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GENERAL INTRODUCTION

Development Standards

These standards are to be used for all developments within Kern County that are outside of incorporated cities. These standards are to establish minimum design & construction requirements that will result in improvements that are economical to maintain and will adequately serve the general public.

The requirements set forth in these standards are considered minimum design standards and will require the approval of the entity that will maintain the facilities to be constructed prior to approval by the County.

Land Division Ordinance

The County of Kern Land Division Ordinance and any conditions of approval for a specific development, and/or requirements identified in an adopted General Plan or Specific Plan, are to be used in conjunction with these standards.

Exceptions

Limited exceptions to these standards may be granted by the Director upon receipt of a written request containing sufficient information to warrant the exception. All major exceptions shall be processed in the same manner as required in the Land Division Ordinance for a development variation.

Standard Specifications (State)

When not otherwise stated in the Kern County Land Division Ordinance, these Development Standards, or prescribed by the Board of Supervisors, or the Engineering, Surveying & Permit Services Department Director, the work shall conform to the Standard Plans and the Standard Specifications published by the California Department of Transportation, current edition.

All definitions and terms in Section 1 of the Standard Specifications shall apply except, whenever the following terms or pronouns are used, the intent and meaning shall be as follows:

a. CONTRACTOR: The person or persons, firm, partnership, corporation or combination thereof who have entered into an agreement with the County of Kern for the completion of work or who is prosecuting work under approved land development improvement plans.

b. DEPARTMENT: The Engineering, Surveying & Permit Services Department and/or the Roads Department of the County of Kern, also referred to as Department.
c. **ENGINEER:** The Director of Engineering, Surveying & Permit Services Department and/or the Road Commissioner of the County of Kern, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties delegated to them.

d. **DIRECTOR:** The Director of Engineering, Surveying & Permit Services Department and/or the Road Commissioner of the County of Kern, also referred to as the Director.

e. **LABORATORY:** The Laboratory of the Roads Department or other laboratories authorized by the Department of Engineering, Surveying & Permit Services of the County of Kern.

**Notice to Work**

The Contractor shall give the Director at least twenty-four (24) hours notice before commencing any part of the improvement work required for the development. If the said improvement work is interrupted for a continuous period in excess of twenty-four (24) hours, exclusive of weekends or holidays, the Contractor shall give an additional twenty-four (24) hours notice to the Director prior to resuming the said improvement work.

**Document Priority**

State and Federal laws shall govern over the Land Division Ordinance. The Land Division Ordinance shall govern over the Development Standard. Development Standards shall govern over the Improvement Plans. Improvement Plans shall govern over Standard Specifications.

**Submittal Standards**

The agency with jurisdiction may establish the format for, and minimum required contents of, submittal intended for the review and/or approval of the Director.

All work, unless specifically exempted, covered by the Professional Engineers Act (PE) of the State of California, shall be submitted as if for final submittal. Such submittal shall include, but is not limited to:

1) Be prepared by a California Registered Engineer (Civil Engineer) competent in the necessary engineering discipline(s), in accordance with these standards, plans, profiles and specifications for all proposed improvements.

2) Include all pertinent calculations. All submitted calculations shall be coherent, legible, and in accordance with the latest applicable codes, standards, and sound engineering practices.

3) Include reference to, or the reference itself for all calculations or assumptions.
4) Include all items identified on any Presubmittal Checklist, where available.

If any of the items listed above are lacking, a finding of “NOT CHECKABLE” will be made by the Director (or his assigned representative) and the project will be returned to the applicant.

GENERAL DEFINITIONS

The following definitions shall be applicable to these standards.

“ARTERIAL”  Interchangeable with Major Highway.

“BOARD”  Refers to the County of Kern, Board of Supervisors, unless otherwise specified.

“CALTRANS”  California Department of Transportation.

“COLLECTOR”  Interchangeable with Secondary Highway.

“COUNTY”  Refers to the County of Kern, its officers or agents.

“DEPARTMENT”  The Department of Engineering, Surveying & Permit Services.

“DEVELOPER”  Includes Subdivider and any person or public agency developing land, seeking to have the County accept or include facilities in its maintained system.

“DEVELOPER’S ENGINEER”  Civil Engineer registered in the State of California employed by, acting on behalf of, or as an agent of the developer.

“DEVELOPMENT”  Means the division of a parcel of land into two (2) or more parcels; the construction, reconstruction, conversion, structural alteration, relocation, or enlargement of any structure; any mining, excavation, landfill, or land disturbance; and any use or extension of the use of land.

“DIRECTOR”  The Director of the Engineering, Surveying & Permit Services Department and/or the Road Commissioner.

“ENGINEER”  The Director of Engineering, Surveying & Permit Services Department and/or the Road Commissioner of the County acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties delegated to them.

“LABORATORY”  The Laboratory of the Roads Department or other laboratories authorized by the Director of the Engineering, Surveying & Permit Services Department.
“LIMITED EXCEPTION”  Permission to depart from specific requirements of the Development Standards, granted by the Road Commissioner and/or the Director of the Engineering, Surveying & Permit Services Department.

“OBSTRUCTION”  Obstruction as used shall mean any potential impediments of whatever kind or nature and shall include, but shall not be limited to, structures, power poles, telephone or telegraph poles and appurtenances, trees, landscaping, fences, pipe lines, conduits and canals.

“OFFICERS”  Whenever in these standards, reference is made to some officer, board or commission, department or office, it shall mean an officer, board, commission, department or office of the County of Kern, unless otherwise specified.

“ROADS DEPARTMENT”  Means the Kern County Roads Department.

“ROAD COMMISSIONER”  The Director the Kern County Roads Department.

“STANDARD DRAWINGS”  Means those drawings approved by the Board of Supervisors and adopted by the County as part of these standards.

“STREET”  Includes roads and highways. The terms street, road, and highway are used interchangeably and refer to the rights-of-way used for vehicular traffic, and, except in the case of freeways, for pedestrian traffic.
DIVISION ONE

STANDARDS FOR STREETS

CHAPTER I. INTRODUCTION

Sec. 101-1 Purpose

These standards apply to and regulate all land development improvements and are intended to provide for adequate, coordinated, modern development with the required facilities to serve and protect the potential uses and users of the various areas of the County of Kern.

Sec. 101-2 Plan Review

Plans submitted with road improvements to be included in the County Road Maintenance System shall be reviewed and approved by the Kern County Roads and Engineering, Surveying & Permit Services Departments.

CHAPTER II. DEFINITIONS AND GENERAL POLICY

Sec. 102-1 The following definitions shall be applicable to these standards:

102-1.01 "INTERSECTION" is the area embraced within the prolongation of the lateral curb lines, or, if none, then the lateral boundary lines of the roadways of two highways which join one another at approximately right angles, or the area within which vehicles traveling upon different highways joining at any other angle may come in conflict.

102-1.02 "BRIDGES" Structures of a span of more than 20 feet, measured under the copings along the centerline of the road and multiple span structures where the individual spans are in excess of 10 feet, measured from center to center of supports along the centerline of the road.

Sec. 102-2 Other Documents Referred to in Standards

The following documents are referred to in these standards may be applicable and are on file in the Roads and/or the Engineering, Surveying & Permit Services Departments. References are to be current editions unless specified otherwise.

102-2.01 "Planning Manual of Instructions," published by the California Department of Transportation.

102-2.02 "California Manual on Uniform Traffic Control Devices (CMUTCD)" of California Department of Transportation.

(Updated 5.21.10)

102-2.04 "Bridge Design Manual" of the Office of Structures, California Department of Transportation.

102-2.05 "Highway Design Manual" of California Department of Transportation (HDM).

102-2.06 "General and Specific Plans" of County of Kern.

102-2.07 "Standard Plans and Specifications" of California Department of Transportation.

102-2.08 "Subdivision Map Act" of the State of California.

102-2.09 "Land Division Ordinance" of County of Kern.

102-2.10 "Hydrology Manual" of County of Kern.

102-2.11 "Federal and/or State Regulations pertinent to accessibility guidelines & requirements."

102-2.12 "California Fire Safe Regulations, Title 14-California Code of Regulations."

102-2.13 "Federal and/or State Regulations pertinent to Wildland fire protection on State Responsibility Areas."

102-2.14 "California Department of Forestry and Fire Protection."

Sec. 102-3 Plans to be Approved by Director

The developer shall cause to be prepared, in accordance with these standards, and submitted to the Director for approval, plans, profiles and specifications for the proposed improvement of all streets, and related improvements. The developer shall obtain the approval of the Director of said plans, profiles and specifications prior to commencing any construction.

Sec. 102-4 Where no Standard Specified: Requirements to be Prescribed by Director
Where the requirements for street improvements are not specified in these standards, or the documents referenced in these standards, the requirements shall be established by the Director. Such requirements shall conform to accepted engineering standards.

Sec. 102-5 Payment for Improvement

102-5.01 All improvements required by these standards shall be constructed and installed by the developer at his expense unless expressly agreed by the Board of Supervisors that the County will bear the expense or any portion of the expense.

102-5.02 Arterial or Collector Highway Alignment in Development:

In case of an arterial or collector highway alignment lying within the development, improvement thereof shall be subject to the following provisions:

a. If it appears to the Board that the County may within a reasonable period, not exceeding five (5) years, undertake construction of an arterial or collector highway along such alignment, it may make an order requiring the Developer to contribute to and deposit with the County an amount equal to the cost of construction as determined by the Board. Such contribution shall be filed with the County Road Fund through the Director.

b. The Director may require expanded intersections where arterial and/or collector alignments cross in urban areas, see Plates R-34 thru R-38.

Sec. 102-6 Access

(See Section 18.55.030 A.5 Land Division Ordinance).

Sec. 102-7 Widening and Improvement of Existing Streets

Where land abuts an existing substandard street is to be developed, the developer shall dedicate any necessary additional right-of-way and improve such street, including drainage improvements, modifications to traffic control devices, and all necessary improvements needed to conform to these standards in order to provide adequate traffic capacities.

Sec. 102-8 Design of Street Systems

The design of street systems, including right of way and improvement widths shall provide:

a. Adequate local circulation for the area being developed.

b. Consistency with adopted General Plans, Specific Plans, and other plan routes where appropriate.
c. Expanded intersections as may be required at arterial and collector highway intersections as shown on the County General Plan or Specific Plans, or as required by the Director.

d. Bike Lanes shall be designed and constructed in conformance with Caltrans Highway Design Manual, Chapter 1000, Bikeway Planning and Design.

Sec. 102-9 Utilities, Design and Installation

All utilities shall be designed, constructed, and installed by the Developer in accordance with all applicable County requirements and State laws. Underground utilities including services to be located within street right-of-way shall be installed prior to surfacing the streets. Underground utility construction shall be in accordance with the provisions of Public Utility Commission General Order 95. The director of Kern County Department of Planning & Community Development may require aboveground cabinets or facilities to be screened in an approved manner. Any aboveground cabinets or facilities located within the road right-of-way shall be permitted only upon approval by the Director. Compliance with this requirement may result in the need to create public utility easements outside of the right-of-way.

CHAPTER III STREET IMPROVEMENT REQUIREMENTS

Sec. 103-1 Improvement Requirements

Wherever the standards mentioned in the Land Division Ordinance are related to lot area, the reference to the area shall be deemed to be either net area or gross area, depending on whether the minimum lot area for the zoning classification is determined by net area or gross area.

103-1.01 Type "A" Subdivision requirements are as follows:

a. Concrete curb and gutters, sidewalks and drive approaches are required on all streets (Residential, Commercial and Industrial) and highways within the development. For Phased Improvements by parcel or lot size, see Appendix B of the Land Division Ordinance.

b. Surfacing shall be asphalt concrete, except as provided in Section 104-4.

c. Structural section shall be designed in accordance with the current Caltrans Highway Design Manual based on the following criteria:

1. Local streets - TI = 4.75
2. Residential and commercial alley - TI = 3.0
3. Industrial streets and alleys - TI = to be designated by the Director.
4. Arterial and collector highways - TI to be designated by the Director.

d. The minimum asphalt concrete thickness shall be 0.20 foot.

e. For details, see Plate R-32 and Chapter IV.

f. Shoulder and/or median areas shall be paved or otherwise treated as necessary to comply with the Air Pollution Control District PM-10 (fugitive dust) regulations.

Sec. 103-2.02 Type "B" Subdivision requirements are as follows:

a. Surfacing shall be asphalt concrete, except as provided in Section 104-4.

b. Structural Section shall be designed in accordance with the current Caltrans Highway Design Manual based on the following criteria:

1. Local streets - TI = 4.0
2. Residential and commercial alley - TI = 3.0
3. Industrial streets and alleys - TI = to be designated by the Director.
4. Arterial and collector highways - TI to be designated by the Director.

c. For details see Plate R-32 and Chapter IV.

d. The minimum asphalt concrete thickness shall be 0.20 foot.

e. For Phase Improvements by parcel or lot size, see Appendix B of the Land Division Ordinance.

f. Shoulder and/or median areas shall be paved or otherwise treated as necessary to comply with the Air Pollution Control District PM-10 (fugitive dust) regulations.

103-2.03 Type "C" Subdivision requirements are as follows:

a. Roads shall be graded to a minimum width of twenty (20) feet.

b. Maximum grade of roads shall be fifteen percent (15%).

c. Roads shall be traversable by a standard passenger car.

d. Road surfacing is not required except as required by the Air Pollution Control District's regulations.
e. As an alternative, roads may be designed utilizing the requirements of the California Fire Code upon approval of a limited exception by the Fire Chief.

103-2.04 Secondary and emergency access shall be constructed per plate R-29

103-2.05 Limited Exceptions

a. Where multi-family residential, commercial, or industrial development is proposed in conjunction with a subdivision which would otherwise qualify for a type other than Type "A," limited exceptions may be approved by the Director with respect to Type "A" subdivision street improvement requirements, including but not limited to industrial or commercial street cross-section (Plate R-13).

b. Where commercial or industrial development is proposed in conjunction with a Type "A" subdivision which also includes residential development, limited exceptions may be approved by the Director with respect to street improvements shown on industrial or commercial street cross-section (Plate R-13) and alleys.

Sec. 103-3 Private Streets

The use of private streets within a subdivision requires a Development Variation as specified by the Land Division Ordinance. When private streets are approved for use, an acceptable entity shall be formed for street and drainage maintenance prior to recording.

The following notes shall be placed on the street improvement plans before the Director signs them:

1. The Subdivider's engineer shall be responsible for inspection of all improvements outside of County road right-of-ways and certify such to the County. No changes shall be made to these plans without the approval of the Director.

2. Subdivider shall obtain the necessary building, grading, and encroachment permits prior to starting any work required by these plans.

3. Private streets shall comply with all requirements of the Kern County Fire Department and Land Division Ordinance. Also, private streets located within the State Responsibility Area (SRA) shall comply with all requirements of the California Department of Forestry and Fire Protection.

Sec. 103-4 Pedestrian Accessibility Guidelines

Federal and state regulations require that each facility or part thereof shall be designed
and constructed in such a manner that the facility is readily accessible to and usable by individuals with disabilities.

Every project, including encroachment permit projects, within the R/W that proposes to construct sidewalk/pedestrian walkway must be designed in compliance with the accessibility requirements of ADA, ADAAG, and Title 24 requirements. If it is found that an accessibility design standard can not be fully incorporated in a design, an accessibility design exception will be required, subject to the Director’s approval. For an exception to be approved, it will be necessary to document that it is technically infeasible to do so because existing physical structural conditions or because other existing physical or site constraints prohibit modification or when a unique characteristic of terrain prevents the incorporation of the accessibility standard.

CHAPTER IV. DESIGN AND CONSTRUCTION STANDARDS

Sec. 104-1  Alignment Criteria for Streets

104-1.01 Minimum centerline radius of horizontal curvature shall be as follows:

b. Local or Industrial Streets – 500 feet.
c. Limited exceptions to the above minimums may be approved by the Director when topography or other conditions warrant within the following limits:

   1. Arterial and collector highways not less than 300 feet.
   2. In mountainous areas, minimum local streets radii may be reduced to 100 feet or as approved by the Director. Curve widening to provide adequate sight distance shall be determined by the Director.

104-1.02 Intersections

a. Streets shall intersect at right angles where practicable. When topography or other physical feature makes this requirement impracticable, a Limited Exception may be granted by the Director. In general, the maximum deviation which may be granted shall not exceed 15° skew beginning at the ultimate curb line from a right-angle intersection. A knuckle shall be considered an intersection for skew angles.

b. Curb return radii shall be:
   1. Residential and commercial = 30 feet
   2. Industrial = 50 feet
c. Property line cut off at intersections shall be in accordance with Plate R-41.

d. Where the angle of intersection is acute, or where a sight distance problem may be anticipated, an increased property line cutoff may be required by the Director.

e. All streets entering upon any given street shall have their center lines directly opposite each other or separated by at least 150 feet, see plate R-48 thru R-50.

f. Tangent distance between end of horizontal curve and intersection centerline shall be a minimum of 150 feet.

104-1.03 Dead-end streets in excess of 150 feet in length shall be constructed to permit vehicles to turn around at the end. The director may increase the length to 200' providing no access is provided by the road. The maximum length of a dead-end street, including all dead-end streets accessed from that dead-end street shall not exceed the following cumulative lengths, regardless of the number of parcels served:

1. Parcels zoned for less than one acre 800 feet
2. Parcels zoned for 1 acre to 4.99 acres 1320 feet
3. Parcels zoned for 5 acres to 19.99 acres 2640 feet
4. Parcels zoned for 20 acres or larger 5280 feet

Where a dead-end street serves areas in which several different length limits could apply because of several different parcel sizes, the shortest allowable length shall apply.

Sec. 104-2 Gradient

104-2.01 Minimum grade on any street or alley shall be 0.5%. Where concrete curb and gutter or gutter in the case of an alley, is constructed, minimum grade shall be 0.2%.

104-2.02 The maximum grade on any street or alley shall be as follows:

a. Arterial and Collector Highways - 6%.

b. Local streets and residential cul-de-sac streets (including street turning area) - 8%.

c. All classes of industrial and commercial streets - 8%.

d. Alleys - 8%.
Exceptions to the maximum or minimum grades may be granted by the Director as follows:

a. Arterial and Collector Highway - 8% maximum.

b. Local and cul-de-sac streets (excluding street turning area) - 15% maximum.

c. All classes of industrial or commercial streets - 8% maximum. (No exceptions allowed).

d. Alleys - 15% maximum.

104-2.03 Superelevation shall be provided for all streets where required by the Director.

104-2.04 Vertical curves shall be as follows:

a. Residential and industrial streets shall be designed to provide a minimum stopping sight-distance corresponding to a design speed of 25 MPH.

b. Arterial and Collector highways shall be designed to accommodate minimum vehicle speeds of 65 MPH. An exception may be granted by the Director to reduce the vertical curve design speed.

c. Vertical curves shall be used when change in grade exceeds 0.50% and shall have a minimum length of 50 feet.

d. Alleys shall be designed for 20 MPH stopping sight distance.

e. The sight distance to be used for all streets and highways, including vertical curves, shall be in accordance with the current edition of California Department of Transportation Highway Design Manual.

104-2.05 The maximum grade for cul-de-sac street turning area shall be 8%.

104-2.06 The maximum grade through any intersection of two streets shall be 8% within the intersection (P.I. to P.I.).

104-2.07 When any road is extended to a subdivision boundary for the purpose of providing a future connection to adjoining property, the subdivider shall submit an alignment and profile demonstrating the feasibility of such future extension. (Minimum distance beyond tract line shall be 100 feet, 200 feet in mountains).
Sec. 104-3  Grading

104-3.01  Roadways shall be graded by the developer to full width as shown on the standard typical cross-sections.

104-3.02  The maximum grade tolerance in roadway sections for aggregate base, aggregate subbase and original ground shall be 0.05 of a foot high.

104-3.03  Grading beyond the right-of-way may be required by the Director to provide for safe sight-distance, stability and to control drainage.

104-3.04  All grading or excavating in an existing county road, city street, or state highway shall be first authorized by a valid encroachment permit.

104-3.05  Where improvements are required outside of the right-of-way as part of the development improvements, the subdivider shall provide satisfactory easements to allow construction and/or maintenance of the improvements. The easements shall conform to all subdivision requirements including, but not limited to, free and clear dedication, removal of obstructions and guarantee of title.

Sec. 104-4  Pavement, Structural Sections

All streets shall be surfaced by the developer in accordance with the following specifications:

104-4.01  Streets shall be designed in accordance with Chapter III "Street Improvement Requirements" of these standards and the following sections.

104-4.02  Roadsurfacing on all classes of streets and alleys shall be of asphalt concrete, except as hereinafter provided.

   a.  Road-mixed asphalt surfacing may be used, in lieu of asphalt concrete, in those areas of the County more than 50 miles along the shortest practical route from a commercial asphalt concrete plant.

      1.  Road-mixed asphalt surfacing (RMAS) shall conform to design mix approved by the Director.

      2.  Minimum thickness of a road-mixed asphalt surfacing shall be 0.25 of a foot.
b. Alleys: Surfacing shall be of asphalt concrete or road-mixed asphalt surfacing, whichever is used in the streets of the development.

c. The minimum thickness of aggregate base or aggregate subbase shall be 0.35 foot.

104-4.03 Aggregate Bases - In addition to the specified R-Value for aggregate bases, the R-Value at 150 psi exudation pressure shall be 90% of the R-Value at 300 psi exudation pressure.

Sec. 104-5 Utility Placement Within Streets

Underground utilities including services to be installed in streets shall be installed prior to surfacing of the streets.

The minimum cover of any underground utility within a street right-of-way shall be 30 inches.

Sec. 104-6 Street Lights

The Engineering, Surveying & Permit Services Department strives to find ways to operate as economically as possible to save energy costs and reduce carbon footprint. The Department will entertain the use of lower wattage bulbs, such as light emitting diode (LED) and solar street lights. The developers are encouraged to utilize new technology in order to reduce carbon footprint and reduce energy cost.

Unless otherwise approved by the Director, street lighting to be designed in conformance with these specifications, RP-8, “American National Standards Practice for Roadway Lighting, Illuminating Engineering Society of North America, Kern County Zoning Ordinance and/or other approved design guidelines.

All material and work shall conform to the requirements of the California Electrical Code, National Electrical Code, and other pertinent codes and regulations.

104-6.01 Residential Areas - Street lights shall be located at intersections, at midblock with blocks greater than 600 feet between intersections, at ends of cul-de-sacs greater than 150 feet in length, and on curved streets as required by the Director. Street lights on arterial and collector streets or intersections with an arterial street shall be 9,500 lumen. Street lights on local streets shall be 5,800 lumen. Luminaries may vary depending on new technology. Street lights shall have an acceptable maintenance entity formed and be energized prior to acceptance of the improvements. Street light construction shall be in accordance with Plate R-75 unless approved otherwise by the Director.

104-6.02 Commercial and Industrial Areas - Street lights shall be located at intersections and ends of cul-de-sacs greater than 150 feet in length. Luminaires shall be as provided in the above paragraph.
On all streets, the pull box shall be installed and the light wired from the pull box at the pole per plate R-76. Electrical service shall be provided to the street light from the adjacent parcel (on either side of the street) as it is developed. Electrical service easements shall be granted as required. Street lights shall be installed per plate R-75.

104-6.03 Additional Street Lights - In commercial, industrial, or residential areas, additional street lights shall be installed as required by the Director.

104-6.04 Street light shall be installed at post office approved community mail boxes.

104-6.05 Street light shall be installed at all passenger bus loading/unloading zones.

104-6.06 All County Service Area maintained street lights shall be Rate Schedule LS1 “PG&E – owned street and Highway Lighting”. Luminaire shall be full cutoff optics.

104-6.07 Street light location plan and general plan details shall be submitted for review and approval by the engineer. The plans shall show and identify all street lights to be installed, distance between poles, height of poles, wattage of lamps, lumens, type of luminaire, irrigation pedestals and all other pertinent information. Also, all existing street lights within 400 feet of the project shall be clearly identified and shown on the plans.

CHAPTER V. ACCESS

Sec. 105-1 State Highways

Access to state highways, is regulated by Caltrans. Requests for access and changes to existing access shall be coordinated with Caltrans. Encroachment permits for access to state highways shall be obtained from Caltrans.

Sec. 105-2 City Streets

Access to city streets, is regulated by the incorporated city who has jurisdiction. Requests for access and changes to existing access shall be coordinated with the respective incorporated city. Encroachment permits for access to city streets must be obtained from the respective incorporated city.

Sec. 105-3 County Roads – Access Limitations and Intersection Locations

Arterial streets are designed primarily for the movement of through traffic (80% to 90%) with minor usage as access to abutting properties (10% to 20%). Collector streets operate at approximately 40% to 60% either way. Local street’s function is to provide nearly 100% access to abutting properties and should be designed to eliminate through traffic.
Driveway access on arterials shall be kept to a minimum as determined by safety, topography, zoning and prior parcelization constraints or other special circumstances. Waivers of access on subdivisions shall be provided along major streets except where driveway access is permitted.

105-3.01 Minimum full access intersection spacing on arterials shall be limited to one-third mile. Closer spacing may be permitted if a traffic signal synchronization study is approved which demonstrates the location to be feasible for a signal. The signal, if allowed, shall be funded and installed by the developer.

105-3.02 Minimum spacing and type of local street access along arterial and collector streets shall conform to details in Plates R-49 and R-50.

Access points along arterial streets shall be restricted to right turn in and right turn out movements only. Full access median openings or openings limited to allow left turn in with no left turn out may be permitted where an approved traffic study provides justification for said access. Analysis for and development of full access openings must also meet the signalization requirements of Section 105-3.03. The design of limited access openings shall conform to applicable details in Plates R-42 through R-50.

105-3.03 For purposed development of no more than 200 residential dwelling units, circulation may be developed with only one access available. Development beyond 200 units will be required to provide a second means of access.

Access points on collectors within 300 feet of the curb return at an arterial intersection shall be limited to right turn in and right turn out movements.

This provision in no way limits more restrictive secondary access requirements, imposed for public safety purposes.

Sec. 105-4 County Roads – Driveway Approaches

All construction to connect driveway approaches to county roads must first be authorized by a valid Encroachment Permit. The design, number and location of driveway approaches must comply with the standards and policies contained herein and must be approved by the County.

105-4.01 Driveway approaches will not be permitted for parking or loading areas which would require backing into county roads with the exception of single family (R-1) residences.

105-4.02 Driveway approaches constructed along arterial streets shall be restricted to right turn in and right turn out movements only. Full access median openings or openings limited to allowing left turn in with no left turn out may be permitted where an approved traffic study
provides justification for said access. Analysis for and development of full access openings must also meet the signalization requirements of Section 105-3.03. The design of limited access openings shall conform to applicable details in Plates R-42 through R-50.

Driveway approaches constructed along collector streets within 300 feet of the curb return at an arterial intersection shall be limited to right turn in and right turn out movements.

105-4.03 Only one driveway approach per property per street is permitted for single family R-1 lots excepted on local streets. Additional driveway approaches may be permitted where an approved traffic study is provided which demonstrates that more than one access is required to adequately handle driveway volumes, and will not adversely affect traffic flow on county roads.

a. Where a property has access to more than one street, at a double frontage location, access will be limited to the lower classification street to minimize the impact upon traffic flow, except as allowed herein. Access to only the higher classification street will be required in the case of incompatible land uses, i.e., the lower classification street serves residential development and the access is to serve commercial or industrial development.

Addition of access to the higher classification street may be allowed provided an approved traffic study provides sufficient justification. Access to the higher classification street may be denied and may also be subject to other constraints contained in these standards and by County regulations.

105-4.04 After all improvements have been accepted by the Roads/Engineering, Surveying & Permit Services Departments, the reconstruction, repairs, and maintenance of all driveways, driveway approaches and sidewalk will be the responsibility of the property owner. During construction all such activities will be the responsibility of the permittee.

105-4.05 Arrangements must be made by the developer or permittee, for the necessary removal or relocation of any public utilities, structures, trees or plants with the person or entity having ownership or control prior to commencing work. Removal or relocations must be accomplished at no cost to the County.

105-4.06 Driveway profiles shall comply with the Kern County Type A Street Improvement Details, Plates R-53 thru R-55.

Sec. 105-5 County Roads – Turn Lanes

105-5.01 Arterial Streets: Left turn storage lanes are required to all streets and
access points where left turn ingress is permitted along arterial streets. Right turn storage lanes are required at all streets and access points where one of the following criteria is met:

a. The 85th percentile speed is less than 45 MPH and the peak hour turning volume is over 200.

b. The 85th percentile speed is 45 MPH or greater, the arterial is shown ultimately having 6 lanes and the peak hour turning volume is 25.

105-5.02 Collector Streets: Left and right turn storage lanes are required on all collector streets at arterial street intersections. Striping for left turn channelization shall be provided for any access leading to a development, which, at build out, generates more than 50 peak trips.

105-5.03 Design of left and right turn storage lanes shall comply with the applicable requirements of details in these standards. Bay tapers for turn lanes shall be 90 feet in length for single turn lanes and 120 feet in length for dual turn lanes. 60' bay tapers will be permitted on streets where the 85th percentile speed is 40 MPH or less, provided the turn lane is accessing either a driveway or a local street.

105-5.04 In the absence of turning volume data showing the need for greater storage, the following minimum lengths shall be used:

Dual left and single right turn storage lanes from arterial street into another arterial street shall be designed for a minimum length of 200 feet (measured from end of taper to limit line). Left and right turn storage into local streets or major private entrances shall be 150 feet minimum. Left and right turn storage into minor private entrances shall be 100 feet minimum on collector streets and 150 feet minimum on arterial streets.

105-5.05 Upon subdivision or other development which accesses onto an arterial or collector street, the following minimum improvements will be required to provide left turn channelization, where insufficient width would otherwise be available due to existing or proposed street improvements.

On and off site road improvements are required from any collector or arterial street to provide left turn channelization into each street (or access point) within the subdivision (or development). Said channelization shall be developed to provide necessary transitions and turn lanes to meet the current Caltrans standards for the design speed of the roadway in question.

Sec. 105-6 Bus Turnout

Bus turnouts and associated speed change lanes will be required on future and existing bus routes at locations identified by Golden Empire Transit (GET)/Kern Regional Transit
Design shall be based upon standards contained in Plates R-66.

CHAPTER VI. SITE ACCESS DESIGN

Sec. 106-1 Introduction

This chapter is intended to serve as a standard for the placement, size and configuration of site access improvements.

Sec. 106-2 Access Widths and Spacing

Access widths and spacing shall be designed per Plate R-56.

Sec. 106-3 Alignment

Access drive or road must intersect a public street at 90 degrees or as close as possible to 90 degrees or minus a maximum deviation of 15 degrees on local streets.

Minimum sight distance shall be provided at all access points in accordance with the provisions of this Division and Chapter 5 of Division Nine.

CHAPTER VII. STREET AND HIGHWAY DRAINAGE

Sec. 107-1 Street and Highway Drainage Easements and Improvements

Any drainage easements and improvements necessary for street and highway drainage shall be provided by the Developer, in accordance with the provisions of this section.

Sec. 107-2 Requirements for Street and Highway Drainage

The following criteria shall be applied to the design and construction of drainage facilities for streets and highways:

107.2.01 Street Drainage

(See Drainage - Division Four, Chapter V.).

107.2.02 Cross Drainage

(See Drainage - Division Four, Chapter VI.).

Sec. 107-3 Design Standards for Culverts and Bridges

Structural Design

a. Bridge and culvert design standards shall conform to "Standard Specifications for Highway Bridges" of the American Association of State Highway Officials, and the Bridge Design
b. Design loading shall be H20-S16-44 with alternate.

c. Bridge width shall equal the approach roadway width plus one pedestrian walkway in accordance with the standard typical cross-sections included. Where a designated bike way exists, additional width may be required by the Director.

Sec. 107-4 Miscellaneous Provisions

Street or highway crossings below check dams and/or spillways shall require special investigation and design. Plans for such crossings shall be submitted to the Director for review and approval.

Where special design or variation from standards is necessary for any drainage facility, crossing a street or highway, said design shall be subject to the approval of the Director.

CHAPTER VIII. LANDSCAPING

Sec. 108-1 Landscaping

Landscaping shall comply with Division Five – Landscaping, of these standards. When landscaping within or adjacent to street intersections, the following sight distance and safety criteria shall be provided:

108-1.01 The standards apply only to those intersections which meet at normal skews and where the grade difference between the intersecting streets is not greater than 10 percent.

108-1.02 The clear sight triangle for roadways intersecting arterial and collector highways (55 mph design speed) and stopping sight distance is three hundred (300) feet (near lane approach) and one hundred and fifty-three (153) feet (far lane approach).

108-1.03 The maximum height of shrubs and other obstruction within the above area shall be maintained at a height of thirty (30) inches or less above the sidewalk grade.

108-1.04 For local street intersections; nothing greater than a thirty (30) inch height (above sidewalk grade) within sixty (60) feet of the curb lines extended (normal skew and grades).

108-1.05 See attached Plate T-7 for illustrations of the above standards.

108-1.06 The maximum trunk diameter for trees located in the road right-of-way of any street shall be four (4) inches or less at 10-year growth.
108-1.07 To maintain appropriate sight distances, no shrubs or trees with a height greater than 30 inches shall be located in a median area within three hundred (300) feet from the centerline of the intersecting cross street, pedestrian walkways, bikeways, or median openings.

108-1.08 All landscaping facilities shall be designed and maintained so as not to present a hazard to the traveling public.

CHAPTER IX. TEMPORARY STREET CLOSURES

Sec. 109-1

Street closures for business purposes require a Special Event Permit, which is approved and issued by the Planning & Community Development Department.

CHAPTER X

SUBDIVISION STREET IMPROVEMENT PLAN NOTES

The following general notes shall be included on Subdivision Street Improvement Plans:

1. All improvements shall be in accordance with Kern County Development Standards and other County adopted policy; street improvements shall be as required for Type _____ Subdivisions.

2. Improvements shall be in accordance with State of California Business and Transportation Agency Department of Transportation Standard Specifications, current edition, as modified and determined applicable by the Director.

3. All streets have been designed in accordance with the Traffic Index as shown on the typical cross-sections.

4. All streets have been designed using a minimum "R" value as shown on typical cross-sections. Should further testing show a lower "R" value of the actual in-place material, streets shall be redesigned according to the lower "R" value.

5. Any layer of "R" value material specified in the typical cross-section may be increased in depth provided that the material above that layer has no less than the minimum thickness shown.

6. If approved in writing by the Director, an alternate pavement design using Class III Aggregate Base and a thicker A.C. section may be used.

7. Any work which affects any existing County maintained road or the traffic thereon shall be completed within 20 working days from start of work.

8. Elevations and grades shown on the profiles are gutter flowlines (inverts).
9. Maximum plus grade tolerance for A.B., A.S.B/ and O.G. shall be 0.05 of a foot.

10. Portland Cement Concrete shall be Class 3 unless otherwise indicated. All concrete shall have all exposed surfaces treated with a white pigmented curing compound (see Section 90-7.01B of the Std. Specs.) after finishing.

11. Permanent traffic control signing and other safety devices (not shown on these plans) shall be installed per plans approved by the Engineer.

12. Street lighting shall be installed and a means provided to contract for public utility services and maintenance.

13. Prior to start of any earthwork, the Subdivider shall obtain a Grading Permit as required by Kern County Code of Building Regulations and Grading Ordinance.

14. Wheelchair ramps shall be constructed at all curb returns per plate R-60 of the Kern County Development Standards and as directed by the engineer. Curb ramps shall have a detectable warning surface that extends the full width & depth of the curb ramp, excluding flared sides.

15. All existing facilities, including but not limited to structures, poles, pipelines,conducts, canals, and appurtenances, which are considered to be obstructions by the County Engineer, shall be relocated at the expense of the Subdivider.

16. New streets shall be extended at intersections as directed by the County Engineer in order to provide a safe connection to the existing street pavement.

17. Storm drainage sump shall not be allowed to accept water until secured by permanent fencing or in the case of shallow unfenced sumps not until compliance with depth and side slope criteria as set by the Kern County Development Standards, Division Four.

18. Asphalt rejuvenating agent shall be applied to new asphalt concrete pavement, as directed by the Engineer, in accordance with the provisions in Section 37 "Bituminous Seals" of the Standard Specifications and the State Department of Transportation's Standard Special Provisions currently in effect.

19. Pavement grinding in accordance with Section 42 of the Standard Specifications shall be provided as directed by the Engineer where new pavement meets existing pavement.

20. All frames and covers within the roadway shall be raised to finish grade per Plate R-69.
21. Underground utilities including services to be located within right-of-way shall be installed prior to surfacing the streets.

22. Utility vaults installed in sidewalk area shall have non-skid surfaces/lids.

23. When bike lanes are required along a highway, the curb line shall be extended three (3) feet and the parkway area reduced three (3) feet.

24. Prior to acceptance of improvements, the developer shall submit a letter to the Kern County Roads Department requesting “No Stopping” along _______ and ________.

25. Street sweeping, walls, drainage, street lights, etc. shall be maintained by ________________.

NOTE: Any additional notes, not required by the Engineer, will be listed under a heading of “The Engineer of Record’s Notes” and will not be considered to be a part of the County approval.
### REQUIRED STREET TYPICAL SECTIONS FOR LOT SIZE AND DEVELOPMENT TYPE-LOT SIZE (ACRES)

<table>
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<tr>
<th>PLATE NO.</th>
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<td>PARKWAY AREAS TYPE “A”</td>
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### NOTES

1. When bike lanes are required along a highway, the curb line shall be extended (3) feet and the parkway area reduced three (3) feet.

2. A Special design for wheelchair ramps on arterial and collector highways to allow for the safe movement of pedestrians may be required by the Director.
NOT TO SCALE

NOTES:
SEE PLATE R-31 FOR PARKWAY AREA (SHOULDER)
MAXIMUM SLOPE TO LOW GUTTER SHALL NOT EXCEED 2.5%.
* GRADE FROM HIGH GUTTER.

TRACT MAPS
LOT SIZE (ACRES) NOTE: LOT SIZE (ACRES)
≥ 1/2 < 2 1/2 > 1/2 ≤ 3
≥ 2 1/2 < 5 DELETE SIDEWALK AND C & G > 3 < 5

PARCEL MAPS

MATERIAL THICKNESS
AC
AB
ASB
COMP. O.G.

SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.
NOT TO SCALE

R/W

55'

** SLOPE EASEMENT

** SLOPE EASEMENT REQUIRED WHEN CUT OR FILL EXCEEDS ONE FOOT AT R/W.

** SLOPE EASEMENT REQUIRED WHEN CUT OR FILL EXCEEDS ONE FOOT AT R/W.

NOTES:
TRACT MAPS: LOTS > 5 < 20 ACRES
PARCEL MAPS: LOTS ≥ 3 < 20 ACRES

*NO DIKE NEEDED IF SIDE SLOPE IS 4:1(H:V) OR FLATTER.

SEE PLATE R-31 FOR PARKWAY AREA (SHOULDER)

PAVING SECTION SHALL CONTINUE
FULL WIDTH OF DIKE

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<td>SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.</td>
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NOT TO SCALE

NOTE:
SEE PLATE R-31 FOR PARKWAY AREA (SHOULDER)

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TRACT MAPS
LOT SIZE (ACRES)  X1  X2  PARCEL MAPS
≥ 5 < 10  24'  11'  LOT SIZE (ACRES)
≥ 10 < 20  12'  23'  > 3 < 20
**SLOPE EASEMENT**

* A.C. DIKE TYPE "A" PER R-52
  (OR AS DIRECTED BY THE ENGINEER)

** NOTES:**

* NO DIKE NEEDED IF SIDE SLOPE IS 4:1 OR FLATTER

** SLOPE EASEMENT REQUIRED WHEN CUT OR FILL EXCEEDS ONE FOOT AT R/W.
PAVING SECTION SHALL CONTINUE FULL WIDTH OF DIKE

---

### TRACT MAPS

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SEE PLATE R-31 FOR PARKWAY AREA (SHOULDER)

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### MATERIALS

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SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.
NOT TO SCALE

NOTES:

TRACT MAPS: LOTS ≥ 5 < 20 ACRES
PARCEL MAPS: LOTS > 3 < 20 ACRES

*NO DIKE NEEDED IF SIDE SLOPE IS 4:1(H:V) OR FLATTER.

SEE PLATE R-31 FOR PARKWAY AREA (SHOULDER)

PAVING SECTION SHALL CONTINUE FULL WIDTH OF DIKE

** SLOPE EASEMENT REQUIRED WHEN CUT OR FILL EXCEEDS ONE FOOT AT R/W.

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SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.
NOT TO SCALE

NOTES:

MAXIMUM CROSS FALL TO LOW GUTTER SHALL BE 0.5'.
* SLOPE FROM HIGH GUTTER.
** DISTANCE FROM \( E \) TO \( F \) MAY BE 18' WHERE STREET WILL NOT SERVE MORE THAN 30 SINGLE-FAMILY LOTS.

SEE PLATE R-31 FOR PARKWAY AREA (SHOULDER)

TRACT MAPS

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PARCEL MAPS

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MATERIAL | THICKNESS
---|---
AC | |
AB | |
ASB | |
COMP. O.G. | |

SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.
NOT TO SCALE

NOTES:

* NO DIKE NEEDED IF SIDE SLOPE IS 4:1(H:V) OR FLATTER

** DISTANCE FROM $C$ TO $E$ MAY BE 18' WHERE STREET WILL NOT SERVE MORE THAN 30 SINGLE-FAMILY LOTS.

*** SLOPE EASEMENT REQUIRED WHEN CUT OR FILL EXCEEDS ONE FOOT AT R/W.

PAVING SECTION SHALL CONTINUE FULL WIDTH OF DIKE

---

### TRACT MAPS

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SEE PLATE R-31 FOR PARKWAY AREA (SHOULDER)

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### MATERIALS

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SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.
**Slope Easement**

- **R/W**
- **40'**
- **10' HP**
- **20' MAX.**
- **10' MAX.**
- **2:1 (H:V)**
- **2.5'**
- **1'**
- **8'**
- **12'**
- **20'**

*AC. DIKE TYPE "A" PER R-52 (OR AS DIRECTED BY THE ENGINEER)*

**Notes:**

- **NO DIKE NEEDED IF SIDE SLOPE IS 4:1 (H:V) OR FLATTER**
- **SLOPE EASEMENT REQUIRED WHEN CUT OR FILL EXCEEDS ONE FOOT AT R/W.**

**See Plate R-30 for Parkway Area (Shoulder)**

Paving Section Shall Continue Full Width of Dike

---

**Tract Maps:** LOTS ≥ 5 < 20 ACRES

**Parcel Maps:** LOTS > 3 < 20 ACRES

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**Plate No.:** R-12

**Lot Size:** > 3 < 20 ACRES

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**Material**

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**See Plate R-32 for Limits of Compaction of O.G.**

---

**County of Kern**

**State of California**

**Development Standard**

---

**NOT TO SCALE**
NOT TO SCALE

* SLOPE FROM HIGH GUTTER. MAXIMUM SLOPE SHALL NOT EXCEED 2.5% TO LOW GUTTER.

** SIDEWALK SHALL BE FULL WIDTH TO R/W ON COMMERCIAL DEVELOPMENTS. IT MAY BE REDUCED TO A MINIMUM OF 5' WIDE, IF LANDSCAPING IS CONTIGUOUS AND MAINTAINED BY OTHERS, SUBJECT TO THE DIRECTOR'S APPROVAL.

NOTES:

22' STREET WIDTH SATISFACTORY ONLY WHERE STREETS ARE CONTINUOUS AND ADEQUATE OFF-STREET PARKING IS PROVIDED. ALTERNATE WOULD BE TYPE "A" SECONDARY HIGHWAY.

SEE PLATE R-31 FOR PARKWAY AREA (SHOULDER).

SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.
NOTES:
* NO DIKE NEEDED IF SIDE SLOPE IS 4:1(H:V) OR FLATTER
** SLOPE EASEMENT REQUIRED WHEN CUT OR FILL EXCEEDS ONE FOOT AT R/W.
*** SIDEWALK SHALL BE FULL WIDTH TO R/W ON COMMERCIAL DEVELOPMENTS. IT MAY BE REDUCED TO A MINIMUM OF 5' WIDE, IF LANDSCAPING IS CONTIGUOUS AND MAINTAINED BY OTHERS, SUBJECT TO THE DIRECTOR'S APPROVAL.

SEE PLATE R-31 FOR PARKWAY AREA (SHOULDER).
PAVING SECTION SHALL CONTINUE FULL WIDTH OF DIKE

SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.
NOT TO SCALE

NOTES:

SEE PLATE R-31 FOR PARKWAY AREA (SHOULDER)

* GRADE FROM HIGH GUTTER.

PAVING SECTION SHALL CONTINUE FULL WIDTH OF DIKE

NOTE:
PAVE FULL SECTION IF RAISED MEDIANS NOT INSTALLED.

AC DIKE TYPE "E" PER R-52 (OR AS DIRECTED BY THE ENGINEER)

AC DIKE TYPE "E" PER R-52 (OR AS DIRECTED BY THE ENGINEER)

AC
AB
ASB
COMP. O.G.

AC
AB
ASB
COMP. O.G.

NOTES:

Ti= | R-Value O.G.=
---|-----------------|
AC  |                 |
AB  |                 |
ASB |                 |
COMP. O.G. |
NOT TO SCALE

NOTE:
PAVE FULL SECTION IF RAISED MEDIANS NOT INSTALLED.
A.C. DIKE TYPE "A" PER R-52  
(OR AS DIRECTED BY THE ENGINEER)

NOTES:
SEE PLATE R-30 FOR PARKWAY AREA (SHOULDER)

** SLOPE EASEMENT REQUIRED WHEN CUT OR FILL EXCEEDS ONE FOOT AT R/W.

* NO DIKE NEEDED IF SIDE SLOPE IS 4:1(H:V) OR FLATTER

PAVING SECTION SHALL CONTINUE FULL WIDTH OF DIKE
NOTES:
SEE PLATE R-30 FOR PARKWAY AREA (SHOULDER)

* NO DIKE NEEDED IF SIDE SLOPE IS 4:1(H:V) OR FLATTER

** SLOPE EASEMENT REQUIRED WHEN CUT OR FILL EXCEEDS ONE FOOT AT R/W.
PAVING SECTION SHALL CONTINUE FULL WIDTH OF DIKE

* A.C. DIKE TYPE "A" PER R-52 (OR AS DIRECTED BY THE ENGINEER)

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SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.
NOTES:

SEE PLATE R-30 FOR PARKWAY AREA (SHOULDER)

* SLOPE FROM HIGH GUTTER. MAXIMUM SLOPE SHALL NOT EXCEED 2.5% TO LOW GUTTER.

** USE WITH BIKE LANES.

PAVING SECTION SHALL CONTINUE FULL WIDTH OF DIKE

A.C. DIKE TYPE "E" PER R-52 (OR AS DIRECTED BY THE ENGINEER)

NOT TO SCALE
NOT TO SCALE

NOTES:
WHERE 4:1(H:V) OR FLATTER FILL SLOPES ARE USED, THE MINIMUM FILL AT THE HINGE
POINT SHALL AVERAGE 0.5 FEET.

SEE PLATE R-30 FOR PARKWAY AREA (SHOULDER)

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SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.
NOTES:

SEE PLATE R-30 FOR PARKWAY AREA (SHOULDER)

* NO DIKE NEEDED IF SIDE SLOPE IS 4:1(H:V) OR FLATTER

** SLOPE EASEMENT REQUIRED WHEN CUT OR FILL EXCEEDS ONE FOOT AT R/W.

PAVING SECTION SHALL CONTINUE FULL WIDTH OF DIKE.

