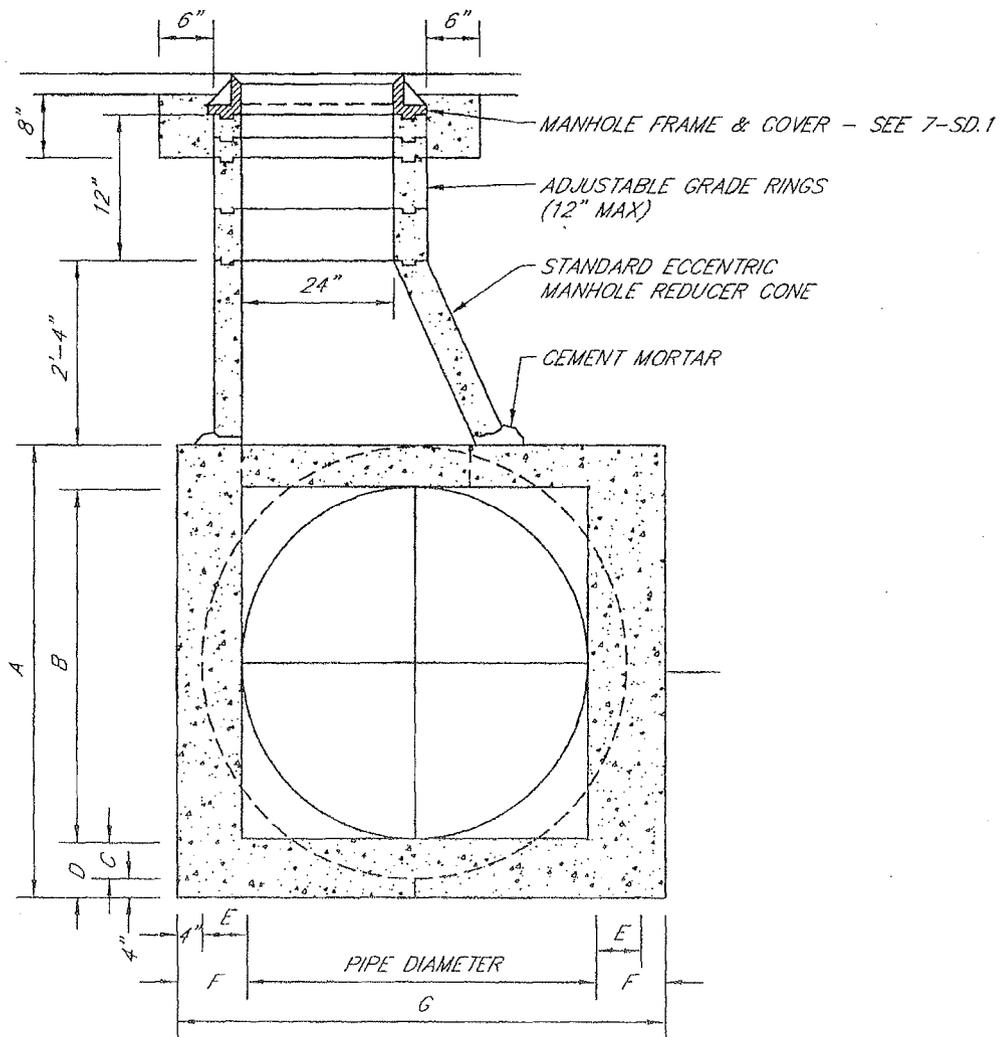
**NOTE:** All stormwater system design and installation shall be constructed to conform to existing BMP's (Best Management Practices) and the City of Hughson Stormwater Management Plan.

The City shall be notified and contacted by the Contractor at least forty-eight (48) hours prior to beginning or re-starting any of the following stages of work and shall be notified when each of the stages has been completed. Subsequent stages shall not begin without authorization of the City. Should the Contractor fail to so notify and contact the City, the

cost of all subsequent inspection and testing necessary to ascertain that the work has met all the specified requirements shall be born by the Contractor or the work shall not be approved.



	<h2>STORM SEWER MANHOLE</h2>	DRAWN BY: A.D.R. CHECKED BY: R.H.H. SCALE: NONE DATE: 1/04
APPROVED BY:  DATE APPROVED: 1/5/04	<h3>CITY OF HUGHSON</h3>	STANDARD DETAIL <b>7-SD.1</b>



PIPE DIA.	A	B	C	D	E	F	G
36	49 1/2	36	3 1/2	7 1/2	4 1/2	8 1/2	53
42	56	42	4	8	5	9	60
48	63	48	5	9	6	10	68
54	69 1/2	54	5	9 1/2	6 1/2	10 1/2	75
60	76	60	6	10	7	11	82
66	83	66	6 1/2	10 1/2	7 1/2	11 1/2	89
72	90	72	7	11	8	12	96

ALL DIMENSIONS ARE IN INCHES



### CAST IN PLACE MANHOLE

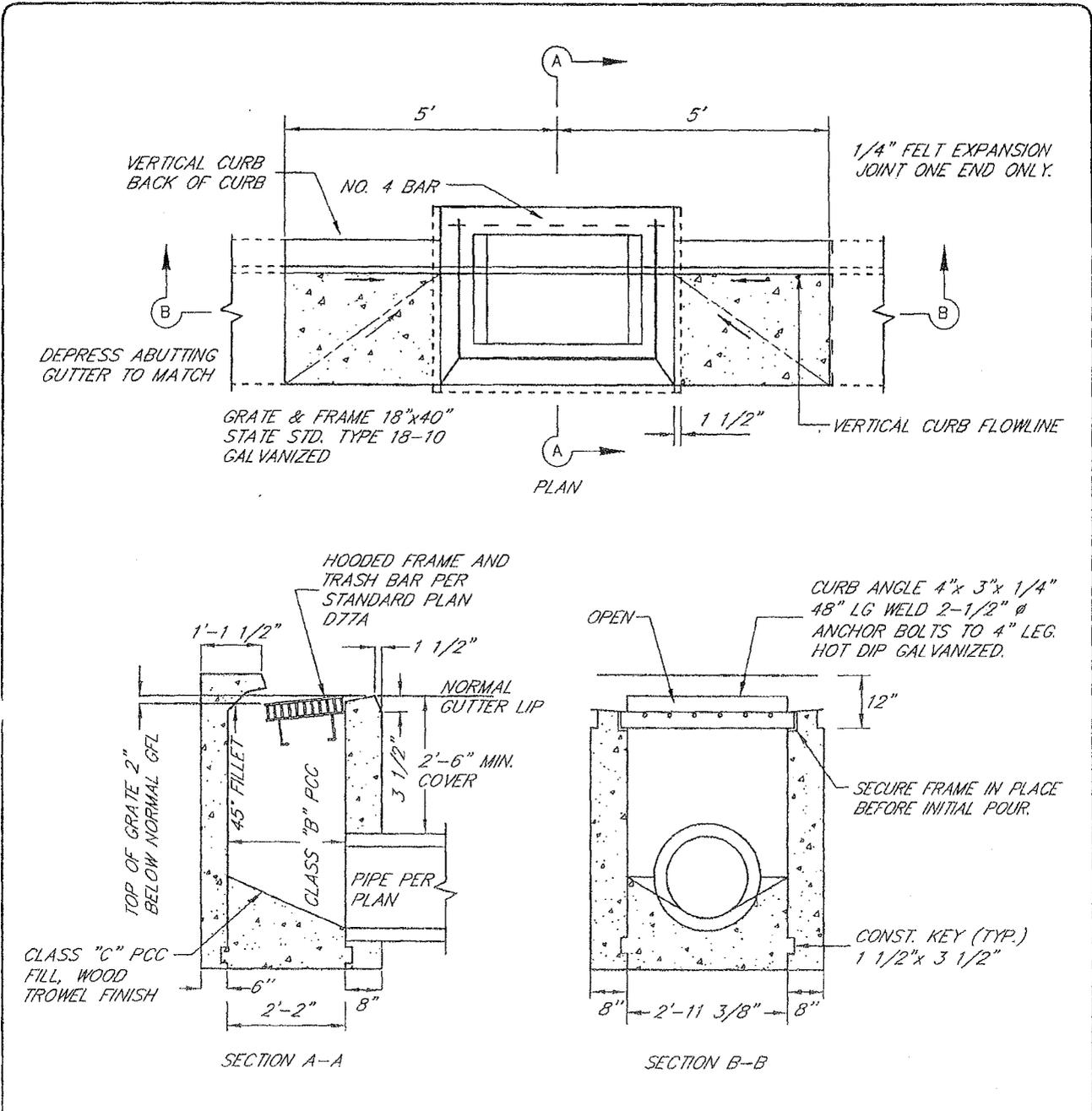
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 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 3/1/04

CITY OF HUGHSON

STANDARD DETAIL

7-SD.2



NOTES:

1. REINFORCING NOT REQUIRED IF INVERT IS LESS THAN 8' DEEP, OTHERWISE USE NO. 4 BARS @ 18" O.C. BOTH WAYS.
2. IN AREAS OF DRIVEOVER CURBING, A 3' TRANSITION TO VERTICAL CURBING WILL BE NECESSARY ON EACH SIDE OF THE CATCH BASIN.



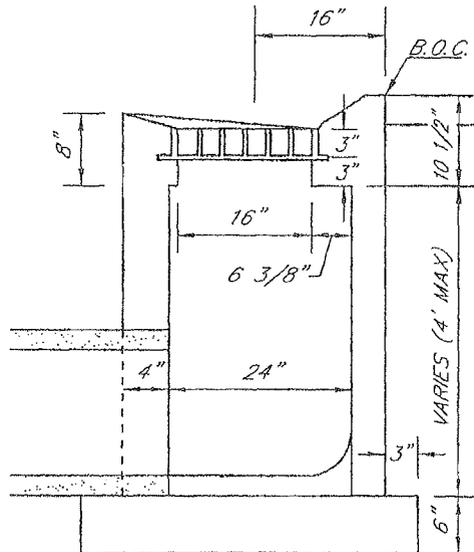
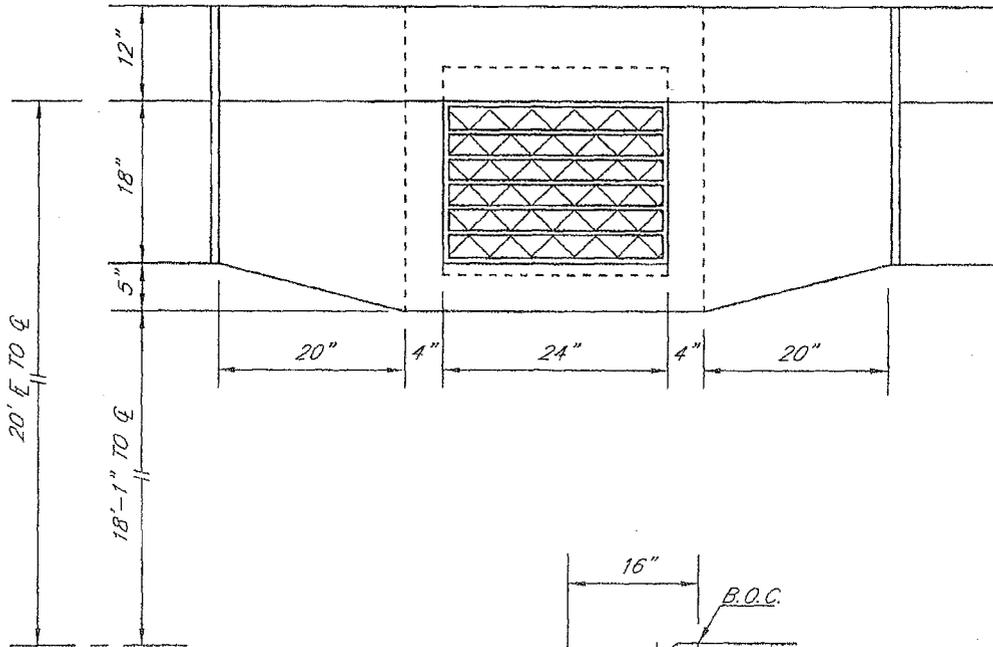
CATCH BASIN DETAILS

DRAWN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04

APPROVED BY: *[Signature]*  
 DATE APPROVED: 5/1/04

CITY OF HUGHSON

STANDARD DETAIL  
 7-SD.3



DRIVEOVER CURB  
CATCH BASIN DETAILS

DRAWN BY: A.D.R.  
CHECKED BY: R.H.H.  
SCALE: NONE  
DATE: 1/04

APPROVED BY: *[Signature]*  
DATE APPROVED: 5/1/04

CITY OF HUGHSON

STANDARD DETAIL  
7-SD.4

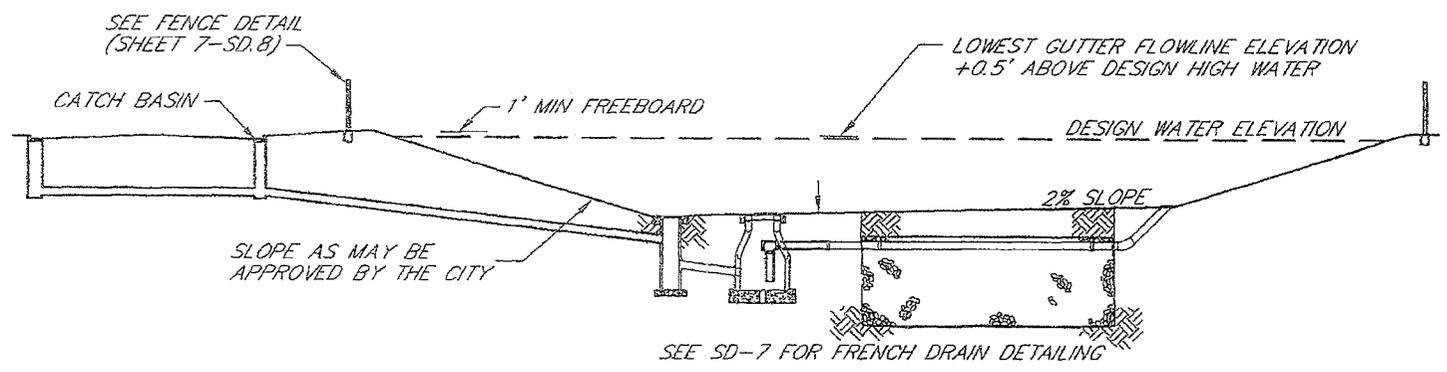
APPROVED BY: \_\_\_\_\_  
 DATE APPROVED: 8/13/07