*** USE WITH BIKE LANES

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SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.
NOT TO SCALE

NOTES:

SEE PLATE R-30 FOR PARKWAY AREA (SHOULDER)

* NO DIKE NEEDED IF SIDE SLOPE IS 4:1(H:V) OR FLATTER

** SLOPE EASEMENT REQUIRED WHEN CUT OR FILL EXCEEDS ONE FOOT AT R/W.

PAVING SECTION SHALL CONTINUE FULL WIDTH OF DIKE

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</tr>
<tr>
<td>ASB</td>
<td></td>
</tr>
<tr>
<td>COMP. O.G.</td>
<td></td>
</tr>
</tbody>
</table>

SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.
NOTES:

SEE PLATE R-30 FOR PARKWAY AREA (SHOULDER)

MAXIMUM CROSS FALL TO LOW GUTTER SHALL BE 0.5'.

* SLOPE FROM HIGH GUTTER.

NOT TO SCALE

PAVING SECTION SHALL CONTINUE FULL WIDTH OF DIKE

<table>
<thead>
<tr>
<th>TI</th>
<th>R-VALUE</th>
<th>O.G.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comp. O.G.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.
NOT TO SCALE

NOTES:

SEE PLATE R-30 FOR PARKWAY AREA (SHOULDER)

* NO DIKE NEEDED IF SIDE SLOPE IS 4:1(H:V) OR FLATTER

** DISTANCE FROM E TO E MAY BE 18' WHERE STREET WILL NOT SERVE MORE THAN 30 SINGLE-FAMILY LOTS.

*** SLOPE EASEMENT REQUIRED WHEN CUT OR FILL EXCEEDS ONE FOOT AT R/W.
PAVING SECTION SHALL CONTINUE FULL WIDTH OF DIKE

<table>
<thead>
<tr>
<th>Tl=</th>
<th>R-Value</th>
<th>O.G.=</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MATERIAL</td>
<td>THICKNESS</td>
</tr>
<tr>
<td></td>
<td>AC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ASB</td>
<td></td>
</tr>
</tbody>
</table>
|     | COMP. O.G. |      | SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.
NOT TO SCALE

**NOTES:**

SEE PLATE R-30 FOR PARKWAY AREA (SHOULDER)

* NO DIKE NEEDED IF SIDE SLOPE IS 4:1 (H:V) OR FLATTER

** SLOPE EASEMENT REQUIRED WHEN CUT OR FILL EXCEEDS ONE FOOT AT R/W.

PAVING SECTION SHALL CONTINUE FULL WIDTH OF DIKE

<table>
<thead>
<tr>
<th>TI=</th>
<th>R-Value</th>
<th>O.G.=</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MATERIAL | THICKNESS
----- | -----
AC     |     |
AB     |     |
ASB    |     |
COMP. O.G. |
INDUSTRIAL, COMMERCIAL, AND MULTIPLE RESIDENTIAL ZONES OR INTENDED USES

NOTE:

* USE FOR R-1 RESIDENTIAL DEVELOPMENTS.

SEE PLATE R-32 FOR LIMITS OF COMPACTION OF O.G.
SECONDARY ACCESS

NOTES:
1. AS REQUIRED BY THE ENGINEER FOR CIRCULATION.
2. PAVEMENT SECTION MAY BE REQUIRED TO BE A FULL DEPTH DESIGNED SECTION IF IN ALIGNMENT WITH A FUTURE STREET.
3. A SECONDARY ACCESS EASEMENT OR STREET RIGHT-OF-WAY DEDICATION IS REQUIRED.

EMERGENCY ACCESS

NOTES:
1. AS REQUIRED BY THE FIRE DEPARTMENT FOR ALL SECONDARY ACCESSES.
2. FOR EMERGENCY ACCESS, BARRICADES MAY BE REQUIRED TO RESTRICT ACCESS.
3. AN EMERGENCY ACCESS EASEMENT IS REQUIRED FOR ALL EMERGENCY ACCESSES.
**Slope Easement**

**R/W**

**HP**

**EP**

**NOTE:**

*FOR PHASE CONSTRUCTION, THE AREA BETWEEN HP AND R/W WILL VARY IN ACCORDANCE TO IMPROVEMENTS REQUIRED.*

**Shoulder Area**

**Cut/Fill Slopes**

4:1 (H:V) OR FLATTER

(SEE TYPICAL SECTION)

**NOTE:**

WHEN CUT/FILL EXCEEDS 1 FOOT AT R/W LINE, SLOPE EASEMENT IS REQUIRED.

**Shoulder Area**

**Cut/Fill Slopes Exceed 4:1 (H:V)**

**NOT TO SCALE**
**Slope Easement**

- 2:1 (H:V) Max.
- 4:1 (H:V) Max., 2% Min.

**Note:**
*Slope easement may be deleted when grading permit is provided or cut/fill is less than one foot at R/W line. For phase construction use type "3" shoulder standard.

**Parkway Area (Type "A")**

- No Access Control

**Notes:**
**May include landscape easement. If not landscaped, sidewalk shall extend to access-control wall at 2%**

**Parkway Area (Type "A")**

- With Access Control Wall

**Notes:**

---

**Plotted:** 02/24/1995

**Country of Kern**

**State of California**

**Development Standard**

**Parkway Areas Type "A"**

**Plate No.:** R-31
T.I.—LIMITS OF COMPACTION OF O.G.

<table>
<thead>
<tr>
<th>T.I.</th>
<th>COMPACTION DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–5</td>
<td>ONE FOOT</td>
</tr>
<tr>
<td>5.5–6.5</td>
<td>1.5 FEET</td>
</tr>
<tr>
<td>7–8</td>
<td>2.0 FEET</td>
</tr>
<tr>
<td>8.5+</td>
<td>2.5 FEET</td>
</tr>
</tbody>
</table>

COMPACT O.G. IS MEASURED FROM TOP OF AC TO BOTTOM OF COMPACT O.G. MINIMUM COMPACTION OF O.G. SHALL BE 95% FOR 0.5 FEET.

R—VALUE TESTS

THE DEVELOPER IS REQUIRED TO HAVE R—VALUE TESTS PERFORMED FOR DEVELOPMENTS IN KERN COUNTY. TESTS SHALL BE PROVIDED BY REGISTERED GOTECHNICAL ENGINEER/CIVIL ENGINEER.

THE MINIMUM NUMBER OF TESTS IS BASED ON CENTERLINE DISTANCE OF STREETS TO BE CONSTRUCTED. SEE CHART BELOW.

<table>
<thead>
<tr>
<th>STREET C/L DISTANCE</th>
<th>NO. OF R—VALUE TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–1500’</td>
<td>2</td>
</tr>
<tr>
<td>1501’–3000’</td>
<td>3</td>
</tr>
<tr>
<td>3001’–4500’</td>
<td>4</td>
</tr>
<tr>
<td>4501’–6000’</td>
<td>5</td>
</tr>
<tr>
<td>ETC.</td>
<td>.</td>
</tr>
</tbody>
</table>

CLASS 3 AGGREGATE BASE & AGGREGATE SUBBASES

REQUIREMENTS FOR CLASS 3 AB AND ALL ASB’S SHALL BE SET FORTH ON THE PLANS FOR THE DEVELOPMENT. SPECIFICATIONS SHALL BE APPROVED BY THE DIRECTOR.

LEGEND

AC—ASPHALT CONCRETE
AB—AGGREGATE BASE
ASB—AGGREGATE SUB—BASE
OG—ORIGINAL GROUND
Comp.—COMPACT
T.I.—TRAFFIC INDEX
HP—HINGE POINT
EP—EDGE OF PAVEMENT
CURVE DATA

C1
D = 36°14'58"
R = 60.00'
L = 37.96'
T = 19.64'

C2
D = 36°14'58"
R = 2.00'
L = 1.27'
T = 0.65'

R5-1

SEE R-53 THRU R-61
FOR APPLICABLE DETAILS
CENTERLINE DRIVEWAY OR STREET

TYPE Q (CA)
MARKER

R6-1R
(48" x 16")

MEDIAN
FINISH
GRADE

6" x 1/4" DIA. ROD OR
BOLT CAST INTO CONC.
TYPICAL

R5-1
(36" x 36")

OM1-3

TYPE OM1-3 MARKER—ALL—YELLOW
RETRO REFLECTIVE DIAMOND PANEL

SIGN PANELS SHALL BE ALUMINUM,
.080" IN THICKNESS

LEGEND TO SIGNS

R6-1R—DENOTES "ONE WAY"
SIGN PER CMUTCD

R5-1—DENOTES "DO NOT
ENTER" SIGN PER CMUTCD

TYPE Q (CA) MARKER SHALL BE
FLEXIBLE POST MARKER YELLOW
ON WHITE PER CALTRANS
STD PLAN A73A.

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT
STANDARD

STANDARD
ONE-WAY MEDIAN OPENING
WITH
14' WIDE MEDIAN

PLATE NO.
R-33

\Drafting\Archive\DEV_STD\REV0_09\D0K-11\VR-33.dwg
TRANSITION TAPER DATA

<table>
<thead>
<tr>
<th>STA.</th>
<th>OFFSET FROM E CONSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEDIAN CURB E</td>
</tr>
<tr>
<td>2+70</td>
<td>9.00' RT.</td>
</tr>
<tr>
<td>2+80</td>
<td>8.69' RT.</td>
</tr>
<tr>
<td>2+90</td>
<td>7.75' RT.</td>
</tr>
<tr>
<td>3+00</td>
<td>6.19' RT.</td>
</tr>
<tr>
<td>3+10</td>
<td>4.00' RT.</td>
</tr>
<tr>
<td>3+20</td>
<td>1.50' RT.</td>
</tr>
<tr>
<td>3+30</td>
<td>1.00' LT.</td>
</tr>
<tr>
<td>3+40</td>
<td>3.50' LT.</td>
</tr>
<tr>
<td>3+50</td>
<td>6.00' LT.</td>
</tr>
<tr>
<td>3+60</td>
<td>8.19' LT.</td>
</tr>
<tr>
<td>3+70</td>
<td>9.75' LT.</td>
</tr>
<tr>
<td>3+80</td>
<td>10.69' LT.</td>
</tr>
<tr>
<td>3+90</td>
<td>11.00' LT.</td>
</tr>
</tbody>
</table>

USE 1500' RADIUS CURVE AT CURB ANGLE POINTS FOR SMOOTH TRANSITION (TYPICAL).

STA. 2+70
RW ANGLE POINT
BEGIN 120' BAY TAPER, MEDIAN & FL

STA. 3+90
END 120' BAY TAPER, MEDIAN & FL
RW ANGLE POINT
BEGIN TAPER

SELECTED CROSS SECTIONS

THIS STANDARD IS TO BE USED FOR INTERSECTIONS WITH ARTERIALS OR COLLECTORS.

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

STANDARD
ARTERIAL TRANSITION
AT INTERSECTION WITH
ARTERIAL OR COLLECTOR

PLATE NO.
R-34
USE 1500' RADIUS CURVE AT CURB ANGLE POINTS FOR SMOOTH TRANSITION (TYPICAL)

STA 2+70
BEGIN 120° BAY TAPER, MEDIAN & E
R/W ANGLE POINT

STA 3+90
END 120° BAY TAPER, MEDIAN & E
BEGIN TAPER, MEDIAN & E R/W ANGLE POINT

STA 7+20
R/W ANGLE POINT
END TAPER, MEDIAN & FL

SELECTED CROSS SECTIONS
ARTERIAL

11' 38' 50'
11'
49' 61'

STA. 2+15
BEGIN STRIPING TAPER

STA. 3+15
BEGIN STRIPING TAPER

COLLECTOR

30' ±

11' 34' 34'
11'

STA. 8+55
END TAPER

USE 1500' RADIUS CURVE AT CURB ANGLE POINTS. FOR SMOOTH TRANSITION (TYPICAL)

LOCATION DETAIL
MEDIAN NOSE & CROSS WALK

LIP LINE

110' R/W

11' 2'
36'
48'
11' 2'

STA. 0+70 TO 2+15

109.38' R/W

11' 2'
35.38'
48'
11' 2'

STA. 3+15

90' R/W

11' 2'
32'
32'
11' 2'

STA. 8+55

SELECTED CROSS SECTIONS

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT
STANDARD

STANDARD COLLECTOR AT INTERSECTION WITH ARTERIAL

PLATE NO. R-36
DETAIL TO BE USED WHERE FULL
EXPANSION OF INTERSECTION AS
SHOWN IN DETAILS R-34 THRU R-38
ARE NOT POSSIBLE DUE TO PRIOR
DEVELOPMENT OR PARCELIZATION.
ALSO AT DRIVEWAYS AND OTHER
PUBLIC ACCESSSES WHERE TURN
LANES ARE REQUIRED OR PERMITTED.
NOTES:
1. THIS DETAIL MAY BE USED WHEN SLOPE CONSTRAINTS EXIST. DETAIL R-39 MAY BE USED UNDER OTHER CONDITIONS.
2. SEE COUNTY OF KERN STANDARD R-52, TYPE "B" CURB AND GUTTER, FOR ALL APPLICABLE DIMENSIONS AND NOTES.
3. CONCRETE TO HAVE 0.125" WIDE BY 2.0" DEEP WEAKENED PLANE JOINT AT 15' O.C. AND 0.5" EXPANSION JOINTS AT 90' O.C.
4. SAWCUT EXISTING EDGE OF PAVEMENT AS DIRECTED BY THE ENGINEER.
5. REMOVE, REPLACE, OR RELOCATE ANY NECESSARY SIGNS PER COUNTY REQUIREMENTS OR AS DIRECTED BY THE ENGINEER.
6. ANY DESIGN DEVIATIONS FROM THIS STANDARD MUST BE APPROVED IN WRITING BY THE ENGINEER.

TABLE "A"

THE FOLLOWING SHALL APPLY FOR CONCRETE STRUCTURAL THICKNESSES:

<table>
<thead>
<tr>
<th>T.I.</th>
<th>CONCRETE DEPTH</th>
<th>AB DEPTH</th>
<th>SUBBASE (AS) DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td>0.5'</td>
<td>0.34'</td>
<td>0.34'</td>
</tr>
<tr>
<td>7.0</td>
<td>0.6'</td>
<td>0.34'</td>
<td>0.34'</td>
</tr>
<tr>
<td>8.0</td>
<td>0.7'</td>
<td>0.34'</td>
<td>0.34'</td>
</tr>
<tr>
<td>10.0</td>
<td>0.8'</td>
<td>0.34'</td>
<td>0.50'</td>
</tr>
<tr>
<td>12.0</td>
<td>0.9'</td>
<td>0.34'</td>
<td>0.80'</td>
</tr>
</tbody>
</table>

SECTION A-A
NOTE:
PROPERTY LINE DETAIL TO BE USED AT INTERSECTIONS OF ALL STREETS ADJACENT TO OR WITHIN NEW DEVELOPMENTS.
LOCAL STREET

R = 100' MINIMUM

60' MINIMUM

MAJOR HIGHWAY

SECONDARY HIGHWAY

250' MINIMUM

NOT TO SCALE

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

FRONTAGE ROADS

PLATE NO. R-42

3-30-1995

DESIGNED BY: R.J.L.
DRAWN BY: A.LUNA
CHECKED BY: 

PLOTTED: 02/24/2010
NOTE: PARKWAY WIDTH TO BE MAINTAINED AT A UNIFORM WIDTH AROUND CUL-DE-SAC

TRACT BOUNDARY

R=25'

MIN. ONE (1) LOT DEPTH

R=50'

WAIVER OF VEHICULAR ACCESS

* 20' MIN.

PEDESTRIAN WAY

MAY BE REDUCED TO "0" BY DIRECTOR.

PARKWAY (TYP.)

* 20' MIN.

MANMADE BARRIER

(I.E. CANALS, RAILROADS, ETC.)

NOT TO SCALE
NOTE: PARKWAY WIDTH TO BE MAINTAINED AT A UNIFORM WIDTH AROUND (PADDLE) CUL-DE-SAC.

VIEW = ORIG WITH 3 & 5 RADS

<table>
<thead>
<tr>
<th>CURVE</th>
<th>RADIUS</th>
<th>LENGTH</th>
<th>TANGENT</th>
<th>DELTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>25.00'</td>
<td>19.38'</td>
<td>10.21'</td>
<td>44°24'55&quot;</td>
</tr>
<tr>
<td>C2</td>
<td>52.00'</td>
<td>40.31'</td>
<td>21.23'</td>
<td>44°24'55&quot;</td>
</tr>
<tr>
<td>C3</td>
<td>52.00'</td>
<td>163.36'</td>
<td>———</td>
<td>180°00'00&quot;</td>
</tr>
<tr>
<td>C4</td>
<td>35.00'</td>
<td>27.13'</td>
<td>14.29'</td>
<td>44°24'55&quot;</td>
</tr>
<tr>
<td>C5</td>
<td>42.00'</td>
<td>32.56'</td>
<td>17.15'</td>
<td>44°24'55&quot;</td>
</tr>
<tr>
<td>C6</td>
<td>42.00'</td>
<td>131.95'</td>
<td>———</td>
<td>180°00'00&quot;</td>
</tr>
<tr>
<td>C7</td>
<td>17.50'</td>
<td>49.50'</td>
<td>110.80'</td>
<td>162°02'56&quot;</td>
</tr>
</tbody>
</table>

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT
STANDARD

(PADDLE) CUL-DE-SAC
CONSTRUCTION
STANDARDS

PLATE NO.
R-45
OFF-SITE TURNAROUND

REQUIRED WHEN THE TRACT AND OFF-SITE HAVE THE SAME OWNER

TEMPORARY PAVING SHALL BE 2" THICK, MINIMUM OVER 6" COMPACTED SUBGRADE COMPACTED TO 95% RELATIVE DENSITY. PAVING SHALL INCLUDE TYPE "A" AC DIKE, PER K.C.D.S. PLATE R-52, AROUND THE CUL-DE-SAC OR OTHER APPROVED METHODS FOR DRAINAGE AS DIRECTED BY THE ENGINEER.

DEDICATION BY SEPARATE INSTRUMENT IS REQUIRED

RADIi ON CUL-DE-SACS SHALL CONFORM TO COUNTY STANDARD R-44 OR AS APPROVED BY THE DIRECTOR.

TEMPORARY PAVING

OIL SAND, R.M.A.S.
A.C., ETC.

STANDARD ASPHALT PAVING

CURB AND GUTTER

PROPERTY LINE

SIDewALK

TRACT BOUNDARY
NOTES:

1. ALL DIMENSIONS SHOWN ARE FOR A 90° KNUCKLE ONLY.

2. WHEN DELTA IS GREATER THAN 120°, KNUCKLE SHALL BE SUBJECT TO SPECIAL DESIGN BY THE DIRECTOR.

3. THE MAXIMUM DEVIATION OF THE STREET CENTERLINES AT INTERSECTIONS SHALL NOT EXCEED 15° SKEW FROM A RIGHT-ANGLED INTERSECTION FOR ALL LOCAL STREETS.

4. THE MAXIMUM DEVIATION OF THE STREET CENTERLINES AT INTERSECTIONS SHALL NOT EXCEED 5° SKEW FROM A RIGHT-ANGLED INTERSECTIONS FOR ALL MAJOR STREET SYSTEMS.
LOCAL INTERSECTION OFFSETS

NOT TO SCALE
* INTERSECTION OFFSET SHALL APPLY ALONG LOCAL STREETS

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

STANDARD
MINIMUM STREET ACCESS SPACING ON ARTERIALS AND COLLECTORS

PLATE NO. R-49

PLOTTED: 02/24/2010
NOTE
NUMBER OF ACCESS POINTS SHOWN TO ARTERIAL STREETS IS FOR ILLUSTRATIVE PURPOSES ONLY TO COVER TYPICAL ACCESS CONFIGURATIONS. ARTERIALS ARE PRIMARILY DESIGNED FOR MOVEMENT OF THROUGH TRAFFIC AS INDICATED SEC. 105.3 ACCESS POINTS TO ARTERIAL STREETS SHALL BE MINIMIZED TO THE GREATEST EXTENT POSSIBLE.
NOTES

1. EXPANSION JOINTS SHALL BE EITHER (A) 1/4" TO 1/2" PREMOLDED EXPANSION JOINT FILLER PER THE STANDARD SPECIFICATIONS, SEC. 51-1-12 OR (B) 2" DEEP SCORED JOINT.

2. WEAKENED PLANE JOINTS (WPJ) REQUIRED ON CENTERLINE FOR DRIVEWAYS 10' TO 20' WIDE. DRIVEWAYS 22' TO 35' WIDE SHALL HAVE TWO WPJ EVENLY SPACED AT 1/3 AND 2/3 POINTS.

3. ALL CONSTRUCTION AND MATERIALS SHALL BE IN CONFORMITY WITH STANDARD SPECIFICATIONS.

4. THICKNESS OF APRONS AND SIDEWALK BETWEEN APRON & DRIVEWAY SHALL BE 6" OF CONCRETE.

5. TO BE CONSTRUCTED ON ALL STREETS WITH A2-6 CURB AND GUTTER.

6. PLANTER STRIP AS PER 503-14-02

7. CONCRETE SHALL BE CLASS 3.

8. NO COLORING SHALL BE ADDED.

* PROVIDE REQUIRED PEDESTRIAN EASEMENT IF OUTSIDE R/W. SIDEWALK MAY BE REDUCED TO 4'-0" WIDE BETWEEN APRON AND DRIVEWAY.

** IF CURB AND GUTTER ARE Poured SEPARATE OF APRON THEN DOWELS ARE REQUIRED AT BACK OF CURB. 3" IN CURB AND 9" IN CENTER OF APRON.
SECTION A–A WITH VERTICAL CURB

NOTES

1. EXPANSION JOINTS SHALL BE EITHER (A) 1/4" TO 1/2" PREMOLED EXPANSION JOINT FILLER PER THE STANDARD SPECIFICATIONS, SEC. 51–1–12 OR (B) 2" DEEP SCORED JOINT.

2. WEAKENED PLANE JOINTS (WPJ) REQUIRED ON CENTERLINE FOR DRIVEWAYS 10' TO 20' WIDE. DRIVEWAYS 22' TO 35' WIDE SHALL HAVE TWO WPJ EVENLY SPACED AT 1/3 AND 2/3 POINTS.

3. ALL CONSTRUCTION AND MATERIALS SHALL BE IN CONFORMITY WITH STANDARD SPECIFICATIONS.

4. THICKNESS OF APRON AND SIDEWALK BETWEEN APRON & DRIVEWAY SHALL BE 6" OF CONCRETE.

5. TO BE CONSTRUCTED ON ALL STREETS WITH A2–6 CURB AND GUTTER.

6. PLANTER STRIP AS PER 503–14–02

7. CONCRETE SHALL BE CLASS 3.

8. NO COLORING SHALL BE ADDED.

* PROVIDE REQUIRED PEDESTRIAN EASEMENT IF OUTSIDE R/W.

SIDEWALK MAY BE REDUCED TO 4"–0" WIDE BETWEEN APRON AND DRIVEWAY.

** IF CURB AND GUTTER ARE POURED SEPARATE OF APRON THEN DOWELS ARE REQUIRED AT BACK OF CURB. 3" IN CURB AND 9" IN CENTER OF APRON.
NOT TO SCALE

1. The ramp shall have a 12-inch wide border with 1/4-inch grooves approximately 3/4 inch O.C. See grooving detail.

2. Concrete shall be class 3. No coloring shall be added.

3. To increase the radius in commercial developments, limited exceptions may be granted by the director.

4. Expansion joints shall be either (A) 1/4" to 1/2" premolded expansion joint filler per Sec. 51-1.12 of the standard specifications, or (B) 2" deep scored joint (weakened plane, extrusion machine only)

5. Additional expansion joint required at centerline when approach is greater than 20'.

6. Curb ramps shall have a detectable warning surface that extends the full width and depth of the ramp, excluding the flared sides. Detectable warning products shall be DSA-AC approved.

SECTION A-A

SECTION B-B

6" O.G. compacted to 95% relative compaction

* Varies 0" to 6"
R1, R2

NOT TO SCALE

THIS STANDARD APPLIES TO RESIDENTIAL ACCESS ON LOCAL STREETS. FOR ARTERIALS AND COLLECTORS WHERE THE SIDE STREET IS AN ARTERIAL OR COLLECTOR, THE DIMENSION FROM THE CORNER WILL BE 20'.

NON R1, R2

NOT TO SCALE

** THESE CLEARANCES MAY BE REDUCED WHERE TRAFFIC CONDITIONS WARRANT, SUBJECT TO THE RECOMMENDATION OF THE TRAFFIC ENGINEER.
NOT TO SCALE

1. CURBS TO BE CONSTRUCTED MONOLITHIC WITH CROSS GUTTER
2. CONCRETE SHALL BE CLASS "2" NO COLORING SHALL BE ADDED.
3. SCORE AS DIRECTED BY ENGINEER.

* ADDITIONAL RIGHT OF WAY MAY BE REQUIRED FOR PEDESTRIAN WALKWAY.
NOTES
1. THE RAMP SHALL HAVE A 12-INC WIDE BORDER WITH 1/4-INC GROOVES APPROXIMATELY 3/4 INC O.C. SEE GROoving DETAIL.

2. EXPANSION JOINTS SHALL BE EITHER (A) 1/4" TO 1/2" PREMOLDED EXPANSION JOINT FILLER PER SEC. 51-1.12 OF THE STANDARD SPECIFICATIONS OR (B) 2" DEEP SCORED JOINT (WEAKENED PLANE, EXTRUSION MACHINE ONLY)

3. CONCRETE SHALL BE CLASS 3 NO COLORING SHALL BE ADDED.

4. CONCRETE 0.5' THICK (MONOLITHIC WITH CURB RETURN)

5. CURB RAMPS SHALL HAVE A DETECTABLE WARNING SURFACE THAT EXTENDS THE FULL WIDTH AND DEPTH OF THE RAMP, EXCLUDING THE FLARED SIDES. DETECTABLE WARNING PRODUCTS SHALL BE DSA-AC APPROVED.
NOT TO SCALE

SECTION A-A

A2-6 CURB 7 1/2"
RETAINING CURB IF NECESSARY
DEPRESS ENTIRE SIDEWALK AS REQUIRED

1/4"
GROOVING DETAIL
SEE NOTES

6" O.G. COMPACTED TO
95% RELATIVE COMPACTION

5' MAX.
2% MIN.

GROOVING DETAIL
SEE NOTES #2

8.33% MAX.

NOTES

1. THE RAMP SHALL HAVE A 12-INCH WIDE BORDER WITH 1/4-INCH GROOVED APPROXIMATELY 3/4 INCH O.C.

2. DETECTABLE WARNING SHALL EXTEND THE FULL LENGTH AND WIDTH OF THE BOTTOM LANDING. DETECTABLE WARNING PRODUCTS SHALL BE DSA-AC APPROVED.

3. CONCRETE SHALL BE CLASS 3. NO COLORING SHALL BE ADDED.

4. CONSTRUCT WHEELCHAIR RAMP AT ALL RETURNS.

5. ONLY TO BE USED WHERE ADEQUATE R/W IS NOT AVAILABLE.

6. MAJOR AND SECONDARY HIGHWAY INTERSECTIONS MAY REQUIRE DUAL WHEELCHAIR RAMPS.

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT
STANDARD

WHEELCHAIR RAMP
PROPERTY LINE SIDEWALK

PLATE NO.
R-61

86
NOTE:
DEEP SCORED JOINTS (DSJ) TO BE CONSTRUCTED AT LOCATIONS APPROVED BY THE ENGINEER.

SECTION A-A
1' OF O.G. @ 95% RELATIVE COMPACTION

SECTION B-B

EXPANSION JOINTS SHALL BE EITHER (A) 1/4" PREMOLDED EXPANSION JOINT FILLER PER SEC. 51-1.12 OF THE STANDARD SPECIFICATIONS, OR (B) 2" DEEP SCORED JOINT (WEAKENED PLANE, EXTRUSION MACHINE ONLY)
Curb return to be part of cross gutter

Part of curb return to be constructed as part of cross gutter. Curb face to be constructed as directed by engineer.

Plan

Flow

Expansion Joint

DSJ

Flowline

B

Expansion Joint

NOTE:

Deep scored joints (DSJ) to be constructed at locations approved by the engineer.

Section A-A

1' of O.G. @ 95% relative compaction

Section B-B

Expansion joints shall be either (A) 1/4" premolded expansion joint filler per Sec. 51-1.12 of the standard specifications, or (B) 2" deep scored joint (weakened plane, extrusion machine only).
NOTES

1. SLOPE IS PLUS 2% MAX FROM TOP OF CURB TO PROPERTY LINE

2. SCORE SIDEWALK IN RECTANGLES OF NOT LESS THAN 12 SQUARE FEET NOR MORE THAN 20 SQUARE FEET

3. CONCRETE FOR SIDEWALK SHALL BE CLASS "3" AS APPROVED BY THE "COUNTY OF KERN"

4. WEAKENED PLANE JOINTS SHALL BE CONSTRUCTED AT 8 FOOT INTERVALS OR AS DIRECTED BY THE ENGINEER

5. EXPANSION JOINTS SHALL BE PLACED AT SIDES OF STRUCTURES, END OF CURB RETURNS, AND OPPOSITE EXPANSION JOINTS IN EXISTING CURB

NOTE: MAXIMUM SPACING = 60 FT.

EXPANSION JOINTS SHALL BE EITHER (A) 1/4" TO 1/2" PREMOLDED EXPANSION JOINT FILLER PER SEC. 51-1.12 OF THE STANDARD SPECIFICATIONS, OR (B) 2" DEEP SCORED JOINT (WEAKENED PLANE, EXTRUSION MACHINE ONLY)
NOTES

1. SLOPE IS PLUS 2% MAX FROM TOP OF CURB TO PROPERTY LINE

2. SCORE SIDEWALK IN RECTANGLES OF NOT LESS THAN 12 SQUARE FEET NOR MORE THAN 20 SQUARE FEET

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EXPANSION JOINTS SHALL BE EITHER (A) 1/4" TO PREMOLDED EXPANSION JOINT FILLER PER SEC. 51-1.12 OF THE STANDARD SPECIFICATIONS, OR (B) 2" DEEP SCORED JOINT (WEAKENED PLANE, EXTRUSION MACHINE ONLY)

NOT TO SCALE
NOTE:
1. WITHOUT BIKE LANE, CURB LINE IS 45', WITH 10' TO PROPERTY LINE. ADDITIONAL RIGHT-OF-WAY IS REDUCED FROM 10' TO 7'.
2. FLOWLINE TO EXTEND THROUGH TURNOUT.
3. COMPACT 18 INCHES OF O.C. TO 95% UNDER CONCRETE FOR TURNOUT.
4. CONCRETE FOR TURNOUT TO BE SAME AS FOR C & G.
5. PROVIDE NECESSARY PASSENGER WAITING PAD AND/OR SHELTER AS REQUIRED BY GOLDEN EMPIRE TRANSIT (GET) OR KERN REGIONAL TRANSIT (KRT).
NOTES:

1. A.C. TO BE 1/2" MAX. SIZE AGGREGATE

2. BACKFILL MATERIAL TO BE PLACED IN LAYERS; 8" LAYERS OF PROPERLY MOISTENED MATERIAL

3. SURFACING TO BE TRIMMED EXTRA WIDTH AFTER TRENCH IS BACKFILLED AND CLASS 2 A.B. IS IN PLACE

4. ALL WORK TO CONFORM TO CALIF. DEPT. OF TRANS. STANDARD SPECIFICATIONS, CURRENT EDITION, AND AS SHOWN ON THIS SHEET

5. SAWCUTS SHALL BE MADE PARALLEL OR AT RIGHT ANGLES TO THE CENTERLINE OF THE ROAD.

6. PATCHES LESS THE 2' FROM EXISTING PATCHES, EDGES OF PAVEMENT, OR GUTTER SHALL BE EXTENDED TO INCLUDE THE INTERMEDIATE ISOLATED STRIP OF EXISTING PAVEMENT.

7. MINIMUM PATCH WIDTH SHALL BE 2' AT ITS SMALLEST DIMENSION UNLESS OTHERWISE ALLOWED BE THE ENGINEER.
NOTES

1. SAWCUTS SHALL BE MADE PARALLEL OR AT RIGHT ANGLES TO THE CENTERLINE OF THE ROAD.

2. PATCHES LESS THE 2' FROM EXISTING PATCHES, EDGES OF PAVEMENT, OR GUTTER SHALL BE EXTENDED TO INCLUDE THE INTERMEDIATED ISOLATED STRIP OF EXISTING PAVEMENT.

3. MINIMUM PATCH WIDTH SHALL BE 2' AT ITS SMALLEST DIMENSION UNLESS OTHERWISE ALLOWED BE THE COUNTY ENGINEER.

FOR PLASTIC PIPE INSTALLATION, SEE PLATE No. S-1 OR W-4.
CONCRETE SHALL BE EITHER:
(A) CLASS 3 (MIN.) WHERE STREET IS NOT COUNTY MAINTAINED OR OPEN TO TRAFFIC FOR 2 WEEKS AFTER PLACING.
(B) CLASS 2 (MIN.) WHERE IN EXISTING STREET OR STREET BEING USED BY PUBLIC TRAFFIC.

CONCRETE TO BE PLACED

PLAN

EXISTING SURFACE

VARIABLE

TOP OF CONCRETE TO BE 1/4" BELOW EXISTING SURFACE

DIMENSIONS SHOWN TO BE SAME FOR ALL SIZES OR TYPES OF OPENINGS ON COUNTY ROADS

NOTE:
CONCRETE MAY BE DELETED ON ROAD MIX STREETS UPON APPROVAL OF INSPECTOR

SECTION

NOT TO SCALE
CONCRETE SHALL BE EITHER:
(A) CLASS 3 (MIN.) WHERE STREET IS NOT COUNTY MAINTAINED OR OPEN TO TRAFFIC FOR 2 WEEKS AFTER PLACING.
(B) CLASS 2 (MIN.) WHERE IN EXISTING STREET OR STREET BEING USED BY PUBLIC TRAFFIC.

NOTE:
FABRICATE IN ACCORDANCE WITH SECTION 55–3 "FABRICATION", OF THE CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.
COVER TO BE 9 5/8" O.D. CASING PIPE WEIGHING AT LEAST 32 LBS. PER LINEAR FOOT AND READILY WELDABLE TO 1/2" x 10 3/4" DIA. STRUCTURAL STEEL PLATE.

SECTION A–A

MONUMENT TO BE FURNISHED AND SET BY THE DEVELOPER

NOT TO SCALE
ALHAMBRA FOUNDRY 22" GALVANIZED FRAME & COVER
# A-1530 WITH TWO 3/4" STAINLESS STEEL SOCKET HEAD
SET SCREWS, (SET OPPOSITE AND FINISHED FLUSH) OR EQUAL.
SEE NOTE B

PLAN

SEE DETAIL B ON PLATE R-72

NOTE:
SEE PLATE R-72 FOR NOTES PERTAINING TO THIS PLATE.

SEE DETAIL A ON PLATE R-72
FOR REINFORCING AROUND PIPE

ROUNDED, R-WALL
THICKNESS

#4 @ 12" O.C.
BOTH WAYS

3.5' MIN. T

D'

6" OF O.C. 95% RELATIVE COMPACTION

SECTION A-A

NOT TO SCALE

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT
STANDARD

TYPE "A"
MINOR STRUCTURE

PLATE NO.
R-71

96
DETAIL A

SEE PLATE R-71 FOR PLAN AND SECTIONAL VIEWS

REINFORCING STEEL
(SEE PLAN VIEW)

ALHAMBRA FOUNDRY A-3904
3 1/2"x3 1/2"x1/2" CURB ANGLE OR EQUAL
(LENGTH = "W"-6")

1 1/8" DIA. HOLE WHEN SUPPORT BOLT IS REQUIRED

CURB ANGLE DETAIL

DETAIL B

SEE PLATE R-71 FOR PLAN AND SECTIONAL VIEWS

A. ADJUSTING NUTS TO BE TIGHTENED AND SECURED IN PLACE WHEN ANGLE IS IN PROPER POSITION

B. 1"x16" SUPPORT BOLT WITH HEX NUTS (SEE NOTE 5 & 6)

C. CURB ANGLE, SEE DETAIL THIS SHEET

NOTES (FOR PLATES R-71 & R-72):

1. ALL CONCRETE TO BE CLASS 2 CONCRETE

2. WALL REINFORCING NOT REQUIRED WHEN H=8' OR LESS OR THE UNSUPPORTED WIDTH OR LENGTH = 7' OR LESS. WALLS EXCEEDING THESE LIMITS SHALL BE REINFORCED WITH NO. 4 BARS AT 18" CENTERS PLACED 1 1/2" CLEAR TO INSIDE OF BOX UNLESS OTHERWISE SHOWN

3. ALL EXPOSED METAL PARTS SHALL BE GALVANIZED AFTER FABRICATION

4. SUPPORT BOLTS SHALL BE INSTALLED WHEN LENGTH OF OPENING EXCEEDS 7'-0" AND SHALL BE SPACED NOT MORE THAN 7'-0" O.C. AND NOT LESS THAN 5'-0" O.C.

5. WHEN STRUCTURE IS LOCATED WITHIN CURB RETURN, THE CURB ANGLE SHALL BE FABRICATED IN CHORD SECTIONS OF EQUAL LENGTH NOT TO EXCEED 4 FEET WITH ONE SUPPORT BOLT AT EACH ANGLE POINT. WHEN "W"=5 THE CURB ANGLE MAY BE FABRICATED STRAIGHT

6. WALL THICKNESS, T=6" EXCEPT:
   H > 8', T=8"
   W > 8', T=8"(FRONT & BACK WALLS ONLY)
   D > 8', T=8"(SIDE WALLS ONLY)

7. LOCATION OF FRAME AND COVER TO BE DETERMINED BY THE ENGINEER

8. CAST-IN-PLACE OR PRECAST ALTERNATIVE IS OPTIONAL WITH CONTRACTOR, SEE SECTION 51-1.02 OF STANDARD SPECIFICATIONS

9. THE MINIMUM OPENING SHALL BE 3.5 FEET.

10. THE DEPRESSED FLOWLINE SHALL BE TRANSITIONED IN 6 FEET ON UPSTREAM SIDE, AND 3 FEET ON DOWNSTREAM SIDE OF THE INLET.

11. WHEN CURB OPENING EXCEEDS 4 1/2", A PLAIN ROUND STEEL PROTECTION BAR 1" IN DIAMETER SHALL BE INSTALLED. BAR SHALL BE IMBEDDED 5" AT EACH END.

NOT TO SCALE

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

TYPE "A"
MINOR STRUCTURE DETAILS

PLATE NO.
R-72
2-1/2" x 2-1/2" x 1/4" GALVANIZED STEEL ANGLE BENT TO RADIUS OF PART CIRCLE PLATE.

2 Ø 1/4" BARS 4' LONG IMBEDDED IN WINGWALLS AT EACH END OF CULVERTS.

SECTION A-A

GENERAL NOTES
CONCRETE FOR CONSTRUCTION SHALL BE CLASS "3"

PART CIRCLE CULVERT SHALL BE FABRICATED OF 8 GAGE CORRUGATED METAL.

FOR RUNS LONGER THAN 20' INSTALL AN ALHAMBRA FOUNDRY A-1530 FRAME AND COVER WITH SET SCREWS IN MIDDLE OF RUN.

PART CIRCLE CULVERT SHALL EXTEND AT LEAST TO RIGHT-OF-WAY LINE.

NOT TO SCALE
NOTES: UNDERSIDEWALK DRAIN TO EXTEND TO PROPERTY LINE. IF LENGTH IS GREATER THAN 20', INSTALL ALHAMBRA FOUNDRY FRAME AND COVER #1530 WITH SET SCREWS AT 10' O.C.

CURB ANGLE TO BE GALVANIZED AFTER FABRICATION.
NOTES:

1. REMOVE COVER BEFORE PLACING CONCRETE. KEEP INSIDE OF BOX FREE OF OVERSPILL.

2. PULL BOX SHALL BE SIZE 3 1/2 AND SHALL BE LOCATED WITHIN 5.0' OF THE STREET LIGHT AND INSTALLED FLUSH WITH THE SIDEWALK. GRAVEL (0.75" MAX.) SHALL BE PLACED UNDER THE PULL BOX FOR DRAINAGE. PULL BOX COVER SHALL BE MARKED TO IDENTIFY IT AS STREET LIGHTING. PULL BOX SHALL BE PRE CAST CONCRETE.
MASONRY NON-BEARING WALL

FOR USE IN SUBDIVISIONS REQUIRING A SIX FOOT MASONRY WALL.

DESIGN CRITERIA

A. CONCRETE MASONRY UNIT GRADE "N", MEDIUM WEIGHT CONFORMS TO ASTM C90, f’c=1,500 PSI
B. GROUT TO BE 2,000 PSI @ 28 DAYS
C. MORTAR TO BE 1,800 PSI @ 28 DAYS
D. REINFORCING STEEL=GRADE 40. PROVIDE 24" MINIMUM LAP.
E. MAXIMUM SOIL BEARING PRESSURE=1500 PSF.
F. WIND DESIGN 85 MPH, EXPOSURE "C" AND SEISMIC DESIGN CATEGORY D OR E.

NOTES:

FOOTING TO BE CLASS "3" CONCRETE. f’c=2500 PSI
FINISHED GRADE DIFFERENCE ON EACH SIDE OF WALL NOT TO EXCEED SIX INCHES.
GROUT ALL CELLS CONTAINING REINFORCEMENT, INCLUDING HORIZONTAL BOND BEAMS.

85 MPH WIND SPEED
EXPOSURE C
(3-SECOND GUST)
FLAT TERRAIN

SECTION
NOT TO SCALE
MASONRY NON-BEARING WALL
FOR USE IN SUBDIVISIONS REQUIRING A SIX FOOT MASONRY WALL.

DESIGN CRITERIA
A. CONCRETE MASONRY UNIT GRADE N, MEDIUM WEIGHT CONFORMS TO ASTM C90, \( f_{cm} = 1500 \) PSI
B. GROUT TO BE 2,000 PSI @ 28 DAYS
C. MORTAR TO BE 1,800 PSI @ 28 DAYS
D. REINFORCING STEEL=GRADE 40. PROVIDE 24" MINIMUM LAP.
E. MAXIMUM SOIL BEARING PRESSURE=1500 PSF.
F. WIND DESIGN 100 MPH, EXPOSURE "C" AND SEISMIC DESIGN CATEGORY D OR E.

NOTES:
FOOTING TO BE CLASS "3" CONCRETE.
\( f'c = 2500 \) PSI
FINISHED GRADE DIFFERENCE ON EACH SIDE OF WALL NOT TO EXCEED SIX INCHES.
GROUT ALL CELLS CONTAINING REINFORCEMENT INCLUDING HORIZONTAL BOND BEAMS.

100 MPH WIND SPEED
EXPOSURE C
(3-SECOND GUST)
FLAT TERRAIN

SECTION
NOT TO SCALE
MASONRY NON-BEARING WALL
FOR USE IN SUBDIVISIONS REQUIRING
A SIX FOOT MASONRY WALL.

DESIGN CRITERIA
A. SOIL EQUIVALENT FLUID PRESSURE = 45 PCF.
   ALLOWABLE SOIL BEARING PRESSURE = 1500 PSF.
B. CONCRETE MASONRY UNIT GRADE N, MEDIUM WEIGHT, CONFORMS TO ASTM C90,
   f'm=1500 PSI.
C. GROUT TO BE 2000 PSI @ 28 DAYS.
D. MORTAR TO BE 1800 PSI @ 28 DAYS.
E. FOOTING TO BE CLASS "3" CONCRETE. f'c=2500 PSI @ 28 DAYS.
F. REINFORCING STEEL TO BE GRADE 40.
G. MAXIMUM SLOPE OF RETAINED AREA SHALL NOT EXCEED 2%.
H. IF RETAINING HEIGHT EXCEEDS 2', PROVIDE 4" PERFORATED PVC DRAIN LINE WITH A
   MINIMUM OF 1 CUBIC FOOT PER FOOT COMPACTED 1/2" GRAVEL BETWEEN WALL.
   PROVIDE 1 1/2" WEEP HOLE AT 100' O.C. MAXIMUM OR AT EACH PROPERTY LINE,
   WHICH EVER IS CLOSER OR OMIT HEAD JOINT IN 1ST COURSE @ 32" O.C. MAXIMUM
   FOR WEEP HOLE.
I. MINIMUM SET BACK FOR STRUCTURES FROM WALL (RETAINED SIDE) IS "H" PLUS 2'.

<table>
<thead>
<tr>
<th>RETAINING HEIGHT</th>
<th>WALL THICKNESS</th>
<th>KEY DEPTH</th>
<th>FOOTING WIDTH</th>
<th>X(BARS)</th>
<th>Y(BARS)</th>
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<td>2'</td>
<td>8''</td>
<td>—</td>
<td>2.5'</td>
<td>#4 @ 32'' O.C.</td>
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GROUT CAP

6"x8"x16" CONCRETE MASONRY UNITS

#4 BARS (HORIZ.) @ 32" O.C.

#4 BARS (VERT.) @ 24" O.C.
CENTER IN WALL

EXTEND MIN. 24" INTO RETAINING WALL

2" CLEAR
WATER PROOFING MEMBRANE PER CBC.

SEE NOTES

3" CLEAR

KEY NOT REQUIRED FOR H ≤ 2'

SECTION NOT TO SCALE

100 MPH WIND SPEED EXPOSURE C (3-SECOND GUST)
FLAT TERRAIN

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

MASONRY SCREEN/RETAINING WALL COMBINATION
1 OF 2

PLATE NO. R-81
MASONRY NON-BEARING WALL

FOR USE IN SUBDIVISIONS REQUIRING A SIX FOOT MASONRY WALL.

DESIGN CRITERIA

A. SOIL EQUIVALENT FLUID PRESSURE = 45 PCF. f' \( \text{m} \)= 1500 PSI.
   ALLOWABLE SOIL BEARING PRESSURE = 1500 PSF.

B. CONCRETE MASONRY UNIT GRADE N, MEDIUM WEIGHT, CONFORMS TO ASTM C90.

C. GROUT TO BE 2000 PSI @ 28 DAYS.

D. MORTAR TO BE 1800 PSI @ 28 DAYS.

E. FOOTING TO BE CLASS "3" CONCRETE. f\(_c\) = 2500 PSI @ 28 DAYS.

F. REINFORCING STEEL TO BE GRADE 40.

G. MAXIMUM SLOPE OF RETAINED AREA SHALL NOT EXCEED 2%.

H. IF RETAINING HEIGHT EXCEEDS 2', PROVIDE 4" PERFORATED PVC DRAIN LINE WITH A MINIMUM OF 1 CUBIC FOOT PER FOOT COMPACTED 1/2" GRAVEL BETWEEN WALL. PROVIDE 1 1/2" WEEP HOLE AT 100' O.C. MAXIMUM OR AT EACH PROPERTY LINE, WHICH EVER IS CLOSER, OR OMIT HEAD JOINT IN 1ST COURSE @ 32" O.C. MAXIMUM FOR WEEP HOLE.

I. MINIMUM SET BACK FOR STRUCTURES FROM WALL (RETAINED SIDE) IS "H" PLUS 2'.

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DIVISION TWO

STANDARDS FOR WATER SYSTEMS

CHAPTER I. GENERAL

Sec. 201-1 Scope

This division establishes the minimum acceptable standards of performance and materials and methods used in the construction of water mains and water systems for developments in the County of Kern. Water purveyors may have more restrictive requirements.

Sec. 201-2 General

201-2.01 The provisions of this manual are not intended to prevent the use of any material or method of construction not specifically prescribed by this manual if such alternate has been submitted to and has been approved by the Director and the Purveyor's Engineer.

201-2.02 The Director may approve such alternate if such alternate is found to be for the purpose intended and at least the equivalent of that prescribed in this manual in quality, strength, sanitation, durability, safety, and effectiveness.

201-2.03 The Director may require the person seeking approval of such alternate to submit to him a sample of such alternate material or method, together with two copies of a technical report, including design data, report of material and chemical analysis, and details of laboratory tests which have been performed, plus copies of all tests and approvals, if any, under "AWWA", "ASA", State Department of Health Services, or other approved testing laboratories.

201-2.04 In no event will the use of other than new and unused materials be permitted unless specifically approved by the Environmental Health Services Department and the Director.

201-2.05 The Land Division Ordinance requires that construction plans for the water supply and distribution system be reviewed and approved by the Fire Department, Environmental Health Services Department, and Engineering, Surveying & Permit Services Department.

(Updated 5.21.10)
201-2.06 The requirement for review by and approval of the Director for water plans may be waived when all of the following conditions exist:

a. The facilities are to be accepted and maintained by an established public district or company.

b. The company or district has adopted standards which are equivalent to, or more restrictive than, the County's adopted Development Standards.

c. The plans are prepared by the developer's engineer and approved by the company's or district's engineer or prepared by the company's or district's engineer and approved by the developer's engineer.

d. The company's or district's engineer is independent of the developer and the developer's engineer.

e. The company's or district's engineer by certificate shall state on the plans that the plans meet or exceed the minimum County Development Standards.

f. The district or company has received written approval of the Director for waiver of the requirement of his review and approval of the plans.

201-2.07 See Section 305 of Division III, Standards for Sanitary Sewers, for clearance between water and sewer lines.

Sec. 201-3 Enforcement

Provisions of these standards for water systems shall be enforced by the Director, the Director of Environmental Health Services, and the Fire Chief.

Sec. 201-4 Definitions, Terms, and Abbreviations

Whenever any of the following words, expressions or pronouns are used in these minimum standards, they shall be understood to have the meanings given below:

201-4.01 PURVEYOR’S ENGINEER: Civil Engineer registered in State of California employed or contracted by the Water Purveyor.

201-4.02 WATER PURVEYORS: The water system shall be owned and operated by a public utility, a mutual water company, or a governmental body. The entity serving water must hold a valid permit to purvey water from the State Department of Health Services or County Environmental Health Services Department. In the case of a
public utility, it must also hold a valid "Certificate of Convenience and Necessity" from the California Public Utility Commission.

201-4.03 TRADE NAMES: Where trade names are used in these minimum standards, it shall be understood that other materials may be substituted provided they are equal in quality and meet with the approval of the Engineer and the Purveyor's Engineer.

201-4.04 REFERENCE TO STANDARDS AND PUBLICATIONS: Any reference made in these minimum standards to any specifications, standard methods or publications of any scientific or technical society or other organization shall be understood to refer to the specification, standard, method or publication, in effect as of the date the work is approved.

201-4.05 SPECIFICATION REFERENCES: The following standards of materials and construction for installation of water mains and water systems in the County are included by reference:

a. Specifications of the "American Water Works Association" (AWWA).


c. Specifications of the "American Petroleum Institute" (API).

d. Specifications of the "American Society of Mechanical Engineers" (ASME).

201-4.06 CERTIFICATE: The supplier shall furnish a certificate if requested by the Engineer, stating that all pipe, valves, fittings, protective coatings and all other materials comply with the specifications in these standards.

CHAPTER II. WATER SUPPLY REQUIREMENTS

Sec. 202-1 General

The developer shall form a service entity or furnish a certificate from the water purveyor stating that they can and will perform the function of providing and maintaining the water supply, mains, valves, hydrants, and fire flows.
All facilities of the water system shall be designed and constructed to provide adequate size and capacity from the source facilities and storage to meet the flow requirements. All distribution systems shall be designed to permit circulation of water flows throughout, except where impractical because of cul-de-sac and like conditions.

Sec. 202-2  Number of Customers (See Water Supply Requirement Chart, Plate W-5)
The total number of customers shall be determined in accordance with this section.

202-2.01  Residential Areas: Each single family home or lot will be counted as one (1) customer. Each dwelling unit of an apartment, duplex, or triplex building will be counted as one-half (½) customer.

202-2.02  Commercial and Industrial Areas: Each acre (including storage and parking area) will be counted as a minimum five (5) customers.

202-2.03  Parks and Landscaped Areas: Each acre of land will be counted as two (2) customers, except where specific design indicates otherwise.

202-2.04  Mobile Home Parks: Each mobile home or mobile home space will be counted a one-half (½) customer.

Sec. 202-3  Required Residential Supply - General

All water systems shall be designed with minimum source and storage capacities as required in this section and as may be required by the California Building Standards Code.

202-3.01  Plate W-5 "Water Supply Requirements Chart," shall be used in computing the peak hourly residential flow. The top of the appropriate band shall be used in computing the peak hourly residential.

202-3.02  The peak hourly residential flow or the sum of the required fire flow plus one-half (½) of the peak hourly residential flow, whichever is greater, shall be maintained for the period of time shown in Section 205-3. With the most critical well or pump inoperative, a minimum of 2/3 of the above flow shall be maintained for the time specified. This requirement may be met by drawing from both well pumping and storage.

202-3.03  The maximum daily residential flow shall be equal to one-half (½) of the peak hourly residential flow and shall be maintained for a period of three days. This requirement may be met from a combined source of wells and storage.

202-3.04  The average daily residential flow for the maximum month shall be equal to one-third (1/3) of the peak hourly residential flow and shall be maintained continuously from the well pumping only.
CHAPTER III. WATER PIPE

Sec. 203-1 Pipe Pressure

Water distribution systems shall be designed to maintain normal operating pressures of not less than 25 PSIG at the service connection, except that during periods of fire flow plus one-half (½) of the peak hourly residential flow as defined in Section 202-3.02, the pressure may be reduced to not less than 20 PSIG. During periods of hourly minimum demand or no flow, the water system pressure may not be more than 150 PSIG. Variations in pressures under normal operations shall not exceed 50% of the average operating pressure. Computations shall be submitted to demonstrate that these maximum and minimum pressures will be met. Class 150 pipe shall be the minimum pressure pipe used.

Sec. 203-2 Pipe Diameter

All diameters shall be full nominal inside diameters; the actual diameters may not be less than the nominal by more than 5.0% when measured approximately three (3) inches from the ends of the pipe. Water main minimum nominal diameter shall be six (6) inches. A variance may be granted by the Director to allow a reduction to four (4) inches minimum nominal diameter for water mains.

203-3 Poly Vinyl Chloride Pipe (PVC)

203-3.01 General

All pipe and fittings shall conform to the following:

a. Pipe and fittings shall conform to AWWA-C-900 Class 150, DR 18, and ASTM-D-3139.

b. Pipe fittings and couplings made from PVC shall have a minimum cell classification of 12454B or 12454C as defined by ASTM-D-1784.

c. Each length of pipe shall be marked with the applicable ASTM, DR, cell classification, nominal pipe size and manufacturer's name or trade mark.

d. A certificate of compliance from the pipe manufacturer shall be provided for each type of material used.

e. PVC pipe shall not deviate from straight by more than 1/16th inch per foot (camber) when the maximum offset is measured from the concave side of the pipe.
Double strap saddles shall be used for service taps.

PVC pipe shall be of the bell and spigot type. Bells shall be factory attached to the pipe. Couplings may be used as allowed by the Engineer.

203-3.02 Storage and Handling of PVC Pipe

PVC pipe shall be stored on a smooth bed. The pipe shall not be dropped or dragged. Stored pipe shall be covered to protect it from ultraviolet light (sun’s rays). PVC pipe with noticeable color changes resulting from exposure to ultraviolet light shall be rejected by the Engineer.

203-3.03 Bedding

Embedment materials (Class I, II, and III) shall conform to, Paragraphs 6.1.1, 6.1.2, and 6.1.3, ASTM D-2321 which reads as follows:

Class I - Angular, 1/4 to 1-1/2 inch, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, crushed gravel, and crushed shells.

Class II - Coarse sands and gravels with maximum particle size of 1-1/2 inch, including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class.

Class III - Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil Types GM, GC, SM, and SC are included in this class.

Soil classification is in conformance with Unified Soil Classification System ASTM Designation D-2487 and D-2488. Native soils meeting the requirements for Class II and Class III materials may be accepted by the Engineer.

Bedding procedure shall conform to Paragraphs 8.1.1, 8.1.2, and 8.1.3 of ASTM-D-2321 and the following:

a. Bedding shall be placed and compacted for all main lines as shown on Plate W-4.
b. After placement and compaction of bedding and prior to installation of water main and laterals, the Engineer shall inspect the bedding placement and compaction.

203-3.04 Installation of Pipe, Fittings, and Haunching

PVC pipe exposed to the sun during summer months shall be allowed to cool prior to connection to manholes or placement of haunching. Allowance shall be made for the movement of pipe along the main line and at the laterals. Fittings shall be sized to receive type of pipe used. Installation of fittings shall be in accordance with manufacturers instruction manuals.

Pipe installation and haunching shall conform to Paragraphs 9.1.1, 9.1.2, and 9.1.3 of ASTM-D-2321, AWWA Standards and the following:

a. After cooling of the PVC pipe, haunching shall be placed and compacted for all main lines as shown on plate W-4.

b. Materials used for haunching shall be the same class as that used for bedding.

c. Prior to placement and compaction of initial backfill, the Engineer shall inspect the placement of the water main and laterals, haunching and compaction.

d. Care shall be exercised in placing haunching material to prevent damage to or displacement of, the water pipe.

e. Initial backfill shall be placed as required to secure the pipe prior to testing in conformance with Section 203-3.07.

203-3.05 Cleaning

The completed water main shall be flushed and chlorinated in conformance with Section 208-7.

203-3.06 Testing

The completed water main and laterals shall be hydrostatically tested, after pipeline cleaning, but prior to completion of initial backfill and compaction in conformance with Section 208-6.
203-3.07 Initial Backfill

Initial backfill shall conform to Paragraphs 9.1.1, 9.1.2, and 9.1.3 of ASTM-D-2321 and the following:

a. After testing of the PVC pipe and placement and inspection of haunching, initial backfill placement shall be completed and compacted for all main lines as shown on plate W-4.

b. Materials used for initial backfill shall be the same class as that used for haunching.

c. Prior to placement and compaction of backfill, the Engineer shall inspect the initial backfill and compaction.

d. Care shall be exercised in placing initial backfill material to prevent damage to or displacement of, the water pipe.

203-3.08 Backfill

The remainder of the trench backfill shall conform with Section 19-3 of the Standard Specifications and as follows:


b. Backfill material shall be free of all rock or lumps, exceeding six (6) inches maximum dimension.

C. Compacting of backfill material shall be required for all main lines and laterals as shown on the attached plate.

CHAPTER IV. VALVES AND OTHER APPURTEANCES

Sec. 204-1 General

All main line gate valves on transmission and/or distribution mains shall be double disc gate valves or butterfly valves and shall conform to the following standards:

204-1.01 Double Disc Gate Valves shall be cast-iron body, all bronze mounted interior, non-rising stem, or for cold water service of 175 PSI working water pressure and shall be in accordance with "AWWA C500", as last revised.
204-1.02 Hub End Gate Valves provided with rubber rings shall be in accordance with "AWWA C500" or C509.

204-1.03 Bronze for interior of Gate Valves shall be Grade 1 and shall conform to current ASTM and State Standards.

204-1.04 Butterfly Valves shall be rubber seated and shall comply with "AWWA C504", class 125-16 gear operated unless otherwise authorized. Disc shall be of ni-resist alloy cast-iron and shall rotate 90 degrees between the fully open and fully closed positions. Rubber seats shall be securely held in place by nickel cast-iron or type 316 stainless steel retaining segments, and shall not require bonding or cementing to the body.

204-1.05 The butterfly valve standard is not intended to cover valves for installation where service conditions exceed the shutoff pressures and line velocities stated in Table 1 of "AWWA C504" or on lines supplying fire hydrants.

Sec. 204-2 Valve Boxes and Vaults

204-2-1 A valve box or vault or capped standpipe shall be provided for every valve installed below the grade. The cover for all valve boxes and vaults placed in the street pavement or any location where there is vehicular traffic shall be traffic rated, metallic or of reinforced concrete.

204-2-2 All valve box caps shall be marked with the word "water", or a "W", or a suitable identification of the water utility.

Sec. 204-3 Air and Vacuum Release Valves

Air and vacuum release valves shall be installed in the water system at all points where it is indicated that air pockets may form. The design shall be such as to ensure the release of air automatically from the water main. These valves may also ensure the entrance of air into the water main when the pressure inside the line is below atmospheric pressure. All valves shall be designed for a minimum of 150 PSI operating pressure. The inlet to each valve shall be provided with a gate valve or corporation stop to provide a positive closure between the main pipeline and the air and vacuum release valve. Vent outlets shall be installed above ground in such manner as to preclude back-flow.
Sec. 204-4 Check Valves

All check valves shall seat readily and completely to assure water tightness. The face of the closure element and valve seat shall be bronze, composition, or other non-corrodible material which will seat tightly under all prevailing conditions of field use. All check valves four (4) inch and larger in size, for use on distribution mains, shall be designed for a minimum of 175 PSI cold water working pressure.

Sec. 204-5 Flushouts (Blowoffs)

All flushouts (blowoffs) shall be a minimum outlet size of 2" and shall be designed for a minimum operating pressure of 150 PSI. A flushout or fire hydrant shall be installed at the terminus of all dead-end water mains or non-circulating flow water mains.

CHAPTER V. FIRE PROTECTION REQUIREMENTS

Sec. 205-1 Fire Hydrants

Fire hydrants shall conform with AWWA Specification NO. C-502 or C-503 2-1/2" and 4" national standard threaded connections as required. Hydrant shall be painted rust inhibiting aluminum silver (Rust-Oleum aluminum silver #7715 or equivalent.) For details see Fire Hydrant Detail Standard Drawing, Plate W-1.

Sec. 205-2 Bury

Bury for hydrants shall conform to AWWA standard specifications C-502 or C-503, height to be sufficient to ensure 30" minimum cover. Bury to be coated with coal tar enamel or coal tar epoxy.

Sec. 205-3 Water Supplies for Fire Protection

205-3.01 The fire flow requirements shall be determined by the Fire Chief and shall be computed on the basis of a minimum 20 PSIG residual operating pressure at the point of lowest pressure of the street main from which the flow is measured. In setting the requirements for fire flow, the Fire Chief may be guided by the minimum requirements set forth in Table 1-W, but may require higher standards on the basis of local conditions, exposure, congestion, other regulations, or construction of the buildings. The required fire flows are to be provided in addition to the residential requirements required in Section 202-3.
TABLE NO. 1-W - FIRE FLOW REQUIREMENTS

<table>
<thead>
<tr>
<th>DISTRICT CLASSIFICATION</th>
<th>MINIMUM FIRE FLOW (in gpm)</th>
<th>MINIMUM DURATION (in hours)</th>
<th>MAXIMUM HYDRANT SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>500</td>
<td>1</td>
<td>660'</td>
</tr>
<tr>
<td>Includes: 1 and 2 family dwellings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial</td>
<td>1,500</td>
<td>2</td>
<td>330'</td>
</tr>
<tr>
<td>Includes: all commercial uses, hotels, apartments, multiple residence buildings, schools, and colleges</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial</td>
<td>1,500</td>
<td>4</td>
<td>330'</td>
</tr>
</tbody>
</table>

205-3.02 The water distribution system shall be provided with valves and other facilities, such as tanks, so that no point on any lot at the street right-of-way shall be more than one and one-half (1-1/2) times the maximum hydrant spacing from a working hydrant as a result of any single break or shutdown for repairs, except where impractical.

205-3.03 All water mains serving hydrants shall have a minimum nominal diameter of six inches (6"). Stub lines over 800 feet in length or supporting more than one hydrant shall have a minimum nominal diameter of eight inches (8").

205-3.04 The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be as required and approved by the Fire Chief.

205-3.05 Fire Hydrants shall be installed with a maximum spacing between hydrants as indicated in Table No. 1-W. A hydrant shall be placed at each intersection except where this would provide excessive hydrant coverage.

**Exception:** The spacing of hydrants shall have an individual tolerance of 10 percent. However, the average spacing between any three (3) adjacent hydrants shall not exceed the required spacing.

205-3.06 Fire hydrant spacing shall be computed separately for each side of major highways, divided roadways, canals, or railways.

205-3.07 The last hydrant on a cul-de-sac or stub street shall not be more than one-half the maximum spacing from the end of the street.
205-3.08 Whenever any hydrant or other valve, which is intended for use by the Fire Chief for fire suppression purposes, is installed or replaced, the same shall be installed or replaced in accordance with Plate W-1, “Fire Hydrant Detail.”

205-3.09 "Dry Barrel" type fire hydrants shall be provided at all elevations above 2,500 feet, or where freezing conditions occur.

Sec. 205-4 Fire Checks

Any connection between a building's fire sprinkler system and the water purveyor's main line shall be protected from backflow in accordance with the Fire Department, Environmental Health Services Department Standards and the water purveyors requirements.

Sec. 205-5 Fire Hydrant Barricades

Barricades shall be installed where considered necessary by the Fire Chief to protect fire hydrants. Fire hydrant barricades shall not obstruct the outlets and shall consist of 4" diameter standard steel pipe filled with concrete, extending 3' above and 3' below ground and imbedded in concrete 15" (inches) in diameter and 4" (ft.) deep. All steel pipe above ground shall be painted with a minimum of two (2) coats of primer paint and a finish coat of John Deere Yellow Paint. Fire hydrant barricades shall be installed in accordance with Plate W-6 “Guard Post Installation” at locations specified by the Fire Chief.

Sec. 205-6 Location Markers for Fire Hydrants

Blue raised retroreflective pavement markers shall be placed on a highway, street, or road to mark fire hydrant locations. They shall not be used for any other purpose.

In general, the blue raised retroreflective pavement markers:

a. Should be placed 0.5 foot from the centerline stripe, or approximate center of the pavement where there is no centerline stripe, on the side nearest the fire hydrant.

b. When placed on expressways, freeways and freeway ramps, they should be placed on the shoulder, 1.0 foot to the right of the edge line, opposite the fire hydrant. Typical marker locations are shown on Figure 3B-102((CA) CMUTCD).

c. In areas at elevations above 2,500 feet and where snow plows are used shall be recessed, as shown in the Caltrans Department of Transportation’s Standard Plan A20-D.

Because fire hydrants adjacent to freeways may be out of the right-of-way and, in many locations, out of view from the freeway, the Fire Department may require installation of small supplemental signs (S9(CA) and S10(CA) CMUTCD) or markings to indentify the
hydrant number or distance to the hydrant. These installations are optional and at the discretion of the Fire Department and Caltrans.

CHAPTER VI. PIPE FITTINGS

Sec. 206-1 Cast-Iron Fittings

206-1.01 Bell and Spigot Fittings: All cast-iron bell and spigot fittings shall conform with either "AWWA C110" (Standard, Class D, 173 PSI) or "AWWA C110" (shortbody, 3 inch to 12 inch, 250 PSI) or the long radius type, in class D, 173 PSI water working pressure.

206-1.02 Flange Fitting: All cast-iron flanged fittings shall conform to "AWWA C110."

CHAPTER VII. WATER SERVICE CONNECTIONS

Sec. 207-1 Threads

All threads for underground service line fittings and materials for these fittings, corporation and meter stops, shall comply with "AWWA C800".

Sec. 207-2 Service Pipe Size

207-2.01 Water service connections shall be adequately sized to provide 25 psi at the customer connection during peak hourly residential flow. Water service connections shall not be less than 3/4 inch nominal size.

207-2.02 In the event of double service connections for two 3/4" services, the service pipe from the main to the service connection tee shall be 1" nominal size.

207-2.03 The water service connection shall be equipped with a service valve or curb stop located two feet outside of the property, or next to the sidewalk where sidewalk is placed.

207-2.04 Where property will be served by two or more water service connections from different street water mains or supplies, each service connection shall be equipped with a single check valve to prevent cross connection flow.

Sec. 207-3 Water Service Pipe and Tubing

All the following materials shall conform either to IAPMO IS 3 "Installation Standard for Copper Plumbing Tube, Pipe and Fittings" or IAPMO 7 "Installation Standard for Polyethylene (PE) Cold Water Building Supply and Yard Piping" in the current adopted edition of the California Plumbing Code.
207-3.01 All 3/4 inch and larger water service connections may be seamless copper water tubing (ASTM B 88) or polyethylene plastic tubing (ASTM D2239, PE 3408).

207-3.02 All 1-1/2 inch and larger water service connections may also use seamless red brass pipe conforming to (ASTM B 43), or copper pipe conforming to (ASTM B 42).

207-3.03 Water services for either 1-1/2 inch or 2 inch may also use annealed coiled copper tubing.

Sec. 207-4 Corporation Stops

All corporation stops, if used, shall be bronze or brass, round, with inlet for either corporation stop (C.S.) thread or iron pipe standard (I.P.S.) thread, and outlet for the type of service pipe used in accordance with AWWA C800.

Sec. 207-5 Meter Stops

All 3/4 inch and 1 inch (curb) meter stops shall be bronze or brass, with inlet for the type of service pipe used, and outlet for the type or service pipe or meter coupling used.

For 1-1/2 inch and 2 inch service, bronze or brass curb stop valve, straight ground key curb stop, or bronze gate valve (Minimum of 200 PSI rated working pressure) may be used. Inlet and outlet shall be appropriate for the type of service pipe or meter flange used. All valves shall be factory hydro-tested to 300 PSI or air-tested to 100 PSI under water.

Sec. 207-6 Bronze Gate Valves

All 1-1/2 inch through 3 inch gate valves shall be all bronze and comply with "AWWA C500" and ASTM standards.

Sec. 207-7 Standard Service Clamps

All Service clamps and straps shall be in accordance with AWWA Standards and the pipe manufacturer's recommendations.

Sec. 207-8 Repair Service Clamp

Where no service clamp is required, and the corporation stop does not seal properly, a repair service clamp shall be used.

Sec. 207-9 Solder Joints and Fittings

The use of solder containing more than two-tenths of one percent of lead in making joints and fittings in any potable water system is prohibited.
CHAPTER VIII. WATER PIPE INSTALLATION

Sec. 208-1 Trench Excavation and Backfilling for Dedicated Streets

All pipeline trenches in streets dedicated or offered for dedication shall be excavated, backfilled, and compacted in accordance with this Division and Division I Standards for Streets, see Plate Nos. W-4, R-67 and R-68.

Sec. 208-2 Trench Excavation and Backfilling Outside of Dedicated Streets

The engineer in charge of the design and construction of the water system shall specify compaction requirements for the backfill of all waterline trenches not located in streets dedicated or offered for dedication. Prior to acceptance of the water system the developer's engineer shall certify by letter that all trenches have been backfilled in accordance with the specifications.

Sec. 208-3 Pipe Depth

All water mains shall be installed so that the top of the pipe and fittings are not less than 30 inches below finished paving of the street for water mains less than 12 inches in diameter or a minimum cover or 36 inches for mains 12 inches and larger in diameter, unless a greater depth is specified in the excavation and/or encroachment permit. All water service connections shall be installed with a minimum of 30 inch cover within the right of way.

Sec. 208-4 Material Handling

All pipe material shall be handled, laid, blocked and joined in accordance with the manufacturer's recommendations.

All open ends of all water mains being installed shall be properly covered at the end of each day's work to prevent entry of foreign matter, animals, debris, or children.

Sec. 208-5 Thrust Devices

All tees, plugs, caps, bends of more than 5 degrees, hydrant branches or pipe reducers shall be restrained against movement by use of thrust devices.

All reaction or thrust backing devices shall be designed for a minimum static pressure of 200 PSIG. All thrust devices shall be installed in accordance with design data and plans submitted to the engineer. For normal situations, installation shall be in accordance with Plate W-3, "Typical Thrust Block Details." The size and shape of the thrust device shall be designed to prevent movement of the water mains when subjected to the maximum hydrostatic test pressure. Thrust devices shall be cast-in-place concrete, metal harness, or other suitable devices. If the thrust exceeds the bearing value of the surrounding soil, the soil shall be precompacted before placing concrete. To ensure against lateral movement of the water main, valve or fitting where a change in direction of the water main is made by the use of such fittings, a metal harness of tie rods and pipe clamps may be used, except
for pipe having rubber-ring type joints. Steel tie rods and pipe clamps shall be galvanized or otherwise rust proofed or painted. All concrete used for thrust blocks shall develop an ultimate compressive strength of 2,000 PSI at 28 days.

Sec. 208-6 Testing

208-6.01 Distribution mains shall be tested to a minimum hydrostatic pressure of design pressure or pipe class. Class 150 pipe shall be tested to a minimum of 150 PSIG. The minimum duration of the test shall be two hours. Before applying the hydrostatic pressure, all entrapped air shall be thoroughly bled off. For all types of water mains, there shall be no visible leakage at any joint or section of pipe and the allowable leakage for the total lengths of all water mains under test shall not exceed that amount specified in "AWWA C600" or "AWWA M23" as appropriate.

208-6.02 All tests shall be made in the presence of the Engineer. Backfill over joints, valves or fittings shall not exceed the initial backfill until they have been inspected, tested, and approved by the Engineer.

208-6.03 When it is necessary to cover the ditch as soon as the water main is laid, the authorized representative of the Engineer may permit the backfilling to be completed prior to testing and disinfecting. If the pipe then tested exceeds the allowable leakage, the pipe must be uncovered, repaired, and tested until it meets the allowable leakage.

Sec. 208-7 Disinfecting

All new or repaired water mains, pumps, tanks, wells, and other facilities before being placed in service, shall be completely disinfected in accordance with "Procedures for Disinfecting Water Mains, AWWA C601" and any additional requirements, as required by the State Department of Health Services or the Kern County Environmental Health Services Department. Water used for testing shall be potable and contain a minimum residual chlorine content of 50 ppm after a time period of 24 hours, after which the water mains and/or waterworks shall be thoroughly drained and flushed. Before being placed in service, a bacteriological test of the system shall be performed in compliance with the requirements of the appropriate health agency.

CHAPTER IX. STORAGE FACILITIES

Sec. 209-1 Design

All steel tanks, standpipes, reservoirs and elevated tanks for water storage shall comply with "AWWA D100 Standard for Welded Steel Tanks for Water Storage" or "AWWA D103 Standard for Factory Coated Bolted Steel Tanks for Water Storage," and also meet all foundation and seismic requirements of the Building Code.
All pressure (hydromatic) tanks containing more than 1000 U.S. gallons shall conform to the ASME Code for pressure storage and vessels.

Sec. 209-2 Repairing and Painting

All inspection, repairing, painting and repainting of steel tanks, standpipes, reservoirs, and elevated tanks for water storage shall comply with "AWWA D102."

CHAPTER X. VERTICAL TURBINE PUMPS

Sec. 210-1 General

All vertical turbine pumps shall comply with "AWWA E-101".

CHAPTER XI. TESTS

Sec. 211-1 General

211-1.01 All tests to determine compliance with any of these specifications shall be made within the Continental United States.

211-1.02 If requested by the Engineer, the test results shall be certified by an established reputable materials testing firm and a copy forwarded to the Engineer.

211.1.03 Any materials delivered to the job site and suspected of damage due to shipping or handling, if requested by the Engineer, shall be tested again and the test results certified by an approved materials testing firm.
**CONDITION NO. 1**

When sidewalk is away from curb or sidewalk occupies all of parkway.

**CONDITION NO. 2**

Sidewalk next to curb or future sidewalk.

**NOTE:** For pressures over 70#, concrete pad & steel straps are required. (Typical all conditions.)

Water main may be in street or parkway for either condition.

Leave drain on dry barrel hydrants free of concrete and provide min. 1 cu. ft. of gravel backfill around drain hole. Below 2500' elev. drain may be plugged and gravel deleted.

* See plate R-69 for concrete pad details.
CONCRETE THRUST BLOCK

MAXIMUM
3' = 3" FOR 6" PIPE
6' - 6" FOR 8" PIPE
OR LARGER

8" THICK CONC. PAD
SEE PLATE R-69
(TYPICAL ALL VALVES)

NOTE:
VALVE SHALL BE LOCATED AS INDICATED UNLESS
THEY WILL OCCUR UNDER A CONCRETE CROSS
GUTTER OR UNLESS OTHERWISE SPECIFIED BY THE
WATER PURVEYOR AND APPROVED BY THE DIRECTOR.

CONCRETE PADS TO BE 16" LARGER THAN VALVE COVER,
24" SQ. MIN.

NOT TO SCALE
NOTES:
ALL THRUST BLOCKS TO BE POURED AGAINST UNDISTURBED SOIL. CONCRETE SHALL BE PLACED BEHIND BELLS OF FITTINGS.

BEARING AREAS SHOWN IN TABLE ARE BASED ON ALLOWABLE SOIL PRESSURE OF 1500 P.S.F.
KEEP CONCRETE AWAY FROM BELLS.
SEE BACKFILL REQUIREMENTS
STREET STANDARDS
PER PLATE R—67/R—68

CLASS 1, 2, OR 3 MATERIAL
PER ASTM—D—2327
90% COMPACTION OF CAL—216

EXCAVATE FOR BELL

BELL O. D. + 16" MAX.
BELL O. D. + 10" MIN.

INITIAL BACKFILL
TO 12" OVER TOP OF PIPE
HAUNCHING
BEDDING
6" MIN.

FOUNDATION FOR UNSUITABLE MATERIAL
6" MIN. IF REQUIRED

PVC PIPE
TRENCH SECTION
IN PAVED AREAS

PLATE NO.
W—4
HYDRANT

PLAN

FILLED WITH CONCRETE

SECTION

CONCRETE ENCASEMENT

NOTES

4" DIA. PIPE, SCHEDULE 40
6' IN LENGTH WITH 3' OF
PIPE ABOVE GROUND.

GUARD POSTS SHALL BE
INSTALLED WHERE CONSIDERED
NECESSARY BY THE FIRE CHIEF.
DIVISION THREE

STANDARDS FOR SANITARY SEWERS

CHAPTER I. GENERAL

Sec. 301-1 Scope

This division establishes the minimum acceptable standards of design, materials and methods to be used in providing sanitary sewer systems for developments in the County of Kern. Where the sewer system being designed is to be installed within a district which has adopted standards for sewers, the more restrictive of that district’s standards and the standards contained herein shall apply. Minor deviations from these standards may be permitted where warranted in the opinion of the Director, with the concurrence of the district Engineer for the district or entity.

Sec. 301-2 General

301-2.01 The design data and calculations, and the construction plans for proposed development sewers are to be submitted by the developer’s engineer to the Director, for review and approval prior to construction. This is in addition to the approval of any applicable district.

301-2.02 The requirement for review by, and approval of, the Director for sewer plans may be waived when all of the following conditions exist:

a. The facilities are to be accepted and maintained by an established Public Utility District, Mutual Water Company, Home Owner Association or other approved entity.

b. The company or district has adopted standards which the Director has found to be equivalent to, or more restrictive than, the County’s adopted Development Standards.

c. The plans are prepared by the developer’s engineer and approved by the company’s or district’s engineer or prepared by the company’s or district’s engineer and approved by the developer’s engineer.

d. The company’s or district’s engineer is independent of the developer and the developer’s engineer.
e. The company's or district's engineer, by certificate, shall state that the plans meet or exceed the minimum Kern County Development Standards.

g. The district or company has received written approval from the Director for waiver of the requirement of County review and approval of the plans.

CHAPTER II. DESIGN STANDARDS

Sec. 302-1 Sanitary Sewers Design Criteria

The following guidelines shall be used to compute contributing sewage:

302-1.01 The average family unit shall be two and eight tenths (2.8) persons per residential dwelling unit or its equivalent, and two and twenty four hundredths (2.24) persons per multi-family residential unit.

302-1.02 The average discharge of domestic sewage shall be one hundred (100) gallons per day per person. In the absence of any specific information to the contrary, the design peak discharge shall be estimated as follows:

\[
\text{Peak Factor} = 1.8 \times (\text{Average Discharge})
\]

302-1.03 Infiltration allowances will be in addition to the above.

302-1.04 In the absence of any specific information to the contrary, the peak design discharge for commercial and industrial sewage shall be:

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Peak Discharge Rate</th>
<th>Peak Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>0.010 CFS/GA (6,460 GPD/GA)</td>
<td>1.8</td>
</tr>
<tr>
<td>Industrial</td>
<td>0.015 CFS/GA (9,695 GPD/GA)</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Flow rates may be obtained from approved references or other acceptable source.

302-1.05 Depth of flow in main and trunk sewers: Main sewers up to fifteen (15) inches inside diameter shall be designed to flow not more than seven-tenths (0.7) full; Trunk or main sewers over fifteen (15) inches inside diameter may be designed to flow full.  

**Note:** Under no condition is a gravity sewer ever to be designed to flow under a head.
Sec. 302-2  

**Sewer Velocity and Quantities**

**302-2.01** Minimum design velocity for any sanitary sewer shall be two (2) feet per second, for pipes flowing full or half full, or with the approval of the Director, one and six tenths (1.6) feet per second. Acceptable criteria for allowing 1.6 feet per second would be as follows: Pipes designed for 1.6 feet per second velocity at peak shall flow at least 40% full for computed average flows. Without considering the above, the following pipe slopes may be used:

<table>
<thead>
<tr>
<th>Pipe Diameter</th>
<th>Minimum Slope - (ft/100 ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=0.011</td>
</tr>
<tr>
<td>4&quot; Laterals</td>
<td>1.00</td>
</tr>
<tr>
<td>6&quot;</td>
<td>0.38</td>
</tr>
<tr>
<td>8&quot;</td>
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<tr>
<td>10&quot;</td>
<td>0.20</td>
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<tr>
<td>12&quot;</td>
<td>0.15</td>
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<td>15&quot;</td>
<td>0.13</td>
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<tr>
<td>18&quot;</td>
<td>0.11</td>
</tr>
<tr>
<td>21&quot;</td>
<td>0.09</td>
</tr>
<tr>
<td>24&quot; greater</td>
<td>0.08</td>
</tr>
</tbody>
</table>

**302-2.02** Unless special provisions approved by the Director have been provided, design velocities for sanitary sewers shall not exceed 10 feet per second. Velocities are to be computed using Manning's formula with a constant "n" value for pipes half full or full as follows:

- PVC Pipe       "n" = 0.011
- Other Pipe     "n" = 0.013

Sec. 302-3  

**Maximum Discharge**

The maximum design discharge shall not exceed the flow at critical slope and velocity. Sanitary sewers shall not be designed for flow conditions at critical slope and velocity.

Sec. 302-4  

**Manholes**

**302-4.01** Manholes shall be placed at the intersections of all six (6) inch and larger sewer lines.

**302-4.02** Manholes shall be placed at all changes of alignment, either vertical or horizontal.

**302-4.03** The maximum distance between manholes shall be 400 feet, except for mains 15 inches in diameter or larger, the maximum distance may
be increased to 600 feet. Minor exceptions may be approved by the Director. In areas where the slope of the sewer line exceeds 1%, the maximum distance between manholes shall be reduced to 350 feet.

302-4.04 A one tenth (0.1) foot energy drop shall be allowed for flow through manholes with a deflection of 45° or more.

302-4.05 Invert elevations of varying size pipes leading into and out of manholes shall be set by matching elevations of the pipe soffits.

302-4.06 Building drains or house laterals which terminate in a manhole shall be elevated a minimum of six (6) inches and a maximum of 12 inches above the flowline of the manhole.

302-4.07 Manholes shall be placed only in locations that provide ready access to the sewer for maintenance and emergency service.

302-4.08 All manholes shall be as shown on standard drawing STANDARD PRECAST MANHOLE, Plate S-5. Manholes shall be constructed to grade. Precast reinforced concrete manhole risers and tops shall conform to ASTM Designations C-478 with openings over outgoing sewer. Precast tops shall be eccentric cone type. All cement used in the construction of concrete manholes shall be Type II and conform to ASTM Designation C-150. Manholes outside of paved areas shall be constructed to prevent drainage water from entering manhole. Approved water stops are required for all PVC sewer lines entering any manholes.

302-4.09 Frame and cover shall be as shown on standard drawing CAST IRON MANHOLE FRAME AND COVER, Plate S-6. They shall be interchangeable with Alhambra Foundry Model A-1270 and conform to ASTM A 48-83 Class 35B gray cast iron with minimum strength 35,000 psi for H20-44 highway loading.

Sec. 302-5 Joints

All joints in the precast concrete sections, except adjusting rings, shall be set in an elastomeric sealant.

Sec. 302-6 Drop Manholes

Whenever the vertical distance between the inverts of sewer line connection and a manhole exceeds 18 inches, a Standard Drop Manhole, Plate S-3 or S-4 shall be constructed. Drop Manholes shall be permitted only for compelling reasons.
Sec. 302-7 Rodding and Flushing Inlets

Standard rodding and flushing inlets may be allowed at the terminal end of sewer segments constructed for later extension, such as at the edge of a subdivision, except where the sewer segment exceeds 200 feet in length, in which case a standard manhole shall be constructed. See Plate S-7 and S-8.

Sec. 302-8 Polypropylene Coated Manhole Steps

Manhole Steps shall be M.A. Industries Model PS-2PF or approved equal Polypropylene Coated Manhole Step.

Sec. 302-9 Sewer Main Location, Alignment, Cover and Size

302-9.01 Location

All sanitary sewers and appurtenant structures shall be a minimum of five (5) feet from the roadway center line. In no case shall a sanitary sewer line be located closer than five (5) feet from an existing or proposed gutter lip. Sanitary sewers shall be centered on travel lanes to the greatest extent possible. In unstable soil, the minimum distances may be increased by the Engineer. Minor exceptions may be approved by the Director.

The entire sanitary system shall be located as mentioned above and shall be designed to clear all other existing or proposed utilities by a minimum of six (6) inches. Clearances with water lines shall conform to Chapter V of this Division.

Location of sewer mains in easements shall be subject to the approval of the Director. Sewer mains in easements shall be kept to a minimum.

Where sewer mains are located within easements, the easements shall be:

a. Granted with final map, or

b. Be granted to the entity accepting and maintaining the sewers, or

c. Be dedicated to and accepted by Kern County.

d. The minimum width of any easement for sanitary sewer purpose shall be ten (10) feet. In special cases of
terrain, depth of sewer line, access, etc. the required easement width shall be increased based on 1:1 cut slope plus three (3) feet for pipe zone. Width of easement to be approved by Director.

e. All easements shall include right of ingress and egress over adjoining property for maintenance, replacement and operation. No permanent structures shall be constructed in such easements, except fences, and except utilities which are the subject of an overlapping easement. Vehicular access shall be provided to all manholes except as specifically exempted by the Director.

302-9.02 Alignment

Whenever possible, sewer lines shall be laid out in a straight line between structures. Curved sewer lines will be allowed under the following conditions:

a. All curve data shall be shown on the plans.

b. Minimum radius of curvature and joint deflections shall be as recommended by the pipe manufacturer and approved by the Director. Alignment shall be concentric to street or easement centerline.

c. All deflections shall be at the pipe joints or by specially mitered pipe sections. Actual bending of the pipe itself will not be allowed.

d. Manholes shall be constructed at the B.C. and E.C. of all curves.

e. Any non-metallic sewer line constructed on a horizontal curve shall have a No. 10 bare soft copper detector wire placed over the pipe line prior to backfilling. The detector wire shall be brought up to the manhole frames at each end of the curved pipeline.

f. Identification tape, designed for use on sewers, shall be placed one foot above on top of the sewer main along its entire length. Identification tape shall also be placed on the top of sewer laterals extending from one foot above the sewer main to the right of way line.
302-9.03 
Cover

Minimum cover for any sewer main shall be four (4) feet within the street section, and three (3) feet in sewer easements, and over sewer laterals within the street section. Any deviation from this cover shall require special design and approval by the Director.

302-9.04 
Size

Minimum line size for any sewer main shall be eight (8) inches in diameter. For sewer mains of 150 feet or less which cannot be extended, (e.g. cul-de-sacs) sewers shall not be less than six (6) inches in diameter or as approved by Director.

Sec. 302-10 
Building Sewers

302-10.01 Minimum size of any sanitary building sewer within road right of way and/or dedicated easement to serve individual residences, commercial structures, etc. shall be four (4) inches. Actual size of building sewers larger than four (4) inches shall be determined by fixture unit requirements as per the current edition of the California Plumbing Code.

302-10.02 Quantity: A separate building sewer lateral shall be provided to each lot, parcel or building. Subdivision of land into large parcels subject to potential future re-subdivision or multiple building sites may require additional laterals or increased lateral size.

Sec. 302-11 
Special Equipment and Structures

302-11.01 All special equipment such as package treatment plants, their appurtenances, and their effluent disposal areas and methods shall be designed, located, and constructed so as to preclude contamination, pollution, nuisance, and structural and mechanical instability. Proposals and plans for package treatment systems and disposal facilities shall be subject to the review and approval of: (1) the Regional Water Quality Control Board (RWQCB) for design, contamination elements of pollution and nuisance aspects. Upon approval, waste discharge requirements will be issued by said RWQCB. (2) the Engineering, Surveying & Permit Services Department for structural and mechanical integrity. Special structures, such as pump stations, pressure lines and sags, etc. shall be subject to the approval of the Engineering, Surveying & Permit Services Department and the maintaining District.
302-11.02 Plans for individual septic tank systems shall be subject to the review and approval of the County Environmental Health Services Department and by the County Building Inspection Division. Reclaimed water usage shall be subject to the review and approval of the State Department of Health Services.

302-11.03 Sewer Pumping Stations: Sewer lift stations shall be designed to lift the design peak flow as determined using the criteria in section 302-1 of this manual. The lift station shall be equipped with two pumps, each capable of discharging the peak flow. Multiple pump stations may be considered where dual pump stations are infeasible, subject to the approval of the Director and/or the maintaining District. Said facilities shall be capable of discharging the peak flow with any one pump out of service. Final design is subject to the approval of the Director and/or maintaining District.

CHAPTER III. FINAL ACCEPTANCE

Sec. 303-1 Cleaning

Prior to the acceptance of any sewer line by the County, the contractor shall clean all lines with a Wayne-type sewer cleaning ball under hydrostatic pressure. Any stoppage, dirt or foreign matter shall be removed from the lines and not be washed into the public sewer system. All cleaning and testing of sewer lines shall take place after all construction work is completed, up to but not including, the final paving. The system will be inspected after final paving is completed and any damage to the system during final paving and cleanup will be corrected before approval.

Sec. 303-2 Air Testing

Prior to final approval, all sewer lines shall be tested for leakage by low pressure air test. The method of test shall follow the procedures and methods as recommended by Uni-bell PVC Pipe Association's publication UNI-B-6-90, "Recommended Practice for Low Pressure Air Testing of Installed Sewer Pipe." Building drains which are not within the right of way shall be tested in accordance with the low pressure air testing procedures specified within the California Plumbing Code.

Sec. 303-3 Mandrell Testing PVC, ABS, and PVC Truss

The sewer mains shall be mandrelled to test for excessive deflection.

Deflections in the installed sewer pipe shall not reduce the base inside diameter, as listed by the manufacturer, by more than 5% no less than thirty (30) days after backfill and compaction. After the time period, the Contractor, at his expense, shall hand-pull a mandrell, approved by the Engineer, through the installed pipe to demonstrate that
deflections have not reduced the inside diameter below tolerance. If the mandrell fails to pass freely, the pipe shall be deemed to be over-deflected. Over-deflected pipe shall be uncovered, any damaged pipe replaced and the pipe again backfilled, compacted and tested at the Contractor's expense.

The Engineer may waive the thirty (30) day time period if the initial deflection, after backfill and compaction, reduces the manufacturer's listed base inside diameter less than 3.5%. Testing procedures for this requirement are the same as previously described. In the case of a non-passing test the Contractor, at his option, may replace over-deflected pipe as described in this section or revert to the requirements previously described for maximum 5% deflection.

The mandrell used to test for excessive deflection shall be rigid and non-adjustable, have an odd number of vanes (nine minimum) and have an effective length of not less than its nominal diameter. Before use, the mandrell shall be passed through a go/nogo ring provided by the Contractor and approved for use by the Engineer. At the option of the County, the Engineer may choose to provide the mandrell and go/nogo ring for use by the Contractor.

CHAPTER IV. MATERIALS AND INSTALLATION

Sec. 304-1 General

All material that is to become a permanent part of any sanitary sewer or appurtenant structure, shall conform to the requirements for the particular material as set forth in these specifications. The contractor shall supply any and all certificates of compliance, certified tests results or shall perform tests as required to assure the Engineer that the material being incorporated into the work has met the requirements as specified. Requests to use materials not listed in these standards shall require special consideration and approval of the Director.

Sec. 304-2 Pipe and Conduits

All pipe or conduits shall be of the size, material and strength as shown on the plans. All pipe and fittings shall be marked or stamped with the trade brand name of the manufacturer, and strength or class of pipe. All pipe shall be designed to withstand all internal or external loads applied. Supporting strength of conduits as installed to safely carry imposed gravity loads and superimposed loads (including a suitable factor of safety) shall be determined by use of Marston formula as per Chapter 9 (Structural Requirements) ASCE Manual of Engineering Practices No. 60 (Copy on file with Director). All pipe or conduits shall be of the same material between structures.
Sec. 304-3  Vitrified Clay Pipe (VCP)

Vitrified Clay Pipe (VCP) and fittings shall be new, first quality pipe and shall comply with the specifications for Extra Strength Unglazed Clay Pipe ASTM Designation: C-700. Joints for bell and spigot VCP shall conform to ASTM Designation: C-425. Installation of VCP shall comply with ATSM Designation: C-12. The only allowable variations from the above recommended practices will be as definitely specified in other sections of these standards.

a. Materials: The pipe and fittings shall be extra strength vitrified clay conforming to current ASTM designation C-700, and shall be installed in conformance with the provisions of section 71 of the standard specifications of the State of California, Department of Transportation, current edition and the current ASTM designation C-12.

b. Joints:
(1) Joints for bell and spigot VCP shall conform to ASTM Designation: C-425. The pipe and fittings shall have a socket end and a spigot end with compression joints conforming with the current ASTM designation C-425.
(2) The pipe and fitting for 6", 8", 10" and 12" sanitary sewer mains may be plain-end with compression couplings conforming with the current ASTM designation C-425, excepting that a stainless steel shear ring as manufactured by Mission Clay Products Corporation for their “Mainline” band seal compression coupling, or approved equal, shall be required.
(3) The pipe and fittings for private sanitary house sewer or building laterals may be plain-end with compression or coupling conforming with the current ASTM designation C425, (stainless steel shear rings are not required.

The only allowable variations from the above recommended practices will be as definitely specified in other sections of these standards.

The use of VCP shall be at the discretion of the District.