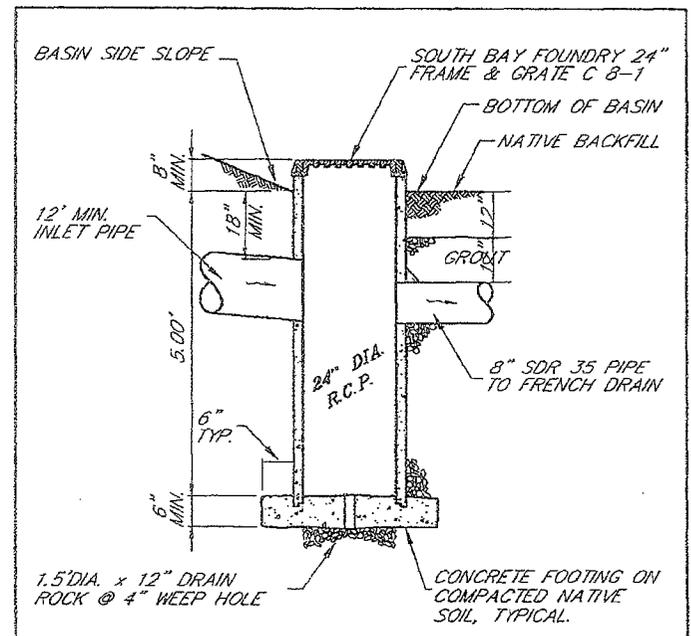
STANDARD DRAINAGE  
 BASIN

CITY OF HUGHSON

STANDARD DETAIL  
 DRAIN BY: A.D.R.  
 CHECKED BY: R.H.H.  
 SCALE: NONE  
 DATE: 1/04  
 7-SD.5

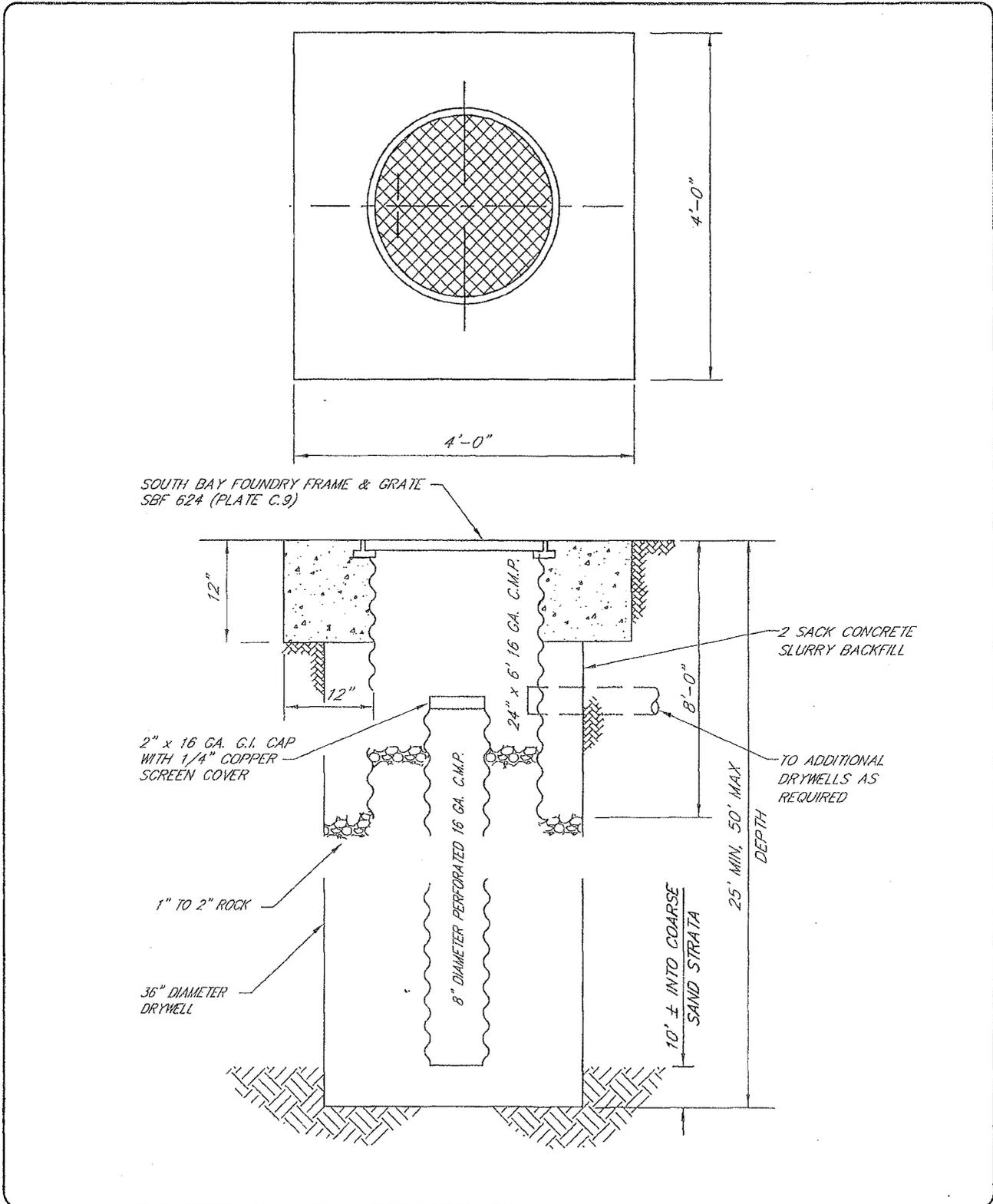


**FRENCH DRAIN INLET DETAIL**  
 NO SCALE



**FRENCH DRAIN INLET DETAIL**  
 NO SCALE

NOTE: FOR INLET PIPE LARGER THAN 18" IN DIAMETER THE DESIGN ENGINEER SHALL PROVIDE PROPOSED DESIGN DRAWINGS FOR A MODIFIED INLET STRUCTURE TO THE CITY ENGINEER FOR APPROVAL.



STANDARD DRAINAGE UNIT

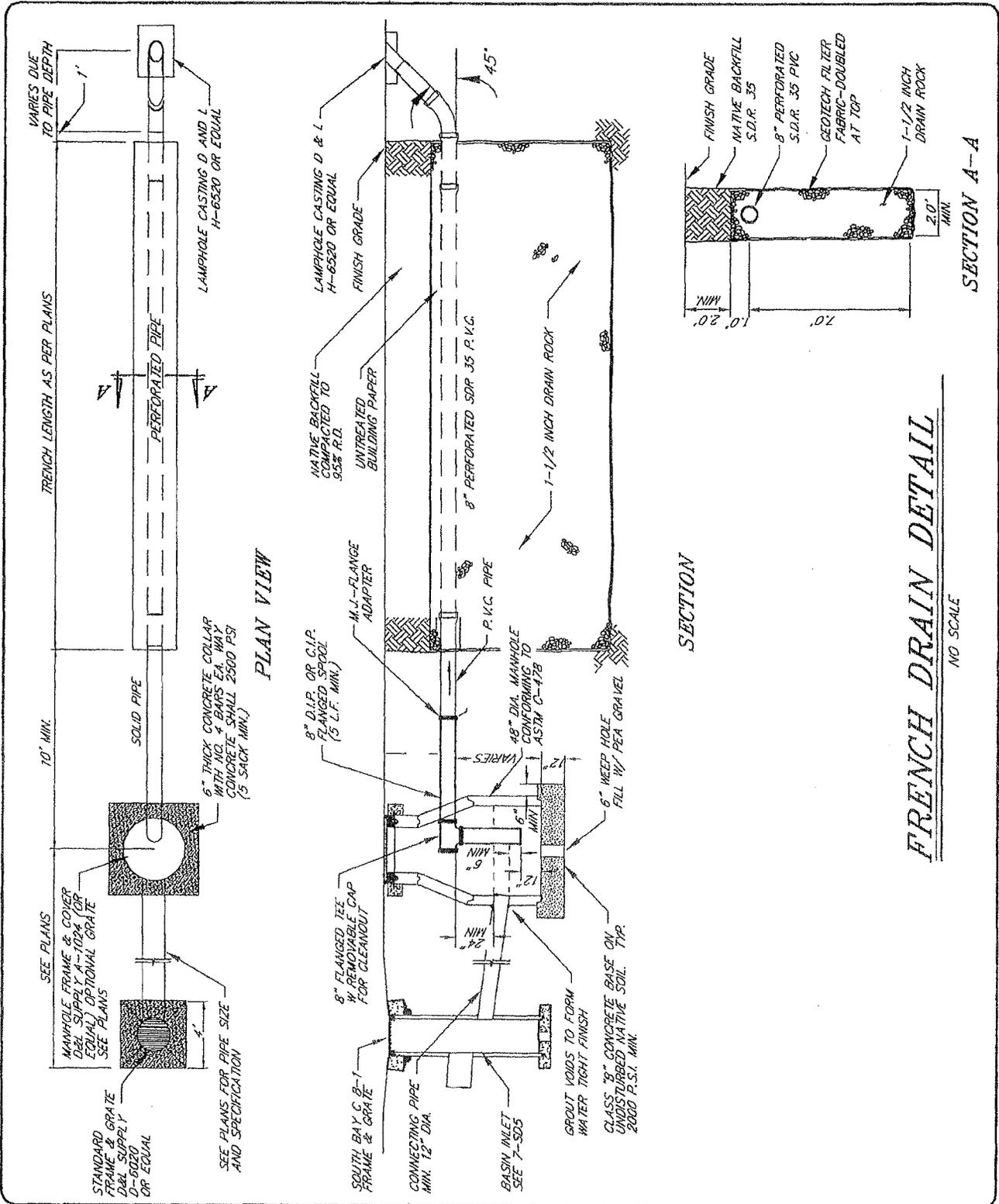
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CHECKED BY: R.H.H.  
SCALE: NONE  
DATE: 1/04

APPROVED BY: \_\_\_\_\_  
DATE APPROVED: 8/13/07

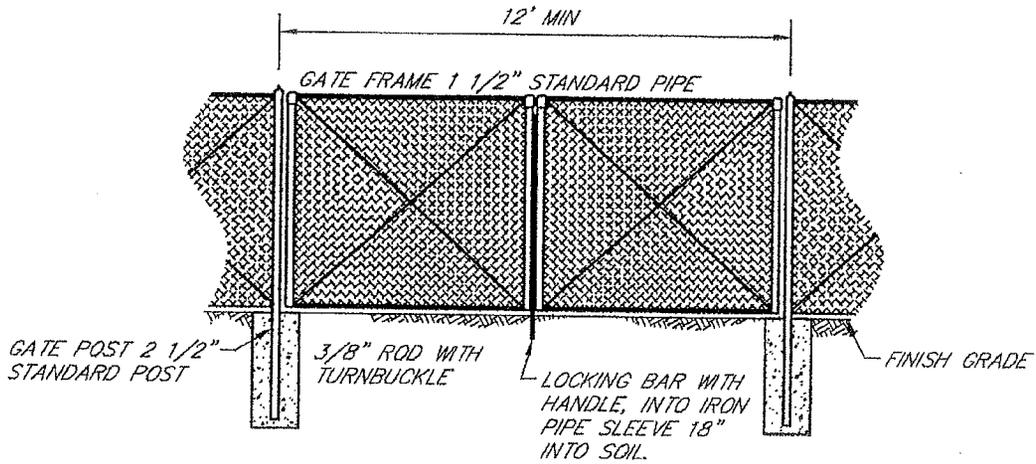
CITY OF HUGHSON

STANDARD DETAIL

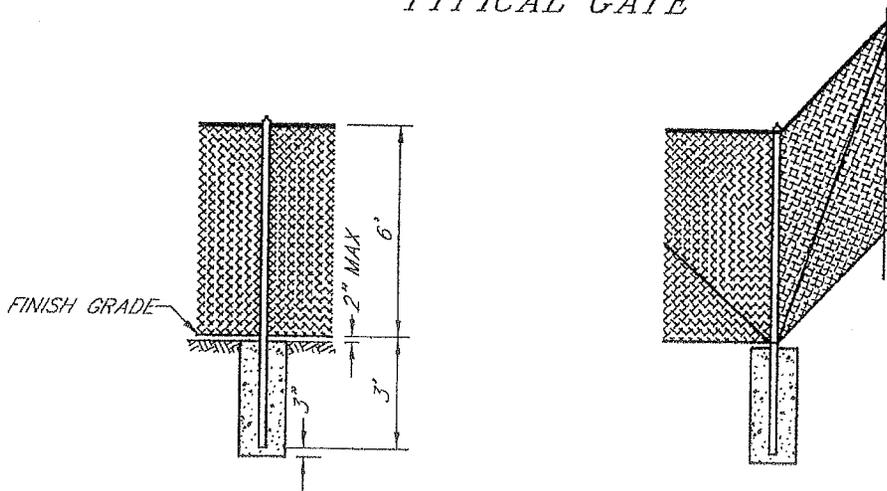
7-SD.6



	<b>STANDARD DRAINAGE BASIN</b>		DRAWN BY: A.D.R. CHECKED BY: R.H.H. SCALE: NONE DATE: 1/04
	APPROVED BY: _____ DATE APPROVED: 2/13/07	<b>CITY OF HUGHSON</b>	



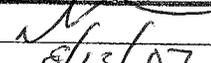
TYPICAL GATE



TYPICAL FENCE POST

TYPICAL CORNER POST

SEE STANDARD SPECIFICATIONS DETAIL A85 FOR MATERIALS SPECS.  
 3 STRAND BARBED WIRE ON TOP MAY BE REQUIRED BY CITY.  
 SEE CONDITIONS OF APPROVAL.

	<b>TYPICAL FENCE FOR          DRAINAGE BASIN ENCLOSURE</b>		DRAWN BY: A.D.R. CHECKED BY: R.H.H. SCALE: NONE DATE: 1/04
	APPROVED BY:  DATE APPROVED: 8/13/07	<b>CITY OF HUGHSON</b>	

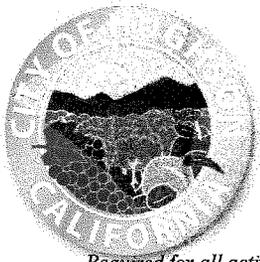
**APPENDIX A – ENGINEERING BULLETINS**

**APPENDIX B – STANDARD FORMS**

**Encroachment Permit Application**

**Street Closure Application**

**Map and Plan Review Checklists**



CITY OF HUGHSON  
 BUILDING PERMIT APPLICATION  
 7018 PINE STREET / PO BOX 9  
 HUGHSON, CA 95326  
 (209) 883-0811 FAX (209) 883-9725

**Encroachment Permit**

*Required for all activities in the public right of way or public easements (H.M.C. Chapter 12.08.110) Including, but not limited streets, sidewalks, alleys, etc.*

**All Work Within the City Right of Way and All Connections to City Utility Services must be Applied for and Conducted by a Contractor Licensed by the State of California**

**Application:** *Please print clearly and fill in all that apply* (Check one)

**Name:** \_\_\_\_\_  **Property Owner**

**Address:** \_\_\_\_\_  **Tenant**

**Phone No:** \_\_\_\_\_ **Fax No:** \_\_\_\_\_  **Contractor**

Property owner approval required (if applicant is tenant or contractor): **CA Contractor License Class/No.** \_\_\_\_\_

**Contractor Applicants SHALL submit written evidence of property owner authorization** (Class A Required for all underground utility work)

**Activity/Project:**

Encroachment purpose/type (select one):

- 1. Temporary Placement: \_\_\_\_\_ Debris box/Supplier<sup>‡</sup> \_\_\_\_\_ Other Objects in the Public Right of Way
- 2. Improvement Construction: \_\_\_\_\_ Driveway \_\_\_\_\_ Sidewalk \_\_\_\_\_ Fence/Wall \_\_\_\_\_ Utility Line \_\_\_\_\_ Other \_\_\_\_\_
- 3. Utility Connection: \_\_\_\_\_ Water \_\_\_\_\_ San. Sewer \_\_\_\_\_ Storm Drain \_\_\_\_\_ Other \_\_\_\_\_
- 4. Banner Installation \_\_\_\_\_

**Engineers Estimated Cost of Work within the Public Right of Way (HMC 12.08.040 A.1) \$** \_\_\_\_\_

**Intended Start Date** \_\_\_\_\_ **Duration (calendar days)** \_\_\_\_\_

<sup>‡</sup> Must be from City Permitted Industrial Waste Hauler.

**I Attest That:**

- 1. The information above is true and complete, to the best of my knowledge;
- 2. I have read, understand, and agree to abide by the City of Hughson Municipal Code 12.40;
- 3. I agree to indemnify the City of Hughson Municipal Improvement district (City/District), it's directors, officers, agents, employees and volunteers and hold them harmless from and against any and all loss, liability, expense, claims, costs, suits, and damages including attorneys' fees, arising out of the activities described in this application;
- 4. I agree to the standard conditions and any added special conditions of this permit, and will notify the City/District in timely manner to make all required inspections.

**Print Name:** \_\_\_\_\_ **Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

*Submit **completed** application, along with required fees, bonds, evidence of insurance, and 3 copies of scaled drawings clearly showing the full scope of work activity to be completed to the Planning and Building Department. Review and approval time will generally depend upon the completeness and clarity of the application package. Incomplete Applications may be rejected.*

**(FOR CITY USE ONLY)**

<b>Approval</b>		<b>How Paid:</b>
Preliminary Application Fee:	_____ \$50 non-refundable fee (contractors)	_____
	_____ \$50 plus cost (utility companies)	_____
	_____ \$25 non-refundable (debris box)	_____
Inspection Deposit*	_____ 3% of estimated costs or \$500 minimum	_____
Banner Installation:	_____ \$100 non-refundable fee and \$750 deposit	_____
Insurance:	_____ Commercial general liability	_____ Workers' Compensation
	_____ Automobile liability	_____ Employer's Liability
Bond: 100% of Estimated Cost		
(public portion HMC 12.08.040 A.1)	_____ Performance bond \$ _____	_____ Cash \$ _____

**Application Reviewed By:** \_\_\_\_\_ **Permit Approved By:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Permit No.** \_\_\_\_\_

\* Applicant is responsible to pay the full actual cost of Inspections and Administration of Encroachment Permit. Additional charges may be incurred based on the extent of work involved. Such additional costs as determined by the City will be deducted from the security deposit, or if necessary invoiced to the applicant.