Sec. 304-4  Intentionally left blank

Sec. 304-5  PVC, ABS, and PVC Truss Pipes

P.W. Pipe Twin Seal or J-M Ring Tite PVC or Armco ABS or PVC Truss pipe sewer installations. Except for procedures involving the use of the above pipes as detailed herein, the requirements of Section 71 of the Standard Specifications and the required Mandrell Test and Air Pressure Test upon completion of compaction of the trench backfill and subgrade grading plane are applicable. ASTM specifications referred to herein shall be the latest edition thereof.
304-5.01 P.V.C. Sewer Pipe shall conform to the following:

a. Pipe shall conform to ASTM-D-3034 in accordance with SDR-35 (1.4.2.3 D2680 and D2751) requirements.

1. Pipe and fittings shall be homogeneous throughout and free from cracks, holes, foreign inclusions or other defects. Fitting shall be injection molded and shall be installed in line on new pipelines; cut-in fittings are not permitted.

2. Joints: Use only elastomeric gasket joints. The assembly of joints shall be in accordance with the manufacturer’s recommendation. Where PVC pipe connects to VCP, use couplings approved by the County and District.

3. Joints: Use only solvent welded joints. The assembly of joints shall be in accordance with the manufacturer’s recommendations. Where ABS pipe connects to VCP, use couplings approved by the County and District.

b. Pipe and fittings shall be made from PVC having a minimum cell classification of 12454-B, 12454-C or 13364-B, as defined by ASTM-D-1784.

c. Pipe stiffness shall be 46 psi minimum when measured in accordance with ASTM-D-2412.

d. P.V.C. compound used shall not contain filler material in excess of 10 pph.

304-5.02 Parallel Rib Sewer Pipe shall conform to the following;
(Only approved for use by limited districts in the County)

a. Pipe shall conform to ASTM-F-949 for 4", 6", or 8" diameter pipe.

b. Pipe and fittings shall be made from PVC having a minimum cell classifications of 12454B or 12454C as defined by ASTM-D-1784.

c. Pipe stiffness shall be 50 psi minimum when measured in accordance with ASTM-D-2412.
d. The PVC compound used for ASTM-F-949 pipe manufacture shall not contain filler material in excess of 5 pph.

304-5.03 ABS or PVC Truss Pipe shall conform to the following:
(Only approved for use by limited districts in the County)

a. Pipe shall conform to ASTM-D02680 in accordance with SDR-23.5 requirements.

b. Pipe shall be made from ABS or PVC having a minimum cell classification of 12454-B or 12454-C, as defined by ASTM D-1784 or classification of 2-2-3 as defined by ASTMD-1788.

c. Pipe, glue and fittings shall conform to ASTM designations D-3189, and F-402, D-1084, D-2234, and D-1788.

d. Fittings shall be made from PVC having a minimum cell classification of 12454B, 12454C or 13343C as defined by ASTM-D-1784.

e. Each length of pipe shall be marked with the applicable ASTM, SDR (if applicable), cell classification, nominal pipe size and manufacturers name or trademark.

f. A certificate of compliance from the pipe manufacturer shall be provided for each type of material used.

304-5.04 PVC Pipe and Fittings

All PVC pipe and fittings shall conform to the following:

a. Each length of pipe shall be marked with the applicable ASTM, SDR (if applicable), cell classification, nominal pipe size and manufacturers name or trademark.

b. A certificate of compliance from the pipe manufacturer shall be provided for each type of material used.

c. PVC pipe shall not deviate from straight by more than 1/16th inch per foot (camber) when the maximum offset is measured from the concave side of the pipe. ABS or PVC pipe shall be of the bell and spigot type. Bells shall be factory attached to the pipe. Wyes or tees for house service connections shall be complete fittings. Saddle type fittings shall not be allowed. Field solvent welded joints shall not be allowed.
304-5.05 Storage and Handling of PVC, ABS, and PVC Truss Pipes.
Pipes shall be stored on a smooth bed. The pipe shall not be
dropped or dragged. Stored pipe shall be covered to protect it from
ultraviolet light (sun's rays). Pipe with noticeable color changes
resulting from exposure to ultraviolet light shall be rejected by the
Engineer.

304-5.06 Bedding for PVC ABS, and PVC Truss Pipes

Embedment materials (Class I, II and III) shall conform to Paragraphs
6.1.1, 6.1.2 and 6.1.3, ASTM D-2321 which reads as follows:

a. Class I - Angular, 1/4 to 1-1/2 in. graded stone,
   including a number of fill materials that have regional
   significance such as coral, slag, cinders, crushed stone,
   crushed gravel, and crushed shells.

b. Class II - Coarse sands and gravels with maximum
   particle size of 1-1/2 in., including variously graded
   sands and gravels containing small percentages of
   fines, generally granular and non-cohesive, either wet
   or dry. Soil types GW, GP, SW, and SP are included in
   this class.

c. Class III - Fine sand and clayey gravels, including fine
   sands, sand-clay mixtures, and gravel-clay mixtures.
   Soil types GM, GC, SM and SC are included in this
   class.

d. Soil classification is in conformance with Unified Soil
   Classification System ASTM Designation D-2487 and
   D-2488. Native soils meeting the requirements for
   Class II and Class III materials may be accepted by the
   Engineer.

e. Bedding procedure shall conform to Paragraphs 8.1.1,
   8.1.2, and 8.1.3 of ASTM-D02321 and the following:

1. Bedding shall be placed and compacted for all
   main lines and building sewer laterals as shown
   on plate S-1.

2. After placement and compaction of bedding and
   prior to installation of sewer main and laterals the
   Engineer shall inspect the bedding placement
   and compaction.
3. Flooding or jetting of bedding will not be allowed.

304-5.07 Installation of Pipe, Fittings and Haunching PVC, ABS, and PVC Truss Pipes

a. Pipe exposed to the sun during summer months shall be allowed to cool prior to connection to manholes or placement of haunching. Allowance shall be made for the movement of pipe along the main line and at the building sewer laterals. Fittings shall be sized to receive type of pipe used. Installation of fittings shall be in accordance with manufacturer's instruction manuals. Plugs shall be placed at the termination of the building sewer laterals and main line (if required).

b. A flexible coupling, Fernco Series #1056 or Mission Rubber Band Seal or a flexible joint, shall be installed within three feet of each sewer manhole. Where bands are tied to secure flexible couplings, the bands, housing, and screw shall be stainless steel.

c. Pipe installation and haunching shall conform to Paragraphs 9.1.1, 9.1.2 and 9.1.3 of ASTM-D-2321 and the following:

1. The pipe shall be laid true to grade with 0.03' maximum tolerance, per joint.

2. After cooling of the pipe, haunching shall be placed and compacted for all main lines and building sewer laterals as shown on Plate S-1.

3. Materials used for haunching shall be the same class as that used for bedding.

4. Prior to placement and compaction of initial backfill, the Engineer shall inspect the placement of sewer main and house building sewers, haunching and compaction.

5. Care shall be exercised in placing haunching material to prevent damage to or displacement of the sewer pipe.
6. Flooding or jetting the haunching will not be allowed.

304-5.08 Initial Backfill PVC, ABS and PVC Truss Pipes

Initial backfill shall conform to Paragraphs 9.1.1, 9.1.2 and 9.1.3 of ASTM-D-2321 and the following:

a. After cooling of the pipe and placement and inspection of haunching, initial backfill shall be placed and compacted for all main lines and building sewer laterals as shown on Plate S-1.

b. Materials used for initial backfill shall be the same class as that used for haunching.

c. Prior to placement and compaction of backfill, the Engineer shall inspect the initial backfill and compaction.

d. Care shall be exercised in placing initial backfill material to prevent damage to or displacement of the sewer pipe.

e. Flooding or jetting the initial backfill will not be allowed.

304-5.09 Backfill PVC, ABS and PVC Truss Pipes

PIE ZONE MATERIAL

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<th>Rigid Pipe</th>
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<td>Flexible Pipe</td>
<td>ASTM D2321 Class I, II or III (Classes I and II allow up to 1 1/2 &quot; rock)</td>
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<td>Compaction</td>
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TRENCH WIDTH

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<tr>
<th>Pipe Size (in.)</th>
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* O.D. may vary from type and/or manufacturer of pipe.

The remainder of the trench backfill shall conform with Section 19-3 of the Standard Specifications and as follows:


b. Backfill material shall be free of all rock or lumps, exceeding six (6) inches maximum dimension.

c. Compaction of backfill material shall be required for all main lines and building sewer laterals as shown on the attached Plate S-1.

d. Flooding or jetting of the backfill will not be allowed.

304-5.10 Sewer Pipes

After pipeline cleaning, backfill and compaction of trench and subgrade grading plane compaction, the completed sewer main shall be air tested in conformance with Section 303-2 of the Kern County Development Standards.

a. Lateral and Stubs

1. All laterals shall extend to the property line and shall be 4" in diameter except as noted on plans. Surface markers for sewer laterals shall be installed at property line.
2. Wye fittings shall be in-line type and shall be used for all lateral connections and shall be rotated a minimum of 23 degrees above the horizontal plane running through the centerline of the main.

3. All sewer stubs shall be closed with a standard plastic plug solvent welded.

b. Existing Facilities: All existing improvements, (curbs, gutter, sidewalk, cross gutter, fencing, etc.), that are removed, damaged or undercut shall be repaired or replaced as directed by the County.

CHAPTER V. STANDARDS FOR SEPARATION OF WATER AND SEWER LINES

Sec. 305-1 General

This document sets forth the construction criteria for the installation of water mains and sewer lines to prevent contamination of the public water supplies from nearby sanitary sewers.

305-1.01 The "California Waterworks Standards" sets forth the minimum separation requirements for water mains and sewer lines. These Standards, contained in Section 64630, Title 22, California Administrative Code, specify:

(a) Parallel Construction: The horizontal distance between pressure water mains and sewer lines shall be at least 10 feet.

(b) Perpendicular Construction (Crossing): Pressure water mains shall be at least one foot above sanitary sewer lines where these lines must cross.

(c) Separation distances specified in (a) above shall be measured from the nearest edges of the facilities.

(d) Common Trench: Water mains and sewer lines must not be installed in the same trench.

(e) Where steel casings or tunnels are used for the passage of water and sewer lines under railroad tracks, highways or other structures, the same shall be specially designed to eliminate any hazard of contamination to the water system.
Sec. 305-2  **Exceptions to Basic Separation Standards**

Local conditions, such as available space, limited slope, existing structures, etc., may create a situation where there is NO ALTERNATIVE but to install water mains or sewer lines at a distance less than that required by the Basic Separation Standards. In such cases, alternative construction criteria as specified in Section 305-4 should be followed, subject to the special provisions in Section 305-3.

Water mains and sewers of 24 inches in diameter or greater may create special hazards because of the large volumes of flow. Therefore, installations of water mains and sewer lines 24 inches in diameter or larger should be reviewed and approved by the health agency prior to construction.

Sec. 305-3  **Special Provisions**

305-3.01 The Basic Separation Standards are applicable under normal conditions for sewage collection lines and water distribution mains. More stringent requirements may be necessary if conditions, such as, high groundwater exist.

305-3.02 Sewer lines shall not be installed within 25 feet horizontally of a low head (5 psi or less pressure) water main.

305-3.03 New water mains and sewers shall be pressure tested where the conduits are located ten feet apart or less.

305-3.04 In the installation of water mains or sewer lines, measures should be taken to prevent or minimize disturbances of the existing line. Disturbance of the supporting base of this line could eventually result in failure of this existing pipeline.

305-3.05 Special consideration shall be given to the selection of pipe materials if corrosive conditions are likely to exist. These conditions may be due to soil type and/or the nature of the fluid conveyed in the conduit, such as a septic sewage which produces corrosive hydrogen sulfide.

305-3.06 Sewer Force Mains

a. Sewer force mains shall not be installed within ten feet (horizontally) of a water main.

b. When a sewer force main must cross a water line, the crossing should be as close as practical to the perpendicular. The sewer force main should be at least one foot below the water line.
c. When a new sewer force main crosses under an existing water main, all portions of the sewer force main within ten feet (horizontally) of the water main shall be enclosed in a continuous sleeve.

d. When a new water main crosses over an existing sewer force main, the water main shall be constructed of pipe materials with a minimum rated working pressure of 200 psi or equivalent pressure rating.

e. Force mains greater than 1000 feet shall have pressure clean-outs every 600 feet.

Sec. 305-4 Alternate Criteria for Construction

The construction criteria for sewer lines or water mains where the Basic Separation Standards cannot be attained are shown on Plate Nos. S-9 and S-10. There are two situations encountered:

Case 1: New sewer line -- new or existing water main.
Case 2: New water main -- existing sewer line.

For Case 1, the alternate construction criteria apply to the sewer line.

For Case 2, the alternate construction criteria may apply to either or both the water main and sewer line.

The construction criteria should apply to the house laterals that cross ABOVE a pressure water main but not to those house laterals that cross BELOW a pressure water main.

305-4.01 Case 1: New Sewer Being Installed (Plate Nos. S-9 and S-10)

Special Construction Required for Sewer

Zone A. Sewer lines parallel to water mains shall not be permitted in this zone without approval from the responsible health agency and water supplier.

Zone B. A sewer line placed parallel to a water line shall be constructed of:

1. Extra strength vitrified clay pipe with compression joints.

2. Plastic sewer pipe with rubber ring joints (per ASTM D3034) or equivalent.
3. Cast or ductile iron pipe with compression joints.

Zone C. A sewer line crossing a water main shall be constructed of:

1. Ductile iron pipe with hot dip bituminous coating and mechanical joints.

2. A continuous section of Class 200 (DR 14 per AWWA C900) plastic pipe or equivalent, centered over the pipe being crossed.

3. Any sewer pipe within a continuous sleeve.

Zone D. A sewer line crossing a water main shall be constructed of:

1. A continuous section of ductile iron pipe with hot dip bituminous coating.

2. A continuous section of Class 200 (DR 14 PER AWWA C900) plastic pipe or equivalent centered on the pipe being crossed.

3. Any sewer pipe within a continuous sleeve.

4. Any sewer pipe separated by a ten-foot by ten-foot, four-inch-thick reinforced concrete slab.

305-4.02 Case 2: New Water Mains Being Installed (Plates S-9 & 10)

Zone A. No water mains parallel to sewers shall be constructed without approval from the health agency.

Zone B. If the sewer paralleling the water main does not meet the Case 1, Zone B, requirements, the water main shall be constructed of:

1. Ductile iron pipe with hot dip bituminous coating.

2. Dipped and wrapped one-fourth-inch thick welded steel pipe.

3. Class 200 pressure rated plastic water pipe (DR 14 per AWWA C900) or equivalent.
4. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-74 or C301-79 or C303-70).

Zone C. If the sewer crossing the water main does not meet the Case 1, Zone C, requirements, the water main shall have no joints in Zone C and be constructed of:

1. Ductile iron pipe with hot dip bituminous coating.
2. Dipped and wrapped one-fourth-inch-thick welded steel pipe.
3. Class 200 pressure rated plastic water pipe (DR 14 per AWWA C900) or equivalent.
4. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-74 or C301-79 or C303-70).

Zone D. If the sewer crossing the water main does not meet the requirements for Zone D, Case 1, the water main shall have no joints within four (4) feet from either side of the sewer and shall be constructed of:

1. Ductile iron pipe with hot dip bituminous coating.
2. Dipped and wrapped one-fourth (1/4) inch thick welded steel pipe.
3. Class 200 pressure rated plastic water pipe (Dr 14 per AWWA C900) or equivalent.
4. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-74 or C301-79 or C303-70).

Sec. 305-5 Notes and Definitions

305-5.01 HEALTH AGENCY - The Department of Health Services. For those water systems supplying fewer than 15 service connections, the local health officer may act for the Department of Health Services.

305-5.02 WATER SUPPLIER - "Person operating a public water system" or "supplier of water" means any person who owns or operates a public water system.
LOW HEAD WATER MAIN - Any water main which has a pressure of five psi or less at any time at any point in the main.

DIMENSIONS are from outside of water main to outside of sewer line or manhole.

COMPRESSION JOINT - A push-on joint that seals by means of the compression of a rubber ring or gasket between the pipe and a bell or coupling.

MECHANICAL JOINTS - Bolted joints.

RATED WORKING WATER PRESSURE OR PRESSURE CLASS - A pipe classification system based upon internal working pressure of the fluid in the pipe, type of pipe material, and the thickness of the pipe wall.

FUSED JOINT - The jointing of sections of pipe using thermal or chemical bonding processes.

SLEEVE - A protective type of steel with a wall thickness of not less than one-fourth inch into which a pipe is inserted.

GROUNDWATER - Subsurface water found in the saturation zone.

HOUSE LATERAL - A sewer connecting the building drain and the main sewer line.

CHAPTER VI STANDARDS FOR SEWER LIFT STATION

Sec. 306-1 General

Sewer Lift stations shall conform to the following minimum features and specifications:

306-1.01 Pumps shall be installed in a single wet well and shall be submersible as approved by the manufacture.

306-1.02 Pumps shall be removable from ground level through use of a guide rail and cable system attached to the wet well.

306-1.03 Sewer lift stations shall be located outside street right of way in an easement dedicated for a lift station.
306-1.04 Site shall be enclosed by fence and interior surface shall be graveled with 0.30' of ¾" gravel. Site shall have approved access.

306-1.05 Wet well shall be equipped with access frame and cover which will allow removal of pump and motor assembly.

306-1.06 Wet well shall be mechanically vented to prevent odors from reaching adjacent properties.

306-1.07 Minimum pump horsepower shall be 5hp.

306-1.08 Wet well surfaces shall be treated with a protective lining, acceptable to County, and shall be integral to all interior surfaces.

306-1.09 A portable supply shall be provided for wash down.

306-1.10 Bottom of wet well shall be sloped toward pumps to direct sludge. Pumps shall be supported on smooth and level bottom area.

306-1.11 All pipes shall be neoprene sealed at walls of wet well.

306-1.12 A wash down assembly to facilitate break-up of scum layer shall be connected to each discharge as near the top as possible. It shall consist of a 1" NPT Bronze strap service saddle with stainless steel nuts and bolts, a 1" NPT cast iron threaded nipple 8" long, and a 1" cast iron threaded 90° ell.

306-1.13 Discharge shall feed into a valve box equipped with check and gate valves for each discharge line. The box shall have a ¾" gravel bedding with a 2-inch bleed off pipe connected to the wet well. (see Detail S-13)

306-1.14 The pump number shall be painted contrasting colors on each discharge pipe in a manner clearly visible from above.

306-1.15 The motor control center shall be pedestal mounted on a concrete base in a metal or fiberglass weatherproof, rainproof and lockable enclosure.

Sec. 306-2 Lift Station Specifications

306-2.01 General
All work involved in constructing sewer pump stations shall conform to the applicable provisions of the California Department of Transportation Standard Specifications, current edition, hereinafter referred to as Standard Specifications, County Standards, the
improvement plans and these specifications.

The following specifications represent the minimum specification allowable for a duplex sewer pump station. Additional features or specifications may be needed as required by the engineer.

306.2.02 Reinforced Concrete

The work included herein shall conform to Section 51 "Concrete Structures" and Section 90 "Portland Cement Concrete" of the Standard Specifications. This work shall consist of furnishing all labor, tools, equipment and materials necessary for the installation of all structural concrete, minor concrete and mortar as shown on the plans and specified herein.

Structural Concrete:

Strength:
The minimum ultimate (28 days) compressive strength of all structural concrete shall be 3250 psi.

Concrete Mix:
All structural concrete shall be Class "1" (675 pounds of cement/cubic yards of concrete) with Type II Portland Cement. The maximum size of aggregate shall be 1 1/2 inches.

Slump:
The amount of water used for mixing (including free moisture carried by the aggregate) shall not exceed the maximum necessary to produce a 4 inch slump as determined by ASTM test method C-143.

Placing:
Concrete shall be placed in accordance with Section 51-1.05: Placing Concrete" of the Standard Specifications.

Forms:
All form work shall conform to Section 51-1.05 "Forms" of the Standard Specifications.

Defective Concrete:
Concrete not meeting the minimum strength requirement, not formed as indicated, not true to intended alignment, which has large voids or rock pockets, which has wood or other debris embedded which has a surface deviation greater than 1/8 inch in 10'-0", or does not fully conform to the specifications shall be deemed defective, and if so directed by the Engineer, shall be removed and replaced with concrete complying with the drawings and specifications.
Minor Concrete:

Concrete Mix:
All minor concrete shall be Class "1" (675 pounds of cement/cubic yards of concrete) with Type II Portland Cement. The maximum size of aggregate shall be 1 inch.

Form-work:
Earthen forms for exterior concrete surfaces shall be allowed only upon approval by the Engineer. The acceptability of the earthen forms shall be solely decided upon by the Engineer.

Mortar:
All mortar shall conform for Section 51-1 .135 "Mortar" of the Standard Specifications.

Non-Shrink Grout and Dry-pack:
Non-shrink grout shall conform to Section 50-1.09, "Bonding and Grouting" of the Standard Specifications with a required admixture using the following proportions:
Portland Cement ....... .... .... .... .... .... .... .... .... .... 1 Part by Wt.
Sand (100% Passing #8 Sieve) ....... .... .... .... .... 1 Part by Wt.
Water...... .... .... .... .... .... .... .... .... .... .... 4 1/2 -5 1/2 gal./sack cement
Sika "intraplast" N Admixture ....... .... .... 1 % by Wt. Of cement
Dry-pack shall be composed as for grout except that only enough water shall be added to wet the mixture (no free water and no slump). Dry-pack shall be tamped into place and cured as specified for concrete in this section. Contractor shall not use non-shrink grout or dry-pack that has been mixed longer than 30 minutes. No retempering shall be allowed.

Finishes on Walking Surfaces:
The contractor shall give a monolithic finish to the walking surfaces at all concrete floors and slabs within and adjacent to the structures. All concrete surfaces to be so finished shall be thoroughly worked, brought to a uniform smooth finish and given a final brush finish.

Curing:
All newly placed concrete shall be kept moist for the first seven (7) days after the concrete has been placed. This shall be achieved by one of the following methods:
1. Ponding
2. Cotton mats rugs or carpets kept continuously wet.
3. Kraft paper or plastic film with joints sealed or tapered. The perimeter of the paper shall be sprinkled once daily.
4. Curing compound method: All exposed cast in place concrete
shall be cured with white pigmented curing compound (State Spec. 8060-71D-05, Type 1) in accordance with Section 90-7 "Curing Concrete", of the Standard Specifications.

Forms may be used to cure formed portions in accordance with Section 90-701D "Forms In-Place Methods" of the Standard Specifications. If the forms are removed prior to seven (7) days after the pour, the newly exposed areas shall be cured for the remainder of the seven (7) days by one of the above methods.

306-2.03 **Metal Work**

The work included herein shall conform to Sections 52- "Reinforcement", 55- "Steel Structures" and 75 -" Miscellaneous Metal" of the Standard Specifications. This work shall consist of furnishing all labor, tools, equipment, and materials necessary for the installation of all reinforcing steel, structural steel and miscellaneous metal as shown on the plans and specified herein and as directed by the Engineer.

Reinforcing Steel:

Materials:
1. Bars shall be deformed bars conforming to ASTM A-615, as follows: Bar Size Grade #4 and smaller Grade 40, #5 and larger Grade 60
2. All reinforcing steel shall be new, clean, free from oil, dirt, loose mill scale, excessive rust, mortar, or other coatings that would destroy or reduce the bond.

Placing Reinforcement:
The bending and placing of all reinforcement shall conform to the "Manual of Standard Practice" of the American Concrete Institute. Bends shall be made around a pin having a diameter of not less than four (4) times the bar diameter for stirrups and ties, six (6) times the bar diameter for other bars except for bars larger than 1" which shall be eight (8) times the bar diameter. Bars shall be bent cold. Reinforcing shall be accurately placed in accordance with the drawings and shall be securely tied in position with at least No. 16 gauge annealed wire at all bar intersections. Metal chairs and bolsters shall be used to hold all steel above the form bottoms at the proper distance. Metal spacers shall be used to secure the proper spacing of the steel. Pre-cast concrete blocks shall be used to support reinforcing steel off the ground in footings and off the soffit of concrete exposed to weather. The clear distance between parallel bars shall not be less than 1 ½ times the bar diameter, but in no case less that 1 ½ inches nor less than 1 1/3 times the maximum size of coarse aggregate.
Splices shall be made with a lap of at least 30 bar diameters unless noted otherwise. The bars shall be placed in contact and wired together in such a manner as to maintain a clearance of not less than the minimum clear distance to the other bars and to the surface of the concrete. Minimum clear distance to all concrete surfaces shall be two (2) inches unless otherwise noted on the plans.

Pump Access Covers:
The wet well shall be equipped with a pump access cover for each pump as shown on the plans. Access covers shall be stainless steel-fitted aluminum construction, designed for access to submersible pumps. Covers shall be equipped with a guide bar bracket, safety chain hook, electric cable support, and a hasp for a padlock. Covers shall be of a size compatible with the pumps.

Valve Box Access Cover:
Cover shall be double leaf, channel frame aluminum construction with stainless steel hardware and a hasp for a padlock. Cover shall be of a size compatible with valve box opening, minimum size shall be 5’x 6’ with each leaf being 3.0’x 5’. The cover shall withstand a live-load of at least 300 pounds per square foot and be equipped with spring door operators and automatic hold-open arms. The cover construction shall have a mill finish with Bituminous Coating applied to exterior of the frame.

Anchor Bolts and Concrete Anchors:
Concrete anchorage devices shall be installed in the concrete as shown on the plans so that the attached equipment will bear firmly against the concrete. The concrete anchors for the pump discharge mount shall be RED HEAD RED-CHEM STAINLESS STEEL CONCRETE ANCHORS 3 CHEM-2034, 3/4” Diameter, or approved equal.

Bolted Connections:
All bolts, nuts and washers within the wet well shall be stainless steel.

306-2.04 **Painting**
Furnish and apply to the satisfaction of the Engineer, protective paint in colors as approved by the engineer. All exposed interior and exterior metal surfaces, except aluminum, galvanized steel, stainless steel and chrome plated metal, shall be coated. All paint shall be delivered in original containers and shall be applied in strict accordance with the recommendations of the manufacturer.
Preparation of surfaces:
Concrete Surfaces:
Before painting, all concrete surfaces to be painted shall be thoroughly cleaned. Surfaces to be painted shall be completely wire brushed to remove any loose concrete or paint, and cracks shall be patched. Concrete surfaces to be painted shall have all air pockets or other imperfections filled, so that a smooth surface results. All surfaces shall be completely dry prior to painting. Concrete surfaces which shall be coated with a protective coating for the purpose of protecting the concrete surface, shall have all air pockets or other imperfections in the concrete filled, so that a smooth concrete surface results, after the surface has been opened, it shall be sacked to fill the voids with mortar. Sacking shall be accomplished soon after the removal of the forms to promote adequate adhesion. Covering over the surface with a thin layer of mortar shall not be acceptable.

Metal Surfaces:
All metal work to be painted shall be absolutely clean and free of all rust and grease. All exposed cast iron or steel piping to be painted, which has a previously applied coal tar derivative, shall be primed, prior to finish coating, with two (2) coats of Koppers Tar Stop or approved equal.

Completion of Surface Preparation:
After completion of preparing all surfaces to be painted, the surfaces shall be inspected and approved by the County prior to the application of any protective coatings.

Materials:
Under these specifications, all paint products to be furnished for application shall be as manufactured by Koppers, or approved equal.

Coating System:
A. One (1) coat of Bitumastic #50M. The completed surfaces shall have a dry thickness of at least 16 mil.
B. Two (2) coats of Bitumastic #300M, first coat to be red, second coat to be black. Application of second coat to be applied within 24 hours of the first. The completed surfaces shall have a dry thickness of at least 16 mil.
C. One (1) coat of 622 Rust Penetrating Primer followed by two (2) coats of Glamortex 501 Enamel, color: OSHA Safety Blue.

The completed surfaces shall have a dry thickness of at least 3 mil.

Exterior Concrete Painting:
Coating System A shall be used to paint the wet well and valve box exterior surfaces in contact with the soil.
Interior concrete Painting:
After surface preparation, the Contractor shall paint all submerged concrete surfaces, surfaces exposed to sewage fumes, all valve box interior, with coating System B.

Wet Well Metalwork Painting:
All exposed metalwork surfaces which are submerged or subjected to sewage fumes shall be painted with coating System B. Metal located within water containing compartments shall be considered submerged. The pumps, pump discharge, pump power cables and lifting cables are not to be coated. Also the access covers are not to be coated.

Valve Box Metalwork Painting:
All exposed metalwork surfaces in the valve box shall be painted with coating System C. The access cover is not to be coated.

306-2.05 Pipe work

All labor and materials shall be furnished for the complete installation and testing of all pipe-work and appurtenances related to lift stations. Shop drawings are required to be submitted by the Contractor/Developer to the Engineer for all fabricated pipe-work, valves and special fittings for approval prior to construction.

Materials:

PVC Gravity Sewer Pipe:
PVC sewer pipe shall conform to these standards and the requirements of ASTM D 3034. SDR 35, and shall have gasketed joints.

PVC Force Main:
PVC force main shall conform to AWWA C900 and shall be class 150.

Ductile Iron Pipe (D.I.):
Ductile iron pipe and fittings shall be cement mortar lined. Pipe joints shall be flanged or as shown on the plans. Applicable sections of the following standards apply.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Item</th>
</tr>
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<tbody>
<tr>
<td>AWWAC151</td>
<td>Ductile Iron Pipe</td>
</tr>
<tr>
<td>AWWACI04</td>
<td>Cement Mortar Lining</td>
</tr>
<tr>
<td>AWWACII0</td>
<td>Fittings</td>
</tr>
<tr>
<td>AWWACIII</td>
<td>Rubber Gasket Joints</td>
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</tbody>
</table>
Cast Iron Fittings (C.I.):
Cast iron fittings shall be in accordance with the American Water Works Association Standard C 11 0-77, "Gray Iron and Ductile Iron fittings, 3 inch through 48 inch, for Water and Other Liquids."

Couplings and Flanges:
In the locations shown on the plans, flanged coupling adaptors shall be ford style FFCA and flexible couplings shall be Ford style FCI or approved equal. Flanges shall be of a size and pattern to fit valves and other piping to which they are to be connected.

Small Piping and Fittings:
These specifications shall apply to all metal pipe four inches (4") in diameter and smaller, other than cast iron piping, and shall also apply to all valves and cocks, unions, fittings, and connecting devices, and to pipe lines furnished as a part of the several piping and equipment items within the pump station. Small pipe shall include all nuts, bolts, gaskets, hangers, supports, the drilling of holes and flanges, and all materials and labor that may be necessary to the best installation of this class of work.

Fittings:
All screwed fittings shall be "American Standard Malleable Iron Screwed Fittings", 300 lb. W.O.G. of standard form and dimensions. Malleable iron shall conform to current standard specifications for malleable iron. Castings, as adopted by the "American Society for Testing Materials." All fittings shall be galvanized to correspond with pipe on which they are installed. All fittings necessary for the satisfactory alignment and arrangement of piping and all necessary unions and clean-outs shall be furnished by the Contractor.

Gate Valve:
All gate valves shall have standard flanged ends. Each valve shall have a 2" square operating nut. Valves shall correspond in size with the run of pipe on which it is installed, except as otherwise noted. Gate valves shall be 4" CLOW AWWA, F-5070, or approved equal.

Swing Check Valve:
Check valves shall be flanged, iron body, bronze-mounted check valves. Hinge pins shall be stainless steel or other noncorroding metal, and the stuffing box assembly shall be made of bronze, securely screwed to the valve body. Swing check valves shall be Mueller check valves catalog number A-2600-6.02 or approved equal.

Pipe-work in Concrete:
Where formed holes are left in the concrete, the Contractor shall be
responsible for the accuracy of their location and for sealing around pipes to produce water tightness where necessary. All necessary pipeline openings through the concrete which may have been omitted shall also be provided.

Christy Box and Force Main Access:
For lift stations without a back-up generator, a Camlock wye connection to the force main shall be installed and placed in a Christy box, to allow portable surface pump access to the force main in the event of a sewer lift station electrical failure, if required by the District.

Domestic Water Service:
The Contractor shall provide and install all items as shown on the plans and as needed to supply 1" water service to the valve box. The Contractor shall also coordinate installation of the service meter with the utility company providing water service to the site.

Meter and Valve Box:
The meter and valve box shall be a Christy B-12 Box with #S20 cover or Brooks Products Number 37.

Reduced Pressure Back-flow Preventer:
The backflow preventer shall be a reduced pressure principle type and shall be suitable for supply pressure up to 175 psi. The backflow preventer shall be designated for inline servicing. The device shall be Febco Model 825Y for a 1" service, or approved equal.

Domestic Water Spigots:
Contractor shall supply one (1) spigot as shown on the plans.

Wet Well Water Stops:
All cored openings in the wet well wall shall be sealed with water stops secured by stainless steel bands and non-shrink grout as specified in Section 306-2.02. Water stops shall be Fernco "Large Diameter Water Stops", or approved equal.

Discharge Wash-Down Assembly:
Wash-down assemblies as shown on the plans shall use 8"x1" Tap rockwell 323 Double Strap bronze saddles, or approved equal.

Wet Well construction:
Wet well shall be constructed using 96 inch diameter Class III reinforced concrete pipe sections manufactured to meet ASTM Standards C76, C443, and C655. The wet well shall be constructed with no more than three pipe sections. The lower wet well section shall be a minimum of 6 feet in length. Interior surfaces shall be painted prior to the installation of pumps. The discharge connection
mating surface shall be kept clean and free of all paint.

Sewer Manholes:
The Contractor shall construct the sewer manholes as shown on the plans per these Standards (Plates S-5 and S-6).

306-2.06 MECHANICAL EQUIPMENT

The Contractor shall provide and install all necessary items and appurtenances required for the proper placement and functioning of the project components as intended, whether such items and appurtenances are directly specified or not. All equipment shall be designed, manufactured and assembled in such a manner so as to perform satisfactorily within housings, enclosures and the environment into which it is to be installed and operated. All items shall be tested in place. Required supervision for installing, testing and starting shall be furnished by factory-trained personnel at no charge. The Contractor shall verify all actual dimensions of existing and new construction equipment areas, bases and mountings; and he shall be responsible for insuring proper fit of the equipment selected for installation. The Contractor shall be fully responsible for the compatibility of furnished mechanical, electrical, pipework and structural items and appurtenances.

Pump Warranty:
The pump manufacturer shall warrant the pumps and motors being supplied to the owner against defects in workmanship and materials for a period of one (1) year under normal use, operation and service. The warranty shall be in printed form and shall apply to all similar units.

Submersible Pumps, Motor and Slide-Away Coupling:
The Contractor shall furnish and install a totally submersible pumps as shown on the plans and as described hereinafter. The pumping unit shall conform to the following: Under this section the Contractor shall furnish and install all mechanical equipment and appurtenances for this project as shown on the plans and hereinafter specified. All such equipment shall be placed by the Contractor in satisfactory operating condition as an integral part of the construction of the project.

Characteristics:
Two (brand) size (size) Model Torque-flow vortex submersible pumps with HP, phase, volt, hertz.

Submersible motors and slide-away casings:
Pump casing shall be constructed of ASTM A48 Class 30 gray iron
and shall be completely open from suction to discharge with no wearing rings or impeller faceplates required. All internal case clearances shall be equal to the discharge diameter so that all material which will pass through the discharge can pass through the pump. The impeller shall be of the recessed design, constructed of ASTM A48 Class 30 gray iron and shall be mounted completely out of the flow path between the pump inlet and discharge connection, so that the solids pumped are not required to flow through the impeller. The impeller shall be keyed to the motor shaft and secured by an impeller bolt.

The motor shall be provided with thrust and radial bearings to carry the entire load which may be imposed upon it under all operating conditions. Motor shall be approved by Underwriters Laboratory for operation in a Class I, Group D, Division I, hazardous location.

The motor shall have two mechanical seals, the lower one outside the motor and protecting the upper one which is an oil-filled chamber. Moisture detector probes in the oil-filled seal chamber shall be connected to a customer-supplied alarm to indicate the presence of moisture in the seal chamber. Thermal overload protectors shall be imbedded in the motor windings and connected to the starter to disconnect the motor in the event of overload. The slide-away coupling shall consist of a foot-mounted discharge elbow and adaptor steel base-plate, upper and lower rail supports, lifting yoke and cable. All metal to metal interfaces where movement might occur shall be non-sparking. The foot-mounted discharge elbow and adaptor shall conform to ASTM A48 Class 30 grey iron. Lifting cable and hardware shall be stainless steel. Cable shall have a minimum working load of 2,400 lbs. and shall be supplied by the pump manufacturer.

Performance:
The developer's engineer shall provide and complete the following performance date on sewer plans. Each pump shall be capable of operating at the following conditions:
First design point GPM @ ________' TDH.
Second design point = GPM @ ______' TDH.
(Minimum) (Maximum) shut off=__________ feet.

Impeller selected shall be capable of operating at all three design points without exceeding BHP.
Minimum clearance through case = ___".

Pump Test:
The pump manufacturer shall perform the following inspections and tests on each pump before shipment from factory:
1. Impeller, motor rating and electrical connections shall first be checked for compliance to the customer's purchase order.
2. A motor and cable insulation test for moisture content or insulation defects.
3. Prior to submergence, the pump shall be run dry to establish correct rotation and mechanical integrity.
4. The pump shall be run for 30 minutes submerged, a minimum of 6 feet under the water.
5. After operational test No.4, the insulation test (No.2) is to be performed again.

A written report stating the foregoing have been done shall be supplied with each pump at the time of shipment. The pump cable end will then be fitted with a shrink fit rubber boot to protect it prior to electrical installation.

Documentation:
Standard drawings supplied shall include pump outlines, controls, access frames and typical installation guides. Electrical control wiring diagrams shall be supplied. Instruction and maintenance manuals and pump parts lists for the pumps installed shall also be supplied.

Acceptance Tests:
After installation, each pumping unit shall be given a running test, during which it shall demonstrate its ability to operate without vibration, overheating or excessive current draw, and to pump the capacity and head specified. These tests are to be conducted by the Contractor in the presence of the Engineer. The Engineer shall be given at least 24 hours notice in advance of each test.

During the tests, observations shall be made of motor input, vibration, noise and overheating to detect any defects in the equipment. Written results of each test shall be submitted by the Contractor to the Engineer prior to approval of the tested pumps. The Contractor shall provide at his expense the necessary water, gauges, meters, piping and labor necessary for conducting the tests. All adjustments needed to place the equipment in satisfactory working order shall be made at the time of the tests. All defects or defective equipment revealed by or noted during a test shall be corrected or replaced promptly at the expense of the Contractor, and if necessary, tests shall be repeated until satisfactory results are obtained. In case the Contractor is unable to demonstrate to the satisfaction of the Engineer that the units will satisfactorily perform the service required, and that they will operate free from vibration and over heating, the units may be rejected. The Contractor shall then remove and replace the equipment at his own expense.

306-2.07 ELECTRICAL WORK
The Contractor shall provide all the required labor, project equipment and materials, tools, construction equipment, safety equipment, transportation, test equipment, and satisfactorily complete all the electrical work shown on the drawings and included in these specifications. The electrical work for this project includes the providing of all electrical materials and equipment required for a complete and full operating facility. The Contractor shall provide temporary power for system testing. Included in this work is the providing of all required conduits, conductors, and cables including those specified; shown on the drawing; and neither specified nor shown on the drawings but nonetheless required for satisfactory interconnection and operations of all electrical, mechanical and instrumentation equipment either shown on the respective drawings, specified in the respective portions of the specifications, or otherwise required.

Codes:
All the electrical equipment and materials, including their installations, shall conform to the following applicable codes:
3. Occupational Safety and Health Act Standards
4. County of Kern Codes and Ordinances

Variance:
In instances where two codes are at variance, the more restrictive requirements shall apply.

Standards:
Equipment shall conform to the applicable EIA, IEEE, and NEMA Standards

Drawings:
The electrical drawings shall govern the general layout of the completed construction. Except where special details are used to illustrate the method of installation of a particular piece or type of equipment or materials, the requirements or descriptions in these specifications shall take precedence in the event of conflict.

Securing Equipment:
1. Locations of equipment, inserts, anchors, motors panels, conduits, stub-ups, fittings, power and convenience outlets and ground wells are approximate unless dimensioned, and the Contractor shall be responsible for field verifications of scaled dimensions on drawings.
2. The contractor shall review the drawings and specifications of other trades and shall perform the electrical work that will be
required for the installations.

3. Should there be a need to deviate from the electrical drawings and specifications, the Contractors shall submit written details and reasons for all changes to the Engineer for approval.

The Contractor shall provide the required inserts, bolts and anchors, and shall securely attach all equipment and materials to their supports.

Cutting, Drilling and Welding:
The Contractor shall provide the required cutting, drilling and welding that is necessary for the electrical construction work. Cutting and drilling structural members shall not be permitted, except when approved by the Engineer. A core drill shall be used wherever it is necessary to drill through concrete. The Contractor shall provide the required welding for equipment supports. Patchwork shall be completed with the same materials and finished to match the surrounding area.

Condit:
All electrical conduits shall be PVC Schedule 80 unless otherwise specified.

Ground Rods:
Ground rods shall be Copper weld, not less than 1/2” x 8’.

Control Panel:
Contractor shall furnish and install one duplex air bubbler control panel (conforming to NEMA 3R and 12 standard) with a hinged inner door (dead front) fabricated from 5052-H32 0.080 thick marine alloy aluminum. The inner door shall be held closed by two hand operated, 1/4 turn fasteners and shall contain the control instruments and indicators. The tamperproof outer door shall be lockable using a hasp. Ventilation shall be provided by louvers on one side of the enclosure. Enclosure shall be double compartment _size __ and contain space for service entrance equipment of the left side. The entire control panel shall be UNDERWRITERS LABORATORY LISTED and furnished with a UL LABEL. Each component shall be factory mounted, wired, inspected and tested. A wiring diagram and heater chart shall be enclosed in the panel. A red "High Voltage Inside" nameplate shall be fastened to door covering the high voltage compartment. All components including indicating lights, switches, buttons, relays, accessories, and permanently identified as to their function with the components. The identifications shall be in the form of photo etching, silk screening or engraving. All terminal blocks shall be identified by both number and graphic symbols which clearly indicate the purpose of each terminal block. All control wiring shall be
numbered at each termination. The panel enclosure shall be free standing and mounted on a reinforced concrete pad. The lower compartment shall have a lockable access door and be flush with the concrete pad. The enclosure shall be constructed of 14 gauge steel. The entire unit shall be degreased, cleaned and treated with a phosphatizing process, then primed and painted inside and out with corrosion-resistant, industrial-grade baked enamel. The finish coat shall be ASA-61 Gray.

Control System Operation:
The control system shall provide total automatic control for two (2) motor driven pumps operating on 480 volts, 3 phase service. The wet well level shall be monitored and controlled as follows:
- Level 5- High Level
- Level 4- Start Lag Pump
- Level 3- Start Lead Pump
- Level 2- Stop Lag Pump
- Level 1- Stop Lead Pump

Contingent upon the wet well level, the bubbler system shall cause the liquid level indicator/controller to energize the appropriate control contacts. Upon wet well level rise, the lead pump start contact (Level 3) shall be energized causing a relay in the pump logic controller to start the lead pump. If the level continues to rise to the lag pump start control (Level 4), the controller shall energize a relay to start the lag pump, and both pumps shall run simultaneously. The liquid level shall be lowered until the lag pump stop contact (Level 2) is reaches, stopping the lag pump. The lead pump shall continue to run lowering the wet well level until the lead pump stop contact (Level 1) is reached. Upon the next wet well level rise, the lead pump selection shall be alternated. If the wet well level rises to high level contact (Level 5), it shall energize a relay in the pump logic controller to operate the alarm system and indicate a high water condition. The control system shall be built in such a manner that the owner will have the ability to select high level alarm activation at a separate specific level or have it activated when start lag pump level is reached. The owner shall have the ability to select independent start and stop for the lead and lag pumps, or a common stop for both pumps.

Liquid Level Indicator/Controller:
The wet well level shall be monitored and maintained by a well-type manometer with mercury media that makes and breaks a series of electrical contacts as the mercury rises and falls in direct proportion to the change of the liquid level in the wet well. Digital read out or horizontal needle deflection instruments are not acceptable. The manometer shall have one common 24 V AC electrical contact and a vertical row of contact points, which when coming in contact with the column of mercury shall signal a relay in the pump logic control to
perform the pump operation and alarm functions. The liquid level indicator/controller shall have a viewing window which shall display the mercury column, and be calibrated in both feet and inches of water indicating the liquid level in the wet well. The unit shall be mounted on the dead front door. The unit shall be an electro-mechanical device with no moving parts. The unit shall be factory calibrated and not require field calibration. Accuracy shall be plus minus ½ percent of full scale with 100 percent repeat accuracy and zero dead band when making and breaking electrical contacts. Indicated full scale range shall be zero to ten feet with front scale graduated in feet (0 to 10 feet) and inches (0 to 120 inches) the vertical, linear, mercury column shall have a total of 40 control points providing as electrical output for every three inches of water pressure, and shall be individually labeled as to the level at which they are activated. The liquid level indicator/controller shall be manufactured from corrosion resistant material. The liquid level indicator/controller shall be equipped with manual testing capability located on the inner door. The testing system shall consist of a two position normal test/blowdown manually operated toggle valve and test-port. Test position shall seal off and prevent liquid from rising in the submerged bubbler tube. Simultaneously, it shall divert the bubbler air output to the test port and relieve any air pressure on the indicator/controller. The operator shall be able to simulate rising and falling liquid level by restricting the air flow exiting the test port. The control panel shall be equipped with W" NPT female bulkhead fitting located on the inner door for the purpose of applying high pressure air to purge any obstruction in the bubbler tube should it become clogged. Protection shall be provided to prevent high pressure air for blowdown from damaging the liquid level indicator/controller. Blowdown must be possible without having to disconnect any tubing or fittings. All fittings shall be brass or stainless steel and assembled with LOC-TITE adhesive. All tubing fittings shall be barbed with a minimum of three barbs. Tubing shall be clear urethane. The control system shall be equipped with an external ¼" NPT female bulkhead fitting for connection to the bubbler tube in the wet well. The air bubbler tubing from the panel to the wet well shall be size 3/8 polyethylene. The tubing shall be fastened to the wet well wall using stainless steel rubber backed brackets and stainless steel fasteners. The tubing shall terminate into an air cell constructed of size 1" PVC pipe with brass adapter. The standard air supply for the bubbler system shall be two continuous running, oil-less, diaphragm-type air pumps. The air pumps shall each deliver .6 SCFH@ 5.5 PSIG. A fixed orifice shall be installed in line with the air pumps output to insure a ripple free air flow. The air pump designated as "lead" shall provide the air flow to operate the bubbler systems. The designated "lag" air pump shall be automatically energized if the "lead" air pump fails. Indication of failure shall be monitored by measuring the AIR FLOW RATE of the lead air
pump. The air flow controlled automatic transfer/alarm chassis shall consist of an automatic electro-mechanical circuit which transfers to the lag air pump whenever air flow from the lead air pump drops to less that 0.15 SCFH for a period of 15 seconds. If the lag air pump fails to produce flow for a period of 120 seconds, an isolated contact shall close relaying a signal, which will activate the high water alarm. A push button shall be provided to manually reset the circuit to the "lead" air pump. Components to make-up this circuit shall include a flow meter, four LED status indicators and a reset push button; plus a push button flow switch with hermetically sealed contacts, a duplex receptacle for the air pumps, transfer relay, transfer timer and alarm timer all mounted on a single chassis.

Logic Controls:
The duplex logic control system shall consist of the logic chassis mounted on the subpanel and the logic panel mounted on the dead front door. The logic chassis shall be a pre-wired assembly constructed of anodized aluminum containing logic and alarm circuits. The logic chassis shall interface with the wet well level liquid indicator/controller. The logic chassis shall contain a three point terminal block for 120 V AC supply power, a power on-off switch for 120 V AC power, a 15 amp circuit breaker to protect 120 VAC power; a 120/24 V AC control transformer, a 3 position lead pump selector switch that can operate in either "automatic alternation", "lead pump #1- Lag pump #2; or "lead pump #2- lag pump #1" positions. Relays shall be square base, plug-in type, 3 pole double throw rated at 10 amp, 240 V AC with epoxy encapsulated coil and clear dust cover and shall be directly interchangeable. Five LED status indicator lights shall be mounted adjacent to the relay sockets and wired in parallel with the relay coils to indicate that the power is applied to the coils. All relays shall have mechanical hold-down bales. All terminals on the logic chassis shall be of the barrier clamp plate type rated at 15 amp at 300 V AC and accept two (2) AWG#14 wires. Terminal blocks shall be provided for interfacing output from the liquid level indicator/controller to the logic chassis via a multi-conductor cable shall be identified with yellow heat shrink tubing with black nomenclature. Labels shall read as follows: High level alarm, start lag pump, start lead pump, stop lag pump, stop lead pump, and common. The logic panel shall be constructed of corrosion resistant anodized aluminum, and connected to the logic chassis via a multi-conductor cable. The logic panel shall be mounted on the inner door. The logic panel shall have the following components: Two "hand-off automatic" selector switches for pumps, two "pump run" green LED Indicators, one 24 V AC "power on" yellow LED indicator, one "start lag pump" yellow LED indicator, one red pushbutton for audible alarm silence, one "high level alarm" red LED indicator and one red pushbutton for visible alarm reset. Provide two 6-digit nonresetable, dust tight, oil
tight and moisture resistant running time meters.

Power Handling:
Main lugs of the appropriate size shall be furnished for connecting the incoming supply power. The lugs shall be suitable for use with aluminum or copper conductors. Ground lugs of appropriate size shall be bolted to the subpanel. Motor circuit protection shall be either thermal magnetic circuit breakers or magnetic motor circuit protectors. Either type shall contain a self test "Trip Selector" permitting a mechanical simulation of the over current tripping device. The protector operating mechanisms shall be quick-mate, quick-break and trip-free type. Thermal magnetic breakers shall comply with Federal SPB.W-C 357a as Class Two breakers. Symmetrical amperes interrupting ratings shall be 10,000 amps minimum for 250 volt rated breakers and 15,000 amps minimum for 480 volt rated breakers. Magnetic motor circuit protectors shall provide instantaneous clearing of faults to a minimum of 10,000 amperes. RMS, symmetrical and shall have an adjustable instantaneous trip setting. Q-Frame type circuit breakers are not acceptable. Circuit breaker toggles shall be operable through external extension handles that will interlock with the dead front door. Each motor starter shall be NEMA rated, FVNR, with three overload relays and reset button. The contractor shall feature double break, silver cadmium oxide contacts, pressure type terminals, and barriers, free floating armature-magnet frame, molded continuous duty coils and stainless steel springs sized for the specific pumps supplied under this contract. Definite purpose contractors, horsepower rated motor starters, and fractional NEMA sizes are not acceptable. Motor starter overload reset operators shall be installed on the dead front door allowing motor starter overload relays to be reset without opening the dead front door. A 100 watt strip heater and separate thermostat set at the appropriate temperature to prevent corrosion-causing condensation and freezing shall be supplied. A control transformer, adequately sized for the connected load shall be provided on 3 phase, 3 wire systems. The transformer shall be protected by fuses or circuit breaker. The control transformer may be eliminated on 4-wire and single phase systems providing that the control voltage is protected by a circuit breaker and is wired per N.B. C. Standards. The unit shall be equipped with the capability to connect a portable generator which will be activated by 60A, 6000V, 3 phase transfer switch.

For CSA maintained facility, the Development shall install back-up generator which complies with the appropriate Air Pollution Control District requirements. The back-up generator shall have a minimum of 2-day fuel capacity and adequate power generation to operate all pumps.
Optional Equipment: (As required)

1. Provide a NEMA 4X, red lexan, break resistant globe and 75 watt lamp which shall be mounted on top of the enclosure. The globe shall be mounted with stainless steel screws and closed cell neoprene gasket to insure water tight integrity.

2. Provide a flasher which shall be installed and connected to the logic chassis to provide a flashing alarm light.

3. Provide dim glow terminals on the logic chassis so that the alarm light glows dim during normal condition to verify circuit integrity. When alarm condition occurs, the alarm light shall be switched to full brilliance.

4. Provide a NEMA 4X encapsulated high intensity electronic horn mounted on the side of the enclosure. Audible rating of the horn shall be a minimum of 85 decibels at 10 feet.

5. A power monitor relay system shall be installed and connected to the logic chassis. When the power monitor relay is activated, it shall disconnect control power from the motor starters and illuminate red LED indicator on the logic chassis. The control power shall automatically reset if the fault conditions correct itself. The power monitor relay shall be activated in the event that any of the following conditions occur:
   a. Phase loss (single phasing) when anyone of the three line voltages drop to 83 percent or less or nominal.
   b. Phase reversal (sequence) when improper phase sequence is applied to equipment.
   c. Low voltage (brown out) when all three line voltages drop to 90 percent or less of nominal.

6. Moisture sensing relays for each motor shall be installed and connected to the logic chassis. In the event that moisture enters the motor housing, the relay shall illuminate the red LED indicator on the logic chassis. Provide a back up control consisting of two mercury tilt switches with intrinsically safe relay circuits. The tilt switches shall be UL approved. The upper tilt switch shall engage both pumps and activate the high water alarm circuit. The lower switch shall disengage both pumps and de-activate the alarm circuit.

7. Provide a 750 watt duplex convenience receptacle with ground fault interrupter installed on the dead front door.

8. Wiring from the thermal sensor located in the pump motor shall be connected to the pump monitor provision on the logic chassis. In the event the sensor is activated, it shall disconnect control power from the appropriate pump motor starter and illuminate the red LED Indicator on the logic chassis. The circuit shall automatically reset on reclosure of the temperature sensor.

9. Provide an automatic two channel telephone dialer. The Dialer shall upon alarm condition call up to five predetermined numbers and deliver a voice message.
The message shall identify the location of the alarm, and the required action to be taken, and instructions for acknowledging the Dialer. The Dialer must be capable of calling at least five different telephone numbers for each channel. If the called telephone number is busy, or does not answer, or answers but is not acknowledged the Telephone Dialer proceeds to call the same number and/or proceeds to call different "backup" numbers. Each called party has the option to cancel all remaining calls or to allow the Dialer to continue the dialing sequence. The Dialer shall retain the programmed telephone numbers should there be a loss of power.

The called party shall be able to communicate with the Telephone Dialer by means of a tone signal. The signal is generated through a touch tone telephone set. To prevent nuisance alarms the Phone Dialer shall have a time delay adjustment which will delay the starting of the calling cycle from 10 to 90 seconds. If during this delay time, or at any time that the Dialer is placing calls, the activating contact is restored to normal, the Telephone dialer automatically hangs up and resets itself to the beginning number of the dialing sequence. The tripping circuits shall be desensitized with filters so that the time response shall be the same as a telephone type relay (approximately 10 milliseconds). Input pulses of less than ten milliseconds shall be filtered out to eliminate false tripping due to lightning or voltage surges.

When any channel is tripped the Dialer shall continue the calling cycle until acknowledged, or the alarm condition in corrected. Independent memory circuits shall be provided for each channel. The system shall have an indicator light defining which channel is tripped. When the condition corrects itself, or it is reset, this light shall automatically reset.

The Telephone Dialer shall utilize a regular private line telephone circuit provided by the owner. Connection into the telephone circuit shall be through an industry standard 8 pin modular jack. The Phone Dialer shall have the proper cable for connecting into the telephone system modular terminal XRJ-31-X. The Phone Dialer shall provide all the necessary power and control switching for the built-in coupler with no auxiliary equipment, coupler, or power source required. All dial pulses and voice message inputs to the telephone system shall meet the requirements as published by the telephone companies, and shall be FCC approved for use on the telephone network.
A low voltage recharging circuit shall be provided to maintain the lead acid batteries in peak condition. An externally mounted pilot light shall indicate when the charging circuit is operational. The stand-by capacity of the Dialer shall be sufficient to sustain one (1) hour of continuous calling or up to eight (8) hours with the system in standby after complete power failure.

The Dialer shall have a built-in AC line monitor. This will allow the Dialer to monitor AC power or another function if desired. The Dialer shall have the option of being called from any of the programmed telephone numbers and being remotely tested. This test shall confirm proper operations of the Dialer and the telephone network. An off/on/abort switch must be accessible to facility testing and installation.

The Dialer shall be provided with one (1) year warranty after acceptance by the Engineer, or a minimum of up to two (2) years after shipment date. The representative shall supply installation and operation data to the Engineer, and shall furnish factory authorized start up service and training at no additional cost to the County.

10. Provide a spray system for breaking up the wet well floating scum blanket. Pump system shall recirculate a portion of the pumpage in the form of a spray.

Submittals:
Shop Drawings:
Shop drawings shall be submitted for approval prior to start of construction and shall include the following:
A wiring diagram and an elementary control diagram for each unit
An overall connection diagram for each control panel
A dimensioned outline drawing to scale showing space for conduits, etc.
A complete identification of all electrical components in each control panel and their interconnections within the control panel
All connections to external equipment and control
Wire marking scheme.

Spare Parts List:
A spare parts list shall be included showing recommended parts and quantities, as well as complete ordering information for replacement components. Instruction books shall be provided for special control devices and special equipment installed in the control panels. These shall be submitted to the Engineer prior to installation of the equipment.
Manuals:
The Contractor shall obtain manuals from the manufacturer of the installed control panels and shall submit same to the Engineer as specified under "Submittals" of this specification section.

The complete system shall be the product of one manufacturer who shall have maintenance personnel that are factory trained to service and repair all components supplied. The guarantee period shall be for two (2) years from the date of successful start-up. Guarantee shall include on-the-job repair and maintenance that cannot be performed by plant personnel.
SEE BACKFILL REQUIREMENTS
STREET STANDARDS
PER PLATE R-67/R-68

RIGID PIPE
ALL MATERIAL PASSING 1” SIEVE
PLASTIC PIPE
CLASS 1, 2, OR 3 MATERIAL
PER A.S.M.E.-D-2321

EXCAVATE FOR BELL
O. D. + 16” MAX.
O. D. + 10” MIN.

FOUNDATION FOR UNSUITABLE MATERIAL
6” MIN. IF REQUIRED

INITIAL BACKFILL
90% COMPACTION
TO 12” OVER
TOP OF PIPE

HAUNCHING
BEDDING
6” MIN.

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT
STANDARD

TYPICAL
TRENCH SECTION
IN PAVED AREAS

PLATE NO.
S-1
GENERAL NOTES

1. STOP ALL PIPES AT INSIDE WALL

2. ALL CONCRETE SHALL BE CLASS (2)

3. DROP TYPE CONNECTION SHALL BE USED IF DIFFERENCE IN ELEVATION BETWEEN THE MAIN & INTERSECTING PIPES IS GREATER THAN 1.5 FT.

4. THE DROP TYPE M.H. IS SAME AS THE STD M.H. EXCEPT FOR DROP TYPE CONNECTION.

5. THE DROP SECTION OF PIPE MAY BE INSTALLED INSIDE THE MANHOLE WHERE PERMITTED BY THE DISTRICT OR COUNTY.
**PLAN**

**WEIR DETAIL**

- **3/8" DIA. ALUMINUM STRAP**
  - **ALLOY 6061-T6**
  - **APPROVED WATER STOP**

- **STEPS WHEN PERMITTED PER SECTION 302-8**
  - **SET TOP OF PIPE BELL TO SERVE AS WEIR**
  - **SEE DETAIL THIS SHEET.**

- **3/8" DIA. ALUMINUM PIPE STRAP**
  - **(TYPICAL, NOT TO EXCEED 4' ON CENTER SPACING)**

**SECTION B-B**

**SECTION A-A**

- **#4 BARS @ 12" O.C.**
- **6" MIN. O.G. @ 95% RELATIVE COMPACTION**

**COUNTY OF KERN**

**STATE OF CALIFORNIA**

**DEVELOPMENT STANDARD**

**STANDARD INSIDE DROP MANHOLE**

**PLATE NO.**

S-4
GENERAL NOTES

1. MANHOLE STEPS WHEN REQUIRED PER SECTION 302-8 SHALL BE STANDARD POLYPROPYLENE STEPS. THE TOP STEP SHALL BE NO MORE THAN 34" BELOW FINISH STREET GRADE AND NO LESS THAN 20" BELOW THE TOP OF THE ECCENTRIC MANHOLE CONE. THE BOTTOM STEP SHALL BE 10" TO 20" ABOVE THE MANHOLE FLOOR. STEPS SHALL BE 12" ON CENTER AND SHALL BE IN VERTICAL ALIGNMENT OVER OUTGOING SEWER.

2. STRUCTURAL BACKFILL IMPERVIOUS MATERIAL @ 95% RELATIVE COMPACTION.

3. ALL CONCRETE SHALL BE CLASS "2" MINIMUM.

4. MANHOLE HEIGHT SHALL BE FIELD VERIFIED PRIOR TO CONSTRUCTION.
NOTES:

1. ALL WORK SHALL CONFORM TO THE APPLICABLE SECTIONS OF THE SPECIFICATIONS ENTITLED "STANDARD SPECIFICATIONS, STATE OF CALIFORNIA, BUSINESS AND TRANSPORTATION AGENCY, DEPARTMENT OF TRANSPORTATION", APPROVED CURRENT EDITION.

2. PIPE MATERIAL SHALL MEET 1.4.2

3. ALL CONCRETE SHALL BE CLASS "2".

4. CLEANOUT FRAME AND COVER SHALL CONFORM TO THE COUNTY OF KERN STANDARDS S-8

5. CONCRETE SHALL HAVE NO ADDITIVES UNLESS PRIOR WRITTEN APPROVAL IS OBTAINED FROM THE DIRECTOR.

6. CONCRETE SHALL BE CURED WITH A WHITE PIGMENTED CURING COMPOUND PER SEC. 90-7.01B OF THE STANDARD Specs.

7. TOP OF SLAB SHALL BE TROWELED SMOOTH AND GIVEN A LIGHT BROOM FINISH.

8. 95% RELATIVE COMPACTON IS REQUIRED PER CITY STD. ST-13.

9. BUILDING PAPER OR PLASTIC SHALL BE PLACED BETWEEN THE 0.5' CONCRETE FOUNDATION AND 4.5' SLAB.

10. FILL CAVITY BETWEEN PIPE AND COLLAR WITH GRAVEL TO WITHIN 0.5' OF TOP OF PIPE. CAULK REMAINING 0.5" WITH APPROVED MASTIC TO TOP OF PIPE FOR WATER TIGHT SEAL.

11. COLLAR SHALL BE VCP, ABS, OR PVC PIPE.

12. FINISHED PCC SLAB TO BE 0.125' MIN. AND 0.25" MAX. BELOW FINISHED PAVING SURFACE.
NOTES:

1. ALL FRAMES AND COVERS SHALL BE TESTED FOR ACCURACY OF FIT AND SHALL BE MARKED IN SETS PRIOR TO DELIVERY.

2. THE SEATS OF FRAMES AND BEARING FACES OF THE COVERS SHALL BE MACHINED FOR A SMOOTH NON-ROCKING FIT BETWEEN THE TWO CASTINGS.

3. CASTINGS SHALL BE THOROUGHLY CLEANED AND DIPPED TWICE IN A QUICK-DRYING, JET-BLACK ASPHALTIC COMPOUND TO PROVIDE A PROTECTIVE COATING.

4. ALL FRAMES AND COVERS SHALL BE GRAY CAST IRON, FREE FROM WARP, CRACKS, HOLES, SWELLS AND HOLE-SHOT, AND SHALL HAVE A WORKMANLIKE FINISH.

5. CASTING SHALL CONFORM TO THE PROVISIONS OF THE SPECIFICATIONS FOR GRAY-IRON CASTINGS, SERIAL DESIGNATION ASTM: A-48 (LATEST REVISION), CLASS NO. 30B.

6. THE NAME OF THE MANUFACTURING COMPANY SHALL BE ON THE UNDERSIDE OF THE COVER.

7. MANHOLE FRAME SHALL WEIGH NOT LESS THAN 120 LBS. NOR MORE THAN 200 LBS. THE COVER SHALL WEIGH NOT LESS THAN 120 LBS. NOR MORE THAN 200 LBS.

8. MANHOLE COVERS SHALL HAVE A SELF DRAINING BLIND PICK HOLE UNLESS OTHERWISE APPROVED BY THE DIRECTOR.

9. THE 2.0" PATTERN LETTERS ON THE MANHOLE COVERS SHALL HAVE ONE OF THE FOLLOWING DESIGNATIONS: DRAIN OR SEWER

10. ASSEMBLY SHALL BE DESIGNED FOR HIGHWAY LOADING OF HS 20-44.

11. 2.0" X 1.0" DIAMOND MAT 0.125" DEEP.

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT
STANDARD

STANDARD FRAMES AND COVERS FOR MANHOLES & CLEANSOUTS

PLATE NO.
S-8
PARALLEL CONSTRUCTION

NOTE:
ZONES IDENTICAL ON EITHER SIDE OF CENTER LINES.
ZONE "P" IS A PROHIBITED ZONE, SECTION 64630 (E) (2) CALIFORNIA ADMINISTRATIVE CODE, TITLE 22.

NOT TO SCALE
CASE 1
NEW SEWER

CASE 2
NEW WATER MAIN

CROSSINGS

NOTE:
"P" is a prohibited construction zone.

NOT TO SCALE

PLATE NO. S–10

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT
STANDARDS
STANDARDS FOR
SEPARATION OF WATER
AND SEWER LINES
NOTES:
1. STAMP "S" INTO CURB FACE OVER SEWER LATERAL.
2. MINIMUM COVER WITHIN RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH SECTION 302.9.03.
3. LATERALS LOCATED SO NOT TO CONFLICT WITH UTILITIES.
4. SEE SECTION 304.5.10 FOR MORE DETAILS.
STEEL CASING PIPE, SEE APPROVED PLANS FOR SIZE AND THICKNESS

HIGH DENSITY POLYETHYLENE PLASTIC PIPE INSULATOR WITH SKIDS TO CLEAR PIPE BELLS (CALPICO MODEL P OR EQUIVALENT) OR REDWOOD SKIDS STRAPPED WITH STAINLESS STEEL.

SECTION A-A
PIPE CASING

STEEL CASING DIAMETER IS PIPE BELL O.D.

SEWER LINE / STORM DRAIN LINE

PIPE JOINT

CASING END SEAL STRAP TO PIPE AND CASING WITH STAINLESS STEEL CLAMPS.

GROUT

1.0' Min.

60'

10.0' MAX.

2.5'

2.5'

10.0' MAX.

12" MIN.

NOTES:

1. CASING SHALL BE INSTALLED BY THE BORE, JACK, AND/OR TUNNEL METHOD.

2. INSTALLATION SHALL BE AS RECOMMENDED BY THE PIPE MANUFACTURER.

3. ALL CASING SECTIONS SHALL BE JOINED BY CONTINUOUS PROCESS.

4. FILL VOID BETWEEN CARRIER PIPE AND CASING WITH SAND SLURRY. IF SAND IS USED, COMPACT BY USE OF AIR BLOWING SAND EQUIPMENT OR AS DIRECTED BY THE DIRECTOR.

5. REDWOOD SKIDS SHALL BE CONSTRUCTION GRADE.

6. REDWOOD SKIDS SHALL BE VEEED TO FIT CONTOUR OF PIPE.

7. REDWOOD SKIDS SHALL BE STRAPPED TO THE PIPE WITH STRAPPING OR APPROVED WIRE BANDS.

COUNTY OF KERN
STATE OF CALIFORNIA

DEVELOPMENT STANDARD

STANDARD SEWER LINE IN PIPE CASING

PLATE NO. S-12
OSHA APPROVED EXTENDABLE LADDER IF BOX IS OVER 4.0’ DEEP.

SEE STANDARD SPECIAL PROVISIONS FOR SPECIFICATIONS.

PLAN VIEW

SECTION A-A

KEY TO CIRCLED REFERENCES

1. FLEXIBLE COUPLING ADAPTOR
2. DUCTILE IRON PIPE WITH EPOXY COATING – PLAIN ENDS
3. FLANGED COUPLING ADAPTOR
4. SWING CHECK VALVE, FLANGED ENDS
5. PLUG VALVE, FLANGED ENDS
6. 45° ELBOW, FLANGED ENDS
7. PIPE – FLANGED ENDS
8. FLANGED WYE
9. PIPE – FLANGED END & PLAIN END
10. CONCENTRIC REDUCER
11. ACCESS COVER WITH FRAME & HINGES SEE APPROVED SPECIFICATIONS
12. REINFORCED CONCRETE VALVE BOX, PRE-CAST OR CAST-IN-PLACE, DESIGN TO BE APPROVED BY THE DIRECTOR.
13. 2 COATS #50 BITUMASTIC, SEE APPROVED SPECIFICATIONS
14. 2.0” SCHEDULE 80 PVC DRAIN PIPE EXTENDED TO BOTTOM OF WET WELL
15. ADJUSTABLE PIPE SUPPORT STAND

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

STANDARD TYPICAL SEWER PUMPING STATION VALVE BOX

PLATE NO. S-13
A WATER STOP DETAIL

B CUT-OFF RING DETAIL

C WASH DOWN DETAIL

1.0" N.P.T. BRONZE DOUBLE STRAP SERVICE SADDLE

1.0" N.P.T. BRONZE IRON THREADED NIPPLE 4.0" LONG.

1.0" N.P.T. BRONZE IRON THREADED 90° ELBOW

1.0" GATE VALVE

NON-SHRINK GROUT
"FERNGO" WATER STOP OR APPROVED EQUAL
STAINLESS STEEL BAND
CORED CONCRETE WALL, PROVIDE 1.5" OF CLEAR OPENING

0.25" MIN. PLATE FASTENED TO PIPE AND LOCATED AT CENTER OF WALL. THE O.D. OF RING SHALL BE AT LEAST O.D. OF RING PLUS 3.0".

PLTDR: 02/25/2009

DATE: 2-26-2009

DESIGNED BY: A.A.

DRAWN BY: D.M.

CHECKED BY: G.F.
NOTES:

1. ALL VALVES, FITTINGS, AND DIRECTIONAL CHANGES ARE TO BE HELD IN PLACE BY CONCRETE THRUST BLOCKS.

2. BEARING AREAS INDICATED ARE BASED ON ALLOWABLE SOIL PRESSURE OF 1500 PSF.

3. CONCRETE IS NOT TO BEAR AGAINST PIPE. THRUST BLOCK TO ONLY BE IN CONTACT WITH THE FITTING.

* 1 S.F. (SQUARE FOOT)

THRUSt BLOCK DETAILS N.T.S.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>TEE OR PLUG</th>
<th>90° ELL</th>
<th>45° ELL</th>
<th>22.5° ELL</th>
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<tbody>
<tr>
<td>4.0&quot;</td>
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<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>6.0&quot;</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
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<td>5</td>
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<td>4</td>
<td>2</td>
</tr>
<tr>
<td>10&quot;</td>
<td>8</td>
<td>11</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>12&quot;</td>
<td>11</td>
<td>16</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>16&quot;</td>
<td>14</td>
<td>20</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>
8.0" STEEL PIPE

0.25" GALVANIZED MESH SCREEN ATTACHED WITH STEEL BAND AND SCREWS.

TOP OF WET WELL

WET WELL WALL OPENING TO BE CORED AND GROUTED WITH NON-SHRINK GROUT.

PVC TO STEEL PIPE, AIR TIGHT CONNECTION

INSIDE WALL OF WELL

8.0" 90° ELBOW

1.5'

1.0'

1.0' MAX.

PLAN VIEW

NTS
NOTES

1. EXCEPT FOR PIPING, ALL METAL WORK WITHIN THE WET WELL SHALL BE STAINLESS STEEL.
NOTES:

1. ALL HARDWARE FOR THE BLOWER ASSEMBLY AND FRP DUCT SHALL BE STAINLESS STEEL.
DIVISION FOUR
STANDARDS FOR DRAINAGE

CHAPTER I. GENERAL

Sec. 401-1 General Purpose

401-1.01 It is the general purpose of these standards that waters generated by storms, springs, or other sources be mitigated so as to provide reasonable levels of protection for life and property, and the maintenance of necessary access to property or passage of the traveling public on the public highways.

401-1.02 To meet this general purpose, it is necessary that these standards reasonably protect life from the direct effects of flood waters, the indirect health effects associated with stagnating water, and the attractive nuisance provided by standing waters. It is necessary to reasonably protect property from the damaging effects of flood waters. Property access for the ingress and egress of emergency vehicles, or the general public should be reasonably provided. The passage of public vehicles on the public highways should also be reasonably ensured.

401-1.03 In general, the mitigation measures for the protection of life and property, and the maintenance of emergency vehicle access are based upon the Capital Storm Design Discharge (CSDD). The issues related to property access (by the public) and passage on public highways, and local drainage facility design are based upon the Intermediate Storm Design Discharge (ISDD).

401-1.04 The design standards in this section are to be deemed to be minimal, and shall not limit the design engineer from using higher standards based upon the engineer’s assessment of the protection needs of the development. Alternatives are permissible which are determined by the Director to be of equal or higher quality.

401-1.05 The Director may allow such exceptions as he may find to be reasonably required by the specific circumstances, to be in the public interest and in conformity with the general objectives of these standards.

401-1.06 Special circumstances may exist that require additional mitigation above and beyond these standards as determined by the Director.
Sec. 401-2  Maintenance

401-2.01 All facilities intended for public maintenance shall be designed and constructed subject to the approval of the Director and the maintenance entity, or these standards, whichever is more conservative.

401-2.02 All drainage facilities intended for private maintenance shall provide a maintenance plan, subject to the approval of the Director. All such facility maintenance plans shall include, but not be limited to: (a) schedule of cleaning (or clearing), (b) mosquito and vector abatement measures (if applicable), (c) pump maintenance schedule (if applicable), (d) notarized statement by the owner(s) acknowledging his/her/their responsibility and intent to maintain the proposed facility in accordance with the approved maintenance schedule.

401-2.03 Subdivisions with privately maintained streets shall have the drainage facilities maintained by a homeowners association or other entity which has the ability to assess fees for maintenance.

CHAPTER II. DEFINITIONS

Sec. 402-1  Definitions:

402-1.01 AGENCY: refers to the Department of the County of Kern with jurisdiction.

402-1.02 ALLUVIAL FAN: is a landform originating at an apex and characterized by high-velocity flows; active processes of erosion, sediment transport, and deposition; and unpredictable flow paths.

402-1.03 APEX: means a point on an alluvial fan or similar landform below which the flow path of the major stream that formed the fan becomes unpredictable and alluvial fan flooding can occur.

402-1.04 CAPITAL STORM DESIGN DISCHARGE (CSDD): is that flow determined based upon a precipitation event having a one percent probability of being equalized or exceeded in any given year, commonly referred to as the 100 year storm.

402-1.05 CLOSED CONDUIT: is any system of underground drainage facilities, other than culverts.
402-1.06 **COMPREHENSIVE DRAINAGE PLAN**: refers to a storm water runoff mitigation plan for multi-phase developments. Such a plan need not be adopted by the County, but will be kept on file by the Director.

402-1.07 **CONSTRUCTED CHANNEL**: refers to the physical modification of natural channels or the construction of channels.

402-1.08 **CONTROL FACILITY**: are those hydraulic structures which mitigate the effects of surface runoff resulting from development, flow pattern modification, or flood flows.

402-1.09 **CULVERT**: is a hydraulically short conduit which conveys storm runoff flows through a roadway embankment or past some other type of flow obstruction.

402-1.10 **DESIGN PONDING DEPTH**: is the depth to which the design volume will pond in a storm water basin.

402-1.11 **DETENTION BASIN**: is a storm water facility designed to affect flood hydrograph peak attenuation.

402-1.12 **EMBANKMENT AREA**: is an area of compacted fill material.

402-1.13 **ENCROACHMENT**: refers to any change in land use that materially alters the lands flow conveyance potential.

402-1.14 **FLOOD CONTROL PLAN**: is a plan for the mitigation of flood flows originating from off-site watersheds, or resulting from on-site development.

402-1.15 **FLOOD FLOW**: shall be considered to be the CSDD for reference in these standards.

402-1.16 **FLOW PATTERN**: refers to any physical tracing resultant from the historic or existing runoff of water.

402-1.17 **INTERMEDIATE STORM DESIGN DISCHARGE (ISDD)**: is that flow determined based upon a precipitation event having a ten percent probability of being equaled or exceeded in any given year, commonly referred to as the ten-year storm.

402-1.18 **LEVEE**: is an embankment whose primary purpose is to furnish drainage or flood protection from storm water runoff and which is, therefore, subject to water loading for periods of only a few days or weeks a year.
402-1.19 **MASTER DRAINAGE PLAN:** refers to a comprehensive drainage plan or flood control plan adopted by the County which includes adopted funding mechanisms.

402-1.20 **NATURAL CHANNEL:** is a flow pattern characterized by incised flow channelization with well defined banks and including the overbank flow areas.

402-1.21 **NUISANCE FLOW:** shall be considered as those waters originating from within, or adjacent to, the development not resulting from storm runoff.

402-1.22 **ONE PERCENT RISK FLOW:** is the flow on an alluvial fan based upon the joint probability of the flow distribution at the fan apex and the probability of occurring at the development site.

402-1.23 **REASONABLE:** in the context of this section refers to the balancing of the utility of the facilities or circumstances described against the gravity of the potential for harm.

402-1.24 **RETENTION BASIN:** is a terminal storm water facility for the storage of runoff. Commonly referred to as a sump.

402-1.25 **RETARDATION BASIN:** Synonymous with Detention Basin.

402-1.26 **SLOPE EASEMENT:** shall include the horizontal dimension from the top to toe of slope plus the setback requirements specified by the Grading Ordinance.

402-1.27 **SOILS ENGINEER (GEOTECHNICAL ENGINEER):** shall mean an engineer experienced and knowledgeable in the practice of soils engineering (geotechnical engineering).

402-1.28 **SOILS ENGINEERING (GEOTECHNICAL ENGINEERING):** shall mean the application of the principles of soil mechanics in the investigation, evaluation and design of civil works involving the use of earth materials and the inspection and/or testing of the construction thereof.

402-1.29 **STRESS AREA:** refers to those locations where the erosion potential is greater than a straight, uniform channel reach, and includes junctions, transitions, and curves.

402-1.30 **WATERWAY:** refers to any natural channel, artificial channel or closed conduit, which provides a course for drainage water to flow.
Sec. 402-2  **Off-Site Capital Storm Design Discharge (CSDD) Mitigation**

The CSDD flow determined from the off-site watershed shall consider the total area of the off-site watershed. The watershed development condition may be considered in its existing condition at the time of the proposed development if no control facilities mitigating surface runoff exist, and as undeveloped if adequate control facilities mitigating surface runoff exist.

The design of all structures within the development shall be protected to a minimum of one (1) foot above the water surface associated with the CSDD.

The CSDD flow shall be received into the development without diversion onto adjacent property or causing more than one foot rise in pre-development water surface, and shall be discharged in a manner as similar as possible to the existing condition downstream of the development.

Sec. 402-3  **Off-Site Intermediate Storm Design Discharge (ISDD) Mitigation**

The ISDD flow shall be based upon the uncontrolled developed watershed proximate to the development when no defined flow pattern exists. When a flow pattern is defined, the ISDD flow determination shall include the total watershed contributing to the flow pattern.

The off-site ISDD shall be mitigated in conjunction with requirements for on-site ISDD flows.

Sec. 402-4  **Hydrologic Flow Determinations**

The CSDD and ISDD flows shall be calculated in accordance with the current Kern County Hydrology Manual.

**CHAPTER III. DRAINAGE PLANS**

Sec. 403-1  **Authority**

403-1.01 County Master Drainage Plans

The County administers master drainage plans (MDP) over some portions of the County. In these MDP areas, the design hydrology is governed by the assumption made and methodology used, in the development of the MDP or its most recent revision. Modifications to the MDP’s assumed land uses may result in the requirement of additional permanent facilities being constructed to mitigate unanticipated runoff.

If MDP planned facilities have not been constructed at the time of site development, then temporary facilities will be required to be
constructed by the Developer. Such facilities may be abandoned upon completion of the MDP facilities intended to serve the site.

403-1.02 Special Districts

Special Districts, such as Community Service Districts, may prepare comprehensive drainage and/or flood control plans for areas under their jurisdiction. Such plans are subject to the review and approval of the County.

If the Special Districts planned facilities have not been constructed at the time of site development, then temporary facilities will be required to be constructed. Such facilities may be abandoned upon completion of the planned facilities intended to serve the site.

County Service Areas are typically required to be formed for the maintenance of drainage facilities in the absence of another maintenance entity.

403-1.03 Subdivisions

These standards shall apply to the drainage/floodplain management requirements specified for subdivisions improvements in the County's Land Division Ordinance.

If the subdivisions storm runoff mitigation measures are to be constructed as part of a comprehensive drainage plan, then each phase of the development shall be designed to function independently or in conjunction with completed development phases.

403-1.04 Mobile Home/Recreational Vehicle Parks

These standards shall apply to the drainage/floodplain management review of Mobile Home/Recreational Vehicle Parks specified in the County's Zoning Ordinance.

403-1.05 Site Development

These standards shall apply to the drainage/floodplain management requirements specified for site development in the County's Building Code, Grading Code, Floodplain Management Ordinance, and all other pertinent County Ordinances.
CHAPTER IV. ALLUVIAL FAN DEVELOPMENT

Sec. 404-1 Development Policy

Development upon an alluvial fan shall mitigate the effects of the flow at the site of development, which has a one-percent risk of being equaled or exceeded in any given year. Such mitigation shall ensure that the one-percent risk flow will be received into the development site, without causing more than one foot of water surface rise resulting from encroachment at the development site, and discharge the one percent risk flow in a manner, as close as possible, to the flow pattern existing prior to development of the site.

Sec. 404-2 Flood Control Facility Requirements

The design of structural flood control measures on alluvial fans shall demonstrate that the measures will effectively eliminate alluvial fan flood hazards from the area protected by such measures. The provided analyses must include, but are not limited to, the following:

404-2.01 Engineering analyses that quantify the discharges and volumes of water, debris, and sediment movement associated with the flood that has a one percent probability of being exceeded in any year at the apex under current watershed conditions and under potential adverse conditions (e.g., deforestation of the watershed by fire). The potential for debris flow and sediment movement must be assessed using an engineering method acceptable to the Director and Federal Emergency Management Agency (FEMA). The assessment should consider the characteristics and availability of sediment in the drainage basin above the apex and on the alluvial fan.

404-2.02 Engineering analyses showing that the measures will accommodate the estimated peak discharges and volumes of water, debris, and sediment, as determined in accordance with Section 404-2.01, and will withstand the associated hydrodynamic and hydrostatic forces.

404-2.03 Engineering analyses showing that the measures have been designed to withstand the potential erosion and scour associated with estimated discharges.

404-2.04 Engineering analyses or evidence showing that the measures will provide protection from hazards associated with the possible relocation of flow paths from other parts of the fan.

404-2.05 Engineering analyses that assess the effect of the project on flood hazards, including depth and velocity of floodwaters and scour and sediment deposition, on other areas of the fan.
CHAPTER V. STREET DRAINAGE

Sec. 405-1 Design Flow

405-1.01 The ISDD shall include the evaluation of both on-site and off-site watersheds when applicable.

405-1.02 Street Conveyance

1. For Type "A" subdivisions, the ISDD may exceed the top of a six (6) inch curb by 0.10 feet.

2. For Type "B" subdivisions, the depth of flow contained within the road right of way shall not exceed 0.60 feet for the ISDD.

3. The depth of flow for the CSDD on major and secondary highways shall be maintained as not to prohibit reasonable access.

4. For mobile home/recreational vehicle parks, the depth of flow for the ISDD shall not exceed the carrying capacity of the travel way.

5. Where the discharge exceeds the above mentioned limits, a stormdrain or other facilities shall be provided to convey the excess flows.

6. The drainage system shall be free flowing and shall not allow the retention of more than one (1) foot of water measured at the flowline after the flows have subsided.

405-1.03 Sedimentation

In areas suspected of significant sediment yield from an ISDD, the following shall apply:

1. The developer's engineer shall quantify any sediment yield from on-site or off-site properties based upon the ISDD.

2. Sediment yield shall be independent of the runoff event and is to be mitigated separate from the design discharge.
3. Sediment shall not be deposited on the roadway.

4. Higher levels of mitigation may be required in mudslide-mudflow areas.

**405-1.04 Erosion**

1. Erosion protection measures based on the ISDD shall be established upstream, downstream and through the project by the developer's engineer subject to approval by the Director.

**CHAPTER VI. CULVERTS, BRIDGES AND AT-GRADE-CROSSINGS**

**Sec. 406-1 General**

406-1.01 All publicly maintained crossings of natural channels shall be bridged or culverted. The minimum length of any culvert shall be from toe-of-slope to toe-of-slope. Additional right-of-way may be required for maintenance of these facilities.

406-1.02 Roadways shall be required to bridge a floodway where encroachment of the floodway is prohibited.

406-1.03 Energy losses for bridge piers, interior walls for multiple box culverts, or other obstructions within the channel shall be predicated upon the obstruction width plus two (2) feet of debris allowance for each obstruction.

**Sec. 406-2 Culverts**

406-2.01 The ISDD for the total upstream watershed under existing conditions shall not exceed soffit of culvert.

406-2.02 The CSDD for the total upstream watershed under existing conditions will be allowed to overtop the roadway until 2.0 feet of specific energy is obtained, at which point additional culverts will be required to meet these minimum requirements.

406-2.03 The 2.0 feet of specific energy shall be calculated at the crown or high point of the traveled roadway.

406-2.04 The minimum size of any culvert under a publicly maintained roadway shall be 18 inches. For private roads or public access, which are privately maintained, this requirement may be waived.

406-2.05 Culverts shall be designed to have a minimum useful life of 50 years.
Sec. 406-3桥梁

406-3.01 最低桥墩的桥宽应为一英尺或0.2倍的以上，流量的水的表面

406-3.02 最低桥墩的桥宽应为一英尺或0.2倍的以上，流量的水

406-3.03 当堤条件存在时，最低部分的桥宽

Sec. 406-4级道

406-4.01 级道桥梁不应在公众维护道路上

CHAPTER VII. CLOSED CONDUIT SYSTEMS, CATCH BASINS

Sec. 407-1设计

407-1.01 封闭管道系统应设计为总流量减少了

407-1.02 封闭管道系统应为场上的

407-1.03 封闭管道系统应设计为有最小的寿命

407-1.04 封闭管道系统在街道

407-1.05 封闭管道系统的大小

407-1.06 封闭管道系统的大小

407-1.07 封闭管道系统应自由流动

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407-1.08 The designed pipe size shall not be allowed to decrease as the system progresses downstream.

407-1.09 The minimum slope of any closed conduit system shall be .001(.10 percent) unless otherwise approved by the Director.

407-1.10 The hydrologic tie-in design criteria for the closed conduit system shall be based on equal recurrence.

407-1.11 Closed conduit system within the street right-of-way or intended for public maintenance shall be Class III reinforced concrete pipe with rubber gasket joints, or cast-in-place concrete pipe unless otherwise approved or required by the Director.

407-1.12 The developer’s engineer shall plot the hydraulic grade line and the energy grade line profiles for the closed conduit system either on a set of, or on the original, street improvement plans. All calculations and related data for these profiles shall be included with the street improvement plans when submitted.

Sec. 407-2 Location

407-2.01 A publicly maintained closed conduit system shall be placed within the road right-of-way or easement unless otherwise approved by the Director.

407-2.02 The alignment of a publicly maintained closed conduit system shall be parallel or perpendicular with the centerline of the road unless otherwise approved by the Director.

Sec. 407-3 Freeboard

Within the closed conduit system, the hydraulic grade line shall be at least 0.5 feet below all inlet flowline elevations, and 0.5 feet below the top of non-pressure manholes.

Sec. 407-4 Manholes

407-4.01 Within the closed conduit system, manholes shall be provided at all junctions, bends, and at intervals prescribed below:

a. Manholes shall be provided at intervals no greater than 300 feet where the conduit diameter is less than or equal to 30 inches.
b. Manholes shall be provided at intervals no greater than 400 feet where the conduit diameter is larger than 30 inches, but smaller than 48 inches.

c. Manholes shall be provided at intervals no greater than 500 feet where the conduit diameter is 48 inches or larger.

**407-4.02** A pressure manhole shaft and a pressure cover shall be installed in a closed conduit system whenever the energy grade line is less than 0.50 below the top of the manhole.

**Sec. 407-5 Losses**

In addition to normal friction losses, energy losses due to entrance and exit conditions, bends, junctions, and transitions shall be computed. The engineer shall supply all data and reference material for calculated losses subject to review and approval by the Director.

**Sec. 407-6 Erosion**

**407-6.01** Velocities within the closed conduit system should not exceed 20 feet per second with standard wall RCP, or 10 feet per second for plastic pipe. Where velocities exceed 20 feet per second for RCP, or 10 feet per second for plastic pipe, a special pipe shall be installed as approved by the Director.

**407-6.02** Erosion protection against scour velocities shall be provided at the inlet and outlet of the closed conduit system. The engineer shall supply all data and reference material supporting his/her design, subject to approval by the Director.

**Sec. 407-7 Catch Basins**

**407-7.01** The inlet design at closed conduit systems (i.e., location, depression, capacity, structural, etc.) shall be subject to review and approval by the Director.

**407-7.02** Grate type inlets to the closed conduit system within the street right-of-way shall be allowed only in conjunction with side curb openings and shall be bicycle safe.

**407-7.03** The minimum width of opening for any catch basin intended to be publicly maintained shall be three (3) feet and six (6) inches (3.5').

**Sec. 407-8 Rights-of-Way/Easements**
A right-of-way sufficient to contain the closed conduit and appurtenances plus a minimum of five feet on each side, measured from the edge of the conduit or drainage structure, shall be provided but in no case shall the right-of-way be less than 15-feet in width. Whenever possible, rights-of-way for conduits shall be adjacent to property lines and outside areas where structures are planned. Under no circumstances shall closed conduits and appurtenances be constructed less than 10-feet from any planned or existing structure.

Easements will be required on all closed conduit systems outside of the street right-of-way, which are intended for public maintenance.

Land rights shall be conveyed to the County in one of the following forms, whichever is appropriate:

1. Separate parcel easement dedicated on a subdivision map.
2. Easement dedicated on a subdivision map as part of adjacent lots.
3. Fee simple or easement offered or granted by separate documents.

CHAPTER VIII. RETENTION BASIN DESIGN

Sec. 408-1 Design Volume

The design volume of storm water retention basins shall be based upon the runoff from the ISDD five-day storm event and a volume of nuisance water determined by the engineer. No runoff generated on site from the design storm or from nuisance flows will be allowed to leave the site unless downstream drainage disposal facilities exist to handle the flow. The retention of upstream off-site flows shall not be considered to reduce the size of the required on-site retention facilities or mitigate the runoff from the proposed development. An evaluation of the runoff volumes associated with the site in its existing condition shall not reduce the size of the required drainage facilities. The runoff volume from the ISDD five-day storm shall be calculated using the formula:

\[ \text{Runoff Volume} = 0.12 \times (D_{10})a_i(Area) \]

- \( D_{10} \) = 10 yr 24-hr. depth of rainfall (in.)
- \( a_i \) = average percentage of impervious area
- \( \text{Area} \) = Drainage area of total development
- 0.12 = 1.44 x 1/12
- 1.44 = 5 day mass ratio (KC Hydrology Manual, Table B-1)
- 1/12 = Conversion of rainfall depth in inches to feet
Sec. 408-2  **Hydraulic Design**

In the absence of a hydrologic volume routing analysis, the storm drain hydraulic grade line calculations shall assume that 50% of the design storm volume and 100% of the nuisance volume is in the basin when the peak flow rates occur.

Sec. 408-3  **Freeboard**

Freeboard shall be required for all retention basins having a design water depth exceeding 18 inches. Six (6) inches of freeboard will be required when the design ponding depth within the basin is four (4) feet or less. For basins with a design ponding depth greater than four (4) feet the amount of freeboard required shall be one (1) foot. Freeboard shall be measured from the lowest gutter inlet or top of bank, whichever is lower.

Sec. 408-4  **Fencing**

Retention basins shall be fenced and provided with gated access when the design ponding depth exceeds 18 inches. All retention basins, regardless of ponding depth, that are maintained by the County or an entity administered by the County shall be enclosed by a six (6) foot high masonry block wall. Exceptions may be made, subject to the Director’s approval, for certain master planned facilities intended for multi-purpose use.

408-4.01 The fence shall consist of a six (6) foot high chain link fence of 9 gage fabric with redwood slats or a six (6) foot masonry block wall or approved equal. Fence post footings shall have a minimum diameter of 12 inches and a minimum depth of 30 inches. Masonry block walls shall be designed in accordance with accepted engineering practices. Retaining walls used for basin fencing requirements shall have their design approved by the Director. See Plates R-77 thru R-82.

408-4.02 Fence setbacks measured from the top of slope shall provide a reasonable maintenance way for the equipment outlined in the maintenance plan. The following minimum setbacks shall apply:

<table>
<thead>
<tr>
<th>Design ponding depth</th>
<th>Setback</th>
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<tbody>
<tr>
<td>≤ 18 inches</td>
<td>2 feet</td>
</tr>
<tr>
<td>&gt; 18 inches but ≤ 4 feet</td>
<td>5 feet</td>
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<tr>
<td>&gt; 4 feet</td>
<td>10 feet</td>
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<tr>
<td>&gt; 8 feet</td>
<td>10 feet (or in accordance with an approved maintenance plan).</td>
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408-4.03 The basin access gate may be chain-link, wrought iron, or other as approved by the Director. The double gate is not to be attached directly to the masonry wall. The opening must be sufficient for the 14-foot double gate and anchor posts. If wrought iron is used, a metal
mesh privacy screen is to be securely attached to the double gate by rivets or equivalent as approved by the Director. Wrought iron double gates will also require a commercial grade latch or equivalent that can be locked with a County padlock (3/8" shackle diameter). See Plates D-11 for specific sizing and material requirements.

Sec. 408-5  Access

An equipment access ramp to the bottom of the retention basin shall be provided when the design depth exceeds 18 inches or when the facility is intended for County maintenance.

408-5.01 The ramp shall be a minimum of 12 feet wide with a maximum slope of 15%. The gate to the access ramp shall be 14 feet wide.

Exception - When the design ponding depth is ≤4 feet, the maximum slope on the ramp may be increased to 20%.

408-5.02 Ramps shall not be designed to convey drainage water into the sump.

408-5.03 The ramp alignment shall be no more than 45 degrees from the center of the access gate to facilitate maintenance equipment ingress and egress. Other proposed alignments shall have their design approved by the Director.