Standard Conditions of Approval:

1. This permit constitutes an agreement between Permittee and City, whereby Permittee is allowed to perform certain approved activities within dedicated public area under the preview of the City.
2. This permit is **revocable at any time** by the Director of Public Works or City Engineer.
3. Permittee shall maintain all required insurance policies endorsements for the duration of the permitted work/activity.
4. Permittee shall comply with all applicable federal, state and local laws, codes, regulations and ordinances, including OSHA requirements for excavation safety, and MUTCD traffic controls.
5. Permittee shall provide **48 hours (2 working days) minimum** notice to City of the schedule for the work/activity for inspections, and comply with all requirements of the City for proper execution of the work/activity. Please contact the Public Works Department at (209) 883-4054 for inspections.

Special Conditions of Approval: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Inspections: (FOR CITY USE ONLY)**

Required Inspections

Passed By\*

Date

<input type="checkbox"/>	Pre-activity walk-through	_____	_____
<input type="checkbox"/>	Traffic Control Plan	_____	_____
<input type="checkbox"/>	Traffic Controls Maintained	_____	_____
<input type="checkbox"/>	Exposed utility line	_____	_____
<input type="checkbox"/>	Utility Connection, and/or testing	_____	_____
<input type="checkbox"/>	Sub-grade/backfill compaction	_____	_____
<input type="checkbox"/>	Aggregate base compaction	_____	_____
<input type="checkbox"/>	Forms/Rebar	_____	_____
<input type="checkbox"/>	Concrete mix, finish	_____	_____
<input type="checkbox"/>	Asphalt paving	_____	_____
<input type="checkbox"/>	Striping, Signage	_____	_____
<input type="checkbox"/>	Irrigation	_____	_____
<input type="checkbox"/>	Planting	_____	_____
<input type="checkbox"/>	Completion/Removal, Cleanup	_____	_____
<input type="checkbox"/>	Water System Disinfection	_____	_____
<input type="checkbox"/>	Final Inspection for acceptance or dedication	_____	_____
<input type="checkbox"/>			

\* City's Authorized Inspector: \_\_\_\_\_  
Print Name Signature – All Work Accepted Date

**DEPOSITS WILL NOT BE RETURNED UNTIL ALL REQUIREMENTS HAVE BEEN APPROVED**

**And this page - signed off by the Inspector - accompanies a written request for reimbursement**

Fees:

Non-utility:

\$50 Application fee, plus actual cost.\*

(Requires an Inspection Deposit of 3% of the estimated construction cost with a \$500 minimum deposit will be renewed when it has reached 5% of the original required amount)

Utility (PUC-regulated):

\$50 Application fee plus:

a. Unimproved areas:  
\$0.10 per square foot

b. Improved areas:  
\$0.74 psf (1 to 500 sf)  
\$0.50 psf (501+ sf)

\*Actual cost is the time and materials.  
Including all direct and indirect overhead



# City of Hughson

7018 Pine Street/P.O. Box 9 \* Hughson, California 95326 \* (209) 883-4054 \* Fax (209) 883-2638  
[www.Hughson.org](http://www.Hughson.org)

## CONSTRUCTION RELATED STREET CLOSURE PERMIT APPLICATION

(To be used in conjunction with an approved Encroachment Permit)

Name of Applicant: \_\_\_\_\_

Address: \_\_\_\_\_ Phone \_\_\_\_\_

Contractor's License Number \_\_\_\_\_ City Business License \_\_\_\_\_

Location and Limits of Closure: \_\_\_\_\_

\_\_\_\_\_

Date and Time Start of Closure: \_\_\_\_\_

Date and Time End Closure: \_\_\_\_\_

Reason for Closure: \_\_\_\_\_

The applicant will be responsible for providing, maintaining and installing traffic control devices necessary for the street closure according to the approved traffic control plan. During hours of darkness, or fog, sufficient warning lights or flares shall be maintained at suitable distances to warn the approaching traffic. The applicant hereby agrees to defend, indemnify and forever holds the City of Hughson, its Officials, Employees, Volunteers or Agents harmless against each and every claim, demand or cause of action that may be made or come against it by reason of or in any way arising out of the closing or blocking of the right-of-way approved under this permit.

Applicant Signature: \_\_\_\_\_ Date: \_\_\_\_\_

---

(Official Use Only)

\_\_\_\_\_  
Fire Department

\_\_\_\_\_  
Date

\_\_\_\_\_  
Ambulance Service

\_\_\_\_\_  
Date

\_\_\_\_\_  
Police Department

\_\_\_\_\_  
Date

\_\_\_\_\_  
Public Works Department

\_\_\_\_\_  
Date

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

# **CITY OF HUGHSON**



## **MASTER CHECKLIST**

**FOR**

**SUBDIVISION**

**MAPS AND PLANS**

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

**These check list are provided as a guide for the preparation and review of plans and documents related to development projects. They are NOT to be relied upon as the sole means for determining completeness, compliance or acceptibility of any documents submitted.**

**The applicable form(s) must be completed and submitted along with the documents to show that the preparer of the document(s) has considered each of the listed items.**

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

## PRELIMINARY MAPS

### Form and Contents:

- Four Prints Submitted
- Names and Addresses of legal property owner(s)
- Names and Addresses of Subdivider(s)
- Names and Addresses of Civil Engineer or Land Surveyor preparing Map
- Boundary lines and dimensions of the entire parcel upon which the subdivision is proposed.
- Location of all adjacent property lines, and names and addresses of all owners of record of all adjoining undeveloped properties.
- Locations, names, and widths of all adjoining streets and right-of-ways.
- Widths, approx. locations, and deed references of all existing easements of right-of-way on or appurtenant to the property.
- The approximate location and direction of flow of all water courses, and approx. location of all areas subject to instability, inundation, or ponding.
- Topographic contour map accurately showing existing terrain etc.
- Elevations in accordance with USGS 1929 sea level datum
- Date, north arrow, and scale
- Areas proposed for development, showing proposed improvements, land use and access, streets, significant public facilities, approx. finished grades, and other necessary information necessary to depict development.
- Current preliminary title report or tile report on subject property.

### Filing Fee:

- Filing Fee Submitted

### Review Requirements:

- Receipt of (conforming) Preliminary Map, fees, accompanying exhibits.
- Consult & Schedule Preliminary Map Conference Meeting.
- Meeting: Matters of Land Use Planning, Design with Respect to General Plan, City Regulations, Requirements to be reflected in tentative or vesting tentative map.

### Waiver:

- Preliminary Map filing, review, and conference waived.

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

### TENTATIVE MAPS

Generally:

- In accordance with Subdivision Map Act
- In accordance with Chapter 16 HMC
- Acceptable to Planning Officer
- Prepared by California Registered Civil Engineer or Land Surveyor

Form and Content:

- Legibly on one sheet
- Acceptable Material
- 24 Inches by 36 inches
- Engineer's scale large enough but not less than one inch per 100 feet
- Elevations based on USGS 1929 sea level datum
- Contour interval not greater than one-half foot for ground slope 25 or less, nor greater than one foot if 5% or less, nor greater than 2 feet if between 5 and 10%. Contour lines no less than 150 feet apart.

Information – Required:

- The boundaries of the property as surveyed on the ground, showing bearings and distances measured and corners and monuments found and set;
- Topographic contour and planimetric mapping accurately showing the existing terrain, within and extending a minimum of 200 feet outside the perimeter of the property, including existing drainage channels and watercourses, irrigation ditches and culverts, and the direction of flow thereof; pipes and structures, wells, springs, slide areas, trees, roads; underground, surface, and aerial utilities and structures; and the locations and names of all adjacent streets and underground improvements and facilities therein;
- The title, which shall be placed at the lower right-hand corner of the map and shall contain the subdivision number assigned by the city and may contain a subdivision name (subject to approval of the planning commission), and shall be dated to reflect the current map status;
- The names, addresses, and phone numbers of the legal owner of the property, the subdivider, and the surveyor or civil engineer who prepared the tentative map; signature and seal of the surveyor or civil engineer indicating the date of preparation;
- Certificates for execution by the planning officer indicating acceptability of the map form and content for filing, and the approval and date thereof by the commission;

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

- The north arrow, scale, and contour interval for maps;
- A vicinity map showing roads, adjoining and nearby subdivisions, towns, creeks, railroads, schools, shopping and other data sufficient to locate the proposed subdivision relative to existing and known proposed community development;
- The limits and dimension, owners of record, purpose, and deed references of existing easements and rights-of-way on, adjacent or appurtenant to the property;
- The property lines of abutting properties, the lot and subdivision numbers of existing abutting lots, and any existing improvements or conditions which may affect or be significantly affected by the proposed development;
- The names and addresses of owners of record of all contiguous undeveloped property, and deed references therefor;
- The approximate boundary lines of existing land use zones and taxing jurisdictions on, near, or affecting the property.

Information – Additional:

- The proposed lot and street layout, with scaled lot line dimensions, each lot numbered consecutively within the entire proposed subdivision;
- Street names, width of street rights-of-way and traveled ways, approximate grade, and radii of curvature along property lines. Street names shall be subject to the approval of the planning officer and shall not duplicate or be in conflict with any existing street names in the city or postal district;
- Typical geometric cross-sections for streets showing pavement widths, curbs, sidewalks, grading in marginal strips, slopes of cuts and fills, and other applicable improvements proposed, in conformance with city standards;
- The location, easement widths, approximate grade, direction of flow, and type of all proposed storm drainage and sanitary sewer systems required to serve the development, on-site and off-site;
- The location of easement widths and type of all proposed major water facilities and systems, on-site and off-site;
- Proposed school, park, recreation, and other public or private use areas other than single-family residential;
- All trees which will remain after the finished grading and construction of the development shall be identified on the tentative map;

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

- Any required data which is impossible or impractical to place on the tentative map shall be submitted in writing.

Data required:

The tentative map shall also be accompanied by the following supplemental data, which shall be submitted at the time the map is filed:

- A preliminary site development plan delineating grading (lot pad elevations and grades, cut-and-fill slopes) and the proposed streets, storm and sanitary sewer improvements, including approximate finish grades and elevations;
- A written statement and tabulation of general information which shall contain:
  - The existing use or uses of the property,
  - A summary description of the proposed subdivision, including the number of lots, their average, minimum and maximum size, the nature of each segment of development proposed and the intended time schedule and sequence therefor, the overall and incremental density of dwelling units in proposed residential areas,
  - The source and methods of sewerage and water supply to serve the development,
  - The proposed plan for draining or correcting areas subject to flooding or inundation by stormwater flowing into, on, or from the subdivision,
  - A description of the organizational and legal structure, format, function, extent of responsibility and principles of associations, management organizations, and other devices proposed,
  - Any other characteristics or improvements proposed or contemplated;
- A current subdivision guarantee on the subject property;
- A draft environmental impact report or other environmental document(s) as required by CEQA;
- When a tentative map is to be filed on an area which is part of a larger single ownership or where contiguous property is affected by or rendered potentially developable by virtue of the proposed development, the planning officer may require a sketch plan of possible future development on all or part of said contiguous properties, to be submitted at the time of tentative map filing;

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

- When required by the planning officer, a preliminary investigation of site soils conditions and a statement of evaluation thereof by a qualified soils geologist or registered civil engineer specializing in soils engineering, pertaining to specific soils conditions and as to the stability of areas in which slides have occurred or where there is slide hazard within or immediately adjoining the proposed subdivision, shall be submitted at the time of the tentative map filing;
- The planning officer shall not accept a tentative map for filing unless the map and all information and data required as part of or to accompany said map for filing are complete and in a form acceptable to the planning officer.
- A completed design expectation guideline self-certification.

Filing:

- Every subdivider shall file with the planning officer the number of tentative map and preliminary site development plan prints as determined necessary by the planning officer together with the tentative map filing fee as set forth in the current city fee schedule.

Acceptance and rejection:

- The planning officer shall, within 30 calendar days from the time the map and all accompanying data have been received, examine the map and accompanying data and, if they are in full compliance with the provisions of all laws and this chapter, shall deem the application as complete and accept the map for filing. If it is incomplete and not accepted, it shall be returned to the subdivider with a written statement of the reason it was not accepted for filing. The planning officer shall forward copies of the filed tentative map and other pertinent accompanying data to the interested public agencies, which may in turn forward to the planning officer their findings and recommendations thereon.

Conference:

- Within 20 working days from the filing of a tentative map, the planning officer shall schedule a subdivision conference to be held prior to the date on which the map is scheduled for planning commission action. Written notice of such conference shall be given to the subdivider and all interested agencies. At such conference, all recommendations made by various agencies and departments shall be discussed. The results of the conference, together with the planning officer's report, shall be presented to the planning commission. A copy of any report or recommendation of the planning officer on a tentative map shall be provided to the subdivider and to those persons specified in Government Code Section 66452.3 at least three days prior to any hearing or action on such map by the planning commission.

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

Exception request:

- Any requests for exceptions to the various conditions to be considered by the planning commission shall be filed, in writing, with the planning officer not later than the second working day following the subdivision conference.

Review by commission:

- The planning officer, upon receipt of the tentative maps for filing conforming to all requirements of this chapter, together with the appropriate filing fees, shall schedule said map for review by the commission. Within 50 days from the date of filing of said maps, unless such time is extended by mutual consent of the subdivider and the commission, the commission shall recommend approval, conditional approval, or denial of the tentative maps and shall report its recommendation to the council and subdivider. In the event of a recommendation of disapproval, the subdivider shall be furnished with a statement of the reason and authority for such recommendation. In the event of a recommendation of conditional approval, the subdivider shall be furnished with a statement of conditions and changes necessary for incorporation in the final map.

Environmental review – Recommendations:

- In considering a recommendation for the approval or conditional approval of a tentative map, the commission shall first find that the proposed subdivision, together with the provisions for its design and improvements, is consistent with applicable general or specific plans of the city, and shall then examine the environmental documentation and determine its adequacy and conformity with the provisions of the California Environmental Quality Act, and shall make recommendations to the council on the environmental documentation.

Conditions – Recommendations:

- The commission may recommend the imposition of such reasonable conditions as it deems necessary and in the interest of public health, safety, environment, or community welfare in accord with the purpose and intent of this chapter.

Denial – Planning commission:

- A tentative map may be denied by the planning commission on any of the grounds provided therefor in the Subdivision Map Act.

Appeal:

- Any action of the commission with respect to a tentative map may be appealed by the subdividers, or those persons listed in Government Code Section 66452.5, in writing, within 15 working days from the date of that action by the

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

commission. Such appeal shall be filed with the city clerk. The council shall set the matter for hearing within 30 days of the date of filing the appeal, and shall render its decision within 10 days after the conclusion of the hearing.

Report:

- If a tentative map is approved, or conditionally approved, the planning officer shall transmit a written report to the city council within 15 days or at its next succeeding regular meeting.

Approval and disapproval:

- At the next regular meeting of the council following the filing of the report of the recommendation of the commission, the council shall fix the date at which the tentative map shall be considered by it, which date shall be within 30 days thereafter. Unless such time is extended by mutual consent of the subdivider and council, the commission shall approve, conditionally approve, or deny the tentative map, within said 30 days. In the event of disapproval, the subdivider shall be furnished with a statement of the reason and authority for such disapproval. In the event of conditional approval, the subdivider shall be furnished with a statement of conditions and changes necessary for incorporation in the final map

Environmental review – Approval:

- In considering the approval or conditional approval of a tentative map, the council shall first find that the proposed subdivision, together with the provisions for its design and improvements is consistent with the applicable general or specific plans of the city, and shall then examine the environmental documentation and certify its adequacy and conformity with the provisions of the California Environmental Quality Act.

Conditions imposed – Approval:

- In approving tentative maps, the council may impose such reasonable conditions as it deems necessary and in the interest of public health, safety, environment, or community welfare in accord with the purpose and intent of this chapter.

Denial – Council:

- A tentative map may be denied by the council on any of the grounds provided therefor in the Subdivision Map Act or the ordinances and statutes of the city.

Expiration – Period:

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

- An approved or conditionally approved tentative map shall expire 24 months from the date of its approval or conditional approval.

Expiration – Renewal prohibited:

- The expiration of the approved or conditionally approved tentative map shall terminate all proceedings, and no final map or parcel map shall be filed for any portion of the real property included within such tentative map without first processing a new tentative map.

Expiration – Time extension – Period:

- Upon written application of the subdivider filed prior to the expiration of an approved or conditionally approved tentative map, the time at which such map expires may be extended by the council for a period or periods not exceeding a total additional 12 months.

Modification limitation:

- Modification of a tentative map after approval or conditional approval shall not extend the time limits imposed by HMC 16.16.170 through 16.16.190.

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

### **VESTING TENTATIVE MAPS**

#### Consistency:

- No land shall be subdivided and developed pursuant to a vesting tentative map for any purpose which is inconsistent with the general plan and any applicable specific plan or which is not permitted by the zoning ordinance or other applicable provisions of any ordinances or of this code.