Sec. 408-6  Curbing and Rodent Barriers

408-6.01 In conjunction with fencing, a six (6) inch wide, eighteen (18) inch deep continuous concrete curb shall be provided around the top of the sump. The top of the curb shall be 0.5 feet above the highest adjacent grade. When the sump is fronting on a street, the top of the curbing shall be a minimum of one (1) foot above the top of the street curb. Ramped access across the curb shall be provided at all gated access points to the sump.

408-6.02 Rodent barriers will be required on the sides of the sump in proximity to open space, agricultural areas or lot one (1) acre or larger. The bottom of the rodent barrier shall be a minimum of 42 inches below finish grade.

Exception - Rodent barriers may be omitted when the design water depth is 4 feet or less.

Sec. 408-7  General Construction Requirements

408-7.01 General construction requirements for retention facilities shall be in accordance with Plates D-1, D-2, and D-3.
408-7.02 Retention facilities shall have the design volume contained entirely in cut.

408-7.03 Slopes shall be designed no steeper than is safe and no steeper than two (2) horizontal to one (1) vertical. A slope stability analysis will be required when the design water depth exceeds eight (8) feet and side slopes are steeper than 3:1.

408-7.04 The minimum bottom dimension for retention basins with a design depth greater than four (4) feet shall be 20 feet. For design water depths 4 feet or less, the minimum bottom width shall be no less than that required for maintenance equipment specified in the maintenance plan.

408-7.05 The maintenance way shall be sloped away from the top of bank at a minimum 2%.

408-7.06 Drainage basins intended for County maintenance shall be located on a lot dedicated exclusively for drainage/recreational purposes.

Sec. 408-8 Testing

408-8.01 Retention basins shall not be permitted unless it can be demonstrated, to the satisfaction of the Director, that the basin will completely drain the design volume within seven (7) days.

408-8.02 Testing of the proposed retention basin shall be provided by a Soils Engineer and shall include, but need not be limited to, an analysis of the soils boring logs and the establishment of the drainage rates of the soils encountered. A minimum of one (1) boring shall be logged within the proposed sump location. This boring shall be advanced below the invert of the basin to a depth equivalent to at least three (3) times the design ponding depth. Testing methods used to establish soil drainage rates shall be approved by the Director.

CHAPTER IX. DETENTION BASIN DESIGN

Sec. 409-1 Design Flow

The design flow into the basin shall be the ISDD five-day runoff hydrograph. Hydrograph design and mass ratios shall be in accordance with the Kern County Hydrology Manual. The out flow hydrograph shall not extend beyond five days from the end of the inflow hydrograph. Infiltration effects from the detention facility shall not be included in the calculation of the outflow hydrograph.
Sec. 409-2  **Facility Design**

Sizing and placement of detention facilities shall not aggravate the potential for downstream flooding.

Requirements for fencing, curbing, setbacks, access, and freeboard shall be in accordance with retention basin design.

409-2.01 Detention basins shall be provided with a concreted low flow bypass, or approved equivalent, for the conveyance of nuisance flows to the outlet.

409-2.02 An emergency spillway will be incorporated in the design of all detention basins.

Sec. 409-3  **Sedimentation**

Sediment yield shall be determined and mitigation provided by the developer's engineer.

Sec. 409-4  **Duplex Pump Station (Wet Well) Design Specifications**

Pumps used in conjunction with detention facilities shall have their design approved by the Director. Specific design criteria shall include the use of an automated duplex pump, and an alarm system. The pump system shall be designed to pass a minimum two (2) inch sphere and for reliability and low maintenance. Pump maintenance shall be included in the facility maintenance plan.

409-4.01 Pump station shall be designed to drain the sump in 5 to 7 days with one (1) pump running. However, the minimum flow rate shall be 100 gpm.

409-4.02 Pump station shall be a duplex system which automatically alternates between pumps at the end of each cycle.

409-4.03 The pump station shall either include a lag pump design or automatic controls, which will start the second pump if the first fails to pump.

409-4.04 Pumps shall be minimum one (1) HP.

409-4.05 Pump station shall be designed to allow easy removal of pumps for maintenance, without requiring personnel to enter into a wet well or similar enclosed structure. A “cage” style pump system, where the pump is located in a cage structure at the bottom of the basin, will not be allowed.
409-4.06  Pumps and pump station inlet structure shall be screened to prohibit plugging by debris.

409-4.07  The pump station (including the electrical/control panel) shall be located next to the entrance of the basin.

409-4.08  The receiver wet well shall consist of one 60" diameter concrete precast manhole sections with single offset R-3 rubber gasket joints per ASTM C-478, latest edition or approved equal. Duplex pump system shall be equipped with two 1HP (minimum), 115V, non-clog, explosion proof, sump pumps with alarm and alarm switch, check valves, ball valves, discharge line, pump lift out assembly, and electrical junction box. Include a 30" x 42" hatch with lockable, steel hinged access with safety grate.

409-4.09  The lifting assembly shall be best suited for the pump arrangement. All cables, etc. are to be stainless steel nylon coated. All slide metal surfaces must be considered non-sparking, by URL, to prevent spark ignition in wet well.

409-4.10  The valve vault shall consist of one 42" diameter concrete precast manhole section (conforming to ASTM C-478 with single offset R-3 gasket joints) with gate valves, swing check valves, and adjustable pipe supports or equivalent. Include a 24" x 24" hatch with lockable, hinged steel access door with safety grate.

409-4.11  Sump pump wiring shall be connected to a waterproof electrical control panel in a NEMA 3 enclosure or equivalent.

409-4.12  A four inch (4") thick Class 2 concrete pad will be required to encompass the precast top slabs, manholes and control panel.

409-4.13  All electrical conduits and connectors shall be sealed water-tight and gas-tight using bitumastic paint.

409-4.14  All pipe or conduit wall penetrations shall be sealed with a neoprene seal.

409-4.15  All exposed steel (pipe, valves, flanges, elbows, and control box exterior) shall be primed with zinc-chromate primer and painted with an epoxy enamel finish. Color to be grey unless otherwise approved.
409-4.16 A water level staff shall be placed in the sump. The staff may be either anchored to the sideslope of the sump or be attached to the outlet structure, as approved by the Director. The bottom portion of the staff shall be painted black and white, alternating at one-foot increments, to an elevation equivalent to the half full-depth of the sump. The top portion of the staff shall be painted red and white, alternating at one-foot increments, to one foot above design water surface.

409-4.17 All controls shall be mounted in a NEMA (3) metal enclosure or equivalent. The control panel and all electrical components shall bear the Underwriter’s Laboratory (UL) Label. All circuit breakers shall have operators extending through the control panel door. All motor starter overload resets, selector switches, push buttons and pilot lights shall be mounted on the control panel door. The control panel shall be enclosed in a vandal resistant enclosure with provisions for locking with a County’s lock 3/8” shank pad lock or approved equal.

409-4.18 The control for each pump shall include a thermal magnetic circuit breaker, rotary hand-off-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 control panel door is open, a control mounted transformer with fused 115 volt secondary, and a door mounted control circuit disconnect switch.

409-4.19 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.

409-4.20 A fourth level sensor, with intrinsically safe circuit, shall be furnished for indication of high water alarm condition. High water alarm shall be indicated by a panel-mounted pilot light and external audible alarm with silence button.

409-4.21 The controls shall provide for lead/lag sequencing of the pumps, an automatic alternator shall alternate the lead/lag duty 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 alarm lamp to indicate possible outer motor seal failure and the alarm light.

409-4.22 The pump station shall have a Hand-Off-Auto switch and an automatic low water shut-off, and have green (run) and red (alarm) indicator lights visible from the road/street.

409-4.23 Control panel shall contain hour meters for each pump.

409-4.24 Control panel shall contain a switched GFI 115 volt duplex electrical outlet.

409-4.25 Control panel shall include an emergency generator hook-up connection.

409-4.26 System Testing—Installed pumps, controls and pipes shall be tested in accordance with recommendations of the manufacturer prior to acceptance by the Kern County Engineering, Surveying & permit Services Department.

409-4.27 Prior to acceptance, two (2) complete operation and maintenance manuals, with wiring and interconnect diagrams for all equipment and controls, model and serial numbers of the sump pumps, and a set of as-built drawings on cronar shall be furnished to the County.

CHAPTER X. CONSTRUCTED CHANNEL DESIGN CRITERIA

Sec. 410-1 Design Flow

Constructed channels shall be designed to carry the CSDD plus freeboard.

Sec. 410-2 Freeboard

410-2.01 The minimum freeboard between the design water surface, and the top of bank of the channel shall be 0.50 feet or 0.20 of the specific energy, whichever is greater.

410-2.02 If the designed water surface is within the embankment area, the design and construction of the channel shall be in accordance with the levee design criteria, including freeboard requirements.

410-2.03 The minimum freeboard requirements for bridges, culverts, and utility crossings which span open channels and which are existing, planned...
or projected at the time of channel design shall be in accordance with the requirements specified in Sections 406-2 and 406-3.

410-2.04 Superelevation resultant from directional modification shall be considered prior to computing the required freeboard.

Sec. 410-3 **Hydraulic Design**

410-3.01 Channels shall be designed with proper allowance for hydraulic losses for all planned and projected future crossings or other obstructions to maintain clearance and freeboard as required.

410-3.02 The water surface and the energy grade line profile shall be computed and plotted for all constructed channels and at locations where natural channels modifications are proposed.

410-3.03 Constructed channels shall not be designed with a slope in the range of ± 20% of critical slope unless freeboard equal to the height for instability waves is added.

410-3.04 A minimum velocity of two (2) feet per second shall be maintained for lined channels to prevent sedimentation.

Sec. 410-4 **Structural Design**

410-4.01 The minimum bottom width of constructed channels shall be ten (10) feet. A triangular channel may be permitted when the channel side slopes are four (4) to one (1) or flatter.

410-4.02 The minimum centerline radii for curves in constructed channels shall be three (3) times the top width of the design water surface.

410-4.03 Design of slopes shall be predicated upon results of an investigation by a Soil Engineer, subject to the approval of the Director.

410-4.04 Adequate bank protection and drop structures shall be provided where the slopes in the channel are steep and high velocities are present.

410-4.05 Bank protection shall be provided based on the design engineer's recommendations, subject to the approval of the Director. Stress area protection shall extend downstream from the end of the stress area a distance equal to ten (10) times the design water depth, unless the engineer can show that the erosion potential is not excessive.
410-4.06 At drop structures or in other locations where a hydraulic jump may occur, bank protection shall be provided through the hydraulic jump for a minimum distance of six (6) times the sum of the sequent depth and the depth of freeboard. This protection shall cover the invert and extend to the height of the sequent depth plus the height of the freeboard. The protection material may be either concrete, concreted-rock slope protection, sacked concrete, air-blown mortar or other approved alternative.

410-4.07 All channel lining materials and methods shall be specified by the engineer and approved by the Director.

410-4.08 All appurtenant drainage facilities shall be constructed and areas adjacent to channels graded so that erosion will be prevented within the channel right-of-way.

410-4.09 Waterways shall enter the main channel at an angle not exceeding 25 degrees.

Sec. 410-5 Erosion

The engineer shall provide recommendations on all necessary mitigation measures for erosion including bank protection and bottom stabilization of the channel, subject to the approval of the Director.

Sec. 410-6 Fencing

410-6.01 Constructed channels with slopes steeper than four (4) to one (1) with specific energy, at any point, greater than 1.5 feet shall be fenced in its entirety.

410-6.02 A six (6) foot high nine (9) gage chain link fence fabric with tension wire shall be installed on each side of the right-of-way.

410-6.03 At all road intersections, fencing shall be installed to prevent public access to constructed channels.

410-6.04 A 14 foot wide chain link drive gate shall be provided at all points of vehicular access.

Sec. 410-7 Easements/Right-of Ways and Maintenance Ways

410-7.01 Right-of-ways for constructed channels with side slopes steeper than four (4) to one (1) shall be provided as follows:
a. The right-of-way for channels with top widths greater than 50 feet, as measured to the top of freeboard, shall include the top width of the channel, two maintenance ways (one on each side of the channel), slope easements (when applicable), and interceptor ditch area (when applicable). The maintenance ways shall be a minimum of 15 feet wide. Runoff from the maintenance ways shall be mitigated.

b. The right-of-way for channels with top widths of 50 feet or less, as measured to the top of freeboard, shall include the top width of the channel, one maintenance way on either side of the channel, slope easements (when applicable), and interceptor ditch area (when applicable). The maintenance way shall be a minimum of 15 feet wide. Runoff from the maintenance way shall be mitigated.

410-7.02 The right-of-way for constructed channels with side slopes four (4) to one (1) or flatter shall be sufficient to contain the top width of the channel (measured from top of freeboard) plus slope easements as needed. A minimum of five (5) feet on either side of the channel shall be provided for maintenance purposes.

410-7.03 Right-of-way for turn-around: Turn-around distance and radii:

At the terminus and at intervals not to exceed one channel mile, turn around areas shall be provided. The minimum inside radii for maintenance roads shall be 40 feet.

410-7.04 Tributary waterways shall be conveyed under maintenance roads in closed conduits or culverts as applicable. Where open channel tributaries cross a maintenance road, a convenient turn-around area shall be provided for maintenance vehicles. The minimum diameter of a turn-around shall be 40 feet.

410-7.05 Right-of-Way for Channels Intersecting Public Roads:
At intersections of the channel with public roads, sufficient right-of-way shall be provided to permit access from the public road to the maintenance road as approved by the Director.

In the event that the channel right-of-way does not intersect a public road, a turn-around or a 15 foot wide access right-of-way shall be provided from a public road to the channel right-of-way at intervals not to exceed one (1) channel mile.
Sec. 410-8  Sedimentation

The determination of sediment yield and proposed mitigation measures of such shall be prepared and recommended by a qualified registered civil engineer, subject to the approval of the Director.

CHAPTER XI. LEVEE DESIGN

Sec. 411-1  Design Flow

Levees shall be designed to accommodate for the CSDD plus freeboard.

Sec. 411-2  Freeboard

411-2.01 The minimum freeboard between the designed CSDD water surface and the levee's top of bank shall be three (3) feet or 0.20 times the specific energy plus one (1) foot, whichever is greater.

411-2.02 An additional one (1) foot, above this minimum of freeboard, shall be required within 100 feet of either side of structures within the levee or whenever the flow is constricted, such as at bridges. An additional 0.50 foot above the minimum is also required at the upstream end, tapering to the minimum at the downstream end of the levee.

Sec. 411-3  Hydraulic Design

See Section 410-3 Hydraulic Design for details.

Sec. 411-4  Structural Design

Levees shall be designed in accordance with the latest revision of the Corps of Engineers Design and Construction of Levees, Engineer Manual, EM1110-2-1913.

Sec. 411-5  Erosion

Mitigation measure for erosion protection shall be prepared and recommended by a registered civil engineer, subject to the approval of the Director.

Sec. 411-6  Fencing

Fencing requirements for levees shall be in accordance with the criteria contained in the constructed channel design, Section 410-6.
Sec. 411-7  **Easements/Right-Of-Way**

Access, easements and right-of-way shall be in accordance with the requirements set forth in Section 410-7. (Constructed Channels).

Sec. 411-8  **Sedimentation**

Mitigation measures shall be prepared and recommended by a qualified, registered engineer, subject to the approval of the Director.

Sec. 411-9  **Maintenance**

A maintenance plan and an entity with taxing power to maintain levees shall be established, subject to the approval of the Director. Neither the County nor County Service Area will maintain a levee.

**CHAPTER XII. NATURAL CHANNELS**

Sec. 412-1  **Delineation**

All natural channels shall be identified and clearly delineated on the plans with the appropriate floodplain designation.

For defined natural channels, the Floodplain and Floodway Boundaries shall be delineated, subject to the approval of the Director.

Sec. 412-2  **Setback**

The minimum setback from the top of bank of a natural channel with side slopes steeper than two (2) horizontal to one (1) vertical, shall be a two (2) to one (1) slope plus a 10 foot wide buffer strip. The setback shall be measured from the toe of the slope. Where the slopes are flatter than two (2) to one (1), the required setback shall be a minimum of 10 feet from the Floodway limit.

Sec. 412-3  **Tie-Ins**

Where natural channels merge into constructed channels, the tie-ins shall be designed in a manner to dissipate energy and protect against erosion. The design for such tie-ins shall be in accordance with acceptable engineering practices and approved by the Director.

Sec. 412-4  **Relocation**

Should an existing natural channel be relocated, the channel shall be designed in accordance with the criteria specified herein for constructed channels.
Sec. 412-5 Use of Natural Facilities

All applicable Federal and State permits and requirements shall be required for any operation that would discharge dredged or fill material in any waters of the United States (normally channels identified with blue lines on the U.S.G.S. maps).
6' HIGH CHAIN LINK FENCE WITH 6" X 18" CONCRETE CURBING, 9 GAUGE FABRIC, WITH REDWOOD SLATS OR EQUIVALENT, AND 17 GAUGE MIN. POSTS. FOR COUNTY MAINTAINED FACILITIES A 6' HIGH MASONRY BLOCK WALL PER PLATES R-77 THROUGH R-82, IS REQUIRED.

SECTION A-A

CONSTRUCT 6' HIGH CHAIN LINK FENCE WITH CONCRETE CURBING AND REDWOOD SLATS OR EQUIVALENT. COUNTY MAINTAINED FACILITIES REQUIRE A 6' HIGH MASONRY BLOCK WALL.

NOTES:
1. MAY EXCEED 8' IF SIDE SLOPES ARE 3:1 OR FLATTER; OR A SLOPE STABILITY ANALYSIS IS PROVIDED.
2. VARIATIONS TO THE DIMENSION MAY BE APPROVED BY THE DIRECTOR.
3. ADDITIONAL REQUIREMENTS MAY BE IMPOSED AS PART OF THE CONDITIONS ISSUED.
4. COMPACT O.G. TO 95% FOR MINIMUM OF SIX (6) INCHES UNDER 2" A.C.
5. WHEN FENCE IS SET ON FRONT R/W LINE SIDEWALK SHALL BE FULL WIDTH.
6. TACK WELD FABRIC AND HARDWARE TO POSTS.
7. TREAT BLOCK WALL WITH ANTI-GRAFFITI PRODUCT SUBJECT TO APPROVAL OF THE DIRECTOR.
8. CONSTRUCT 6" X 18" CONCRETE CURB UNDER GATE W/ TWO (2) #4 REBAR TOP AND BOTTOM.

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

SUMP DETAILS

PLATE NO. D-1

219
CURBING AND RODENT BARRIER DETAILS

#4 - TOTAL 4

#4 EDGE BAR

CATCH POINT

SLOPE

VARIABLE

FILL MATERIAL

REPRESENT TO PLAN FOR ACTUAL PIPE SIZE

DISCHARGE STRUCTURE

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

CURBING, RODENT BARRIER,
AND DISCHARGE STRUCTURE
DETAILS

PLATE NO.
D-2
6' HIGH CHAIN LINK FENCE WITH 9 GAUGE FABRIC AND REDWOOD SLATS (ALL SIDES). FOR COUNTY MAINTAINED FACILITIES A 6' HIGH MASONRY BLOCK WALL, PER PLATES R-77 THROUGH R-82 IS REQUIRED.

SECTION A-A

6' HIGH CHAIN LINK FENCE WITH 9 GAUGE FABRIC AND REDWOOD SLATS (ALL SIDES). COUNTY MAINTAINED FACILITIES REQUIRE A 6' HIGH MASONRY BLOCK WALL.

SUMP PLAN

NOTE:
SEE ADDITIONAL NOTES AND REQUIREMENTS FOR CHAIN-LINK FENCES AND MASONRY WALLS ON PLATE D-1

PLANNED: 02/15/2010

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

SHALLOW SUMP DETAILS

PLATE NO. D-3
NOTES:

1. ALL CONCRETE SHALL BE MINOR CONCRETE.
2. WALL REINFORCING NOT REQUIRED WHEN H = 8’ OR LESS AND THE UNSUPPORTED LENGTH OF ALL WALLS = 7’ OR LESS. WALLS EXCEEDING EITHER LIMIT SHALL BE REINFORCED WITH #4 BARS AT 18” CENTERS PLACED 1 1/2” CLEAR TO INSIDE OF BOX UNLESS OTHERWISE SHOWN.
3. GALVANIZING – SEE STANDARD SPECIFICATIONS OR SPECIAL PROVISIONS.
4. T = 6” WHEN H = 8’ OR LESS AND THE UNSUPPORTED LENGTH OF ALL WALLS = 7’ OR LESS. WALLS EXCEEDING EITHER LIMIT SHALL HAVE T = 8”.
5. LOCATION OF FRAME AND COVER TO BE DETERMINED BY THE ENGINEER.
6. PRECAST ALTERNATIVE IS OPTIONAL. SEE SECTION 51-1.02 OF STANDARD SPECIFICATIONS.

TRAFFIC FRAME AND COVER SET TO GRADE AS DIRECTED BY THE ENGINEER. COVER AND FRAME MACHINED TO FIT. COVER TO HAVE RADIAL BLOCK TREAD, FRAME TO HAVE FLANGE DOWN, APPROXIMATE WEIGHT = 315 POUNDS. SEE NOTE #5

PRECAST CONCRETE ADJUSTMENT RINGS

SEE DETAIL A FOR REINFORCING AROUND
DETAIL A
NO SCALE

IN FIELD IN ROADWAY

TOP OF CONCRETE
1/4" BELOW EXIST. SURFACE

MINOR CONCRETE PAD
(SIX SACKS)

STANDARD GRADE RING

STANDARD ECCENTRIC CONE

MINOR CONCRETE PAD
(SIX SACKS)

STANDARD CENTER SECTION
(Shaft)

STANDARD BOTTOM SECTION
(Shaft)

W=52" MIN. WITH 36" MANHOLE
W=64" MIN. WITH 48" MANHOLE

SECTION A-A
NO SCALE

TYPICAL C.I.P. MANHOLE—PLAN VIEW
NO SCALE

MANHOLE COVER AND
CONCRETE PAD
NO SCALE

NOTES:
1. MANHOLE CONSTRUCTED ON CONCRETE PIPE OF 36" I.D. OR GREATER SHALL USE 48" SHAFT;
   CONCRETE PIPE WITH LESS THAN 36" I.D. SHALL USE 36" SHAFT.
2. USE COMBINATION OF CONE AND SHAFT AS DIRECTED BY THE ENGINEER.
3. ALL CONCRETE TO BE MINOR CONCRETE.
4. ALL REINFORCING TO BE NO.4 BARS AT 12" O.C., 1 1/2" CLEAR OF INSIDE FACE UNLESS
   OTHERWISE NOTED. SEE DETAIL "A" FOR REINFORCING AROUND PIPE.
5. ALL EXPOSED METAL PARTS SHALL BE GALVANIZED AFTER FABRICATION EXCEPT FRAME AND
   COVER.
6. LOCATION OF FRAME AND COVER TO BE DETERMINED BY THE ENGINEER.
7. ALL REINFORCEMENT FOR SURFACES IN CONTACT WITH THE GROUND SHALL BE PROTECTED
   WITH NOT LESS THAN 2" OF CONCRETE.
8. WORDING ON MANHOLE TO READ "STORM DRAIN".
SECTION A–A

FRONT

PLAN

INLET STRUCTURE

GRATE NOTES:

1. GRATE FABRICATED OR EQUIVALENT SHELF ITEM—ALL PARTS & PRODUCTS GALVANIZED

2. FRAME CONSTRUCTED W/ 1/4" X 3/4" X 2" X LENGTH (VARIES TO PIPE SIZE) ANGLE IRON

3. MIN. FOUR–3/8"X 3" S.S. RED HEAD ANCHOR BOLTS FLAT LOCK WASHER, 2 EA PER VERTICAL ANGLE 3" FROM TOP & BOTTOM OF FRAME.

4. FOUR–1/2" DIA. HOLES IN FRAME

5. GRATE OPENING 1 3/16" X 2" O.C.

6. 1/4" DIA ROD WELDED TO FRAME ON ALL SIDES

NOTES:

1. PIPE DETAIL REFER TO PLATE D–2.

Revisions
Date  Desc
4–30–2009

Designed By: K.L.H.

Drawn By: B.D.H.

Check By: A.A.

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT
STANDARD

PUMP STATION
INLET STRUCTURE

PLATE NO.
D–6
FORCE MAIN DISCHARGE PIPE

MANHOLE PER K.C.D.S. PLATE R-71

PREFABRICATED INTERIOR BOX AT 45° ANGELS TO DRAIN WITH FLOW OF STREET.

DISCHARGE STRUCTURE

SECTION A-A

TOP OF GRADE 1'

TOP OF STRUCTURE

HORIZONTAL 45° SWEEP

SECTION B-B

0.25"X3" OUTLET W/ GALV. STEEL RODENT FLAP GATE

FORCED MAIN DISCHARGE PIPE

GALV. STEEL ANGLE W/ ANCHOR BOLTS @ 12" O.C.
GALV. STEEL RODENT FLAP W/ MIN OF 2 HINGES.

#3 REBAR @ 9" O.C. EACH WAY

.17'

.25'

.25'

.5'

.25'
TYPICAL CHAIN LINK FENCE DETAIL

FENCING SPECIFICATIONS:
1. FENCING FABRIC SHALL BE 9 GUAGE, 2" MESH, AFTER WEAVING, KNUCKLED TOP AND BOTTOM, 6" HIGH GALV.
2. CORNER POSTS SHALL BE 2-3/8" O.D. GALV. PIPE.
3. LINE POST 2-3/4" O.D. GALV. PIPE.
4. PRIVACY SLATS SHALL BE 2-3/8" X ¼".

NOTES:
1. INSTALLATION OF FENCING AND GATES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF "STANDARD SPECIFICATION, STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION," APPROVED CURRENT EDITION.
2. CONCRETE CURBING SHALL BE CONSTRUCTED UNDER ALL FENCES. CURBING SHALL BE 6" X 18", CLASS 3 CONCRETE.
3. CORNER POST SHALL BE INSTALLED AT ALL ANGLES IN FENCE LINE IN EXCESS OF 10°.
4. END, CORNER, AND GATE POSTS SHALL BE BRACED TO THE NEAREST LINE POST WITH GALV. DIAGONAL OR HORIZONTAL BRACES USED AS COMPRESSION MEMBERS AND GALV. 0.375" STEEL TRUSS RODS WITH TURNBUCKLES OR TRUSS TIGHTENER USED AS TENSION MEMBERS.
5. FABRIC SHALL BE FASTENED TO GATE POST, TERMINAL POST, OR CORNER POST WITH 3" X 3/4" STRETCHER BAR BONDS AT 8" ON CENTER.
6. FABRIC SHALL BE FASTENED TO LINE POST, LAST RUNNER, AND BOTTOM TENSION WIRES WITH FABRIC BONDS SPACED APPROX. 14" APART.
7. FABRIC SHALL CONFORM TO ASTM A-392, CLASS 1.
8. SUBGRADE PREPARATION SHALL BE CONSTRUCTED TRUE TO GRADE AND CROSS SECTION WITH COMPACTION OF 85% TO A DEPTH OF 0.5".
9. WHEN REDWOOD SUBURBAN SCREEN, OR EQUIVALENT IS REQUIRED IT SHALL BE CONSTRUCTED SO THAT THE SLATS ARE LOCKED INTO POSITION AND CAN ONLY BE REMOVED WITH TOOLS.
10. FENCE FABRIC IS TO BE TACK WELDED TO POSTS IN THREE PLACES (TOP, CENTER, AND BOTTOM). FENCE HARDWARE IS TO BE TACK WELDED AND GROUND SMOOTH. ALL EXPOSED METAL PARTS ARE TO BE GALV. PRIOR TO INSTALLATION.

PLANNED: 02/25/2010

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT
STANDARD

CHAIN LINK FENCING
SPECIFICATIONS

PLATE NO.
D-10

228
WROUGHT IRON GATE SPECS:
1. Hinge post shall be a min. of 4"x4x½" sq. tubing.
2. Gate frame shall be a min. 1-½" sq. tubing.
3. Pickets shall be a min. ¾" sq tubing with 4" max. clear dimension.
4. Privacy sheeting shall be perforated sheet metal, 24 gauge, ½" dim. hole, ¼" staggered center.
5. Gate shall be a 14' double gate.
6. Gate latch shall have commercial grade locking device for ¾" padlock shank or a locking device that can be keyed to the standard K.C.E.S.S. key-core.

privacy sheeting detail

chain link double gate

NOTES:
2. End, corner, and gate posts shall be braced to the nearest line post with galv. diagonal or horizontal braces used as compression members and galv. 0.375" steel truss rods with turnbuckles or truss tensioners used as tension members.
3. When redwood suburban screen, or equivalent, is required it shall be constructed so that the slats are locked into position and can only be removed with tools.
4. Frames shall be made with fittings or welds ground smooth, and galvanized.
5. Chain link fence fabric shall conform to ASA-A-393, Class 1, and be installed in accordance with the requirements of section 80-4 of the "standard specifications. State of California, Department of Transportation," approved current edition.

double drive gate
width=14'
height=6'
frame=1.875" o.d. galv. pipe 2.72lb/ft
commercial locking device with drop rod

plotted: 02/25/2010

rev. date desc.
6-6-2009 designed by: k.l.h.
drawn by: b.d.h.
checked by: a.a.
TRANSVERSE PROTECTION BAR

NOTES:
1. ALL CONCRETE SHALL BE CLASS 3.
2. SEE PLATE D-10 FOR ADDITIONAL FENCE DETAILS.
3. ALL EXPOSED METAL PARTS ARE TO BE GALV PRIOR TO INSTALLATION.
4. HARDWARE IS TO BE TACK WELDED AND GROUND SMOOTH AND GALV.
5. SEE PLATE D-2 FOR RODENT BARRIER DETAILS.

DETAIL "A"

2 3/8" IRON PIPE GALV.

SIDE VIEW

2 3/8" IRON PIPE GALV.

3/8" BOLTS SPOT WELDED

PLAN VIEW

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT
STANDARD
FLOOD ZONE FENCING
SPECIFICATIONS

PLATE NO.
D-12
DIVISION FIVE

STANDARDS FOR LANDSCAPING

CHAPTER I. GENERAL

Sec. 501-1  Purpose and Scope

This division establishes the minimum standards of design, materials, plants, and methods to be used in providing landscaping for developments in Kern County. Landscaping required by development or within a County right-of-way shall be maintained by an entity approved by the Director. A County Service Area (CSA) or Park District are examples of acceptable maintenance entities. All landscaping installed in County right-of-way shall require an encroachment permit from the Roads Department.

Sec. 501-2  Procedures

The following procedures shall be used when landscaping is to be provided:

501-2.01  Maintenance entity/CSA shall be formed prior to approval of landscape plans.

501-2.02  Landscape plans shall be submitted to the Department for checking. All Landscape plans and specifications shall be designed in compliance with Article 10.8 of the Government Code, State and/or local regulations and ordinances relating to water conservation.

501-2.03  Landscape plans shall be approved by the Director and the maintenance entity.

501-2.04  Provisions from Division One, Standards for Streets, Chapter VI shall be met.

501-2.05  The plans shall clearly show the location of all valves, meters, backflow preventers, controllers, sprinkler heads, points of connection to the water system and other such equipment. These exact locations shall be indicated on the "As Built, Record Drawings" to allow easy location. The As Built, Record Drawings shall be prepared by the Landscape engineer/architect.

The plans shall clearly show existing and proposed streetlights, utility poles, utility vaults and fire hydrants.

501-2.06  The plans shall be prepared on mylar or similar material on sheets sized to 24 X 36 inches.
Title sheet shall identify the development, contain a vicinity map, a key map (scale 1 inch = 200 feet), signature blocks for the Landscape designer and the maintenance entity/CSA.

The balance of the drawings shall be drawn at a scale not less than 1 inch = 20 feet.

Where shrubs or trees are to be planted, the sight distance lines, Plate No. R-71 shall be overlaid on the plans to show that the plants and other improvements do not interfere with clear zones. See Division I Section 106-1 Landscaping, for sight distance requirements.

**CHAPTER II. IRRIGATION SYSTEM**

Sec. 502-1  **General Design Notes**

502-1.01 All electrical wiring, controls, and devices shall be U.L. listed, and so labeled. Other approval organizations will be subject to review and approval prior to installation.

502-1.02 The landscape system shall be designed to properly function from service pressure without the use of pumps.

502-1.03 Sprinkler heads shall be selected to limit the amount of overspray on walls, sidewalks, or pavement.

502-1.04 All sprinklers and quick coupling valves shall be installed using double swing joints.

502.105 A master irrigation plan shall be submitted for phased development.

502.106 Irrigation system shall be designed to minimize the number of meters and backflow devices.

Sec. 502-2  **As-Built Drawings**

502-2.01 Provide a complete "As-Built" record set of prints which shall be corrected daily and show every change from the original drawings and the exact "As-Built" locations, sizes, and kinds of equipment. The "As-Built" prints shall be a set of cronar or similar mylar material. All work shall be in waterproof, red ink and applied to the mylar by a technical pen made expressly for use on mylar material in a neat and complete legible manner.
502-2.02 The As-Builts shall be dimensioned from two permanent points of reference, i.e., building corners, sidewalks, or road intersections, etc., and accurately show the location of the following items:

a. Connection to existing water lines.

b. Connection to existing electrical power.

c. Gate valves, remote control valves, quick couplings and related equipment.

d. Routing and/or directional turns of sprinkler pressure lines and control wiring (dimension max. 100 feet along routing).

Sec. 502-3 **Controller Charts**

Provide three controller charts for each controller supplied, one is to be attached in the controller and the other turned over to the County in the Operation and Maintenance Manuals. Chart attached to controller shall be laminated to prevent weather damage.

The chart shall indicate the area controlled by the automatic controller and shall be the maximum size which the controller door will allow.

Sec. 502-4 **Operation and Maintenance Manuals**

Prepare and deliver prior to completion of construction, two (2) hard cover three (3) ring binders containing the following information:

502-4.01 Index sheet stating landscape Contractor's address and telephone number, list of equipment with contacts for manufacturer's representative.

502-4.02 Catalog and part sheets on all material and equipment installed.

502-4.03 Complete operating and maintenance instructions on all major equipment.

**CHAPTER III. MATERIALS**

Sec. 503-1 **PVC Pipe and Fittings**

503-1.01 Pressure Main Line Piping and Fittings: Sizes two and one half (2-1/2) inches or larger shall be P.V.C. class 200 ring tite or approved equal.
503-1.02 Pressure Main Line Piping and Fittings: Sizes two (2) inches and smaller shall be Schedule 40 P.V.C.

503-1.03 Non-pressure laterals shall be minimum thickness Schedule 40 P.V.C.

503-1.04 P.V.C. nipples shall be schedule 80 with molded threads.

503-1.05 All pipe and fittings shall conform to specific requirements as follows:

a. P.V.C. Pipe: Manufactured from virgin polyvinyl chloride compound in accordance with ASTM D1784 or ASTM D2241, Cell classification 12454B.

b. P.V.C. Fittings (solvent weld or thread): Standard weight, schedule 40, side gated, injection molded P.V.C. complying with ASTM D1784, cell classification 13454B, including threads when required.

Sec. 503-2 Electrical (Low Voltage)

503-2.01 Wiring sizing shall be a minimum of #14 direct burial AWG-UF, 600 volt wire, insulation thickness 3/64 inch, utilizing low density high molecular weight polyethylene insulation. Wiring shall be color coded with the common wire to be white and all others in different colors. An extra wire for every six (6) stations shall be looped in each valve box and housed in a box.

503-2.02 Splices, where necessary or permitted, shall be waterproofed using Rain-Bird, Pen Tite, or other approved equal connectors.

503-2.03 All wiring placed under concrete or pavement shall be placed in a sleeve with pull boxes at each end.

Sec. 503-3 Gate Valves

503-3.01 Gate valves three (3) inches and smaller: ASTM B62 brass body, 150 pound saturated steam rated; with screwed joints; non-rising stem; screwed bonnet, solid disc. Provide with handwheel.

503-3.02 All gate valves shall be installed with schedule 80 unions to allow easy removal and placed in an approved valve box.

Sec. 503-4 Backflow Prevention Units

503-4.01 Backflow preventer shall be designed to operate on a "reduced pressure" principle; equipped with gate valves, "Wye" strainers of
125# class brass with 40 mesh monel screen and field test cocks acceptable to the water purveyor and the Environmental Health Services Department.

503-4.02 Prior to acceptance, the backflow prevention unit must be tested and the test results submitted to, and approved by, the Environmental Health Services Department.

The backflow preventer shall be protected by a water protection unit mounted to the concrete slab and shall have adequate insulation blanket attached to the unit.

Sec. 503-5 Automatic Controller

Automatic controllers shall be the fully automatic operation type capable of independently operating the number of stations indicated.

503-5.01 Wall mount type in a housing with locking hinged cover.

503-5.02 Fuse and chassis ground all controller components.

503-5.03 The controller shall be mounted inside a stainless steel, vandal-resistant enclosure with a predrilled backboard with 117 volt duplex outlet. Metal conduit shall run from the 117 volt supply to the controller housing. All power within the housing shall be properly phased. The enclosure shall be a Myer MEUG-I-M 285, LeMeur EM 100 or equal.

503-5.04 Controller shall be Rainbird ISC-Sat-B+ (Maxi-Com compatible Independent Station Computer) controlled or approved equal; each valve shall be controlled by a separate station.

503-5.05 The electric meter may be installed in the above cabinet or a separate, approved vandal-resistant enclosure.

Sec. 503-6 Remote Control Valves

503-6.01 Valve type shall be spring-loaded, packless diaphragm activated, normally closed type with plastic body, equipped with adjustable flow control.

503-6.02 Valve solenoid shall be 24 volt a.c. 45 watt maximum, 500 milli-amp maximum surge, corrosion-proof, stainless steel construction, epoxy encapsulated to form a single integral unit.

503-6.03 Provide bleeder valve to permit operation in the field without power at the controller.
503-6.04  All valves shall be installed with schedule 80 unions to provide for easy maintenance.

503-6.05  Identification tags shall be attached to each remote control valve, showing the number that corresponds with the controller sequence. Tags shall be stainless steel or aluminum with the station number stamped with 1/2 inch letters.

Sec. 503-7  **Small Lawn Sprinkler Heads**

Heads shall have screw adjustments.

Nozzles shall rise a minimum of six (6) inches.

Sec. 503-8  **Rotary Sprinkler Heads**

Rotary sprinkler heads shall be gear driven with minimum six (6) inch pop-up sprinkler heads.

Part circle heads shall have variable arc setting capability.

Sec. 503-9  **Quick Coupling Valves**

503-9.01  Type: Heavy-duty, brass construction, with stainless steel internal valve spring, using a 3/4 inch valve key, Rainbird 33 or equal, and shall have a locking rubber cover.

503-9.02  Quick Coupling Valves shall be spaced no more than 100 feet apart or 50 feet from either end of landscape sections.

503-9.03  All Quick Coupling Valves shall be installed in approved round valve boxes.

Sec. 503-10  **Small Shrubbery Sprinkler Heads**

12 inch minimum pop-up type body shall be used.

Heads shall be fully adjustable.

Sec. 503-11  **Valve Boxes**

503-11.01  Valve boxes shall be fabricated from a durable plastic material resistant to weather, sunlight and chemical action of soils.

503-11.02  Gate valve boxes shall be round plastic boxes with flex lock covers, CARSON or approved equal.
503-11.03 Remote control valve boxes shall be rectangular plastic boxes, CARSON or approved equal, with hinged covers with flex lock.

Sec. 503-12 Installation - General

503-12.01 All plastic pipe and fittings shall be installed in accordance with manufacturer's instructions for same.

503-12.02 Line Clearance: All lines shall have a minimum clearance of six (6) inches from each other and from lines of other trades. Parallel lines shall not be installed directly over one another.

503-12.03 Pressure lines shall have a metallic detector tape placed above them in accordance with manufacturer's recommendation.

503-12.04 Provide minimum coverage as follows:

- Pressure supply lines (two and one half - (2-1/2) inches and smaller): 18 inches
- Pressure supply lines (three (3) inches and larger): 30 inches
- Non-pressure lines: 12 inches
- Control wire: 18 inches

All wire and pipes under concrete or paving shall be at least 30 inches deep and sleeved.

503-12.05 All lines placed under paving or concrete shall be contained in a Schedule 40 P.V.C. sleeve. The size of the sleeve shall be the minimum size which will allow the interior pipe or control wire to be freely removed and replaced.

Sec. 503-13 Field Quality Control - Adjustment of the System

503-13.01 The Contractor shall adjust all sprinkler heads and valves for optimum performance and to prevent as much as possible any overspray onto walks and roadways.

503-13.02 Testing of Irrigation System

Test all pressure lines under hydrostatic pressure of 150 pounds per square inch, and prove watertight. Testing of pressure main lines shall occur prior to installation of electric control valves, quick couplers or any other equipment that might prevent a proper test from being
performed. All piping under paved areas shall be tested under a hydrostatic pressure of 150 pounds per square inch, and proved water tight, prior to paving. Pressure in lines shall be sustained for not less than two (2) hours. If leaks develop, replace joints and repeat test until entire system is proven watertight.

Sec. 503-14 Plant Material

503-14.01 Soil

Engineer shall submit to the County for approval a soil nutrient report; this requirement may be waived if the County has on file acceptable information to indicate that it is not warranted. The report shall contain recommendations of soil amendments, fertilizers, as well as an indication of the soil's suitability for the purpose intended.

503-14.02 Plants

Small patches of turf which will not lend themselves to maintenance with riding mowers will not be acceptable, particularly narrow strips which will be costly to maintain. Encouraged are the use of ground cover plants with a few shrubs; the use of trees will be allowed where the trees or their overhang do not interfere with the sight distance at intersections. Trees shall not be a type which have a lot of surface roots or drop fruit, or are a maintenance problem. Trees when planted near concrete or paving shall be planted with root guards. All plants shall be tolerant of and readily adaptable of the climatic area in which they are to be planted. Trees which exceed a four (4) inch diameter trunk at 10 years growth shall not be placed in the right-of-way without specific approval from the Roads Department. No trees shall be planted within 20 feet of a street light pole base.

Sec. 503-15.01 Multi-Use Trail Fence

Trail fence shall be heavy duty two rail white vinyl fence designed for agricultural uses, or an alternative approved by the Engineer. Fence rails shall be nominal 2” x 6” x 16’ ribbed type, with minimum 0.11 inch wall thickness, installed with a minimum 24” bury at 8’ on center. Use aluminum inserts at all end, corner and gate posts (both latch and hinge sides), or fill with concrete. See Plate No. L-15 for details.

CHAPTER IV. MAINTENANCE

Sec. 504-1 Maintenance

Maintenance of the system is the responsibility of the Developer until such time as the maintenance entity/CSA has collected sufficient
funds to operate and maintain the system. Prior to the entity/CSA beginning to maintain the system, the Developer shall replace all plants which are not in healthy condition, readjust all sprinklers and make all repairs to the system.

A one year's maintenance bond is required prior to acceptance of the landscaping by the maintenance entity.
### PLANT MATERIAL LEGEND

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NOTES:

1. ALL ELECTRICAL WIRING AND WATER LINES SHALL BE INSTALLED 2.5' DEEP IN A SCHEDULE 40 PVC CONDUIT WHEN CROSSING ROADWAYS OR UNDER ANY HARD SURFACES. PULL BOXES SHALL BE PLACED AT EACH END FOR ELECTRICAL WIRE RUNS.

2. WHERE THE RAINBIRD MAXICOM IRRIGATION SYSTEM IS SPECIFIED, THE MAXICOM CABLE MUST NOT COME INTO CONTACT WITH THE POWER SUPPLY OR VALVE WIRING. LOCATE THE MAXICOM CABLE NEAR THE MAIN LINE AT A 9 O'CLOCK POSITION.

3. IF MORE THAN ONE LINE IS INSTALLED PER TRENCH, PROVIDE 0.5' HORIZONTAL AND VERTICAL SEPARATION.

4. ALL PVC SOLVENT (GLUE) SHALL BE #711 (PRIMER IS REQUIRED ON MAIN LINE ONLY).

5. LANDSCAPE AND IRRIGATION IMPROVEMENTS WITHIN THE DEDICATED STREET RIGHT-OF-WAY MAY REQUIRE AN OPEN STREET PERMIT. CHECK WITH COUNTY ENGINEERING DEPARTMENT FOR REQUIREMENTS.

6. WHERE OPEN STREET CUTS ARE REQUIRED TO INSTALL VARIOUS IRRIGATION LINES AND/OR WIRES, ALL STREET PATCHING WITHIN THE COUNTY RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH COUNTY STARNDA RD R-67 OR AS DIRECTED BY THE ENGINEER.

7. WHEN THERE IS A CHANGE IN FITTED DIRECTION, ALL IRRIGATION MAIN LINES LARGER THAN 2.0" IN DIAMETER PRESSURE LINES SHALL BE SECURED WITH CONCRETE THRUST BLOCKS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION AND AS DIRECTED BY THE ENGINEER. SEE COUNTY STANDARD SHEET L-7 FOR THRUST BLOCK DETAIL.

8. ALL IRRIGATION LATERAL LINES SHALL BE CLASS 200 PVC AND SIZED AS SHOWN ON THE PLANS. IF A LATERAL LINE IS LOCATED UNDER A HARD SURFACE, SCHEDULE 40 PVC IS REQUIRED.

9. ALL IRRIGATION MAINLINES 2.0" IN DIAMETER AND LESS SHALL BE SCHEDULE 40 PVC. IRRIGATION MAINLINES GREATER THAN 2.0" IN DIAMETER SHALL BE CLASS 200 RING TITE PVC SCHEDULE 40 OR APPROVED EQUAL BY THE ENGINEER.

10. ANY AND ALL CHANGES SHALL BE APPROVED BY THE ENGINEER, PRIOR TO IMPLEMENTATION.

11. ALL IRRIGATION INSTALLATION SHALL BE IN ACCORDANCE WITH COUNTY STANDARDS, THE LATEST APPROVED EDITION OF THE CALIFORNIA PLUMBING CODE, MANUFACTURER'S RECOMMENDATIONS, SECTION 20 OF THE STANDARD SPECIFICATIONS, AND AS DIRECTED BY THE ENGINEER.

12. ALL MATERIAL USED SHALL BE NEW AND FREE FROM IMPERFECTIONS.

13. SEE APPROVED LANDSCAPE AND IRRIGATION PLANS AND LEGENDS FOR SPECIFIC MODEL NUMBER, SIZE, QUANTITY, MANUFACTURER, AND PERFORMANCE REQUIREMENTS.
NOTES:

1. ALL ELECTRICAL WIRING AND WATER LINES SHALL BE INSTALLED 2.5' DEEP IN A SCHEDULE 40 PVC CONDUIT WHEN CROSSING ROADWAYS OR UNDER ANY HARD SURFACES.

2. WHERE THE RAINBIRD MAXICOM IRRIGATION SYSTEM IS SPECIFIED, THE MAXICOM CABLE MUST NOT COME INTO CONTACT WITH THE POWER SUPPLY OR VALVE WIRING. LOCATE THE MAXICOM CABLE NEAR THE MAIN LINE AT A 9 O’CLOCK POSITION.

3. IF MORE THAN ONE LINE IS INSTALLED PER TRENCH, PROVIDE 0.5' HORIZONTAL AND VERTICAL SEPARATION.

4. ALL PVC SOLVENT (GLUE) SHALL BE #711 (PRIMER IS REQUIRED ON MAIN LINE ONLY).

5. LANDSCAPE AND IRRIGATION IMPROVEMENTS WITHIN THE DEDICATED STREET RIGHT-OF-WAY MAY REQUIRE AN OPEN STREET PERMIT. CHECK WITH COUNTY ENGINEERING DEPARTMENT FOR REQUIREMENTS.

6. WHERE OPEN STREET CUTS ARE REQUIRED TO INSTALL VARIOUS IRRIGATION LINES AND/OR WIRES, ALL STREET PATCHING WITHIN THE COUNTY RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH COUNTY STANDARD R-67, R-68 OR AS DIRECTED BY THE ENGINEER.

7. WHEN THERE IS A CHANGE IN FITTED DIRECTION, ALL IRRIGATION MAIN LINES LARGER THAN 2.0" IN DIAMETER (PRESSURE LINES) SHALL BE SECURED WITH CONCRETE THRUST BLOCKS IN ACCORDANCE WITH MANUFACTURER’S RECOMMENDATION AND AS DIRECTED BY THE ENGINEER. SEE COUNTY STANDARD SHEET L-7 FOR THRUST BLOCK DETAIL.

8. ALL IRRIGATION LATERN LINES SHALL BE CLASS 200 PVC. IF A LATERAL LINE IS LOCATED UNDER A HARD SURFACE, SCHEDULE 40 PVC IS REQUIRED.

9. ALL IRRIGATION MAINLINES 2.0" IN DIAMETER AND LESS SHALL BE SCHEDULE 40 PVC. IRRIGATION MAINLINES GREATER THAN 2.0" IN DIAMETER SHALL BE CLASS 200 RING TITE PVC SCHEDULE 40 OR APPROVED EQUAL BY THE ENGINEER.

10. ANY AND ALL CHANGES SHALL BE APPROVED BY THE ENGINEER PRIOR TO IMPLEMENTATION.

11. ALL IRRIGATION INSTALLATION SHALL BE IN ACCORDANCE WITH COUNTY STANDARDS, THE LATEST APPROVED EDITION OF THE UNIFORM PLUMBING CODE, MANUFACTURER’S RECOMMENDATIONS, SECTION 20 OF THE STANDARD SPECIFICATIONS, AND AS DIRECTED BY THE ENGINEER.

12. ALL MATERIAL USED SHALL BE NEW AND FREE FROM IMPERFECTIONS.

13. SEE APPROVED LANDSCAPE AND IRRIGATION PLANS AND LEGENDS FOR SPECIFIC MODEL NUMBER, SIZE, QUANTITY, MANUFACTURER, AND PERFORMANCE REQUIREMENTS.
IRRIGATION CROSSOVER (NO CENTER MEDIAN)

IRRIGATION CROSSOVER (WITH CENTER MEDIAN)

IRRIGATION SLEEVE CHART

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GENERAL NOTES:
1. ALL PIPING AND FITTINGS SHALL BE SCH. 40 P.V.C. UNLESS APPROVED EQUAL BY THE ENGINEER.
2. WHERE CONDUIT(SLEEVE ONLY) IS INSTALLED, ONE PULL WIRE OR ROPE SHALL BE INSTALLED. THE LENGTH OF WIRE OR ROPE SHALL EXTEND 6' BEYOND EACH END OF THE CONDUIT. EACH CONDUIT (SLEEVE) SHALL BE CAPPED AT EACH END.
3. ALL MATERIAL USED SHALL BE NEW AND FREE FROM IMPERFECTIONS.
4. SEE APPROVED LANDSCAPE/IRRIGATION PLANS AND LEGENDS FOR SPECIFIC MODEL NUMBER, SIZE, MANUFACTURER AND PERFORMANCE REQUIREMENTS.
5. ALL TRANSITIONS FROM GALVANIZED PIPE TO PVC PIPE SHALL BE CONSTRUCTED WITH SCH. 40 FEMALE ADAPTER OR APPROVED EQUAL BY THE ENGINEER.
6. ALL IRRIGATION INSTALLATION SHALL BE IN ACCORDANCE WITH COUNTY STANDARDS, THE LATEST EDITION OF THE CALIFORNIA PLUMBING CODE, MANUFACTURER'S RECOMMENDATION, SECTION 20 OF THE STANDARD SPECIFICATIONS, AND AS DIRECTED BY THE ENGINEER.
7. ANY AND ALL CHANGES SHALL BE APPROVED BY THE ENGINEER PRIOR TO IMPLEMENTATION.
8. THE METHOD USED FOR BORING SHALL BE REVIEWED AND APPROVED BY THE ENGINEER PRIOR TO START OF OPERATION.

VERIFY ALL MEASUREMENTS IN THE FIELD
VERIFY SPECIFIC SITE CONDITIONS IN THE FIELD

IRRIGATION LINES

ELECTRICAL CONDUIT

SCH. 40 SLEEVE IRRIGATION LINES

MORE THAN ONE PIPE PER SLEEVE
ONE PIPE PER SLEEVE

ROUTE PIPE AS REQUIRED PER THE APPROVED LANDSCAPE/IRRIGATION PLANS
DOUBLE CHECK OR REDUCED PRESSURE BACKFLOW PREVENTER
(GREATER THAN 2.0" DIA.)

NOTES:
1. EXCEPT AS NOTED, ALL PIPING AND FITTINGS SHALL BE GALVANIZED UNLESS APPROVED BY THE ENGINEER.

2. USE TEFLOM PIPE TAPE ON ALL THREADED JOINTS OR APPROVED EQUAL BY THE ENGINEER.

3. ALL MATERIALS SHALL BE NEW AND FREE FROM IMPERFECTIONS

4. SEE APPROVED LANDSCAPE AND IRRIGATION PLANS AND LEGENDS FOR SPECIFIC MODEL NUMBERS, SIZE, QUANTITY, MANUFACTURERS, AND PERFORMANCE REQUIREMENTS.

5. ALL TRANSITIONS FROM GALVANIZED PIPE TO PVC PIPE SHALL BE CONSTRUCTED WITH SCHEDULE 40 FEMALE ADAPTOR OR APPROVED EQUAL BY THE ENGINEER.

6. A 6.0" THICK REINFORCED CONCRETE SLAB IS REQUIRED FOR ALL WATER PROTECTION DEVICES. MINIMUM CLEARANCE SHALL BE 1.5' ON ALL SIDES OF THE DEVICE AND AS DIRECTED BY THE ENGINEER (SEE STANDARD L-5 DETAIL 1).

7. ALL IRRIGATION INSTALLATION SHALL BE IN ACCORDANCE WITH COUNTY STANDARDS, THE LATEST ACCEPTED EDITION OF THE CALIFORNIA PLUMBING CODE, MANUFACTURER'S RECOMMENDATION, SECTION 20 OF THE STANDARD SPECIFICATIONS, AND AS DIRECTED BY THE ENGINEER.

8. ANY AND ALL CHANGES SHALL BE APPROVED BY THE ENGINEER BEFORE IMPLEMENTATION.
NOTES:

1. USE TEFLOM ON ALL THREADED JOINTS.

2. ALL NIPPLES SHALL BE SCHEDULE 80 PVC. ALL FITTINGS SHALL BE SCHEDULE 40 PVC.

3. ALL IRRIGATION CONTROL VALVES SHALL BE PLACED IN A PLASTIC IRRIGATION CONTROL VALVE BOX WITH TOP OF VALVE BOX 2.0" BELOW FINISHED GRADE IN TURF AND 2.0" ABOVE FINISHED GRADE IN PLANTER AREA. THE FOLLOWING PLASTIC VALVE BOXES AND LIDS ARE DEEMED ACCEPTABLE. ANY DEVIATION FOR THE ACCEPTED BOXES AND LIDS BELOW MUST BE APPROVED BY THE ENGINEER.

   AMTEK #10-173-134 LID
   #10-170-001 BOX
   BROOK #1419 "SNAP" LOCK TAB LID
   #1419 BODY BOX

4. INSTALLATION OF EXTRA IRRIGATION CONTROL WIRE FROM IRRIGATION CONTROL CLOCK TO REMOTE CONTROL VALVE IS REQUIRED FOR EACH MANIFOLD (BUNDLE OF VALVES). EXTRA WIRE SHALL BE A DIFFERENT COLOR THAN THE ONE USED TO OPERATE VALVES.

5. ALL IRRIGATION CONTROL WIRES (CONTROL AND COMMON) SHALL BE 14 GAUGE U.L. SINGLE STRAND COPPER WIRE, TAPED AND BUNDLED AT 10' INTERVALS AND PLACED NEAR THE IRRIGATION MAINLINE AT THE 3 O'CLOCK POSITION.

6. ALL WIRE CONNECTIONS SHALL BE WATERPROOF AND CONSTRUCTED WITH MODEL NO. 57-03 SNAP-TITE WIRE CONNECTORS AND PT-55 SEALER OR AN EQUAL APPROVED BY THE ENGINEER. SPLICES WILL NOT BE ALLOWED UNLESS APPROVED BY THE ENGINEER. THE APPROVED SPLICES WILL REQUIRE THE USE OF A SPLICE BOX.

7. ALL IRRIGATION INSTALLATIONS SHALL BE IN ACCORDANCE WITH STANDARDS, THE LATEST APPROVED EDITION OF THE CALIFORNIA PLUMBING CODE, MANUFACTURER'S RECOMMENDATIONS, SECTION 20 OF THE STANDARD SPECIFICATIONS, AND AS DIRECTED BY THE ENGINEER.

8. ALL MATERIALS USED SHALL BE NEW AND FREE FROM IMPERFECTIONS.

9. ANY AND ALL CHANGES SHALL BE APPROVED BY THE ENGINEER PRIOR TO IMPLEMENTATION.

10. SEE APPROVED LANDSCAPE AND IRRIGATION PLANS AND LEGENDS FOR SPECIFIC MODEL NUMBERS, SIZE, QUANTITY, MANUFACTURERS AND PERFORMANCE REQUIREMENTS.
NOTES:

1. ALL MAINLINES INSTALLED SHALL BE TESTED AS PER MANUFACTURES SPECIFICATIONS AND SHALL BE A PART OF THE INSTALLATION SPECIFICATIONS.

2. ALL DITCHING DEPTHS SHALL BE IN COUNTY STANDARD SHEET L-2 DETAIL D & E, L-3 DETAIL F.

3. PORTLAND CEMENT CONCRETE USED FOR THRUST BLOCKS SHALL BE CLASS "3" AS PER APPLICABLE PROVISIONS OF SECTION 90 OF THE STANDARD SPECIFICATIONS OF THE CALIFORNIA DEPARTMENT OF TRANSPORTATION, APPROVED CURRENT EDITION.

4. THRUST BLOCKS SHALL BE USED AT CHANGES OF DIRECTION (BENDS, TEES), CHANGES OF VELOCITY (REDUCERS, VALVES), AND PIPE DEAD ENDS.

5. WHEN THRUST BLOCKS ARE USED, THE SIZE AND TYPE OF THE BLOCKING MUST BE BASED ON THE MAXIMUM THRUST FORCE EXPECTED AND THE LOAD-BEARING CAPACITY OF THE SOIL.

6. ALL ANCHOR RODS SHALL BE REINFORCED STEEL AND A MINIMUM OF 0.5" IN DIAMETER.

7. ALL CONCRETE THRUST BLOCKS SHALL BE IN ACCORDANCE WITH THE LATEST APPROVED EDITION OF THE CALIFORNIA PLUMBING CODE.

8. ALL THRUST BLOCKS TO BE Poured AGAINST UNDISTURBED SOIL, CONCRETE SHALL BE PLACED BEHIND BELLs OF FITTINGS.

9. BEARING AREAS SHOWN IN TABLE ARE BASED ON ALLOWABLE SOIL PRESSURE OF 1500 P.S.F.

10. KEEP CONCRETE AWAY FROM BELLS.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>45° TEE OR PLUG</th>
<th>90° ELL OR HYDRANT</th>
<th>45° ELL</th>
<th>22-1/2° ELL</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>6&quot;</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>8&quot;</td>
<td>5</td>
<td>7</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>10&quot;</td>
<td>8</td>
<td>11</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>12&quot;</td>
<td>11</td>
<td>16</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

COUNTY OF KERN
STATE OF CALIFORNIA
DEVELOPMENT STANDARD

STANDARD DETAILS FOR THRUST BLOCKS

PLATE NO. L-7
NOTES:

1. USE TEFON ON ALL THREADED JOINTS.

2. ALL NIPPLES SHALL BE SCHEDULE 80 PVC. ALL FITTINGS SHALL BE SCHEDULE 40 PVC.

3. ALL IRRIGATION CONTROL VALVES SHALL BE PLACED IN A PLASTIC IRRIGATION CONTROL VALVE BOX WITH TOP OF VALVE BOX 2.0" BELOW FINISHED GRADE IN TURF AND 2.0" ABOVE FINISHED GRADE IN PLANTER AREA. THE FOLLOWING PLASTIC VALVE BOXES AND LIDS ARE DEEMED ACCEPTABLE. ANY DEVIATION FOR THE ACCEPTED BOXES AND LIDS BELOW MUST BE APPROVED BY THE ENGINEER.

   AMETEK    #10-173-134 LID
   #10-170-001 BOX
   BROOK     #1419 "SNAP" LOCK TAB LID
   #1419 BODY BOX

4. INSTALLATION OF EXTRA IRRIGATION CONTROL WIRE FROM IRRIGATION CONTROL CLOCK TO REMOTE CONTROL VALVE IS REQUIRED FOR EACH MANIFOLD (BUNDLE OF VALVES). EXTRA WIRE SHALL BE A DIFFERENT COLOR THAN THE ONES USED TO OPERATE VALVES.

5. ALL IRRIGATION CONTROL WIRES (CONTROL AND COMMON) SHALL BE 14 GAUGE U.L. SINGLE STRAND COPPER WIRE, TAPPED AND BUNDLED AT 10' INTERVALS AND PLACED NEAR THE IRRIGATION MAINLINE AT THE 3 O'CLOCK POSITION.

6. ALL WIRE CONNECTIONS SHALL BE WATERPROOF AND APPROVED BY THE ENGINEER. SPLICES WILL NOT BE ALLOWED UNLESS APPROVED BY ENGINEER. THE APPROVED SPLICES WILL REQUIRE THE USE OF A SPLICE BOX.

7. MAINTAIN 2.0' SEPARATION BETWEEN REMOTE CONTROL VALVE (CENTERLINE TO CENTERLINE) WHEN MORE THAN ONE VALVE IS INSTALLED IN THE SAME LOCATION.

8. WHERE POSSIBLE, LOCATE VALVES IN THE PLANTER AREAS.

9. ALL IRRIGATION INSTALLATIONS SHALL BE IN ACCORDANCE WITH COUNTY STANDARDS, THE LATEST APPROVED EDITION OF THE CALIFORNIA PLUMBING CODE, MANUFACTURER'S RECOMMENDATIONS, SECTION 20 OF THE STANDARD SPECIFICATIONS, AND AS DIRECTED BY THE ENGINEER.

10. ALL MATERIALS USED SHALL BE NEW AND FREE FROM IMPERFECTIONS.

11. ANY AND ALL CHANGES SHALL BE APPROVED BY THE ENGINEER PRIOR TO IMPLEMENTATION.

12. SEE APPROVED LANDSCAPE AND IRRIGATION PLANS AND LEGENDS FOR SPECIFIC MODEL NUMBERS, SIZE, QUANTITY, MANUFACTURERS AND PERFORMANCE REQUIREMENTS.
NOTES:

1. USE TEFolon TAPE ON ALL THREADED JOINTS.

2. ALL RISERS AND NIPPLES SHALL BE SCHEDULE 80 PVC SIZED AS REQUIRED BY THE ENGINEER.

3. ALL FITTINGS SHALL BE SCHEDULE 40 PVC SIZED AS REQUIRED.

4. WHERE IRRIGATION HEADS ARE INSTALLED WITHIN EMBANKMENTS, A DRAIN VALVE OR CHECK VALVE IS REQUIRED TO PREVENT EROSION. CHECK VALVES AND DRAIN VALVES SHALL BE INSTALLED AT LOCATIONS AS PERScribed BY THE SPECIFIC FIELD CONDITIONS AND SHALL BE APPROVED BY THE ENGINEER PRIOR TO USE AND PLACEMENT.

5. USE SCHEDULE 80 PVC CONDUIT WITH AN ENCLOSED PEDESTAL, SLOPE CONDUIT TO DRAIN 1/8" PER 1.0'

6. CONSTRUCT 0.5' CLASS "3" CONCRETE SLAB AS REQUIRED TO RECEIVE THE PEDestAL MOUNTED IRRIGATION CONTROL CLOCK. COMPACT 0.5' BASE TO 90% RELATIVE DENSITY PRIOR TO PLACEMENT OF CONCRETE SLAB.

7. WHERE PART CIRCLE IRRIGATION HEADS ADJACENT TO A BUILDING WALL, LOCATE IRRIGATION HEAD 4.0" FROM FACE OF BUILDING WALL TO BACK OF IRRIGATION HEAD.

8. ALL IRRIGATION HEADS SHALL PROVIDE 100% COVERAGE WITH NO OVER SPRAY ONTO SIDEWALKS, STREETS, WALLS, AND BUILDINGS. ADDITION OF HEADS MAY BE REQUIRED AT ANY TIME IN ORDER TO ACHIEVE 100% COVERAGE.


10. ALL MATERIALS SHALL BE NEW AND FREE FROM DEFECTS.

11. SEE APPROVED LANDSCAPE AND IRRIGATION PLANS AND LEGENDS FOR SPECIFIC MODEL NUMBERS, SIZE, QUANTITIES, MANUFACTURES AND PERFORMANCE REQUIREMENTS.

12. ANY AND ALL CHANGES FROM THIS STANDARD SHALL BE APPROVED BY THE ENGINEER PRIOR TO ANY TYPE OF CONSTRUCTION.
NOTES:
1. USE TEFLOM PIPE ON ALL TREATED JOINTS
2. ALL RISERS AND NIPPLES SHALL BE SCH. 80 PVC. ALL FITTINGS SHALL BE SCH. 40 PVC.
3. ALL LATERALS SHALL BE CLASS 200 PVC OR AS REQUIRED ON PLANS.
4. WHEN IRRIGATION HEADS ARE INSTALLED WITHIN EMBANKMENTS, A DRAIN VALVE OR CHECK VALVE IS REQUIRED TO PREVENT EROSION. CHECK VALVES AND DRAIN VALVES SHALL BE INSTALLED AT LOCATIONS AS PRESCRIBED BY THE SPECIFIED CONDITIONS AND SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT AND USE.
5. ALL POP UP HEADS SHALL BE 1.0" FROM CONCRETE AND ASPHALT AREAS. ALL LARGE RADIUS IRRIGATION HEADS (PART CIRCLE) SHALL BE 4.0" FROM CONCRETE AND ASPHALT AREAS. HEIGHT OF POP UP HEADS SHALL BE AS FOLLOWS:
   4.0" FOR LAWN AREAS
   1.0" FOR SHRUBS
   1.0" FOR GROUND COVERS
6. WHERE PART CIRCLE IRRIGATION HEADS ARE ADJACENT TO A BUILDING WALL, LOCATE HEADS 1.0’ FROM FACE OF BUILDING WALL TO BACK OF IRRIGATION HEAD.
7. WHERE TRIPLE SWING JOINT IS REQUIRED, SEE COUNTY STANDARD L-9, DETAIL Z. SWING JOINTS SHALL BE ALLOWED ON ALL IRRIGATION HEADS EVEN WHERE NOT REQUIRED.
8. ANY AND ALL CHANGES FROM THIS STANDARD DETAIL SHEET SHALL BY APPROVED BY THE ENGINEER.
9. SEE APPROVED LANDSCAPE AND IRRIGATION PLANS AND LEGENDS FOR SPECIFIC MODEL NUMBERS, SIZE, QUANTITY, MANUFACTURER’S, AND PERFORMANCE REQUIREMENTS.
10. ALL IRRIGATION INSTALLATIONS SHALL BE IN ACCORDANCE WITH COUNTY STANDARDS, THE LATEST EDITION OF THE CALIFORNIA PLUMBING CODE, MANUFACTURER’S RECOMMENDATION SECTION 20 OF THE STANDARD SPECIFICATIONS, AND AS DIRECTED BY THE ENGINEER.
11. ALL MATERIALS USED SHALL BE NEW AND FREE FROM IMPERFECTIONS.
F. PARKWAY SECTION
(COMBINATION TYPE SIDEWALK)

- CONCRETE BLOCK WALL
- 2% SLOPE
- MOW STRIP (SEE STANDARD L-13, DETAIL "O")
- COMPACT SOIL UNDER SIDEWALK TO 90%
- 1% MIN SLOPE
- 2% MAX
- 1% MIN SIDEWALK
- 2' MAX
- VARIES

G. PARKWAY SECTION
(STANDARD TYPE SIDEWALK)

- CONCRETE BLOCK WALL
- 2% MIN SLOPE
- 4:1 MAX SLOPE
- VARIES
- COMPACT SOIL UNDER SIDEWALK TO 90%
- MOW STRIP (SEE STANDARD L-13, DETAIL "O")
- VARIES
- 1% MIN

H. MEDIAN SECTION

- TYPE B1 CURB
- (TYPE M-1, M-2 NOT ALLOWED IN LANDSCAPED MEDIAN ISLANDS)
- 1.5' STAMPED CONCRETE
- (SEE LANDSCAPE STANDARD L-14, NOTE 3)
- FINISHED GRADE
- REMOVE ALL FOREIGN MATERIAL TO A DEPTH SPECIFIED IN STANDARDS
- ROOT GUARD BARRIER

I. WATER PROOFING
(PLANTERS AND RETAINING WALLS)

- CONCRETE BLOCK WALL
- 2.0'
- VARIES
- SEE APPROVED PLANS FOR BACKFILL REQUIREMENTS
- WATERPROOF COATING OR APPROVED EQUAL BY COUNTY

NOTES:

1. PROVIDE POSITIVE DRAINAGE (2% MINIMUM TO 4:1 MAX.) IN ALL LANDFILL AREAS.

2. 9.0" CONCRETE MOW STRIP IS REQUIRED FOR ALL LAWN AREAS ADJACENT TO PROPOSED OR EXISTING WALL PER COUNTY STANDARD L-13, DETAIL "O".

3. WHERE LOT GRADES ARE HIGHER THAN STREET GRADES, SIDE OF WALL WATER PROOFING IS REQUIRED PER COUNTY STANDARD L-11, DETAIL "M".

4. ANY AND ALL CHANGES SHALL BE APPROVED BY THE ENGINEER PRIOR TO IMPLEMENTATION.

5. ALL IRRIGATION INSTALLATION SHALL BE IN ACCORDANCE WITH COUNTY STANDARDS, THE LATEST EDITION OF THE CALIFORNIA PLUMBING CODE, MANUFACTURER'S RECOMMENDATIONS, SECTION 20 OF THE STANDARD SPECIFICATIONS, AND AS DIRECTED BY THE ENGINEER.

6. ALL MATERIALS USED SHALL BE NEW AND FREE FROM IMPERFECTIONS.

7. SEE APPROVED LANDSCAPE AND IRRIGATION PLANS AND LEGENDS FOR SPECIFIC MODEL NUMBERS, SIZE, QUANTITY, MANUFACTURES, AND PERFORMANCE REQUIREMENTS.

8. IF CURBING AND OR CURB/GUTTER FOR LANDSCAPE CENTER MEDIAN ARE NOT EXISTING, SEE APPROVED CIVIL ENGINEERING DRAWINGS.

9. MEANDERING SIDEWALK MAY BE APPROVED BY THE DIRECTOR WITHIN THE PARKWAY AREA WHERE LANDSCAPING IS PROVIDED.
NOTES:

1. APPLY SOIL AMENDMENT AS PER SOIL TEST.

2. ALL TREES SHALL BE STAKED WITH NEW 2.0" DIA. (PRESSURE TREATED) LODGE POLE PINE. REMOVE ORIGINAL TREE STAKES FROM ALL PLANT MATERIAL DELIVERED TO THE PROJECT SITE AND INSTALL NEW TREE STAKES.

3. CONSTRUCT MOUND AS REQUIRED TO SECURE PLANTS STABILITY DURING CONSTRUCTION INSTALLATION.

4. ARBOR TREE GUARD OR APPROVED EQUAL IS REQUIRED AROUND ALL TREES PLANTED IN LAWN AREAS.

5. ROOT GUARD BARRIER IS REQUIRED ON ALL HARD SURFACES WHEN THE TREE TRUNK IS 5.0' OR LESS FROM ANY HARD SURFACE. PLACE BARRIER PARALLEL ALONG THE EDGE OF HARD SURFACE.

6. PLANTING TABLET SHALL BE PLACED 2.0" BELOW FINISHED GRADE NEAR ROOT FOUNDATION AS FOLLOWS:
   1 - TABLET PER 1 GAL.
   3 - TABLETS PER 5 GAL.
   6 - TABLETS PER 15 GAL.
   9 - TABLETS PER 20' BOX

7. ANY AND ALL DEVIATIONS FROM THIS STANDARD SHALL BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.

8. ALL LANDSCAPE INSTALLATION SHALL BE IN ACCORDANCE WITH COUNTY STANDARDS, MANUFACTURER'S RECOMMENDATION, AND SECTION 20 OF THE STANDARD SPECIFICATIONS, AND AS DIRECTED BY THE ENGINEER.

9. ALL MATERIAL USED SHALL BE NEW AND FREE FROM IMPERFECTIONS.

10. SEE APPROVED LANDSCAPE AND IRRIGATION PLANS FOR SPECIFIC MODEL NUMBERS, SIZE, MANUFACTURER, AND PERFORMANCE REQUIREMENTS.

COUNTY OF KERN STATE OF CALIFORNIA DEVELOPMENT STANDARD

STANDARD LANDSCAPE AND IRRIGATION FOR VARIOUS PLANTINGS

PLATE NO. L-12
NOTES:

1. CONSTRUCT A DEEP SCORE EXPANSION JOINT AT EVERY FENCE POST AND EVERY 15' ON ALL OTHER CONCRETE SURFACES.

2. ALL AREAS TO RECEIVE CONCRETE SHALL BE COMPACTED TO 90% RELATIVE DENSITY FOR A DEPTH OF 0.5' OR AS APPROVED BY THE ENGINEER.

3. TOP OF MOW STRIP SHALL BE 1.0" ABOVE FINISHED GRADE WHEN ADJACENT TO TURF AND 2.0" ABOVE FINISHED GRADE WHEN ADJACENT TO PLANTER.

4. WHERE THE GRADE ON THE LOT SIDE OF THE WALL IS HIGHER THAN THE GRADE ON THE STREET SIDE OF THE WALL, WATER PROOFING IS REQUIRED. SEE COUNTY STANDARD L-11, DETAIL 1 FOR WATER PROOFING REQUIREMENTS.

5. A 9.0" CONCRETE MOW STRIP IS REQUIRED FOR ALL LAWN AREAS ADJACENT TO AN EXISTING OR PROPOSED FENCE PER COUNTY STANDARD L-13, DETAIL N & O.

6. ANY AND ALL CHANGES FROM THIS STANDARD DETAIL SHEET SHALL BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.

7. ALL CONCRETE SHALL BE CLASS "3" IN ACCORDANCE WITH COUNTY STANDARDS, THE LATEST EDITION OF SECTION 73 OF THE STANDARD SPECIFICATION, AND AS APPROVED BY THE ENGINEER.
1. A 1.5' MIN. BORDER OF HARD SURFACE TREATMENT IS REQUIRED ADJACENT TO THE BACK OF CURB THROUGHOUT SECTIONS A & B.

2. WHERE WIDTH IS LESS THAN 8.5' MEASURED FROM E TO E (6' PLANTER WIDTH) HARD SURFACE TREATMENT ONLY REQUIRED.

3. HARD SURFACE TREATMENT ONLY MUST BE INSTALLED WHEN THE MINIMUM WIDTH DOES NOT OCCUR FOR 30 CONSECUTIVE FEET.

4. NO TURF WILL BE ALLOWED IN PLANTER AREA WITHOUT PRIOR APPROVAL OF THE DIRECTOR.

5. STAMPED CONCRETE INSTALLATION SHALL BE TO "BOMANITE" SPECIFICATIONS OR APPROVED EQUAL.

6. "SPRAY HEAD" TYPE IRRIGATION REQUIRES THE 1.5' HARD SURFACE TREATMENT ALONG THE PERIMETER OF THE PLANTER TO BE SLOPED INWARD TOWARD THE PLANTER AT 2%. 

7. "BUBBLER HEAD" TYPE IRRIGATION IS ENCOURAGED HOWEVER WHERE STREET E GRADES EXCEED 2% FALL, "SPRAY HEAD" TYPE IRRIGATION IS REQUIRED.

8. COLOR OF CONCRETE OR OTHER HARD SURFACE TREATMENT SHALL BE DETERMINED IN CONSULTATION WITH THE DIRECTOR.

9. ALLOWABLE SHAPE OF LANDSCAPED PLANTER AREAS CAN BE FREE FORM AND IS NOT LIMITED TO RECTANGULAR OR CIRCULAR CONFIGURATIONS.

10. INSTALL MOWER RAMP AT ALL MEDIAN BREAKS. (PREFERABLY AT LEFT TURN POCKETS ADJACENT TO LAWN AREAS).
NOTES

1. RAILS SHALL MEASURE EXACTLY 2"X6".
2. POST SHALL MEASURE EXACTLY 5"X5".
3. ALL FENCE MATERIAL SHALL CONSIST OF 100% MONO-EXTRUDED VIRGIN PVC WITH A MIN. OF 8% T102 THROUGHOUT THE PRODUCT OR ALTERNATIVE APPROVED BY THE DIRECTOR.
4. FENCE MATERIAL SHALL BE UV RESISTANT.
5. CAP ALL POSTS AND ENDS OF EXPOSED RAILS.
6. EVERY THIRD PVC POST AND ALL PVC POSTS LOCATED AT CHANGES OF DIRECTION OR END POSTS ARE REQUIRED TO BE FILLED WITH CONCRETE.
7. STAINLESS STEEL SCREWS SHALL BE USED FOR FENCE CONSTRUCTION.
8. RAILS SHALL HAVE TWO RIBS ALONG THE ENTIRE LENGTH OF THE PRODUCT FOR ADDEND STRENGTH.
9. TRAILS ON CURVES REQUIRE SPECIAL DESIGN.
DIVISION SIX

STANDARDS FOR SEWAGE DISPOSAL, WATER SUPPLY, AND PRESERVATION OF ENVIRONMENTAL HEALTH

CHAPTER I. GENERAL

Sec. 601-1 The Environmental Health Services Department's "Standards for Land Developments" include the aspects of sewage disposal, water supply, and preservation of environmental health. The standards, which are intended to safeguard the public health, are enforced by the County's Environmental Health Services Department. They are primarily intended to apply to residential units. Exceptions may be granted by the Director of the Environmental Health Services Department. The applicant may request a variance from the requirements of these "Standards". The Director of the Environmental Health Services Department is authorized to approve a variance if it is determined that the granting of such variance will not result in any nuisance or menace to the public health. The Director of the Environmental Health Services Department may conditionally approve a variance if it is determined to be necessary to meet the goals and objectives of these "Standards".

Sec. 601-2 The present document replaces the "Policies and Requirements of the Kern County Health Department, Environmental Health Division, Regarding Individual Water Supply and Sewage Disposal Facilities" of 23 April 1970 et.seq. As in the past, the furnishing to the Environmental Health Services Department of any and all data needed to satisfy the content and intent of these Standards is the responsibility of the land developer and his technical consultants.

Sec. 601-3 Regulations of the State of California or other governmental agencies, if more restrictive in nature, have precedence over these Standards.

Sec. 601-4 All references herein to the California Plumbing Code (CPC) relate to the latest edition as adopted by the County of Kern and as the same may be amended from time to time.

CHAPTER II. SEWAGE DISPOSAL

BY INDIVIDUAL SOIL ABSORPTION SYSTEMS

Sec. 602-1 Where connection to a public sewer is not possible, consideration should be given to the construction of a community sewerage system and treatment plant. Where sewage disposal by individual soil absorption systems (for example, septic tanks with disposal fields or pits) is proposed the following standards shall apply:

(Updated 5.21.10)
A soils report regarding the feasibility of using individual sewage disposal systems in accordance with the standards of good public health and engineering practice is required. Three copies of the report shall be submitted. The report must be prepared by a registered civil engineer, qualified in the field of soils engineering, or by some other specialist acceptable to the Environmental Health Services Department. The report is subject to the review and approval of the Environmental Health Services Department.

Unless waived by the Environmental Health Services Department, the report shall include the results of soil percolation tests (the results of all such tests performed must be submitted). Percolation tests shall be made in accordance with the U. S. Public Health Service test procedure (Manual of Septic Tank Practice, Part I). Any departure from that procedure must first be approved by the Environmental Health Services Department. The submittal of soil test hole logs is also required, with soils classified in accordance with the California Plumbing Code soil-type system and by either the Unified Soil Classification System or other standard method. Where soil and bedrock conditions permit, the test pits or borings shall extend to minimum depths of seven (7) feet below the bottoms of proposed disposal trenches or 12 feet below the bottoms of pits. The Engineer must specify whether disposal trenches and/or pits are to be used. The number of test holes and percolation tests is ordinarily at the discretion of the engineer, but he is required to state whether or not the soil in each lot in a land development is capable of satisfactorily absorbing sewage effluent. Soil and percolation test hole locations must be accurately plotted on the map which accompanies the report. If CPC soil types (for disposal purposes) vary within the development, the map shall indicate the limits of the different types, and a lot-by-lot list of soil types shall be submitted. (Effective September 24, 1979; Resolution #79-716).

For purposes of standardization, the following table shall be used to correlate percolation rates with the California Plumbing Code soil types:

<table>
<thead>
<tr>
<th>Percolation Rate Minutes/Inch</th>
<th>CPC Soil Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than one</td>
<td>1</td>
</tr>
<tr>
<td>1 to 3</td>
<td>2</td>
</tr>
<tr>
<td>3+ to 10</td>
<td>3</td>
</tr>
<tr>
<td>10+ to 25</td>
<td>4</td>
</tr>
<tr>
<td>25+ to 60*</td>
<td>5</td>
</tr>
<tr>
<td>Greater than 60</td>
<td>Unacceptable</td>
</tr>
</tbody>
</table>

*unacceptable for seepage pits
NOTE: Regional Board guidelines require that where percolation rates of less than five (5) minutes per inch are present, it must be shown that a sufficient distance of soil is available to ensure proper filtration.

Sec. 602-2 Individual sewage disposal systems may be used only where sufficient area for them is provided and where, in the opinion of the Director of the Environmental Health Services Department, the density of such systems and of the resulting sewage effluent will not have an adverse effect upon water quality or public health.

602-2.01 The minimum allowable lot size where individual sewage disposal systems are used is considered to be a function of soil properties, hydraulic properties, climate, geology, and topography. The required minimum lot size where individual sewage disposal systems are used is 10,000 square feet net, except as follows:

1. In other than mountain and foothill areas, lots may be less than 10,000 square feet net but not less than 7,200 square feet net, where individual sewage disposal systems are used, provided that, in addition to other criteria contained in these Standards, a functioning public entity, as defined herein (See Sec. 602-22 following) exists or is provided.

2. In mountain and foothill areas lots may be less than 10,000 square feet net but not less than 7,200 square feet net, where individual sewage disposal systems are used, provided that the following criteria, over and above those contained elsewhere in these Standards, are satisfied:

a. A functioning public entity, as defined herein (See Sec. 602-22 following), exists or is provided.

b. The site is shown on the Geologic Map of California (as published by the California Division of Mines and Geology) as "Recent Alluvium", that is symbol, "Qal".

c. The soils, for septic tank system purposes, are Type 1 or Type 2 of the California Plumbing Code.

d. The natural slope of the surface of the ground throughout the site does not exceed ten (10) percent.

e. Other pertinent environmental quality control factors, at the discretion of the Director of the Environmental Health Services Department, allow the smaller lot size.
602-2.02 Notwithstanding the minimum lot size specification in Sec. 602-2.01 of this section, in all areas each lot shall be provided with an adequate site for subsurface disposal of sewage effluent within the boundaries of the lot. That site must have a natural slope of 30% or less; it must be located to allow disposal by gravity flow, and its size for single family residential use, whether leaching trenches or disposal pits are used, shall be in accordance with the following table:

<table>
<thead>
<tr>
<th>CPC Soil Type in Disposal Area</th>
<th>Required Minimum Size of Disposal Site (square feet)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2,000</td>
</tr>
<tr>
<td>2</td>
<td>2,500</td>
</tr>
<tr>
<td>3</td>
<td>4,500</td>
</tr>
<tr>
<td>4</td>
<td>13,000</td>
</tr>
<tr>
<td>5</td>
<td>21,000</td>
</tr>
</tbody>
</table>

* exclusive of any areas occupied by structures, setbacks, and easements on the lot and in accordance with the requirements of the California Plumbing Code and these "Standards".

The minimum disposal area required by the table above (which includes expansion area) is for standard leaching trenches which provide three (3) square feet of leaching area per lineal foot, or special leaching trenches which provide seven (7) square feet of leaching area per lineal foot.

602-2.03 The required minimum size of the effluent disposal field area for multiple-dwelling lots (i.e., R-2 and R-3 zones), whether leaching trenches or seepage pits are used, shall be determined by the following formulae, where "A" equals the required area in square feet and "C" equals the required septic tank capacity in gallons in accordance with the California Plumbing Code. Two factors must be known in order to derive the required area, namely: (1) the proposed number of dwelling units and the number of bedrooms in each unit, and (2) the CPC soil type in the future effluent disposal area:

<table>
<thead>
<tr>
<th>CPC Soil Type in Disposal Area</th>
<th>Required Minimum Size of Disposal Site (square feet)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A = 2.0C - 480</td>
</tr>
<tr>
<td>2</td>
<td>A = 2.5C - 640</td>
</tr>
<tr>
<td>3</td>
<td>A = 4.1C - 690</td>
</tr>
<tr>
<td>4</td>
<td>A = 11.0C - 940</td>
</tr>
<tr>
<td>5</td>
<td>A = 17.1C - 900</td>
</tr>
</tbody>
</table>
* exclusive of any areas which are unsuited for disposal system installation in accordance with the requirements of the California Plumbing Code and these Standards. Minimum size septic tank provided shall be 1,500 gallons.

Also, the use of dual disposal systems (which entails alternate, periodic use and resting of trenches or pits) is required on multiple-dwelling lots. Each one-half of the dual system shall have an absorption area equal to at least two-thirds of that required by the California Plumbing Code (i.e., two-thirds of a conventional system).

602-2.04 In designing lots and sewage disposal sites prior to the filing of a tentative map, the following factors shall be considered:

a. Space shall be allowed on the lot for expansion of the original absorption facility. The square footages given in the preceding tables are intended to satisfy initial and expansion area requirements for disposal fields. The use of dual disposal systems (which entails alternate, periodic use and resting of trenches or pits) may be required at the reasonable discretion of the Director of the Environmental Health Services Department. Where dual disposal systems are to be used, each one-half of the system shall have an absorption area equal to at least two-thirds of that required by the California Plumbing Code (i.e., two-thirds of a conventional system). For such dual systems an expansion area capable of accommodating at least 50% of the original installation is required in Types 1, 2, and 3 soils; at least 87-1/2% in Type 4 soil; and 125% in Type 5 soil.

b. The design of the lot should allow the system to be easily accessible for future maintenance, repair, reconstruction, or connection to future public sewers. For example, on smaller lots the design should allow for installation of the system in the front portion of the lot; the back portion of a lot may be used where an alley is provided.

c. The installation of sewage disposal systems within easements is not permitted without prior approval of the easement holder. Slope easements are included in this prohibition.

d. Where cut or fill banks are, or will be, nearby, the disposal system must be located so that sewage effluent will not percolate out through the surface of the embankment. As a guideline, disposal systems should be set back at a ratio of four (4) to one (1) from embankments (i.e., for each vertical
foot of embankment height, the disposal system should be located four (4) feet horizontally from the top of the embankment). Setbacks should be adjusted to suit local geologic conditions.

e. The following minimum setbacks from water wells are required:

<table>
<thead>
<tr>
<th>System</th>
<th>All Water Wells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewer or water-tight septic tank</td>
<td>50 feet</td>
</tr>
<tr>
<td>Leaching field</td>
<td>100 feet</td>
</tr>
<tr>
<td>Seepage pit</td>
<td>150 feet</td>
</tr>
</tbody>
</table>

These setback distances may be increased where deemed necessary by the Director of the Environmental Health Services Department.

f. Disposal systems should not have to be installed underneath pavement or other impervious ground surface coverings. If it is necessary to install disposal fields beneath impervious surface coverings, the disposal system and required areas shall be increased by 25%.

g. The use of aerobic-treatment equipment in place of conventional septic tanks is not acceptable as a basis for reduction of the required subsurface disposal area. The installation of electro-mechanical sewage disposal devices without provision for periodic professional maintenance is not encouraged, and is subject to disapproval by the Director of the Environmental Health Services Department.

h. A lot is not subject to residential use if the sewage disposal system cannot be installed within its boundaries.

i. Bedrock, other impervious formations, and the maximum seasonal elevation of the ground water level shall be at least seven (7) feet below the bottoms of disposal trenches or twelve (12) feet below the bottoms of seepage pits. In very pervious soils (e.g., CPC Types 1 and 2) the required separation between the ground water level and the bottoms of disposal trenches or pits may be increased at the discretion of the Director of the Environmental Health Services Department.

j. The installation of sewage disposal systems in areas underlain by carbonate rocks (e.g., limestone) or by fractured bedrock is not permitted unless evidence indicates that solution cavities or open fractures will not serve as conduits for the passage of
improperly filtered sewage effluent into ground waters, springs, or surface streams. Where applicable, professional findings or opinions in this regard shall be submitted.

k. No sewage or sewage effluent may be discharged within 100 feet (horizontally) of any water source or the high water mark of a river, stream, canal, lake, or other surface body of water.

Sewage disposal systems shall be located as far as practical from a non-classified stream or its established easement and in no case closer than 25 feet thereto unless certified by a qualified engineer that it is safe to do so without creating a nuisance or endangering the watershed.

For purposes of interpreting this section, the following definitions apply:

Stream - a continual or seasonal flow of water in a definite channel having a bed or banks.

Non-classified stream - flow of water within a well-defined course only during period of storm.

Sec. 602-3 The engineer is required to submit a statement that all lots have been designed in compliance with these Standards. For specially engineered systems, the engineer shall certify that the system(s) have been installed according to the approved plans.

Sec. 602-4 One copy of a topographical analysis map on the tentative map base (or on a larger scale map) may be required at the Director of Environmental Health Services Department's discretion. Slope percentage categories shall be depicted in accordance with the following color code:

<table>
<thead>
<tr>
<th>Slope Range</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 30%</td>
<td>Uncolored</td>
</tr>
<tr>
<td>Greater than 30%</td>
<td>Red</td>
</tr>
</tbody>
</table>

Additionally, the map shall show all easements and locations of rock out-crops, high ground water, and spring discharge. The portions of lots allocated for the subsurface disposal of sewage effluent shall be delineated, and their approximate areas in square feet indicated. The approximate size of irregularly-shaped lots must also be shown.

Sec. 602-5 Where watercourses, significant drainage channels, or bodies of water traverse or adjoin a lot, a predevelopment plan, showing how sewage disposal systems
can be installed and still remain at least the necessary distance from the high water mark, may be required. Lines depicting the required setbacks from such watercourses, drainage channels, or bodies of water shall be indicated on a copy of the tentative map.

Sec. 602-6 Wherever conditions of soil, topography, etc. permit, the use of disposal fields is preferred to that of pits. Seepage pits are prohibited where percolation rates for them exceed 25 minutes per inch (U.S. Public Health Service test procedure). In lieu of seepage pits, the engineer might consider the use of "specially designed", deeper disposal trenches as described in the California Plumbing Code.

Sec. 602-7 If the engineer determines that the building of fill pads for the installation of disposal fields is necessary, he must submit design criteria for such pads and fields. Where any fill pad is to be built in sloping terrain, the Environmental Health Services Department may require the subdivider to furnish findings of an engineer or engineering geologist qualified in such matters regarding the possibility of soil slippage or landside of the pad area. The Engineer shall certify that the fills are constructed in accordance with the design.

Sec. 602-8 If lot-grading adversely changes the engineer's initially-reported percolative characteristics of the soil in a proposed sewage disposal area, the system installed therein shall be designed in accordance with specific recommendations of a soils engineer or other specialist acceptable to the Environmental Health Services Department.

Sec. 602-9 If underground irrigation lines or other pipelines, either abandoned or proposed for abandonment, exist within a proposed land development, their locations must be shown on the tentative map, and they must be removed or destroyed as part of the subdivision improvements.

Sec. 602-10 When a geologic hazards report for land development is prepared (either at the developer's volition or as a requirement of any governmental agency), it shall include findings and recommendations concerning probable adverse effects of such hazards on the integrity of water supply and sewage disposal facilities. A copy of the report shall be furnished to the Environmental Health Services Department.

Sec. 602-11 When a flood hazard is found to exist, the engineer shall define it and shall submit his recommendations for protecting the integrity of water wells, water quality, and sewage disposal systems. Where applicable, the limits of the floodplain shall be indicated on the tentative map.

The installation of public or private sewage disposal systems in a floodway is prohibited. In an area subject to inundation (by the CSDD/See Division Four or areas identified on the Flood Insurance Rate Maps), individual sewage disposal systems are not permitted unless protected by flood control devices approved by the Department and constructed in accordance with the requirements of the Environmental Health Services Department so as
to minimize infiltration of floodwaters into the systems and discharges from the systems into the floodwater.

Sec. 602-12 Environmental Health Services Department acceptance of proposed water supply and sewage disposal methods is contingent upon clearance of those proposals through the State Regional Water Quality Control Board and/or the State Department of Health Services.

Sec. 602-13 If a private domestic water well and individual sewage disposal system are to be constructed on a lot, the minimum lot size shall be 2-1/2 acres gross. In order to preclude interference with neighboring installations, water wells shall be located with consideration of required setback distances from existing or future neighboring sewage disposal systems. Where demonstrated by a qualified civil engineer or geologist to be practical from the public health and engineering viewpoints, an exception may be granted to allow lot-design of one (1) acre net minimum size.

Sec. 602-14 In accordance with the California Plumbing Code and County ordinance, all individual sewage disposal systems must be installed under permit with the Building Inspection Division of the Engineering, Surveying & Permit Services Department.

Sec. 602-15 In areas which are determined by the Environmental Health Services Department to be unsafe for installation of individual sewage disposal systems, and where it is considered likely that a nuisance or health hazard might be created, said areas shall be served by an approved public or community sanitary sewer system.

Sec. 602-16 If a "package treatment plant" is proposed as a means of community sewage disposal, the engineer must submit design criteria for the plant to the Environmental Health Services Department for approval.

Sec. 602-17 In larger land developments consideration should be given to setting aside easements and areas for possible future use for sewage collector lines and treatment plant sites. In some cases, the Environmental Health Services Department may require such provisions.

Sec. 602-18 If a proposed land development is to be served by a public or community sewerage system, a letter from the appropriate agency or company signifying its capability and its intention to furnish its sewerage facilities to the property must be submitted to the Environmental Health Services Department. If construction has not begun within one year of the date the "will serve" letter is issued, an updated letter will be required.