#### Application:

- Whenever a provision of the Subdivision Map Act, as implemented and supplemented by this title, requires the filing of a tentative map for a residential development, a vesting tentative map may instead be filed, in accordance with the provisions of this chapter.
- If a subdivider does not seek the rights conferred by Chapter 4.5 of the Subdivision Map Act (commencing with Section 66498.1 of the California Government Code), the filing of a vesting tentative map shall not be a prerequisite to any approval for any proposed subdivision, permit for construction, or work preparatory to construction.

#### Filing and processing:

- A vesting tentative map shall be filed in the same form and have the same contents, accompanying data and reports and shall be processed in the same manner as set forth in this title for a tentative map except as provided in this chapter.
- At the time a vesting tentative map is filed it shall have printed conspicuously on its face the words “**Vesting Tentative Map.**”
- At the time a vesting tentative map is filed a subdivider shall also supply information with respect to the proposed height, size, location and architectural plans for buildings shown on a vesting tentative map.

#### Filing fee:

- At the time of filing of the vesting tentative map, the subdivider shall pay the vesting tentative map fee as set forth in the current city fee schedule.

#### Expiration:

- The approval or conditional approval of a vesting tentative map shall expire at the end of the same time period, and shall be subject to the same extensions

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

established by this title for the expiration of the approval or conditional approval of a tentative map.

Vesting on approval of vesting tentative map:

- The approval or conditional approval of a vesting tentative map shall confer a vested right to proceed with development in substantial compliance with the ordinances, policies, and standards described in California Government Code Section 66474.2. However, if Section 66474.2 of the California Government Code is repealed, the approval or conditional approval of a vesting tentative map shall confer a vested right to proceed with development in substantial compliance with the ordinances, policies, and standards in effect at the time the vesting tentative map is approved or conditionally approved.
- Notwithstanding subsection A of this section, a permit, approval, extension, or entitlement may be made conditional or denied if any of the following are determined:
  - A failure to do so would place the residents of the subdivision or the immediate community, or both, in a condition dangerous to their health or safety, or both.
  - The condition or denial is required, in order to comply with the state or federal law.
  - The rights referred to in this section shall expire if a final map or parcel map is not approved prior to the expiration of the vesting tentative map as provided in HMC 16.17.050. If the final map or parcel map is approved, these rights shall last for the following periods of time:
    - An initial time period of one year. Where several final maps are recorded on various phases of a project covered by a single vesting tentative map, this initial time period shall begin for each phase when the final map or parcel map for that phase is recorded.
    - The initial time period set forth in subsection (C)(1) of this section shall be automatically extended by any time used for processing a complete application for a grading permit or for design or architectural review, if such processing exceeds 30 days, from the date a complete application is filed.
    - A subdivider may apply for a one-year extension at any time before the initial time period set forth in subsection (C)(1) of this section expires. If the extension is denied, the subdivider may appeal that denial to the council within 15 days.
    - If the subdivider submits a complete application for a building permit during the periods of time specified in subsections (C)(1), (2) and (3) of this section, the

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

rights referred to in this section shall continue until the expiration of that permit, or any extension of that permit.

Development inconsistent with zoning – Conditional approval.

- Whenever a subdivider files a vesting tentative map for a subdivision whose intended development is inconsistent with the zoning ordinance in existence at that time, that inconsistency shall be noted on the map. The council may deny such a vesting tentative map or approve it conditioned on the subdivider, or his or her designee, obtaining the necessary change in the zoning ordinance to eliminate the inconsistency. If the change in the zoning ordinance is obtained, the approved or conditionally approved vesting tentative map shall, notwithstanding HMC 16.17.060(A), confer the vested right to proceed with the development in substantial compliance with the change in the zoning ordinance and the map, as approved.
- The rights conferred by this section shall be for the time periods set forth in HMC 16.17.060(A).

Application inconsistent with current policies:

- Notwithstanding any provision of this title, a property owner, or his or her designee, may seek approvals or permits for development which depart from the ordinances, policies, and standards described in HMC 16.17.060 and 16.17.070, and local agencies may grant these approvals or issue these permits to the extent that the departures are authorized under applicable law.

Other provisions apply:

- Except as otherwise set forth in this chapter, all other provisions of this title shall apply to vesting tentative maps.

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

### **PARCEL MAPS**

Tentative or vesting tentative map required:

- When a parcel map is required by this chapter, a preliminary map and a tentative or vesting tentative map shall first be filed with the planning officer.
- The preliminary map shall meet all the requirements for preliminary maps provided by Chapter 16.12 HMC.
- The tentative or vesting tentative map shall meet all the requirements for tentative maps provided by the Subdivision Map Act and Chapter 16.16 HMC.
- The vesting tentative map shall also meet all the requirements for vesting tentative maps provided by Chapter 16.17 HMC.

Required when:

- A parcel map shall be filed and recorded for any subdivision for which a final map is not required by the Subdivision Map Act, except for subdivisions created by short-term leases (terminable by either party on not more than 30 days' notice in writing) of a portion of an operating right-of-way of a railroad corporation defined as such by Section 230 of the Public Utilities Code; provided, however, that if the planning officer finds, upon substantial evidence, that the public interest necessitates such a map, this exception shall not apply.

Improvement requirements:

- Where public improvements are required, improvement plans, engineering calculations, and cost estimates shall be submitted and approved by the city engineer prior to acceptance of a parcel map for filing.

Form and contents:

- The parcel map shall be prepared by or under the direction of a registered civil engineer or licensed land surveyor, shall show the location of all streets and property lines and easements bounding the property, and shall conform to all the following provisions:
- It shall be legibly drawn, printed, or reproduced by a process guaranteeing a permanent record in black on tracing cloth or a stable polyester-base vellum. Certificates may be legibly stamped or printed upon the map with opaque ink. If ink is used on polyester-base vellum, the ink surface shall be coated with a suitable substance to assure permanent legibility;
- The size of each sheet shall be 18 by 26 inches. A marginal line shall be drawn completely around each sheet, leaving a completely blank margin of one inch. The scale of the map shall be large enough to show all details clearly, but not less than 100 feet to the inch, and enough sheets shall be used to accomplish this end.

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

The particular number of the sheet and the total number of sheets comprising the map shall be stated on the lower right-hand corner of each sheet and its relation to each adjoining sheet shall be clearly shown;

- Each parcel shall be numbered or otherwise designated;
- The exterior boundary of the land included within the subdivision shall be indicated by distinctive symbols and clearly so designated;
- The map shall show the location of each parcel and its relation to surrounding surveys. The location of any remainder of the original parcel shall be shown, but need not be shown as a matter of survey, but only by reference to the existing record boundaries if such remainder has a gross area of five acres or more;
- Subject to the provisions of the Subdivision Map Act and this chapter, a certificate is required, signed and acknowledged by all parties having a record title interest in real property to be subdivided, consenting to the preparation and recordation of the parcel map;
- The city engineer may require that a parcel map shall satisfy any additional requirements for final maps as provided therefor by the Subdivision Map Act and this title;
- The map shall show all dedications and offers of dedication. The city engineer may require that such dedications or offers of dedication be made by deed in lieu of or in addition to appearing on the parcel map and, when made by separate instrument, they shall be recorded concurrently with or prior to the parcel map being filed for record and shall be signed by the same parties and in the same manner as set forth for dedications by a final map, as provided in the Subdivision Map Act and this title;
- In all cases, the parcel map shall be based on a field survey in conformity with the Land Surveyors Act.
- Any subdivision of the same land shall require the filing of a new map.

Submittals required:

- The subdivider shall submit to the city engineer the original tracing(s), duplicate print(s) on linen, duplicate tracing(s), and a set of print(s) of the parcel map, the improvement plans, if applicable, in which case the subdivider shall submit the original tracings or duplicate tracings and three sets of prints. The subdivider shall also provide one electronic version of such prints and plans in AutoCAD (compatible with the current version of AutoCAD used by the city engineer) sent via CD and/or DVD. At the same time, the subdivider shall submit the plan checking fee, filing report, current preliminary title report, and a letter of clear

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title (from a title company), and the recording fee to the city engineer for certification of the parcel map. At the same time, the subdivider shall submit, if applicable, the subdivision improvement bonds, agreements, and instruments of conveyance. All outstanding bonded indebtedness upon the land shall be paid off prior to the parcel map being filed. The subdivision agreement shall be as given in the sample format in Chapter 16.24 HMC. At the same time, the subdivider shall submit a completed design expectation guidelines self-certification checklist.

Approval and recordation:

- If the parcel map is in compliance with the Subdivision Map Act, local ordinances, and this title, and if the conditions of approval have been met, the council shall, at its next regular meeting, or within a period of 10 days after such submission, whichever is later, approve the map. Upon the approval of the parcel map, the city clerk shall submit the map for recordation in the same manner as provided for final maps, set forth in Chapter 16.24 HMC.

PROJECT: \_\_\_\_\_

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**DEVELOPMENT  
(Improvement Plans)**

General requirements:

- Following approval of a tentative or vesting tentative map, and prior to the submission of any final map or parcel map therefor, the subdivider/developer shall have prepared and submitted complete sets of improved plans and cost estimates for the improvement(s) required. The approval of said plans by the planning officer and the city engineer, when improvements are required, shall be a prerequisite to the approval of the final map or parcel map by the city council, and in the case of a site development only, shall be prerequisite to issuance of any building permit.

Improvement plan – Preparation:

- The improvement plans shall be prepared by or under the direction of a civil engineer licensed by the state and shall show the complete plans, profiles, and details for all streets and appurtenances, storm drainage, water systems and fire hydrants, sewers, utilities, grading and all other improvements proposed or necessary, on-site and off-site.

Improvement plan – Form and content:

- Plans and profiles shall be submitted on uniform size sheets 24 by 36 inches in overall dimension. A border shall be provided of one-and-one-half inches along the 24-inch left-hand side of the sheet, and a one-half inch border on the other three sides, with a title block on the lower right side to clearly identify the nature of the plan. The scales for various portions of the drawings and the north point, where applicable, shall be shown on all sheets.
- References may be made to applicable city standard details and plans, in lieu of duplicating the drawings thereof. Plans shall be drawn to professional drafting standards and to appropriate scales to clearly show intent without crowding or possibility of misinterpretation. All plans, lettering, and details shall be drafted at sufficient scale to permit full legibility when photographically reduced to one-half original drawing size.
- If the plans include three or more sheets, a key map, at one inch equals 300 feet or one inch equals 600 feet scale, showing streets and street names, lots and lot numbers, and the area thereof covered by each sheet of the plans, shall be included on the first sheet of the plans.
- Plans shall show complete plan, profile, and detail for all street work, sanitary sewer systems, water supply and distribution systems, including valves and fire hydrants, storm drainage conduits, inlets, channels, and structures; retaining

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walls, earthworks, bridges, and location of underground and aerial utilities, appurtenances, and structures which may affect or be affected by the horizontal and vertical location of other facilities; street monuments, curbs, gutters, sidewalks, landscaping; fences, gates, and driveways, and paths in conjunction with subdivision improvements; and any and all other improvements which may be required to complete the work and coordinate the process of construction.

- The city engineer may require cross-sections, taken at intervals, locations, and to a scale as determined by him, to be submitted with the improvement plans, accurately showing original ground and finished grades throughout the full width of the improvement area and beyond as he deems necessary, on-site or off-site.
- All storm drainage, sanitary sewer, water, and street systems shall be designed and sized to accommodate such additional flows, volumes, or loads as may be distributed by the existing or future development of lands adjacent to or beyond the limits of the subdivision or site development.
- At the time of submittal for checking, plans shall be accompanied by a complete bond estimate for all public improvements, engineering calculations for storm drainage and sanitary sewerage systems, water systems, and for any other facilities or structures deemed necessary by the city engineer to evaluate and check the improvement plans. Said bond shall bear the signature and seal of the engineer who personally prepared and supervised the preparation thereof.

Soils report – Generally:

- A preliminary soils report, prepared by a civil engineer, registered in this state, and based upon adequate test borings and submitted at the time of improvement plan submission, shall be required by this chapter, and may be required, as determined by the city engineer, for subdivisions for which a parcel or final map are required.
- If the preliminary soils report indicates the presence of critically expansive soils or other soil problems which, if not corrected, could lead to structural defects, a full soils investigation and report for all or any portion of the subdivision may be required. Such soils investigation shall be done by a civil engineer, registered in this state, who shall recommend the corrective action which is likely to prevent structural damage to all structures proposed in the area where such soils and soil-related problems exist.
- The council may approve the parcel or final map for subdivision, or portion thereof, where such soils problems exist if it finds, upon recommendations of the city engineer, that he recommended action is likely to prevent structural damage to each structure to be constructed and, as a condition of the issuance of any

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building permit, may require that the approved recommended action be incorporated in the construction of each structure.

Soils report – Certification:

- Where a preliminary soils report, soils report, or geological report has been required for a subdivision, the grading plans or development plans which provide the design for earthwork therefor shall bear the signature of the soils engineer who has performed the investigation, and the as-built plans shall bear his certification that the work was performed in accordance with those plans.

Document filing:

- The subdivider/developer shall submit two complete sets of prints of the improvement plans to the city engineer for review, and said plan submittal shall be accompanied by the plan-checking fee in accordance with the current fee schedule of the city. The city engineer shall expeditiously review the plans and return one set to the subdivider/developer's engineer with the required revisions, if any, marked thereon.

Copies required:

- When the plans are found to be complete and satisfactory to the city engineer, the subdivider/developer shall submit three complete sets of prints and one complete set of transparent vellums thereof for use by the city engineer, and the prints shall at the time be accompanied by any additional number of complete sets of prints the subdivider/developer, his engineer and contractors may require, to be noted as approved by the city engineer.

Approval:

- The improvement plans shall have been approved by the city engineer prior to submission of the final map to the council for approval.

Start of work:

- No work shall be started unless authorized by the city.  
(Encroachment permit(s), Grading permit(s), SWPPP, Conditions of Approval, etc.)

Permit required:

- The subdivider/developer shall not commence construction on any portion of improvements prior to the issuance of an encroachment permit and payment of construction inspection fees, and the city public works department shall be notified at least 48 hours in advance of commencement of any portion of the work.

PROJECT: \_\_\_\_\_

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Site development agreement:

- In the case of a site development where no subdivision agreement is required, the planning officer shall require as a prerequisite to the issuance of a building permit, the execution of a site development agreement. The site development agreement shall be in the format of the sample subdivision agreement set forth in HMC 16.24.050, modified as appropriate for the individual site development, and shall require the developer, at a minimum, to construct, install, and complete specified improvements, provide guarantees, provide security for performance, and provide warranties.

Improvement Plan Review:

All Improvement Plans submitted to the City for plan check review shall be submitted with all the following information unless determined otherwise by the City Engineer. Additional information may be required on a case by case basis. Use **ideal design criteria** “**NOT minimum,**” **minimums shall only be the ‘rare’ exception not the rule.**

### **GENERAL**

- Plans shall be prepared, signed and stamped by a California Registered Civil Engineer.
- North arrow and scale shown on each sheet.
- Titles and numbers on all sheets and match index.
- Conformance to Parcel Map and conditions of Approval; including street and Right-of Way widths, grading, drainage sewerage, water lines, etc.
- Submittal shall include a copy of the Soils Report.

### **TITLE SHEET** (May be with architect’s cover sheet)

- Name of Subdivision or Project.
- Subdivision Number (resolution number).
- Address of the property.
- Vicinity Map with North Arrows (North up and/or left or right)
- Sheet Index.
- City Engineer’s Signature Block.
- Consultant Signature Block.
- General Notes per the Design Standards.
- Resolution No. approving project and detail sheet with the actual approval conditions on the plan sheet.
- Benchmark data to tie in the parcel.

### **SHEET ONE** (Title Sheet and/or sheet two)

- Map showing all streets, utilities, structures, etc. and show improvement plan sheet layout.
- Drafting symbol legend & list of abbreviations.
- Street sections shown.
- Structural sections shown in conformance with City Standards (TI, R-Value, AB, AC, etc.).
- Curb shown.
- Right-of-Way and Street widths shown.
- Cross-slope shown – note relative difference of TC.
- Sidewalk shown.
- Pedestrian paths shown.
- Drainage ways shown (overland flow after construction).
- Temporary and permanent benchmarks and descriptions.

### **DEMOLITION / ABANDONMENT PLAN** (If Required)

- Clearly show existing topography.
- Show existing septic tanks, leach fields, wells, water sewer, electrical, gas, cable, or other utilities, buildings and structures. Show what will be removed, modified, or what will remain (protect in place).

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### **GRADING PLANS** (On & Off Site)

- Existing elevations or contours shown.
- Proposed pad grades.
- Show TC elevations at property line extensions, grade breaks, curb returns and drain inlets.
- Street slopes at centerline shown (0.4% minimum on new streets).
- Pad numbers or letters shown.
- Retaining walls and sound walls shown (detail shown).
- On-site highpoint at driveways at least 0.8' above flow line.
- Show grading required for off-site drainage.
- Grading shown between back-of curb or sidewalk and original ground at Right-of-Way line.
- Grading conforms to adjacent properties shown correctly and no adverse impact to future development.
- Maximum slopes 2:1 or per Soils Report.
- All pads above high water if storm drains plug. (overland surface flows)
- All storm drain inlets (low points)
- High Points
- Elevations at rear of lots shown.
- NOI & SWPPP Plan Submitted.
- SJVACPD Construction Notification /Dust Control Plan

### **STREETS: PLANS & PROFILES** (Plan Views 1" = 40')

- Designed in full accordance with current Streets Master Plan, and Traffic Impact Analysis Guidelines. All existing and proposed improvements clearly shown.
- Radius of curvature, central angle, length, and radius (30' on residential and 50' on industrial streets).
- Cul-de-sac radius per City Standard Details.
- Right-of-Way and street width dimensions shown.
- Centerline stationing at 100' and at BC and EC of curves.
- Profiles shall show existing and proposed grades.
- Lot/parcel lines and numbers/letters shown.
- Cul-de-sac cross slopes from high point to gutter lip minimum 2% and maximum 5%.
- Valley gutters (in-fill projects only) – show flow lines.
- Stationing in all drainage structures and utility stubs to property.
- TC elevations given at all drain dimensioned.
- Location of underground pipes and utilities shown.
- Street monuments shown.
- Pedestrian paths shown. Basic grades shown.
- Street names shown.
- Stations and elevations street intersections shown.
- All notes and symbols standard and conforming to legend.
- All existing utility poles, manholes, valves, signs, mailboxes, trees, etc. shown. Indicate those to be removed, relocated or adjusted to grade.
- Continuations and cross streets properly referenced.
- Project limits and City limits shown.
- Barricades (temporary during construction and permanent) shown in proper locations, and specified as to type.
- Handicap ramps with reference to City Std. Detail number.
- Show existing driveway locations on both sides of the streets adjacent to the proposed project.
- All Traffic Control Devices identified.

### **Profiles, Vertical Scale 1" = 2' or 4'**

- Minimum vertical curve lengths observed (50')
- Vertical curve, used for grade breaks greater than 2%
- In cul-de-sacs, show profiles @ centerline from end of TC profile through the radius point to top curb at end of cul-de-sac (dashed line).
- 2% maximum grade observed across intersections.
- 0.40% minimum grade on all new streets at curb.
- 0.50' minimum fall around curb returns on all streets.
- All underground pipes and utilities shown; storm drain, water, gas, electrical, cable, and sewers.
- Existing ground on centerline shown.
- Finished grade profile for top of curb shown.
- Centerline stations and elevations shown @ all BVC, EVC, PIVC, grade breaks, low points and high points.

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- All slopes in profile shown.
- Show all utility crossings with clearances indicated when closure than 15".
- Manhole and drop inlet invert and flow line elevations shown.

### **Driveways: Flared & Drop Approaches**

- Design conforms to City Standards.
- Size of driveway shown.
- Flare ends a minimum of 2' from the property line.
- Use a Drop Approach instead of a flared approach for the heavier traffic volumes or truck traffic.
- An on-site high point is established at least 0.8' above the gutter flow line. Drop approach may require 17' or more.
- On-site drainage stays on-site except for minor driveway drainage. Contains 2" water over the site Drop Approach.
- Handicap ramps 12:1 at driveway Drop Approach.
- Driveway part in sidewalk does not exceed 2% cross slope and is 4 feet wide for pedestrians to traverse.

### **DEDICATIONS** (If Required)

- Right-of-Way Dedications made. New property line shown on plans. Off-tract drainage improvements (plan and profile) and accompanying easements shown. Off-tract offers of dedication for drainage easement submitted for review.
- All PUEs dedicated and shown on Improvement Plans. No PUEs for private on-site utilities. These should be indicated as private utility easements.
- Planting easements dedicated.
- Off-Tract work to be done but no easement requirements. Right-to-Entry submitted for review.
- Easements widths indicated.
- Easements across lots are not permitted.

### **UTILITY PLANS – GENERAL**

- Design conforms to City Standards.
- Sizes of lots shown. Stations annotated at all services of lots.
- Adequate cover; 36" min. to finished grade for water and sewer – 2' min. to sub grade, Ductile Iron Pipe or approved if shallower; storm at minimum 36" to finished grade. Engineered alternatives if shallower.
- Connections to existing facilities.
- Curves allowed within 80% or recommendations of pipe manufacturer. Show curve data or offsets if concentric with centerline (also provide the manufacturers recommendations used).
- On all curves where short pipe lengths are used, indicate clearly on plans.
- Show all existing power poles to be relocated/under grounded.
- Conformance with Department of Health Requirements. Plans must specify length of section and type of pipe at crossing.
- Special approval areas shall be boldly noted in profile (less than minimum cover and clearances).
- Water & Sewer – 8" minimum main size. Storm – 15" RCP minimum.
- Length & size of pipe shown in profile (indicate all changes in class of pipe exceeding CL 150).

### **UTILITY PLANS – SEWER & STORM**

- Deigned in full accordance with current Sewer Collection and Storm Water Master Plans.
- Size, slope, length between structures, and type of pipe.
- Rim elevations on manhole shown.
- Stations given for manholes.
- Sewer – 400' maximum distance manhole to manhole.
- Storm – 500' maximum distance manhole to manhole.
- Storm & Sewer Lines a MINIMUM of 50 feet from closest edge of casing(s) of domestic water wells.
- Storm & Sewer Manholes a MINIMUM of 100 feet from closest edge of casing(s) of domestic water wells.
- Gravity system – Minimum 2 fps velocity (when partially full).
- Sewer – 0.10' drop around corner through manhole.
- Bolted manhole covers for any off-street manholes under public maintenance.
- In unimproved areas of right-of-ways and PUEs manholes extend 1' above ground, a minimum of 3 each one foot grade rings are used to bring up to grade.
- Cleanout on main where temporary phasing exists and run does not exceed 250' and 3 services. Manhole and stub when temporary stop exceeds 250' or more than 3 services are going to be installed. Terminal manhole on short runs that end shallow.

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- Sewer – PVC lining on manholes constructed on trunk mains.
- Manhole size i.e., 48", 60", etc.
- Storm calculations showing 2" over site (Engineer provides cross sections and map locations of the cross sections with calculations).
- An on-site high point behind driveway is established at least 0.8' above the gutter flow line. High points for Drop Approaches will require 17' or more feet to locate a high point.
- Access to storm drain line does not exceed 500'. Access provided to catch basin, manhole, or open ditch (headwall).
- Trunk lines 1.25' behind top face of curb. Transition to enter catch basin in the center.
- Storm drain outlet protection provided.
- A detail for the on-site detention basin showing top, toe, high water and other relevant elevations including dimensions meeting the minimum city requirements.

## **WATER**

- Length shown as distance between crosses or tees.
- Invert elevations shown at grade breaks.
- Top of curb at hydrant locations.
- Looped lines in cul-de-sacs, dead ends.
- Blow-offs behind walks.
- Fire Hydrants at back of cul-de-sac for terminating water lines (in-lieu of a blow off). When allowed.
- Connection to existing facilities.
- Water sampling stations
- Air valves per AWWA Manual of Water Practices M51
- At points of future extension install temporary blow-off with valve.
- Fire hydrants maximum spacing – 500' residential and 300' other. Hose lay lengths 250' residential and 150' other Cul-de-sacs within 200' of radius point. And not closer than 15' to any dry utility pole, vault or transformer.
- Designed in full accordance with current Water System Master Plan.
- Water usage demand quantities for project area determined. Annual total, Maximum daily, and Maximum with fire flow.

## **STREET LIGHTING**

- Streetlight locations, wattage and pole height shall be shown on plans and approved by the City.
- Plans shall be 1" = 40', 50', or 100' scale.
- Service pedestal shall be located out of sight distance triangle area, 25' or more.
- Point of connection (TID transformer)
- Conduit location.
- Luminosity Plan

## **LANDSCAPE & IRRIGATION**

- Scale 1" = 20'
- Shall be submitted when Improvement Plans are submitted.
- Irrigation schematic to be shown separate from planting details, and include head loss calculations for each line.
- Property/Right-of-Way lines and Planting Easements.
- Plants specified by scientific and common names.
- Trees conforming to City Tree Master Plan.
- Drainage.

## **STORM CALCULATIONS & DRAINAGE MAP**

- The Tributary Area Map shall be large enough and legible and must include: the size in acres for each drainage area (DA) and related drainage information including the Catch basin and manhole numbers and locations, corresponding to the drainage analysis sheet, rim/top of curb, and invert of all structures, the pipe information (length, size, type, and slope of all pipes). This information shall correspond directly with the respective structures on the improvement plans.
- The Hydraulic Grade Line (HGL) and Energy Grade Line (EGL) shall be also shown on the Tributary Map and shall correspond to the Hydraulic Calculations.
- Known or assumed downstream water surface elevation or HGL, and basis of the assumptions.
- Copies of the referenced county/city standards and rainfall intensity curves, for both pipe size/slope calculations and basin size calculations for each event (on-site 10-year, and basin 100-year storm).
- A detail for the on-site detention basin showing top, toe, high water and other relevant elevations including dimensions (including required freeboard).

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- The hydraulic analysis shall be prepared, signed, and stamped by a California Registered Civil Engineer.
- Storm calculations must be completed using a dynamic analysis computer program such as SWMM for basin and storm pipe analysis (not modified excel spreadsheets with own formulas).
- Minimum velocity shall be 2 fps for partially full pipes.
- Designed in full accordance with current Storm Water Master Plan.
- The hydraulic analysis shall include all the information stated above.

### **ENGINEER'S COST ESTIMATE**

- All quantities, unit costs, extensions, and assumptions clearly stated.
- Verify that unit costs compare with current City Opinion of Costs
- Verify quantities of all items.
- Review with plans to determine if there are any missing items.
- 10% minimum contingency required. Higher if construction cost data suggests escalating cost environment.
- Grading quantities shown – lump sum not acceptable.
- Driveways included as separate item.
- Sidewalk on square foot and not included in curb and gutter item.
- Increase costs of facilities installed in existing streets by 50%.
- Check groundwater depth. If pipes installed below water table, increase cost by \$10 per lineal foot.
- When resubmitted, verify that all changes in plans are reflected in the estimate.
- City fees shown – grading, water (systems, lateral and hot taps), sewer bond redemption or EDU prefunding, subtruck and lateral.
- Do not use developer bid prices, use the cost to the City if it was to be bid as a public project (since that is what will happen in which case the City would be forced to use the given bonds to complete the construction).
- Include all testing and inspection costs, as well as 8% for construction management, 15% for administration.

### **RECORD / AS BUILT DRAWINGS**

- All "Record" or "As Built" drawings shall be field verified after construction, and shall include field measurement for all: inverts, rims, grates, top of curb for curb returns, top of curb adjacent to drainage inlets, top of curb at all changes in alignment (both vertical and horizontal), toe of slope and top of bank for all storm basins (and to include measured volume of the basin versus required design volume) and related facilities as required by the City Engineer.

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

**FINAL MAP**

Conformance with provisions:

- Tentative Map approved or conditionally approved, or
- Vesting Tentative Map approved or conditionally approved
- Approved Improvement Plans and Approved Cost Estimates
- Improvements in place and accepted, or fully bonded.

Preparation:

- Prepared by a California Registered Civil Engineer, or
- Prepared by a California Registered Land Surveyor
- Based on a Survey
- Conforms to Subdivision Map Act
- Conforms to Chapter 16 HMC

Form and Contents:

- Legibly drawn, printed or reproduced
- On material meeting reproduction requirements
- Each Sheet 18 inches by 26 inches
- One inch margin and margin line around perimeter
- Number of and total number of sheets in lower right hand corner
- Engineer's scale of one inch to 100 feet or less
- All Survey/math/data shown to retrace monuments, interior, exterior boundary lines, including bearings, distances, radii, arc length, chord bearings, length of all curves, ties to monuments to establish boundaries of subdivision, streets, and lots.
- Each parcel numbered, each block numbered or lettered.
- Each Street or public way named.

Final Map Filing:

- Plan Sets, Three sets
- Checking Fee
- Filing Report
- Current preliminary title report, or certificate of title
- Improvement Bonds, agreements and instruments of conveyance
- Bonded indebtedness of land paid off

Final Map Examination:

- Final Map Plan Sets Approved
- Required documents in order
- Surveys
- Technically Correct
- Substantial conformance with Tentative Map

PROJECT: \_\_\_\_\_

Date: \_\_\_\_\_

PREPARER: \_\_\_\_\_

### SUBDIVISION IMPROVEMENTS ACCEPTANCE

#### Inspection Reports

- Encroachment Permit(s) closed out
- Underground Work Completed
- Utilities
  - Water
    - Hydrants
    - Meters set
    - Valves
    - Bac T Results
    - Sampling Stations
  - Sewer
  - Lighting, Gas, Cable
- Roadway
- Video Tapes/ Tests of Sewer
- Sprinklers/Irrigation reset
- Other

#### Submittals

- Preconstruction Check List Used
- Submittals provided Per Plans
- Reviewed and Accepted
- Warranties/Bonds

#### Field Visit

- Punch List Inspection
- Final Inspection

#### Development Agreement Requirements met

- Detailed review of all provisions
- Sign off by Planning and Building
- Sign off by Legal

#### Conditions of Approval met

- Detailed review of all provisions
- Covenants to buyers verified

- Sign off by Planning and Building
- Sign off by Legal

#### Final Record Drawings

- Submitted in Form and Numbers required
- Based on actual land survey for conformance.

#### CAD/GIS files Accepted

- Reviewed and Returned for Correction
- Reviewed and Accepted

#### Recommendation of Acceptance

- Conditional Acceptance
- Unconditional Acceptance

#### Presented to City Council for Acceptance

- Accepted

**APPENDIX C – CAD SUBMITTAL STANDARD AND POLICY**



## **Improvement Projects**

# **CAD Submittal Standards and Policy**

July 2007

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## **1.0 Introduction**

This section will assist in understanding this document and its overall relationship to the City of Hughson.

### **1.1 Purpose**

This technical document establishes the data standard for Computer Aided Drafting (CAD) submittals to the City of Hughson. This standard is necessary to ensure efficient data transfer between the City of Hughson, its consultants and developers. Developed specifically for engineering, this standard is designed to enforce commonality amongst data required throughout the City of Hughson.

### **1.2 Scope**

This document provides instructions for standardizing various aspects of CAD data produced for the City of Hughson. This standard applies only to CAD drawings generated for the City of Hughson's improvement projects. However, other City Departments may include these Standards as part of their scope of services to be performed by a consultant.

### **1.3 Additions/Changes**

This standard is intended to be updated and enhanced as appropriate over time. Recommended additions and modifications are to be directed, for review, to:

David Chase, P.E.  
City of Hughson  
Director, Public Works  
7018 Pine St.  
Hughson, CA 95326

Fax: (209) 883-2638  
E-mail: [dchase@hughson.org](mailto:dchase@hughson.org)

If a recommended addition or modification will result in any changes to the template, or any of the supporting files, then the appropriate files need to be submitted. Allow 30 days for review.

***CAD Data Standards***

Form for Proposed Additions and Modifications  
to CAD Data Standards

Date Submitted: \_\_\_\_\_

Contact: \_\_\_\_\_  
Company: \_\_\_\_\_  
Phone: \_\_\_\_\_  
E-mail: \_\_\_\_\_  
Address: \_\_\_\_\_

Attn: David Chase, P.E.  
City of Hughson  
Public Works  
7018 Pine St.

Justification for Revision:

- Incomplete       Inaccurate       Obsolete  
 Conflicting       Redundant       Other \_\_\_\_\_

Description

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Proposed Revision Description

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Filename	File Content
_____	_____
_____	_____
_____	_____

**COH USE ONLY**

Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_

- Approved  
 Disapproved

Comments

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## 2.0 Drawing Organization

This section addresses CAD files model space and paper space (layout), naming files, external references and project sheet order.

### 2.1 Model Space and Paper Space Files

Two types of CAD spaces are addressed in this standard: model space and paper space. Model space contains the physical components of a particular area at actual size and typically represents plans, profiles, elevations, cross-sections, etc.

The City of Hughson established a local horizontal and vertical control published in December 2006. The Datum used by the City is NAD83 and NAGVD29 is shown in the Horizontal and Vertical Control Layout for the City of Hughson, California and will be the basis of all maps submitted to the City. A minimum of two (2) ties will be made to horizontal and vertical monuments.

All model space drawings are to be setup to **State Plane Coordinates** (NAD83, Zone III, US foot) and UCS set to world. Units shall be set to decimal, with a precision of at least a hundredth. Paper space is the plotted sheet for the project, which has a particular view of a portion of the model space. All notes, leaders and dimensions shall be in model space.

### 2.2 File Names

Naming standards for electronic drawing files allows the users to identify the content and relevance of the drawing. They provide basic information for organizing the files within a project directory. When electronic files are submitted to the City of Hughson, the files must be saved within a folder that has been properly named with a brief description of the project, *i.e. Charles Street Project*.

Table 2.2 is a standard of file names, including x-references, and layout information to include, but not be limited to the items listed.

**Table 2.2 File Layout**

File Name	Paper Space	Model Space
Master	No information	All existing and proposed information for project area
Tblk	Border, Text (any text that remains constant for all sheets, <i>i.e. project number, total sheets, etc.</i> ), Engineer Stamp and Company Logo	Nothing
Cover (see Appendix A)	<i>Tblk.dwg</i> as an x-ref Title block information** All text Vicinity Map hatch	<i>Master.dwg</i> as an x-ref
Clearing-StreetName* <i>i.e. Clearing-Charles</i>	<i>Tblk.dwg</i> as an x-ref Title block information* All text, callouts and leaders	<i>Master.dwg</i> as an x-ref with appropriate clearing and grubbing information.

<b>File Name</b>	<b>Paper Space</b>	<b>Model Space</b>
Construction-StreetName* <i>i.e. Construction-Charles</i>	<i>Tblk.dwg</i> as an x-ref Title block information** All text, callouts and leaders	<i>Master.dwg</i> as an x-ref with appropriate construction information, including AC, curb, pipe work, etc.
Details	<i>Tblk.dwg</i> as an x-ref Title block information**	All detail information including text and leaders.
Electrical -StreetName* <i>i.e. Electrical-Charles</i>	<i>Tblk.dwg</i> as an x-ref Title block information** All text, callouts and leaders	<i>Master.dwg</i> as an x-ref with appropriate electrical plans, including street lighting.
Landscape-StreetName* <i>i.e. Landscape-Charles</i>	<i>Tblk.dwg</i> as an x-ref Title block information** All text, callouts and leaders	<i>Master.dwg</i> as an x-ref with appropriate landscaping information, including irrigation.
Traffic-StreetName* <i>i.e. Traffic-Charles</i>	<i>Tblk.dwg</i> as an x-ref Title block information** All text, callouts and leaders	<i>Master.dwg</i> as an x-ref with appropriate traffic plan information, including signal, striping and pavement markings

\* There shall be only one of each file per a street. If the project includes more than one (1) street, then clearing, construction and landscape files need to be provided for each street within the project scope of work. Some exceptions may apply.

\*\* Refer to Section 3.2.2 Title Block below.

### 2.3 External Reference (x-refs) and Image Files

External references to other CAD files may be used to subdivide a large CAD drawing into several smaller, more efficient drawings. The use of this procedure will reduce drawing size, increase performance and improve operator efficiency. There shall be no specific drive or directory references associated with the reference files. All references must reside in the same directory as the drawing files (relative path only). External references shall be brought in as an overlay only, not attached, bound or inserted. There shall be no aerial images on construction plans.

### 2.4 Drawing Order

The drawings shall be setup and placed in a particular order, based on Table 2.4 Project Sheets. If street will take more than one (1) sheet, then the project shall read continuously from west to east or south to north.

**Table 2.4 Project Sheets**

	<b>Sheets</b>	<b>Description</b>
1	Cover	Cover of Project (see Sample Cover - Appendix A)
2	Site Plan	General overview of project, if project includes multiple categories ( <i>i.e. pipework, electrical, curb and gutter, landscape</i> )
3	Demolition Plan	Callout items to be removed or modified.
4	Utility Plan	Plan and corresponding profile of Sanitary Sewer, Storm Drain and Water Systems as well as other utilities.
5	Electrical Plan	Electrical System

	<b>Sheets</b>	<b>Description</b>
6	Road Plan	All concrete work, to include any and all curb, gutter, medians, drive approaches, sidewalks, curve table and any necessary details of curb sections.
7	Striping Plan	Illustrating existing and new striping and pavement markings.
8	Details	Details that pertain to any previous sheets in the order that they appear. With Detail 1 starting on the upper right corner of the sheet and continuing down and to the left. (see Section 4.1)
9	Landscaping Plan	Landscaping and irrigation plans, including details of landscaping.
10	Signal Plan	Complete signal plans.

### 3.0 Appearance and Presentation

In this Standard, CAD appearance and presentation involves lines, text, hatch patterns, sheet organization and drawing scale.

#### 3.1 Appearance

Appearance involves primarily line width, line style, line color and text style.

##### 3.1.1 Line Width

Using a variety of line widths substantially improves a drawing's readability. AutoCAD provides extensive control over line width to support viewing and plotting. The City of Hughson makes use of the line width option in the plot style setup (see Plot Style - Appendix B).

Pipe networks to be drawn with global line widths set equal to pipe diameter in inches.

##### 3.1.2 Line Style

The line styles selected for this standard are listed in Table 3.1.2. Line styles corresponding to each layer are listed in the Layer Dictionary-Appendix C. Utility lines shall contain one letter representing the category (i.e. *E for electrical*), and the size if available. This information shall appear a minimum of three (3) times per a sheet for each line. The text shall conform to Section 3.1.4 Text Style for dimensions and callouts.

**Table 3.1.2 Standard Line Types**

<b>Description</b>	<b>Example</b>
Center2	— — — — —
Continuous	
Dashed	
Dashed2	
Divide2	
Fenceline1	

Description	Example
Hidden	
Hidden2	
Phantom2	

### 3.1.3 Line Color

The primary reason to use color in CAD drawings is to improve the clarity of the drawings on a computer monitor. The variety of colors available in a CAD application depends on the capabilities of the monitor and its video card. Today, most systems are capable of displaying from 16 to 256 colors. Based on the limitations of monitor color display capabilities and differing CAD systems plotting methods, this standard requires that all drawings be created using the colors presented in Table 3.1.3. Line colors corresponding to each feature type on a drawing are described in the Layer Dictionary - Appendix C.

**Table 3.1.3 Required Line Colors**

Color	Color No.
Red	1
Yellow	2
Green	3
Cyan	4
Blue	5
Magenta	6
White	7
Grey	8
Dark Grey	250
Medium/Dark Grey	251
Medium/Light Grey	252
Light Grey	253
Grey	254

### 3.1.4 Text Style

The text style used shall be ROMANS or may be changed to ARIAL when specified (see Table 3.1.4 Text Style). Contrasting text sizes and colors are used within a drawing to delineate different types of information. All lettering shall be done to facilitate reading from the bottom or right hand edge of the sheet. All lettering shall be capital (uppercase). Callouts shall be done in model space using a scaled ROMANS font found in Hughson.lsp. In general, any text that has the possibility of being dis-associated with its object shall be in model space. General Notes for each drawing sheet shall be located in paper space as well as general utility, symbols, abbreviations, border and title block information.

**Table 3.1.4 Text Style**

Text Application	Style Name	Font Name	Height**
“CITY OF HUGHSON”*	L750	ARIAL	.75
“PLANS FOR CONSTRUCTION”	L350	ARIAL	.35
Project Title*	L500	ARIAL	.50
Project Limits*	L350	ARIAL	.35
Project Number*	L500	ARIAL	.50
General Notes Title*	L140	ROMANS	.14
General Notes*	L100	ROMANS	.10
Sheet Index Title*	L140	ROMANS	.14
Sheet Index Numbering and Description*	L100	ROMANS	.10
Utility Contact Title	L140	ROMANS	.14
Utility Contact*	L100	ROMANS	.10
Symbol Legend Title*	L140	ROMANS	.14
Symbol Legend*	L100	ROMANS	.10
Abbreviation Title	L140	ROMANS	.14
Abbreviations*	L100	ROMANS	.10
Sheet Title in Title Block	L200	ARIAL	.20
All other Title Block Text	L80	ROMANS	.08
Scale Ratio	L100	ROMANS	.10
Callouts**	XX SCALE	ROMANS	---
Dimensions***	XX SCALE	ROMANS	---
Detail Name	L200	ROMANS	.20
Detail Description	L120	ROMANS	.12

\* See Project Cover Sheet Sample Appendix A

\*\* Use appropriate text scale from **Hughson.lsp** based on viewport scale.

\*\*\* Use appropriate scale as found in AutoCAD Dimension Style. Dimension styles loaded with lisp routine **Hughson.lsp**.

## 3.2 Sheet Organization

Sheet organization primarily involves sheet size and title block.

### 3.2.1 Sheet Size

All project drawings shall be 24” x 36” (ARCH D), with a 2” border on the left and a 1” border on all remaining sides.

### 3.2.2 Title Block

Consultants to use their own title block. The information to be included, but not limited to, shall be consultant information, logo and engineer stamp; project information, date, City of Hughson project number, sheet number, scale, drawn by, City Use approved by and engineer stamp area, and revision number, date and description.

The sheet number for multi-sheet drawings shall be located in the title block. The drawing title shall include the following:

SHEET TYPE (see Table 2.4 Project Sheets)

STREET/AVENUE/BOULEVARD NAME

STATION NUMBERING

### 3.3 Drawing Scale

For each drawing, a numerical scale ratio used per plan shall be shown by the respective title on all sheets (paper space). All construction plans within one project shall have the same scale. The horizontal scale of the plans are not to exceed 1"=30' and shall have a minimum of 1"=50'. The only exception for the horizontal scale is on the Signal Plan, which can have a scale of 1"=20". The vertical scale of the plans are not to exceed 1"=1' and shall have a minimum of 1"= 4'. Scales used shall be standard engineering scales of 1"=30', 1"=40' or 1"=50'. Every sheet shall also include a graphical scale bar that represents the numerical scale and a north arrow pointed to the top or right of the sheet.

#### 3.3.1 Dimensioning and Leaders

Dimension/Leader arrows shall be "closed filled" with a size of 0.1200. All leaders for clearing, construction and landscape plans shall be in paper space (see Table 2.2 File Layout). Dimension lettering in model space shall be arranged to read from the bottom or right hand side of the sheet. Repetition of dimensions in a single sheet shall be avoided.

### 3.4 Hatch

All hatching shall be on one of the hatch layers (see Layer Dictionary - Appendix C). The hatch pattern shall appear and be plotted behind all text, lines, grids, etc. Refer to Table 3.4 Hatch Patterns for approved hatch patterns.

**Table 3.4 Hatch Patterns**

Description	Hatch Pattern	Scale
New AC	Solid Hatch	1
AC to be removed	ANSI 37	10
Details	Earth, Conc, etc.	various

### 3.5 Drawing Aesthetics

The aesthetics of the drawing are an important component of the project. The goal is to have a complete and accurate set of plans that are legible to all involved; Engineer, Contractor, Plan Checker, Inspectors, etc. In order to accomplish this, the following items shall be included on the drawings:

- State Plane coordinate with basis of bearing;
- Bearing on Construction Line;
- Monument with Northing and Easting noted;
- Hatch legend on corresponding sheets;
- Enlarged details of particular areas that require more information than what may fit legibly.

In addition, to maintain legible drawings refer to Table 3.5 Dos and Don'ts.

**Table 3.5 Dos and Don'ts**

<b>Do</b>	<b>Don't</b>
1. One (1) note per a leader.	1. Break leaders or dimension lines.
2. Multiple leaders per a note.	2. Break profile grid vertically.
3. Create a detail of an area that will be overwhelmed with text and information.	3. Place matchlines at odd alignments, i.e. 50+23.
4. Make all note/callout text size uniform in size and style.	4. Place aeriels on construction sheets.
5. Align text vertically or horizontally when possible	5. Overlap text, with exception to topography tags and station labels.
6. Keep title block information uniform throughout project.	6. Repeat pipework calculation. Linear feet of pipe shall only reflect the feet illustrated on current sheet.

## 4.0 Details, Blocks and Profiles

This section will address the requirements for details, blocks and profiles.

### 4.1 Details

Details shall be located on the detail sheet, unless sufficient space is available on the corresponding construction sheet. Include details that pertain to any previous sheets in the order that they appear. With detail one (1) starting on the upper right corner of the sheet and continuing down and to the left. The electronic copy of the City of Hughson "Improvement Standards" shall not be reduced more than 25% of the original size when included on the drawings. Any modified or special details shall be at a reasonable scale that makes the detail legible, including use of linetype and hatch pattern.

### 4.2 Blocks

A block in AutoCAD is a group of graphical elements that can be manipulated as a single entity. Examples of typical blocks are manholes, fire hydrants, water valves, etc. The use of such symbols enhances CAD productivity. Any traffic, including striping and signal (i.e. *turn arrows*, *railroad crossing*) standards shall be obtained from Cal-Trans. All utility access points (vaults, boxes) larger than one (1) square foot shall be drawn to scale.

### 4.3 Profiles

Profiles shall be shown on a grid sheet format conforming in scale to the plans. The alignment for plan and profile shall be in line vertically, when possible. Profiles shall not be broken vertically, see Section 3.3 Drawing Scale for appropriate scale. The alignment shall be labeled in increments of 100 feet for plan and profile. Grid lines shall be a minimum of 100 foot increments with lighter (in linetype) lines at 50 foot horizontally and every foot vertically.

### 5.0 Layers

CAD layers (levels) are analogous to overlays in manual drafting systems and serve to separate graphic elements (lines, shapes, and text) according to the feature type they represent. This section addresses layer naming convention and layer assignment. Layer Dictionary - Appendix C consists of a detailed standard layer table.

These layers are also directly linked to the way our drawings are inserted into the City of Hughson's Utility Master Plan. By referring to the color chart, you will notice that specific colors have been assigned unique line weights. This helps insure ease of insertion of submitted AutoCAD drawings into the master plan.

For your convenience, a LISP routine has been created to assist the City's consultants and developers when starting a new drawing. The LISP routine automatically loads the appropriate layers, dimension styles, and text styles for you.

### 5.1 Layer Naming

Layer names consists of distinct data fields separated from one another by a dash, with the exception of the alignment, profile grid and title block (see Layer Dictionary - Appendix C).

Example: **C-ROAD-WALK**

**C = Prefix    Road = General    Walk = Specific**

#### The Prefix

The Layer Manager sorts the layers in alphabetical order by default. Several prefixes are used to help group similar layers together.

- C        Layers with this prefix are proposed civil features. Generally, they are on colors that, when plotted, stand out above existing and future features. C = construction
  
- X        Layers with this prefix are existing civil features. These layers will be faded back by using color 252 so as not to stand out above the proposed features.
  
- F        Layers with this prefix are future civil features and are also faded back similar to the existing features.
  
- D        Layers with this prefix are details of larger sections either of existing features or features to be constructed.

- A Layers with this prefix are used for attributes in paper space relating to title block information, north arrow and legend.
- SV Layers with this prefix are used primarily by surveyors for survey information.

## General

The general description helps to sort the layers into more specific groups. The following is a description of these general layer names:

- ANNO Any text in a drawing is placed on a layer with this general description
- BORD This is used for border information
- BDRY This is used for boundary data. Most commonly used in the creation of site and parcel boundaries, including lot lines.
- DETL Detail information/linework/objects
- ESMT Easement boundary linework
- ROAD Road features including pavements curb and gutter, etc.
- SITE General site features including objects such as buildings, fences, etc.
- STRP Striping features corresponding to Cal-Trans
- UTIL Utility features; storm drain, sanitary sewer, electric, and so on
- GRAD Graded features such as swales, berms, hinge points and toes. Basically any graded feature.

## 6.0 CAD Data Submittal

This section will address how a consultant or developer is to submit a completed improvement project to the City of Hughson, Public Works Department, to include but not be limited to a plotted set of CAD drawings and the electronic version of all necessary CAD files and any supporting files.

### 6.1 CAD Hard Copy

Preliminary plan sets shall be plotted on bond, bound and stapled along the left edge when viewing the plan set. Binding shall be plain white paper with Submittal Title only, no company logo or advertisements (i.e. *95% Submittal*). The preliminary plans shall include a "Preliminary, Not For Construction" stamp. Final plan sets shall be plotted on mylar or polyester and unbound. Each sheet in the final plan set shall include a "plot stamp" in the bottom left corner and orientated vertically. The "plot stamp" shall include the file name, date and time plotted. A letter of transmittal is required with each hard copy plan set, to include the City of Hughson Director of Public Works, consultant Project Manager with contact information, project name, project number, and submittal description.

## 6.2 CAD Electronic Format

When submitting electronic files to the City of Hughson, the consultant or developer must submit all files on a CD or a DVD. All AutoCAD files shall be saved as a .dwg in version 2005, and as a .dwt or .pdf file. The files shall be saved as outlined in Table 2.2. A letter of transmittal is required with each submittal, sent to the City of Hughson Director of Public Works, with contact information, project name, project number, and submittal description.

## 6.3 CAD Submittal Compliance

Since nearly all layers have been created for you already, the consultant or developer will rarely be required to produce new layers. New layers must be approved by the City prior to their use. Any consultant or developer making revisions, designing, etc. is responsible for using the correct layers

**CAD drawings not submitted in accordance with City of Hughson CAD Submittal Standard and Policy will be subject to a MINIMUM fine of \$800. Changes to incorrectly formatted CAD submittals will be performed by the City with fines in excess of \$800 being charged on a time and materials basis to bring CAD submittals into compliance.** This fine is necessary to ensure compliance and to encourage developers and consultants to follow the City's standards.

## 6.4 Support Files

Any and all support files shall be included with the electronic CAD files. Support files shall include, but not be limited to, external references and data point files. The data point file shall be provided in a .txt version. The consultant or developer shall not change or provide any other text style than what has been previously stated.

## 7.0 Appendices

Appendix A – Project Cover Sheet Sample

Appendix B – Plot Style Table

Appendix C – Layer Dictionary

**Appendix A** – Insert “PLANS FOR CONSTRUCTION” GRAPHIC

## Appendix B - Plot Style

Object Color		Plot Color	Screening	Lineweight (mm)
Name	Color #			
Red	1	Black	100	0.008
Yellow	2	Black	100	0.015
Green	3	Black	100	0.020
Cyan	4	Black	100	0.025
Blue	5	Black	100	0.030
Magenta	6	Black	100	0.010
White	7	Black	100	0.010
Dark Gray	250	Gray	100	0.010
Med./Dark Gray	251	Gray	100	0.010
Med./Light Gray	252	Gray	100	0.010
Light Gray	253	Gray	100	0.010
Light Gray	254	Gray	100	0.010

**Default lineweight = 0.15mm**

## Appendix C – Layer Dictionary

The Layer Dictionary - Appendix C present the following:

- A layer name (see Section 5.1 above)
- A brief description
- The presentation graphics associated with each layer

### ***CONSTRUCTION LINEWORK LAYERS***

<b>Layer Name</b>	<b>Description</b>	<b>Color</b>	<b>Linetype</b>
A-BORD	SHEET BORDER IN PAPER SPACE	VARIABLES	CONT
A-BORD-ATT	BORDER ATTRIBUTES	VARIABLES	CONT
A-BORD-NORTH	NORTH ARROW	VARIABLES	CONT
A-BORD-TEXT	TEXT IN PAPER SPACE	VARIABLES	CONT
DAYSTAMP	DAYSTAMP	VARIABLES	CONT
C-ANNO-BEAR	BEARING, DISTANCE	6	CONT
C-ANNO-CURV	CURVE DATA	6	CONT
C-ANNO-DIMN	DIMENSION, TEXT LEADER	6	CONT
C-ANNO-HTCH	HATCH, POCHE	VARIABLES	CONT
C-ANNO-LEAD	CROW'S FOOT	6	CONT
C-ANNO-LNUM	LOT NUMBER	2	CONT
C-ANNO-MTCH	MATCHLINE	5	PHANTOM2
C-ANNO-NAME	STREET NAME, BUILDING NAME	2	CONT
C-ANNO-RADL	RADIAL DATA	6	CONT
C-ANNO-STAT	STATION TEXT, STATION TIC	1	CONT
C-ANNO-STAT-NAME	STATION NAME	1	CONT
C-ANNO-TEXT	GENERAL TEXT	7	CONT
C-ANNO-SYMB	SYMBOL, BLOCK	2	CONT
C-BDRY-CNTR	CENTERLINE	7	CENTER2
C-BDRY-DIMN	DIMENSION, TEXT LEADER	6	CONT
C-BDRY-ELEV	GRADE ELEVATION	7	CONT
C-BDRY-HTCH	HATCH, POCHE	253	CONT

Layer Name	Description	Color	Linetype
C-BDRY-LINE	LOT LINE, PARCEL LINE	2	DASHED2
C-BDRY-LOTS	PROPERTY LOTS	2	CONT
C-BDRY-PROP	PROPERTY LINE	2	CONT
C-BDRY-ROFW	RIGHT OF WAY	3	PHANTOM2
C-BDRY-SECT	SECTION LINE	1	PHANTOM2
C-BDRY-STBK	SETBACK	1	HIDDEN2
C-BDRY-SYMB	SYMBOLS, BLOCKS	2	CONT
C-BDRY-TEXT	BOUNDARY TEXT	7	CONT
C-STRP-DIMN	DIMENSION, TEXT LEADER	6	CONT
C-STRP-FOGG	FOG LINE	4	CONT
C-STRP-HTCH	HATCH, POCHE	VARIABLES	CONT
C-STRP-LANE	LANE STRIPE	4	VARIABLES
C-STRP-MARK	STREET PAINT, MARKING	2	CONT
C-STRP-MISC	MISC.	7	CONT
C-STRP-PARK	PARKING STRIPE	1	CONT
C-STRP-SIGN	STREET SIGN	2	CONT
C-STRP-STRP	STRIPING	3	CONT
C-STRP-SYMB	SYMBOL, BLOCK	2	CONT
C-STRP-TEXT	CHANNELIZATION TEXT	7	CONT
C-ESMT- *	EASEMENT - * USE MODIFIER	6	HIDDEN
C-ESMT-BDRY	EASEMENT BOUNDARY	6	CONT
C-ESMT-DIMN	DIMENSION, TEXT LEADER	6	CONT
C-ESMT-GRAD	EASEMENT GRADE	6	CONT
C-ESMT-HTCH	HATCH, POCHE	VARIABLES	CONT
C-ESMT-ROAD	ROAD EASEMENT	6	CONT
C-ESMT-TEXT	EASEMENT TEXT	7	CONT
C-ESMT-TOPO	EASEMENT TOPO	6	CONT
C-ESMT-UTIL	UTILITY EASEMENT	6	CONT

Layer Name	Description	Color	Linetype
C-GRAD-BERM	BERM	2	CONT
C-GRAD-CULV	CULVERT, DITCH STRUCTURE	2	CONT
C-GRAD-DIMN	DIMENSION, TEXT LEADER	6	CONT
C-GRAD-ELEV	GRADE, SPOT ELEVATION	7	CONT
C-GRAD-FLOW	DRAINAGE FLOW LINE	1	DASHDOT2
C-GRAD-HTCH	HATCH, POCHE	VARIES	CONT
C-GRAD-HP	HINGE POINT	2	CONT
C-GRAD-POND	POND BANK, CONTOUR	7	CONT
C-GRAD-SWAL	SWALE, DITCH BANK	2	CONT
C-GRAD-RRAP	DRAINAGE FILTER, RIP RAP	250	CONT
C-GRAD-SYMB	SYMBOL, BLOCK	7	CONT
C-GRAD-TEXT	GRADING TEXT	7	CONT
C-GRAD-TOE	TOE	7	CONT
C-GRAD-VGUT	VALLEY GUTTER	1	CONT
C-GRAD-DESIGN-BW	DESIGN –BACK OF WALK	7	CONT
C-GRAD-DESIGN-DIMN	DESIGN –DIMENSION, TEXT LEADER	7	CONT
C-GRAD-DESIGN-FL	DESIGN –DRAINAGE FLOW LINE	7	CONT
C-GRAD-DESIGN-FTG	DESIGN –FOOTING	7	CONT
C-GRAD-DESIGN-GB	DESIGN –GRADE BREAK	7	CONT
C-GRAD-DESIGN-SD	DESIGN –STORM DRAIN	7	CONT
C-GRAD-DESIGN-SS	DESIGN –SANITARY SEWER	7	CONT
C-GRAD-DESIGN-TEXT	DESIGN -TEXT	7	CONT
C-ROAD-CNTR	STREET CENTERLINE	7	CENTER2
C-ROAD-DIMN	DIMENSION, TEXT LEADER	6	CONT
C-ROAD-DRIV	DRIVEWAY APPROACH	6	CONT
C-ROAD-FL	FLOW LINE OF CURB	1	CONT
C-ROAD-CG	CURB AND GUTTER	6	CONT
C-ROAD-HTCH	HATCH, POCHE	254	CONT

Layer Name	Description	Color	Linetype
C-ROAD-LIP	LIP OF GUTTER	7	DASHED2
C-ROAD-MEDN	MEDIAN CURB	6	CONT
C-ROAD-PAVE	EDGE OF PAVEMENT	2	CONT
C-ROAD-RAMP	ACCESS RAMP	1	CONT
C-ROAD-RW	ROAD RIGHT OF WAY	3	CONT
C-ROAD-SAW	SAWCUT LINE	6	DASHDOT2
C-ROAD-SCOR	PAVMT. SCORING, CONC. PATTERN	1	CONT
C-ROAD-SYMB	SYMBOL, BLOCK	2	CONT
C-ROAD-TC	TOP OF CURB	1	CONT
C-ROAD-TEXT	ROADWAY TEXT	7	CONT
C-ROAD-WALK	SIDEWALK, PATH	6	CONT
C-SITE-BLDG	BUILDING	2	CONT
C-SITE-BOL	BOLLARD	2	CONT
C-SITE-CONC	CONCRETE STRUCTURE	2	CONT
C-SITE-DIMN	DIMENSION, TEXT LEADER	6	CONT
C-SITE-FENC	FENCE	2	FENCELINE1
C-SITE-FTNG	FOOTING	2	CONT
C-SITE-GATE	GATES	2	CONT
C-SITE-HTCH	HATCH, POCHE	VARIES	CONT
C-SITE-POST	POST, COLUMN, SUPPORT	2	CONT
C-SITE-RAIL	RAIL ROAD	1	CONT
C-SITE-ROCK	ROCK, GRAVEL, BOULDER	2	CONT
C-SITE-SURF	SITE , MANMADE FEATURE	2	CONT
C-SITE-SYMB	SYMBOL, BLOCK	7	CONT
C-SITE-TEXT	SITE TEXT	7	CONT
C-SITE-TREE	TREES	1	CONT
C-SITE-VEGE	VEGETATION	1	CONT
C-SITE-WALL	ROCK WALL, RETAINING WALL	7	CONT

<b>Layer Name</b>	<b>Description</b>	<b>Color</b>	<b>Linetype</b>
C-UTIL-CATV	CABLE TV	2	CONT
C-UTIL-CBOX	BOX	2	CONT
C-UTIL-DIMN	DIMENSION, TEXT LEADER	6	CONT
C-UTIL-ELEC	ELECTRIC	2	CONT
C-UTIL-FH	FIRE HYDRANT	5	CONT
C-UTIL-HTCH	HATCH, POCHE	VARIES	CONT
C-UTIL-IRR	IRRIGATION	2	CONT
C-UTIL-NGAS	NATURAL GAS	2	CONT
C-UTIL-PP	POWER POLE	2	CONT
C-UTIL-SD	STORM DRAIN	4	CONT
C-UTIL-SDCB	STORM DRAIN CATCH BASIN	4	CONT
C-UTIL-SDDI	STORM DRAIN INLET	4	CONT
C-UTIL-SDMH	STORM DRAIN MANHOLE	4	CONT
C-UTIL-SS	SANITARY SEWER	3	CONT
C-UTIL-SSMH	SANITARY SEWER MANHOLE	3	CONT
C-UTIL-*-SYMB	SYMBOL, BLOCK	7	CONT
C-UTIL-TANK	TANK	2	CONT
C-UTIL-TELE	TELEPHONE	2	CONT
C-UTIL-TEXT	UTILITY TEXT	7	CONT
C-UTIL-TP	TELEPHONE POLE	2	CONT
C-UTIL-UP	UTILITY POLE	2	CONT
C-UTIL-WATR	WATER	2	CONT
C-UTIL-WELL	WATER WELL	4	CONT
C-UTIL-WM	WATER METER	2	CONT
C-UTIL-WV	WATER VALVE	2	CONT

***DETAIL LINEWORK LAYERS***

<b>Layer Name</b>	<b>Description</b>	<b>Color</b>	<b>Linetype</b>
D-DETL-1	DETAIL LINE	1	CONT
D-DETL-2	DETAIL LINE	2	CONT
D-DETL-3	DETAIL LINE	3	CONT
D-DETL-4	DETAIL LINE	4	CONT
D-DETL-5	DETAIL LINE	5	CONT
D-DETL-6	DETAIL LINE	6	CONT
D-DETL-7	DETAIL LINE	7	CONT
D-DETL-8	DETAIL LINE (SCREENED)	252	CONT
D-DETL-HIDD	DETAIL LINE (HIDDEN)	7	HIDDEN2
D-DETL-TEXT	DETAIL TEXT	2	CONT
D-DETL-DIMN	DIMENSION, TEXT LEADER	6	CONT
D-DETL-HTCH	HATCH, POCHE	VARIABLES	CONT
D-DETL-SYMB	SYMBOL, BLOCK	7	CONT

***FUTURE LINEWORK LAYERS***

<b>Layer Name</b>	<b>Description</b>	<b>Color</b>	<b>Linetype</b>
F-ANNO-BEAR	BEARING, DISTANCE	1	CONT
F-ANNO-CURV	CURVE DATA	1	CONT
F-ANNO-DIMN	DIMENSION, TEXT LEADER	1	CONT
F-ANNO-HTCH	HATCH, POCHE	VARIABLES	CONT
F-ANNO-LEAD	CROW'S FOOT	1	CONT
F-ANNO-LNUM	LOT NUMBER	1	CONT
F-ANNO-NAME	STREET NAME, BUILDING NAME	1	CONT
F-ANNO-RADL	RADIAL DATA	1	CONT
F-ANNO-STAT	STATION TEXT, STATION TIC	1	CONT
F-ANNO-STAT-NAME	STATION NAME	1	CONT
F-ANNO-SYMB	SYMBOL, BLOCK	2	CONT
F-ANNO-TEXT	GENERAL TEXT	6	CONT

Layer Name	Description	Color	Linetype
F-BDRY-CNTR	CENTERLINE	1	CENTER2
F-BDRY-DIMN	DIMENSION, TEXT LEADER	6	CONT
F-BDRY-ELEV	GRADE EVEVATION	1	CONT
F-BDRY-HTCH	HATCH, POCHE	VARIES	CONT
F-BDRY-LINE	PROPERTY LINE	1	CONT
F-BDRY-LOTS	PROPERTY LOTS	1	CONT
F-BDRY-PROP	PROPERTY LINE	1	CONT
F-BDRY-ROFW	RIGHT OF WAY	1	CONT
F-BDRY-SECT	SECTION LINE	1	PHANTOM2
F-BDRY-STBK	SETBACK	1	HIDDEN2
F-BDRY-SYMB	SYMBOL, BLOCK	1	CONT
F-BDRY-TEXT	BOUNDARY TEXT	7	CONT
F-ESMT- *	EASEMENT - * USE MODIFIER	1	HIDDEN
F-ESMT-BDRY	EASEMENT BOUNDARY	1	CONT
F-ESMT-DIMN	DIMENSION, TEXT LEADER	1	CONT
F-ESMT-GRAD	EASEMENT GRADE	1	CONT
F-ESMT-HTCH	HATCH, POCHE	VARIES	CONT
F-ESMT-ROAD	ROAD EASEMENT	1	CONT
F-ESMT-TEXT	EASEMENT TEXT	1	CONT
F-ESMT-TOPO	EASEMENT TOPO	1	CONT
F-ESMT-UTIL	UTILITY EASEMENT	1	CONT
F-STRP-DIMN	DIMENSION, TEXT LEADER	1	CONT
F-STRP-FOGG	FOG LINE	1	CONT
F-STRP-HTCH	HATCH, POCHE	VARIES	CONT
F-STRP-LANE	LANE STRIPE	1	VARIES
F-STRP-MARK	STREET PAINT, MARKING	1	CONT
F-STRP-MISC	MISC.	1	CONT
F-STRP-PARK	PARKING STRIPE	1	CONT

Layer Name	Description	Color	Linetype
F-STRP-SIGN	STREET SIGN	1	CONT
F-STRP-STRP	STRIPING	1	CONT
F-STRP-SYMB	SYMBOL, BLOCK	1	CONT
F-STRP-TEXT	CHANNELIZATION TEXT	1	CONT
F-GRAD-BERM	BERM	1	CONT
F-GRAD-DIMN	DIMENSION, TEXT LEADER	1	CONT
F-GRAD-ELEV	GRADE, SPOT ELEVATION	1	CONT
F-GRAD-FLOW	DRAINAGE FLOW LINE	1	DASHDOT2
F-GRAD-HTCH	HATCH, POCHE	VARIABLES	CONT
F-GRAD-HP	HINGE POINT	1	CONT
F-GRAD-POND	POND BANK, CONTOUR	1	CONT
F-GRAD-SWAL	SWALE, DITCH BANK	1	CONT
F-GRAD-RRAP	DRAINAGE FILTER, RIP RAP	250	CONT
F-GRAD-SYMB	SYMBOL, BLOCK	1	CONT
F-GRAD-TEXT	GRADING TEXT	7	CONT
F-GRAD-TOE	TOE	1	CONT
F-GRAD-VGUT	VALLEY GUTTER	1	CONT
F-GRAD-DESIGN-BW	DESIGN -BACK OF WALK	1	CONT
F-GRAD-DESIGN-DIMN	DESIGN -DIMENSION, TEXT LEADER	1	CONT
F-GRAD-DESIGN-FL	DESIGN -DRAINAGE FLOW LINE	1	CONT
F-GRAD-DESIGN-FTG	DESIGN -FOOTING	1	CONT
F-GRAD-DESIGN-GB	DESIGN -GRADE BREAK	1	CONT
F-GRAD-DESIGN-SD	DESIGN -STORM DRAIN	1	CONT
F-GRAD-DESIGN-SS	DESIGN -SANITARY SEWER	1	CONT
F-GRAD-DESIGN-TEXT	DESIGN -TEXT	1	CONT
F-ROAD-CNTR	STREET CENTERLINE	1	CENTER2
F-ROAD-DIMN	DIMENSION, TEXT LEADER	1	CONT
F-ROAD-DRIV	DRIVEWAY APPROACH	1	CONT

Layer Name	Description	Color	Linetype
F-ROAD-FL	FLOW LINE OF CURB	1	CONT
F-ROAD-CG	CURB AND GUTTER	1	CONT
F-ROAD-HTCH	HATCH, POCHÉ	VARIABLES	CONT
F-ROAD-LIP	LIP OF GUTTER	1	CONT
F-ROAD-MEDN	MEDIAN CURB	1	CONT
F-ROAD-PAVE	EDGE OF PAVEMENT	1	CONT
F-ROAD-RAMP	ACCESS RAMP	1	CONT
F-ROAD-RW	ROAD RIGHT OF WAY	1	CONT
F-ROAD-SCOR	PAVMT. SCORING, CONC. PATTERN	1	CONT
F-ROAD-SYMB	SYMBOL, BLOCK	1	CONT
F-ROAD-TC	TOP OF CURB	1	CONT
F-ROAD-TEXT	ROADWAY TEXT	1	CONT
F-ROAD-WALK	SIDEWALK, PATH	1	CONT
F-SITE-BLDG	BUILDING	1	CONT
F-SITE-BOL	BOLLARD	1	CONT
F-SITE-CONC	CONCRETE STRUCTURE	1	CONT
F-SITE-DIMN	DIMENSION, TEXT LEADER	1	CONT
F-SITE-FENC	FENCE	1	FENCELINE1
F-SITE-FTNG	FOOTING	1	CONT
F-SITE-GATE	GATES	1	CONT
F-SITE-HTCH	HATCH, POCHÉ	VARIABLES	CONT
F-SITE-POST	POST, COLUMN, SUPPORT	1	CONT
F-SITE-RAIL	RAIL ROAD	1	CONT
F-SITE-ROCK	ROCK, GRAVEL, BOULDER	1	CONT
F-SITE-SURF	SITE , MANMADE FEATURE	1	CONT
F-SITE-SYMB	SYMBOL, BLOCK	1	CONT
F-SITE-TEXT	SITE TEXT	1	CONT
F-SITE-TREE	TREES	1	CONT
F-SITE-VEGE	VEGETATION	1	CONT

<b>Layer Name</b>	<b>Description</b>	<b>Color</b>	<b>Linetype</b>
F-SITE-WALL	ROCK WALL, RETAINING WALL	1	CONT
F-UTIL-CATV	CABLE TV	1	CONT
F-UTIL-CBOX	BOX	1	CONT
F-UTIL-DIMN	DIMENSION, TEXT LEADER	1	CONT
F-UTIL-ELEC	ELECTRIC	1	CONT
F-UTIL-FH	FIRE HYDRANT	1	CONT
F-UTIL-HTCH	HATCH, POCHE	VARIES	CONT
F-UTIL-IRR	IRRIGATION	1	CONT
F-UTIL-NGAS	NATURAL GAS	1	CONT
F-UTIL-PP	POWER POLE	1	CONT
F-UTIL-SD	STORM DRAIN	1	CONT
F-UTIL-SDCB	STORM DRAIN CATCH BASIN	1	CONT
F-UTIL-SDDI	STORM DRAIN INLET	1	CONT
F-UTIL-SDMH	STORM DRAIN MANHOLE	1	CONT
F-UTIL-SS	SANITARY SEWER	1	CONT
F-UTIL-SSMH	SANITARY SEWER MANHOLE	1	CONT
F-UTIL-*-SYMB	SYMBOL, BLOCK	1	CONT
F-UTIL-TANK	TANK	1	CONT
F-UTIL-TELE	TELEPHONE	1	CONT
F-UTIL-TEXT	UTILITY TEXT	1	CONT
F-UTIL-TP	TELEPHONE POLE	1	CONT
F-UTIL-UP	UTILITY POLE	1	CONT
F-UTIL-WATR	WATER	1	CONT
F-UTIL-WELL	WATER WELL	1	CONT
F-UTIL-WM	WATER METER	1	CONT
F-UTIL-WV	WATER VALVE	1	CONT

***SURVEY AND MAPPING LAYERS***

<b>Layer Name</b>	<b>Description</b>	<b>Color</b>	<b>Linetype</b>
SV-ANNO-BD	BEARINGS, DISTANCES	6	CONT
SV-ANNO-DIMN	DIMENSION, TEXT LEADER	6	CONT
SV-ANNO-TEXT	GENERAL SURVEY/MAPPING TEXT	6	CONT
SV-CTRL	CONTROL POINTS	7	CONT
SV-MONUMENT	MONUMENT SYMBOLS & TEXT	7	CONT
SV-RADIAL	RADIALS TEXT & LEADERS	6	CONT
SV-BDRY-CL	CENTERLINE	7	CENTER2
SV-BDRY-PHAS	PHASE LINE	7	CENTER2
SV-BDRY-DIMN	DIMENSION, TEXT LEADER	6	CONT
SV-BDRY-ELEV	GRADE, SPOT ELEVATION	7	CONT
SV-BDRY-ESLD	LANDSCAPE EASEMENT	3	DASHED
SV-BDRY-ESPU	PUBLIC UTILITIES EASEMENT	3	HIDDEN
SV-BDRY-ESSD	STORM DRAIN EASEMENT	3	HIDDEN
SV-BDRY-ESWR	WATER EASEMENT	3	DASHED
SV-BDRY-HTCH	HATCH, POCHE	VARIES	CONT
SV-BDRY-IOD	IRREVOCABLE OFFER OF DEDICATION	2	CONT
SV-BDRY-LINE	LOT LINE, PARCEL LINE	2	CONT
SV-BDRY-LOTS	LOTS	2	CONT
SV-BDRY-PROP	PROPERTY LINE	2	CONT
SV-BDRY-ROW	RIGHT OF WAY	3	PHANTOM2
SV-BDRY-SECT	SECTION LINE	2	PHANTOM2
SV-BDRY-SITE	SYMBOL, BLOCK	2	CONT
SV-BDRY-STBK	SETBACK	1	HIDDEN2
SV-BDRY-SYMB	SYMBOL, BLOCK	2	CONT
SV-BDRY-TEXT	BOUNDARY TEXT	7	CONT

***EXISTING LINEWORK LAYERS***

<b>Layer Name</b>	<b>Description</b>	<b>Color</b>	<b>Linetype</b>
X-ANNO-BEAR	BEARING, DISTANCE	252	CONT
X-ANNO-CURV	CURVE DATA	252	CONT
X-ANNO-DIMN	DIMENSION, TEXT LEADER	252	CONT
X-ANNO-LEAD	CROW'S FOOT	252	CONT
X-ANNO-LNUM	LOT NUMBER	252	CONT
X-ANNO-NAME	STREET NAME	252	CONT
X-ANNO-HTCH	HATCH, POCHE	253	CONT
X-ANNO-RADL	RADIAL DATA	252	CONT
X-ANNO-STAT	STATION TEXT, STATION TIC	252	CONT
X-ANNO-STAT-NAME	STATION NAME	252	CONT
X-ANNO-SYMB	SYMBOL, BLOCK	252	CONT
X-ANNO-TEXT	GENERAL TEXT	252	CONT
X-STRP-DIMN	DIMENSION, TEXT LEADER	252	CONT
X-STRP-FOGG	FOG LINE	252	CONT
X-STRP-HTCH	HATCH, POCHE	253	CONT
X-STRP-LANE	LANE STRIPE	252	VARIES
X-STRP-MARK	STREET PAINT, MARKING	252	CONT
X-STRP-MISC	MISC.	252	CONT
X-STRP-PARK	PARKING STRIPE	252	CONT
X-STRP-SIGN	STREET SIGN	252	CONT
X-STRP-STRP	STRIPING	252	CONT
X-STRP-SYMB	SYMBOL, BLOCK	252	CONT
X-STRP-TEXT	CHANNELIZATION TEXT	252	CONT
X-BDRY-CNTR	CENTERLINE	252	CENTER2
X-BDRY-DIMN	DIMENSION, TEXT LEADER	252	CONT
X-BDRY-ELEV	GRADE ELEVATION	252	CONT
X-BDRY-HTCH	HATCH, POCHE	253	CONT

Layer Name	Description	Color	Linetype
X-BDRY-LINE	LOT LINE, PARCEL LINE	252	DASHED2
X-BDRY-LOTS	PROPERTY LOTS	252	CONT
X-BDRY-PROP	PROPERTY LINE	252	DASHED2
X-BDRY-ROFW	RIGHT OF WAY	251	DIVIDE2
X-BDRY-SECT	SECTION LINE	1	PHANTOM2
X-BDRY-STBK	SETBACK	252	HIDDEN2
X-BDRY-SYMB	SYMBOLS, BLOCKS	252	CONT
X-BDRY-TEXT	BOUNDARY TEXT	252	CONT
X-ESMT- *	EASEMENT - * USE MODIFIER	252	HIDDEN
X-ESMT-BDRY	EASEMENT BOUNDARY	252	CONT
X-ESMT-DIMN	DIMENSION, TEXT LEADER	252	CONT
X-ESMT-GRAD	EASEMENT GRADE	252	CONT
X-ESMT-HTCH	HATCH, POCHE	253	CONT
X-ESMT-ROAD	ROAD EASEMENT	252	CONT
X-ESMT-TEXT	EASEMENT TEXT	252	CONT
X-ESMT-TOPO	EASEMENT TOPO	252	CONT
X-ESMT-UTIL	UTILITY EASEMENT	252	CONT
X-GRAD-BERM	EARTH BERM	252	CONT
X-GRAD-CMJR	MAJOR CONTOURS	253	CONT
X-GRAD-CMNR	MINOR CONTOURS	251	CONT
X-GRAD-CULV	CULVERT	252	CONT
X-GRAD-DIMN	DIMENSION, TEXT LEADER	252	CONT
X-GRAD-ELEV	GRADE, SPOT ELEVATION	252	CONT
X-GRAD-FLOW	DRAINAGE FLOW LINE	252	DASHDOT2
X-GRAD-HP	HINGE POINT	252	DIVIDE2
X-GRAD-HTCH	HATCH, POCHE	253	CONT
X-GRAD-POND	POND BANK, CONTOURS	252	HIDDEN2
X-GRAD-RRAP	RIP RAP, DRAINAGE FILTER	252	CONT

Layer Name	Description	Color	Linetype
X-GRAD-SWALE	SWALE, DITCH BANK	252	DIVIDE2
X-GRAD-SYMB	SYMBOL, BLOCK	252	CONT
X-GRAD-TEXT	GRADING TEXT	252	CONT
X-GRAD-TOE	TOE	252	DASHDOT2
X-GRAD-VGUT	VALLEY GUTTER	252	CONT
X-ROAD-CNTR	STREET CENTERLINE	252	CENTER2
X-ROAD-DIMN	DIMENSION, TEXT LEADER	252	CONT
X-ROAD-DRIV	DRIVEWAY APPROACH	252	CONT
X-ROAD-FL	FLOW LINE OF CURB	252	CONT
X-ROAD-CG	CURB AND GUTTER	252	CONT
X-ROAD-HTCH	HATCH, POCHE	253	CONT
X-ROAD-LIP	LIP OF GUTTER	252	DASHED2
X-ROAD-MEDN	MEDIAN CURB	252	CONT
X-ROAD-PAVE	EDGE OF PAVEMENT	252	CONT
X-ROAD-RAMP	ACCESS RAMP	252	CONT
X-ROAD-RW	ROAD RIGHT OF WAY	252	CONT
X-ROAD-SCOR	PAVMT. SCORING, CONC. PATTERN	252	CONT
X-ROAD-SYMB	SYMBOL, BLOCK	252	CONT
X-ROAD-TC	TOP OF CURB	252	CONT
X-ROAD-TEXT	ROADWAY TEXT	252	CONT
X-ROAD-WALK	SIDEWALK, PATH	252	CONT
X-SITE-BLDG	BUILDING	252	CONT
X-SITE -BOL	BOLLARD	252	CONT
X-SITE -CONC	CONCRETE STRUCTURES	252	CONT
X-SITE-DIMN	DIMENSION, TEXT LEADER	252	CONT
X-SITE -FENC	FENCE	252	CONT
X-SITE -FTG	FOOTING	252	CONT
X-SITE -GATE	GATES	252	CONT

Layer Name	Description	Color	Linetype
X-SITE -HTCH	HATCH, POCHE	253	CONT
X-SITE -MISC	MISC	252	CONT
X-SITE -POST	POST, COLUMN	252	CONT
X-SITE -RAIL	RAIL ROAD	252	CONT
X-SITE -ROCK	ROCK, GRAVEL	252	CONT
X-SITE-SURF	SITE , MANMADE FEATURE	252	CONT
X-SITE -SYMB	SYMBOL, BLOCK	252	CONT
X-SITE -TEXT	TOPOGRAPHY TEXT	252	CONT
X-SITE -TREE	TREES	253	CONT
X-SITE -VEGE	VEGETATION	253	CONT
X-SITE -WALL	ROCK WALL, RETAINING WALL	252	CONT
X-UTIL-CATV	CABLE TV	252	CONT
X-UTIL-CBOX	BOX	252	CONT
X-UTIL-DIMN	DIMENSION, TEXT LEADER	252	CONT
X-UTIL-ELEC	ELECTRIC	252	CONT
X-UTIL-FH	FIRE HYDRANT	252	CONT
X-UTIL-HTCH	HATCH	253	CONT
X-UTIL-IRR	IRRIGATION	252	CONT
X-UTIL-NGAS	NATURAL GAS	252	CONT
X-UTIL-PP	POWER POLE	252	CONT
X-UTIL-SD	STORM DRAIN	252	CONT
X-UTIL-SDCB	STORM DRAIN CATCH BASIN	252	CONT
X-UTIL-SDDI	STORM DRAIN INLET	252	CONT
X-UTIL-SDMH	STORM DRAIN MANHOLE	252	CONT
X-UTIL-SS	SANITARY SEWER	252	CONT
X-UTIL-SSMH	SANITARY SEWER MANHOLE	252	CONT
X-UTIL- * -SYMB	SYMBOL, BLOCK	252	CONT
	* utility modifier SS, SD, ETC.		
X-UTIL-TANK	TANK	252	CONT

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<b>Layer Name</b>	<b>Description</b>	<b>Color</b>	<b>Linetype</b>
X-UTIL-TELE	TELEPHONE	252	CONT
X-UTIL-TEXT	UTILITY TEXT	252	CONT
X-UTIL-TP	TELEPHONE POLE	252	CONT
X-UTIL-UP	UTILITY POLE	252	CONT
X-UTIL-WATR	WATER LINE	252	CONT
X-UTIL-WELL	WATER WELL	252	CONT
X-UTIL-WM	WATER METER	252	CONT
X-UTIL-WV	WATER VALVE	252	CONT

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