Sec. 602-19 The sewerage statement on the tentative map for a land development for which individual sewage disposal systems are proposed should be worded: "Sewerage: Individual septic tank systems to be furnished by each subsequent lot owner", or similar. Proposals to utilize "cesspools" are not acceptable.
Sec. 602-20 The findings and comments of the Environmental Health Services Department regarding a proposed land development are ordinarily based upon the most recent of available tentative maps. If the design is later changed significantly, a reappraisal of the development by this Department may be necessary.

Sec. 602-21 Whenever possible, all unbound maps for submittal to the Environmental Health Services Department should be folded to 8 ½” x 11” with the title showing.

Sec. 602-22 Definition:

Public Entity—a local agency which is empowered to plan, design, finance, construct, operate, maintain, and to abandon, if necessary, any sewerage system or the expansion of any sewerage system and sewage treatment facilities serving a land development. In addition, the entity shall be empowered to provide permits and to have supervision over the location, design, construction, operation, maintenance, abandonment of individual sewage disposal systems and to conduct any monitoring or surveillance programs required for water quality control purposes.

CHAPTER III. WATER SUPPLY

Sec. 603-1 There must be an adequate supply of potable domestic water for the needs of the development, at buildout.

Sec. 603-2 The quality of the domestic water supply shall meet the current U.S. Environmental Protection Agency Drinking Water Standards. Should those standards be replaced by those of some Federal or State agency, the newer standards shall apply.

Sec. 603-3 Where domestic water supply by private wells is proposed, a report prepared by a qualified engineer or geologist outlining findings and opinions concerning the adequacy of the quantity and quality of ground water is required. The report shall include, but shall not be limited to data on the chemical and bacteriological qualities of the ground water (chemical and bacteriological analyses must be made by a State approved laboratory). Constituents and properties to be tested for shall be in accordance with current Federal and State requirements, as may be modified from time to time by directive of the Director of the Environmental Health Services Department.

Sec. 603-4 Tank-truck hauling of domestic water for land developments or lots within new land developments is not permitted.

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Sec. 603-5 Domestic water supply wells shall be drilled and constructed in accordance with the Kern County Ordinance Code. The installation of private water wells within easements or in building setback areas is not permitted.

Sec. 603-6 All domestic water supply systems must be under Environmental Health Services Department or State Department of Health Services permit. A permit to construct a new water system for a subdivision must be obtained prior to recordation of the final map. If an existing system is to be expanded, its permit must be updated prior to recordation of the final map. Construction of any water supply facilities shall be in compliance with the Kern County Zoning Ordinance, and any Variance, Conditional Use Permit, Modification, or other requirement shall be obtained prior to recordation of the final map.

Sec. 603-7 Existing water wells which have been, or are proposed to be abandoned shall be destroyed in accordance with the Kern County Ordinance Code prior to Environmental Health Services Department acceptance of the development.

Sec. 603-8 If the proposed land development is to be served by a public domestic water supply, a letter from the appropriate agency or company signifying its capability and its intention to furnish domestic water to the property must be submitted to the Environmental Health Services Department. If construction has not begun within one year of the date the "will serve" letter is issued, an updated letter will be required.

Sec. 603-9 Sources of domestic water supply (e.g., wells, springs, etc.) are not permitted in floodplains unless protected by flood control devices approved by the Water Agency or the Department of Engineering, Surveying & Permit Services Department and constructed in accordance with the requirements of the Environmental Health Services Department so as to minimize infiltration of floodwaters thereinto.

CHAPTER IV,

PRESERVATION OF ENVIRONMENTAL HEALTH

Sec. 604-1 Any aspect of the design of a proposed development which, in the opinion of the Director of the Environmental Health Services Department, is likely or highly possible to cause serious public health problems shall be cause for a recommendation from the Environmental Health Services Department for disapproval of the development.

Sec. 604-2 Any aspect of the design of a proposed development which, in the opinion of the Director of the Environmental Health Services Department, is likely to cause degradation of environmental quality by pollution or contamination shall be cause for a recommendation from the Environmental Health Services Department for disapproval of the development. Environmental Health Services Department activities in this regard will be coordinated with the appropriate State agencies.
Sec. 604-3 Violations of health and safety laws within a proposed land development must be abated prior to Environmental Health Services Department acceptance of the development.

Uncovered or abandoned shafts, pits, and wells, and any other possible hazards, shall be properly destroyed, filled, or otherwise corrected.

Sec. 604-4 Land developments are subject to review by the Environmental Health Services Department with regard to the disposal of solid wastes and liquid wastes (e.g., septic tank pumpings) which may be generated by the development.
DIVISION SEVEN

CONSTRUCTION SECURITY

CHAPTER I. GENERAL

Sec. 701-1 Purpose and Scope

The following unit prices are to be used when security is required for developments within the unincorporated area of Kern County. The unit prices may be revised when construction costs differ significantly from current amounts. Revisions will be made by the Director with consultation of private engineers.

Sec. 701-2 Preparation and Approval of Engineer's Estimate

Estimates shall be prepared by a registered engineer for the developer and approved by the Director. Small projects/estimates shall be adjusted to the approval of the Director.

Sec. 701-3 Reduction in Estimates

When a portion of the work required is completed prior to posting security, the security may be reduced based on work completed. The security amount shall be as follows:

1. Total estimate
2. Minus estimated work completed
3. Plus 20% of (1-2) (See Section 702-9)
4. Plus 10% of work completed. The estimate of work completed shall be approved by the Director.
## CHAPTER II. UNIT PRICES

### Sec. 702-1  Unit Prices for Preparing Improvement Security Estimates for Kern County Developments

### Sec. 702-2  Road Construction Items

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
<th>MINIMUM UNIT PRICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation (Roadway)</td>
<td>Over 50,000</td>
<td>Cu. Yd.</td>
<td>$ 9.00</td>
</tr>
<tr>
<td></td>
<td>20,000 to 50,000</td>
<td>Cu. Yd.</td>
<td>12.00</td>
</tr>
<tr>
<td></td>
<td>20,000 to 10,000</td>
<td>Cu. Yd.</td>
<td>18.00</td>
</tr>
<tr>
<td></td>
<td>Under 10,000</td>
<td>Cu. Yd.</td>
<td>25.00</td>
</tr>
<tr>
<td></td>
<td>Compacted Imported Borrow</td>
<td>Cu. Yd.</td>
<td>30.00</td>
</tr>
<tr>
<td>Curb and Gutter</td>
<td>PCC A2-6 (6&quot; High Curb)</td>
<td>L.F.</td>
<td>40.00</td>
</tr>
<tr>
<td></td>
<td>Under 1,000 L.F.</td>
<td>L.F.</td>
<td>25.00</td>
</tr>
<tr>
<td></td>
<td>Over 1,000 L.F.</td>
<td>L.F.</td>
<td>20.00</td>
</tr>
<tr>
<td>Concrete Sidewalk,</td>
<td>4&quot; Thick</td>
<td>Sq. Ft.</td>
<td>6.00</td>
</tr>
<tr>
<td>Driveways</td>
<td>6&quot; Thick</td>
<td>Sq. Ft.</td>
<td>9.00</td>
</tr>
<tr>
<td>Concrete Cross Gutter</td>
<td>6' Wide X 6&quot; Thick (Std.)</td>
<td>Ea.</td>
<td>5,500.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sq. Ft.</td>
<td>9.00</td>
</tr>
<tr>
<td>Wheelchair/Curb Ramps</td>
<td>ADA, Title 24, and Caltrans compliant. With detectable warning</td>
<td>Ea.</td>
<td>2,500.00</td>
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<tr>
<td>Concrete-Miscellaneous</td>
<td>Class B</td>
<td>Cu. Yd.</td>
<td>500.00</td>
</tr>
<tr>
<td>Concrete-Structural</td>
<td>Retaining Walls, etc.</td>
<td>Cu. Yd.</td>
<td>650.00</td>
</tr>
<tr>
<td>Aggregate Base</td>
<td>Class 2</td>
<td>Cu. Yd.</td>
<td>70.00</td>
</tr>
<tr>
<td></td>
<td>Class 3</td>
<td>Cu. Yd.</td>
<td>50.00</td>
</tr>
<tr>
<td>Street Surfacing</td>
<td>Asphalt Concrete - For Streets and Alley Only</td>
<td>Tons</td>
<td></td>
</tr>
<tr>
<td>Paving</td>
<td>&lt;1000</td>
<td></td>
<td>100.00</td>
</tr>
<tr>
<td></td>
<td>1000-5000</td>
<td></td>
<td>75.00</td>
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<tr>
<td></td>
<td>&gt;5000</td>
<td></td>
<td>65.00</td>
</tr>
<tr>
<td></td>
<td>Misc. Asphalt Concrete - Includes all areas outside of street &amp; Alley Gutterlines</td>
<td>SY</td>
<td>120.00</td>
</tr>
<tr>
<td>Construction Seal</td>
<td>Asphalt Rejuvenating Agent</td>
<td>SY</td>
<td>0.25</td>
</tr>
<tr>
<td>Saw Cutting</td>
<td></td>
<td>L.F.</td>
<td>2.50</td>
</tr>
</tbody>
</table>
### Drainage Items

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
<th>MINIMUM UNIT PRICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structures</td>
<td>Manholes</td>
<td>Ea.</td>
<td>$4,000.00</td>
</tr>
<tr>
<td></td>
<td>Junction Boxes</td>
<td>Ea.</td>
<td>5,000.00</td>
</tr>
<tr>
<td></td>
<td>Standard Outlet Structure</td>
<td>Ea.</td>
<td>4,000.00</td>
</tr>
<tr>
<td></td>
<td>Catch Basin Up to 5'</td>
<td>Ea.</td>
<td>5,000.00</td>
</tr>
<tr>
<td></td>
<td>Opening Width</td>
<td>Ft.</td>
<td>1,000.00</td>
</tr>
<tr>
<td></td>
<td>Per Additional Foot of Opening Beyond 5'</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The estimated actual structure cubic yardage may be used in lieu of the above each and per foot, using $2500 per cubic yard.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
<th>MINIMUM UNIT PRICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Structures and head-walls (Includes Forming &amp; Reinforcement)</td>
<td>Cu. Yd.</td>
<td>2,500.00</td>
<td></td>
</tr>
<tr>
<td>Under-Sidewalk Drain</td>
<td>Ea.</td>
<td>2000.00</td>
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</tr>
<tr>
<td>Gunit - (Includes Reinforcement - 3&quot; Thick)</td>
<td>Sq. Ft.</td>
<td>15.00</td>
<td></td>
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<tr>
<td>Rip Rap</td>
<td>Cu. Yd.</td>
<td>125.00</td>
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### Pipe Installed As Storm Drains - (In-Place per L.F.)

<table>
<thead>
<tr>
<th>CONCRETE (Plain)</th>
<th>R.C.P (Rubber Gasket)</th>
<th>For Runs over 200 Ft.</th>
<th>C.M.P. (Galvanized)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Cost</td>
<td>Size</td>
<td>Cost</td>
</tr>
<tr>
<td>18&quot;</td>
<td>$100</td>
<td>18&quot;</td>
<td>$120</td>
</tr>
<tr>
<td>21&quot;</td>
<td>110</td>
<td>--</td>
<td>125</td>
</tr>
<tr>
<td>24&quot;</td>
<td>115</td>
<td>24&quot;</td>
<td>130</td>
</tr>
<tr>
<td>27&quot;</td>
<td>--</td>
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<td>138</td>
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<td>30&quot;</td>
<td>--</td>
<td>30&quot;</td>
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<td>36&quot;</td>
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<td>36&quot;</td>
<td>160</td>
</tr>
<tr>
<td>42&quot;</td>
<td>--</td>
<td>42&quot;</td>
<td>170</td>
</tr>
<tr>
<td>48&quot;</td>
<td>--</td>
<td>48&quot;</td>
<td>220</td>
</tr>
<tr>
<td>54&quot;</td>
<td>--</td>
<td>54&quot;</td>
<td>260</td>
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<td>60&quot;</td>
<td>--</td>
<td>60&quot;</td>
<td>300</td>
</tr>
<tr>
<td>72&quot;</td>
<td>--</td>
<td>72&quot;</td>
<td>700</td>
</tr>
<tr>
<td>84&quot;</td>
<td>--</td>
<td>--</td>
<td>1,500</td>
</tr>
<tr>
<td>DOWNS DRAINS</td>
<td>UNITS</td>
<td>MINIMUM UNIT PRICES</td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------</td>
<td>---------------------</td>
<td></td>
</tr>
<tr>
<td>12&quot; Pipe</td>
<td>L.F.</td>
<td>$ 60</td>
<td></td>
</tr>
<tr>
<td>Entrance Taper</td>
<td>Ea.</td>
<td>675</td>
<td></td>
</tr>
<tr>
<td>Exit Treatment W/Anchors</td>
<td>Ea.</td>
<td>400</td>
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</tr>
</tbody>
</table>

**C.M.P. Standard End Sections - (Installed)**

<table>
<thead>
<tr>
<th>Size</th>
<th>Units</th>
<th>Minimum Unit Prices</th>
<th>Size</th>
<th>Units</th>
<th>Minimum Unit Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>18&quot;</td>
<td>Ea.</td>
<td>$ 190</td>
<td>54&quot;</td>
<td>Ea.</td>
<td>$2,280</td>
</tr>
<tr>
<td>21&quot;</td>
<td>Ea.</td>
<td>215</td>
<td>60&quot;</td>
<td>Ea.</td>
<td>2,860</td>
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<tr>
<td>24&quot;</td>
<td>Ea.</td>
<td>250</td>
<td>66&quot;</td>
<td>Ea.</td>
<td>3,160</td>
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<tr>
<td>30&quot;</td>
<td>Ea.</td>
<td>460</td>
<td>72&quot;</td>
<td>Ea.</td>
<td>3,450</td>
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<tr>
<td>36&quot;</td>
<td>Ea.</td>
<td>680</td>
<td>78&quot;</td>
<td>Ea.</td>
<td>3,700</td>
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<tr>
<td>42&quot;</td>
<td>Ea.</td>
<td>1,190</td>
<td>84&quot;</td>
<td>Ea.</td>
<td>4,025</td>
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<tr>
<td>48&quot;</td>
<td>Ea.</td>
<td>1,710</td>
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</table>

**Sec. 702-4 Sanitary Sewer**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
<th>MINIMUM UNIT PRICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3' Minimum Cover-</td>
<td>Includes trenching,</td>
<td>L.F.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>backfill and fittings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manholes</td>
<td>Standard - 6' to 8' Deep</td>
<td>Ea.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- 9' to 12' Deep</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- 13' to 16' Deep</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single Drop</td>
<td>Ea.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Multiple Drop</td>
<td>Ea.</td>
<td></td>
</tr>
<tr>
<td>Tie-In</td>
<td>Connect to existing</td>
<td>Ea.</td>
<td>5000.00</td>
</tr>
<tr>
<td>Clean Outs (To Grade)</td>
<td>4&quot;</td>
<td>Ea.</td>
<td>525.00</td>
</tr>
<tr>
<td></td>
<td>6&quot;</td>
<td>Ea.</td>
<td>650.00</td>
</tr>
<tr>
<td></td>
<td>8&quot;</td>
<td>Ea.</td>
<td>700.00</td>
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</table>
### Domestic Water Items

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
<th>MINIMUM UNIT PRICES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pipe (Includes trenching, backfill and fittings - No Valves)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4&quot; PVC Class 150</td>
<td>L.F.</td>
<td>$26.00</td>
<td></td>
</tr>
<tr>
<td>6&quot; PVC Class 150</td>
<td>L.F.</td>
<td>$31.00</td>
<td></td>
</tr>
<tr>
<td>8&quot; PVC Class 150</td>
<td>L.F.</td>
<td>$35.00</td>
<td></td>
</tr>
<tr>
<td>10&quot; PVC Class 150</td>
<td>L.F.</td>
<td>$42.00</td>
<td></td>
</tr>
<tr>
<td>12&quot; PVC Class 150</td>
<td>L.F.</td>
<td>$48.00</td>
<td></td>
</tr>
<tr>
<td>14&quot; PVC Class 150</td>
<td>L.F.</td>
<td>$60.00</td>
<td></td>
</tr>
<tr>
<td>4&quot; DIP Class 50</td>
<td>L.F.</td>
<td>$36.00</td>
<td></td>
</tr>
<tr>
<td>6&quot; DIP Class 50</td>
<td>L.F.</td>
<td>$41.00</td>
<td></td>
</tr>
<tr>
<td>8&quot; DIP Class 50</td>
<td>L.F.</td>
<td>$45.00</td>
<td></td>
</tr>
<tr>
<td>10&quot; DIP Class 50</td>
<td>L.F.</td>
<td>$50.00</td>
<td></td>
</tr>
<tr>
<td>12&quot; DIP Class 50</td>
<td>L.F.</td>
<td>$60.00</td>
<td></td>
</tr>
<tr>
<td>14&quot; DIP Class 50</td>
<td>L.F.</td>
<td>$72.00</td>
<td></td>
</tr>
<tr>
<td>16&quot; DIP Class 50</td>
<td>L.F.</td>
<td>$78.00</td>
<td></td>
</tr>
<tr>
<td>Road Bore</td>
<td>12&quot;</td>
<td>L.F.</td>
<td>200.00</td>
</tr>
<tr>
<td></td>
<td>Valves (Mechanical Joints - Includes Installation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&quot; Gate</td>
<td>Ea.</td>
<td>400.00</td>
<td></td>
</tr>
<tr>
<td>4&quot; Gate</td>
<td>Ea.</td>
<td>710.00</td>
<td></td>
</tr>
<tr>
<td>6&quot; Gate</td>
<td>Ea.</td>
<td>850.00</td>
<td></td>
</tr>
<tr>
<td>8&quot; Gate</td>
<td>Ea.</td>
<td>1,050.00</td>
<td></td>
</tr>
<tr>
<td>10&quot; Gate</td>
<td>Ea.</td>
<td>1,800.00</td>
<td></td>
</tr>
<tr>
<td>12&quot; Gate</td>
<td>Ea.</td>
<td>2,100.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Valves (Flanged Joints - Includes Installation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4&quot; Gate</td>
<td>Ea.</td>
<td>950.00</td>
<td></td>
</tr>
<tr>
<td>6&quot; Gate</td>
<td>Ea.</td>
<td>1,500.00</td>
<td></td>
</tr>
<tr>
<td>8&quot; Gate</td>
<td>Ea.</td>
<td>2,600.00</td>
<td></td>
</tr>
<tr>
<td>10&quot; Gate</td>
<td>Ea.</td>
<td>2,800.00</td>
<td></td>
</tr>
<tr>
<td>12&quot; Gate</td>
<td>Ea.</td>
<td>3,100.00</td>
<td></td>
</tr>
<tr>
<td>Valve Boxes</td>
<td>Ea.</td>
<td>510.00</td>
<td></td>
</tr>
<tr>
<td>Meter Boxes-</td>
<td>Concrete</td>
<td>Ea.</td>
<td>105.00</td>
</tr>
<tr>
<td>Blow-offs</td>
<td>2&quot; (with box &amp; valve; add $35 per linear foot of pipe length from main to blowoff in excess of 15&quot;)</td>
<td>Ea.</td>
<td>1,200.00</td>
</tr>
<tr>
<td></td>
<td>4&quot; (with hydrant outlet; add $30 per linear foot of pipe length from main to blowoff in excess of 15&quot;)</td>
<td>Ea.</td>
<td>2,000.00</td>
</tr>
<tr>
<td>ITEM</td>
<td>DESCRIPTION</td>
<td>UNITS</td>
<td>MINIMUM UNIT PRICES</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Services</td>
<td>3/4&quot; single-long &amp; short</td>
<td>Ea.</td>
<td>$ 900.00</td>
</tr>
<tr>
<td></td>
<td>1&quot; single-long &amp; short</td>
<td>Ea.</td>
<td>1,100.00</td>
</tr>
<tr>
<td></td>
<td>1&quot; double-long &amp; short</td>
<td>Ea.</td>
<td>1,300.00</td>
</tr>
<tr>
<td></td>
<td>2&quot; single (add $24 per linear foot of pipe length from main to R/W in excess of 15')</td>
<td>Ea.</td>
<td>1,150.00</td>
</tr>
<tr>
<td>Fire Hydrant (Including gate valve)</td>
<td></td>
<td>Ea.</td>
<td>4,000.00</td>
</tr>
<tr>
<td>Tie-in</td>
<td></td>
<td>Ea.</td>
<td>1,100.00</td>
</tr>
<tr>
<td>Plug &amp; Block</td>
<td></td>
<td>Ea.</td>
<td>200.00</td>
</tr>
</tbody>
</table>

Sec. 702-6 Miscellaneous Items

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>UNITS</th>
<th>MINIMUM UNIT PRICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chain Link</td>
<td>4’ High Chainlink Fence</td>
<td>L.F.</td>
<td>$ 75.00</td>
</tr>
<tr>
<td>Fencing</td>
<td>6’ High Chainlink Fence</td>
<td>L.F.</td>
<td>75.00</td>
</tr>
<tr>
<td></td>
<td>Gates-14’ Opening w/post lock</td>
<td>Per Pair</td>
<td>3,600.00</td>
</tr>
<tr>
<td></td>
<td>6’ Chainlink Fence (with redwood slats &amp; 6”x18” concrete footing (including gates)</td>
<td>L.F.</td>
<td>95.00</td>
</tr>
<tr>
<td>CMU</td>
<td>5’ High</td>
<td>L.F.</td>
<td>115.00</td>
</tr>
<tr>
<td>Screen Wall</td>
<td>6’ High</td>
<td>L.F.</td>
<td>130.00</td>
</tr>
<tr>
<td>Electric Gates - Double</td>
<td></td>
<td>Ea.</td>
<td>20,000.00</td>
</tr>
<tr>
<td>Electric Gates - Single</td>
<td></td>
<td>Ea.</td>
<td>15,000.00</td>
</tr>
<tr>
<td>Landscaping</td>
<td></td>
<td>S.F.</td>
<td>5.00</td>
</tr>
<tr>
<td>Liquid Asphalt (R.M.S.)</td>
<td></td>
<td>Ton</td>
<td>600.00</td>
</tr>
<tr>
<td>Survey Monuments</td>
<td></td>
<td>Ea.</td>
<td>150.00</td>
</tr>
<tr>
<td>Survey Monument Encasements</td>
<td></td>
<td>Ea.</td>
<td>600.00</td>
</tr>
<tr>
<td>Lot Corners</td>
<td></td>
<td>Ea.</td>
<td>50.00</td>
</tr>
<tr>
<td>Street Signs</td>
<td></td>
<td>Ea.</td>
<td>300.00</td>
</tr>
<tr>
<td>Barricades</td>
<td></td>
<td>Ea.</td>
<td>150.00</td>
</tr>
<tr>
<td>Street Lights</td>
<td></td>
<td>Ea.</td>
<td>6000.00</td>
</tr>
<tr>
<td>Pump Station</td>
<td></td>
<td>Ea.</td>
<td>Per Engineer</td>
</tr>
</tbody>
</table>
Sec. 702-7 Utilities

The cost of all utility relocations shall be based upon estimates submitted by utility companies.

Sec. 702-8 Items not listed

When the project requires construction or installation of items not listed in the previous tables, the engineer shall provide an estimate of the item(s), to be approved by the director.

Sec. 702-9 Inflations-Contingency Factor

A contingency factor of 20% shall be added to the unit prices to compensate for the effect of inflation and any changes in construction during the life of the project.
DIVISION EIGHT

SURVEY MONUMENTS

CHAPTER I. GENERAL

Sec. 801-1  Purpose and Scope

Survey monuments shall be set in accordance with the Land Division Ordinance by a surveyor registered in the State of California, or an appropriately licensed civil engineer, for all land developments. All monuments shall be properly identified by the surveyor or engineer setting the monuments.

CHAPTER II. MONUMENTS

Sec. 802-1  Permanent Monuments (Streets)

Monuments for street locations shall be precast concrete blocks in the shape of a frustum of a cone with a base diameter of ten (10) inches, a top diameter of six (6) inches and a height of ten (10) inches per Plate R-70. These monuments shall be set at all points of intersection of street centerline, all angle points of street centerline and all beginning and ending of curvature along street centerlines.

Sec. 802-2  Permanent Monuments (Boundaries)

The surveyor may use the street monument, or a two (2) inch iron pipe a minimum of 18 inches in length, for boundary monuments. Iron pipes shall be filled with concrete or have a two x two (2 x 2) redwood stake driven in the top of the pipe or a suitable metal cap driven into or permanently fixed to the pipe. Boundary monuments shall be set along the exterior boundary of the development at all angle points, all curve points and all points of intersection.

Sec. 802-3  Monuments (Lot Corners)

Monuments shall be set for all lot corners in a development by a surveyor. Monuments for lot corners shall be a one (1) inch iron pipe a minimum of 12 inches in length, or a one-half (1/2) inch rebar or a five-eighths (5/8) inch rebar a minimum of 18 inches in length with a plastic or aluminum cap. Where concrete curb and gutter exists, the surveyor may set brass tags in the curb along the offset of the lot line. Tag and nail shall be set in wet concrete or in a drilled hole filled with approved epoxy. Brass tags shall be set where extended lot lines intersect the concrete curb.

Sec. 802-4  Monuments General

The County Surveyor shall determine the number, type and location for all survey monuments. Variance to the above requirements may be granted or required by the County Surveyor.

(Updated 2.23.10)
DIVISION NINE

STANDARDS FOR TRAFFIC ENGINEERING

CHAPTER I. INTRODUCTION

Sec. 901-1 Purpose and Scope

This division establishes the minimum acceptable standards for the application of traffic engineering and traffic planning principals in the design of the transportation system to promote the safe, efficient and orderly movement of goods and people.

CHAPTER II. TRAFFIC STUDIES

Sec. 902-1 Responsibility for Traffic Studies

Traffic studies may be required by the County in order to adequately assess the impacts of a development proposal on the existing and/or planned major street system. These impacts would typically be addressed in the "Traffic Circulation" section of an Environmental Impact Report (EIR). If a full EIR is not required, a Negative Declaration, or an expanded initial study addressing traffic impacts, may be required. The primary responsibility for assessing the traffic impacts associated with a proposed development shall be the developer's, with the County serving in a review capacity.

The following development proposals will require regional traffic studies prepared, in a format acceptable to the Kern County Roads Department, unless the study is waived.

902-1.01 Any Project proposed within the Kern County General Plan, where a Transportation Impact Fee Program has not been implemented and the increase in project trip generation during any peak hour is expected to exceed 50 vehicles.

902-1.02 Any Project proposed within the Rosamond-Willow Springs Specific Plan where the increase in project trip generation during any peak hour is expected to exceed 50 vehicles.

902-1.03 Any General/Specific Plan Amendment application, which is expected to intensify land use over that previously allowed in the General/Specific Plan whereby the increase in trip generation during any peak hour is expected to exceed 50 vehicles.

Where proposed projects, as noted above, are not expected to result in an increase in trip generation it is exempt from a regional traffic impact study. To be eligible, a traffic analysis shall be submitted and approved which computes trip generation with existing and proposed land uses. Said analysis shall show that increase in peak hour trip generation does not exceed 50 trips.

902-1.04 Special traffic studies may be required where special

(Updated 2.23.10) 275
circumstances dictate the need for a traffic study (such as issues of safe access concerns, significant public opposition, request for deviation from standards, large commercial/industrial centers, etc.).

902-1.05 Where access points are not defined at the time the traffic study is prepared, additional traffic work may be required when the access points are determined.

902-1.06 Transportation consultants are required to discuss projects with the Development Review Division prior to starting the study.

902-1.07 The traffic study shall be prepared, stamped and signed by a licensed Traffic Engineer or Civil Engineer experienced in preparing traffic studies.

Sec. 902-2 Traffic Study Format

In order to provide consistency and to facilitate staff review of traffic studies, the Caltrans "Guide for The Preparation of Traffic Impact Studies" shall be followed in the preparation of traffic studies.

(http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf)

Facilities to be studied shall be any City, State or County facility (mainline, interchange, structure, intersection or any project on the Transportation Impact Fee (TIF) list) when the peak hour trip generation onto said facility exceeds 50 trips. For those facilities currently experiencing level-of-service (LOS) "C" or less, the following "sliding scale" of "added peak project trips" shall be applied as the procedure to determine whether the facility should be included:

<table>
<thead>
<tr>
<th>EXISTING LOS</th>
<th>ADDED PEAK PROJECT TRIPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;C&quot;</td>
<td>50</td>
</tr>
<tr>
<td>&quot;D&quot;</td>
<td>40</td>
</tr>
<tr>
<td>&quot;E&quot;</td>
<td>20</td>
</tr>
<tr>
<td>&quot;F&quot;</td>
<td>10</td>
</tr>
</tbody>
</table>

902-2.01 Project Trip Generation and Design Hour Volumes must be calculated using the data contained within the Institute of Transportation Engineer's (ITE) Trip Generation Manual, latest edition, or more appropriate local data as approved by the Traffic Engineer. (Formula Averaging is NOT acceptable for the calculation of Peak Hour trip generation rates as published in the ITE Trip Generation Manual, latest edition.)

902-2.02 Capacity Analysis must be determined by the methods contained within the Highway Capacity Manual (HCM), latest edition.

902-2.03 Traffic Signal requirements will be determined by the warrants

902-2.04 Proportionate Shares along State highways shall be calculated using the Caltrans formula. All other County Proportionate Shares are calculated with the following formula:

\[(\text{Project Traffic/Future Forecasted Traffic}) \times 100\]

CHAPTER III. TENTATIVE SUBDIVISION REVIEW

Sec. 903-1 Introduction

This chapter is intended as a standard for design and review of the traffic aspects of tentative subdivision maps.

Sec. 903-2 Street Name Signs

Street name signs shall be paid for and installed by the developer and placed in accordance with the requirements of County Standards Plate T-1 and T-2. These shall also be placed at the corner of knuckled streets.

Sec. 903-3 Regulatory/Warning Signs

Developer will be required to pay for and install regulatory and warning signs in accordance with these standards. Traffic signs shall be installed in conformance with the standards in the California MUTCD. In the event of a conflict between these standards and the California MUTCD, the California MUTCD shall take precedence.

CHAPTER IV. TRAFFIC SIGNAL IMPROVEMENTS

Sec. 904-1 Introduction

This chapter is intended as a standard for design and installation of traffic signal improvements.

Sec. 904-2 Traffic Signal & Lighting System Design

Traffic signals and lighting systems shall be designed to meet all County and State standards. These standards are defined in detail by the Kern County Roads Department, Traffic Engineering Division.

Sec. 904-3 Traffic Signal Interconnect

Traffic signal interconnect conduit shall be installed along all collector and arterial streets or as directed by the Traffic Engineer as part of the standard street improvements. Placement of conduit shall be on the side of the street first developed unless otherwise directed due to prior development or conduit placement.
Interconnect conduit shall be 2" minimum with pull rope or pull wire and shall conform to CalTrans Standard Specifications, latest edition. Interconnect conductor shall be installed where a complete segment of conduit is being placed between signalized or future signalized intersections. The standard location for conduit shall be under sidewalk and shall be constructed with No. 5 pull boxes per Plate T-16 spaced at a maximum of 400 feet. Alternate design locations may be allowed as approved by the Traffic Engineer.

Sec. 904-4 Future Signal Conduit

Future signal conduit shall be installed at all major intersections or intersections planned for future signals per Plate T-15. Additional right of way shall be provided for location of controller as shown in the detail.

CHAPTER V. LINE OF SIGHT REVIEW

Sec. 905-1 Introduction

This chapter is intended as a standard for the construction and restriction of improvements in the line of sight for vehicles entering and exiting county roads as required.

Sec. 905-2 Uncontrolled Intersections

At all corners located on uncontrolled intersections no obstruction to the driver’s view in excess of three feet above the adjacent gutter flowline shall be placed in a triangular area formed by the intersecting street curblines and a line connecting them at points 60 feet from the intersection point per Plate T-7.

Sec. 905-3 Alleys and Minor Driveways

No obstruction to sight view will be allowed within a triangular area formed by the alley or driveway edge and the interior sidewalk edge (the street right-of-way line if no sidewalk exists) and a line connecting them at points 10 feet from the intersection point.

Sec. 905-4 Controlled Intersections

905-4.01 Sight distance at controlled intersections shall be based upon a sight distance equal to design speed (S) in miles per hour multiplied by a factor of 10 (See Plate T-7). Design speeds for various street classifications are as follows:

<table>
<thead>
<tr>
<th>Classification</th>
<th>Speed (S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Street</td>
<td>25 MPH</td>
</tr>
<tr>
<td>Collector</td>
<td>65 MPH</td>
</tr>
<tr>
<td>Arterial</td>
<td>65 MPH</td>
</tr>
</tbody>
</table>

905-4.02 Corner sight distance is measured from a point on the minor road fifteen feet from the curb line of the major road, and three feet right of the left edge of the viewing lane under consideration. Said point is
viewed from a height of 3.5 feet on the minor road to an oncoming vehicle height of 4.25 feet on the major road.

905-4.03 When viewing left, the location of the oncoming vehicle is considered to be twelve feet from the nearest curb line of the major street (six feet with parking prohibited). Parking is assumed to be prohibited on arterial and collector streets.

905-4.04 When viewing right, the location of the oncoming vehicle is considered to be three feet right of the left edge of the left most lane for the oncoming vehicle on the major street.

Sec. 905-5 T-Intersections

At uncontrolled T-intersections, the requirements of both Sections 905-2 and 905-4 shall be met.

Sec. 905-6 Landscaping

905-6.01 Landscaping over thirty (30) inches in height above top of curb shall not be placed within the lines of sight defined in the preceding sections. All landscaping must be maintained at a height of thirty (30) inches or less with the exception of trees as provided for in Section 905-6.02 (See Plate T-8)

905-6.02 Trees are permitted in the line of sight for controlled intersections provided that the skirt height (bottom of foliage) is maintained seven feet above the adjacent top of curb height. In the event more than one tree is placed in the sight line area they must be placed on a radial from the viewpoint. (See Plate T-8)

CHAPTER VI. SIGNING, STRIPING AND MARKING

Sec. 906-1 Introduction

The County shall provide all new and revised signing, striping, marking and other channelization necessary except as noted in Section 903. However, design of all new and revised signing, striping, marking and other channelization shall be provided by the project's Engineer and comply with the standards established in the State of California and detailed in the California MUTCD.

These requirements are intended to supplement and clarify the requirements contained in the California MUTCD and the CalTrans Standard Plans and Specifications, latest edition.

The associated details, special provisions and these requirements are to be used as a general standard for developing signing & striping plans. Specific situations may require special consideration.
Sec. 906-2 Design Requirements

906-2.01 Signing & striping plans shall show the proposed signing, striping and markings within the limits of the project. It shall also show existing signing and striping in and beyond the project limits as needed to determine proper transition.

909-2.02 Depending upon the location involved, various methods for dividing traffic may be available or appropriate. These include: a yellow skip stripe, double yellow stripe, double-double yellow stripe (painted median) and two-way turn lane stripe. The Traffic Engineer shall have final determination as to which method is used.

909-2.03 Paint shall conform to Section 84 of the Caltrans Standard Specifications, unless another treatment is allowed.

906-2.04 Existing stripes shall be removed, where necessary. Removal shall be in accordance to Section 15 of the Caltrans Standard Specifications.

906-2.05 Provisions shall be included to have the Inspector review the "Rabbit Tracked" layout in the field prior to final striping. Field adjustments may be needed.

906-2.06 It is the responsibility of the project's Engineer to review the road work to be done with relationship to maintaining existing traffic. If the project's Engineer determines a detour is needed then a detour plan shall also be included. If no detour plan is provided but the Inspector finds that one is necessary during construction then the project's Engineer shall provide such a plan at that time and no work shall progress until such plan is approved.

906-2.07 Figures T-12 and T-13 detail typical striping plans, which cover most of the common striping situations encountered. Striping plans shall be designed to provide the total number of lanes for ultimate full width improvements whenever possible. Specific projects may require special treatment to match existing conditions. (e.g. - dropping a lane or forcing the outside lane to turn at an intersection, providing only 2-lanes each way on a 6-lane arterial, moving lanes over due to 1/2 width improvements, etc.)

CHAPTER VII STREET SIGN SPECIFICATIONS

907-1 Design

Street signs shall consist of two double faced signs, mounted at right angles. (or 45 degree if angle of intersection warrants)
907-2 **Bracket Assembly**

Post cap shall fit a 2" I.D. Standard Pipe, complete with minimum of three (3) Allenhead setscrews to secure to pipe. Crosspiece shall secure the name plates at 90 degree (or 45 degree) with a minimum of two (2) 5/16" Allenhead setscrews in each plate (setscrews shall be electro-plated zinc-coated.0003-.0005"). Casting shall be die-cast aluminum. Standard weight.

907-3 **Plate Size**

Length shall be either 24" or 30". Width shall be 6". Radius of corners shall be ½". Plates shall be .125" ga. aluminum, 6061T6 Alloy with Alodine 1200 surface treatment.

907-4 **Finish**

Signs shall be baked enamel finished in accordance with the State of California Specifications of Interstate Green.

907-5 **Lettering**

The letters shall be die cut and of the rounded type style conforming to the standard alphabet for highway signs designed by the U.S. Public Roads Administration. Street names shall be Series B, C, D, or E, 4" high. Abbreviations (St., Dr., Ln., Ave., Ct., Way, etc.) shall be series C, 2" high. Street names and abbreviations shall be White-2290 Scotchlite Reflective Sheeting Material, as manufactured by the 3M Company, or equal. Each name shall be individually laid out and spaced to fit either the 24" or 30" plates. Application of Reflective sheeting shall be applied in accordance with the manufacturer's specifications.
**Typical Location**

**Offset Street Marker**
- To lot line closest to alignment of centerline of intersecting street
- Standard location for full intersection of local streets, street marker to be placed on NW corner

**Local Street**
- Street sign shall be placed on SE corner when NW location does not apply

**General Notes:**
- Street signs shall conform to street sign specifications per Division Nine, Chapter 7 and Plate No.'s T-1 & T-3

**Major or Secondary Highway**
- With full intersection with major or secondary highway, two street signs shall be placed on both the NW and SE corners when a local street intersects a major or secondary highway. From one side only, one street sign shall be placed on either the NW or SE corner, whichever applies

**Note:**
- Street sign hardware shall conform to catalog #V14805-PH, Hawkins & Hawkins Co., or equal

**Sign Post Elevation Detail**

**Dimensions:**
- 3 1/4" - 20 x 3/8"
- 2 1/4" - 20 x 1/2"
- 3 1/4" - 20 x 1/2"
- 3/8" x 6" galvanized bolt

**Typical Dimensions:**
- 7" min.
- 12" min.
WHEN PLACED IN EXISTING SIDEWALK, SIDEWALK SHALL BE CORE DRILLED.

ALTERNATE LOCATION TO BE USED WHEN THE SIDEWALK EXTENDS FROM THE CURB TO THE PROPERTY LINE, PARTICULARLY IN COMMERCIAL AREAS. A MINIMUM OF 4" CLEARANCE IS REQUIRED FROM BACK OF SIDEWALK TO EDGE OF SIGN POST.

CURB & GUTTER

TYPE B.S.S.
2" GALVANIZED STEEL PIPE
AS PER AMERICAN FENCE CO.
OR 2"-14 GAUGE SQ. POST
W/ 7/16" PREPUNCHED HOLES
ON 1" CENTERS (GALV.)

BACK OF SIDEWALK

6" x 1/4" DIA. ROD
OR BOLT CAST INTO CONCRETE

CLASS "3" P.C.C.

3" CLR.

8" MIN

ROD OR BOLT THRU DRILLED HOLE

THRU BOLT DETAIL

SIZE OF SIGN PANELS SHALL BE ASSUMED AS STANDARD DENOTED IN THE CALIFORNIA MUTCD UNLESS OTHER SIZE IS SPECIFIED ELSEWHERE.

MOUNTING REQUIREMENTS
SIGN PANELS SHALL BE MOUNTED WITH HAWKINS M2G SERIES BOLT AND VANDAL PROOF NUT ASSEMBLY OR APPROVED EQUAL. SIGNS MOUNTED ON SIGNAL OR OTHER POLES SHALL BE ATTACHED WITH STAINLESS STEEL STRAPS AND HAWKINS M2G SERIES BOLT AND VANDAL PROOF NUT ASSEMBLY OR APPROVED EQUAL. DRILLED HOLES SHALL NOT EXCEED DIAMETER OF BOLT MORE THAN 1/16". TOP OF POST IS TO BE BELOW TOP OF SIGN PANEL BY NO MORE THAN 1 1/2".

PLOTTED: 02/26/2010
SPECIFICATIONS:

THE SIGN PLATE SHALL BE ALUMINUM, 0.125" THICK.

THE BACKGROUND SHALL BE REFLECTIVE SHEETING, HIGH INTENSITY GRADE, GREEN.

THE STREET NAME LETTERING SHALL BE 10 INCH REFLECTIVE SHEETING, DIAMOND GRADE, WHITE.

BACKGROUND AND LETTERING SHALL BE INSTALLED ON BOTH SIDES.

INSTALL USING MAST-ARM HANGER METHODS SUCH AS HAWKINS M10J SERIES SWINGING SIGN BRACKET, WITH RETURN SPRING REMOVED, OR ACCEPTABLE EQUAL.

OTHER DETAILS SHALL BE PER THE STANDARD SPECIFICATIONS, STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION, SECTION 56, "SIGNS."
NOTES

1. SIGNS SHALL BE REFLECTORIZED IN ACCORDANCE WITH KERN COUNTY SIGN SPECIFICATIONS


6"x1/4" DIA. ROD OR BOLT CAST INTO CONCRETE
12" PORTLAND CEMENT CONCRETE-CLASS 3

12" MIN. 24" MAX.
2" I.D. SCHEDULE 20 GALVANIZED STEEL PIPE OR 2"-14 GAUGE SQUARE POST WITH 7/16" PREPUNCHED HOLES ON 1" CENTER (GALV.)
NOTES:

1. MARKINGS FOR BARRICADE RAILS SHALL BE ORANGE AND WHITE STRIPES (SLOPING AT AN ANGLE OF 45 DEGREES)

2. THE ENTIRE AREA OF THE ORANGE AND WHITE RAIL SHALL BE REFLECTORIZED AND SHALL MEET THE FOLLOWING MINIMUM DRY REFLECTIVE VALUES AT 0.2 AND 0.5 DEGREE DIVERGENCE, EXPRESSED IN UNITS OF CANDLEPOWER PER FOOT CANDELA PER SQUARE FOOT, AS MEASURED AT A DISTANCE OF 50 FEET FROM THE LIGHT SOURCE. THE WET REFLECTIVE VALUES SHALL BE A MINIMUM OF 90 PERCENT OF THE DRY VALUES. THE PREDOMINATE COLOR FOR OTHER BARRICADE COMPONENTS SHALL BE WHITE.

<table>
<thead>
<tr>
<th>INCLUDED</th>
<th>WHITE</th>
<th>ORANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANGLE</td>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>-4</td>
<td>45.0</td>
<td>20.0</td>
</tr>
<tr>
<td>+30</td>
<td>20.0</td>
<td>11.0</td>
</tr>
</tbody>
</table>

3. SECTION 57, "TIMBER STRUCTURES" OF THE STANDARD SPECIFICATIONS, CURRENT EDITION, SHALL APPLY. ALL TIMBER TO BE DOUGLAS FIR CONSTRUCTION GRADE 4S.

4. RAILS SHALL BE NOMINAL 2" X 8" OF 2" X 10"

5. WIDTHS OF BARRICADE AND PLACEMENT OF TRAFFIC STANDARD SIGNS SHALL BE DETERMINED/APPROVED BY THE DIRECTOR.
NOT TO SCALE
A=6' WITHOUT PARKING  
(ALWAYS USED ON ARTERIALS 
AND COLLECTORS) 
A=12' WITH PARKING 

---

**DESIGN SPEEDS**

- 60' R/W 25 MPH 
- 76' R/W 55 MPH 
- 90' R/W 65 MPH 
- 110' R/W 65 MPH 

---

**CENTERLINE OR MEDIAN EDGE**

**MAXIMUM ENCROACHMENT**

**FLOW LINE**

---

\[ D = S \times C \]

**D=SIGHT DISTANCE**

**S=CRITICAL SPEED (85th PERCENTILE) OR, IF NOT KNOWN,**
**DESIGN SPEED ON THRU STREET.**

*(SIGHT LINE ASSUMES AN EYE AT 3.5' HEIGHT**
**LOOKING AT AN OBJECT AT 4.25' HEIGHT)*

---

**CONTROLLED INTERSECTION**

---

**CURB LINE**

---

**NO OBSTRUCTION TO MOTOR VEHICLE**
**DRIVER VIEW IN EXCESS OF THREE**
**FEET HIGHER THAN FLOWLINE IN THIS**
**AREA.**

---

**UNCONTROLLED INTERSECTION**

---

\[ C=10 \text{ FT}/\text{MPH} \]
MULTIPLE TREES MUST BE ON A RADIAL FROM THE VIEW POINT OR BE PLACED BEHIND SIGHT LINE.

TREES IN MEDIANS WITHIN SIGHT LINE VIEWING AREA SHALL BE SPACED AT OR GREATER THAN 50'. OTHER PLANT MATERIALS SHALL BE RESTRICTED TO LOW GROWTH SHRUBS, GROUND COVER OR TURF.

TREES AND SHRUBS WITHIN SIGHT LINE AND TREES OVER SIDEWALKS SHALL CONFORM TO THE DETAIL BELOW.

3" MAX WITHIN SIGHT LINE

7" MIN

30° MAX*

* MEASURE FROM TOP OF CURB FOR SOLID OBJECTS, I.E. FENCES, WALLS, ETC.

NOT TO SCALE
TO BE USED WHERE RESTRICTED TURNING MOVEMENTS ARE REQUIRED AND MEDIAN NOT
BEING CONSTRUCTED ON MAIN STREET AT TIME OF DRIVEWAY OR LOCAL STREET CONSTRUCTION.

ALTERNATIVE DESIGN DIMENSIONS MAY BE ACCEPTED, PROVIDING MOVEMENTS
ARE SATISFATORILY RESTRICTED, PEDESTRIAN AND DISABLED ACCESS IS
PROVIDED FOR, AND DESIGN TURNING RADIUS IS ACCOMODATED.

NOTE:
THIS PLAN IS CONCEPTUAL ONLY AND IS NOT TO BE CONSIDERED A
CONSTRUCTION DRAWING.

NOT TO SCALE
TO BE USED WHERE RESTRICTED TURNING MOVEMENTS ARE REQUIRED AND MEDIAN NOT BEING CONSTRUCTED ON MAIN STREET AT TIME OF DRIVEWAY OR LOCAL STREET CONSTRUCTION.

NOTE:
THIS PLAN IS CONCEPTUAL ONLY AND IS NOT TO BE CONSIDERED A CONSTRUCTION DRAWING.
TYPICAL MEDIAN END DETAIL FOR T - INTERSECTION OF LOCAL STREET WITH ARTERIAL STREET HAVING FULL ACCESS IN ALL DIRECTIONS

NOT TO SCALE
CROSS WALKS NORMALLY USED AT SIGNALIZED OR MAJOR—MAJOR INTERSECTIONS

GENERAL NOTES
1. THE MUTCD (CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES) SHALL BE USED AS A DESIGN GUIDE FOR STRIPING, SIGNING & MARKING PLANS.

2. STRIPING DETAILS AND PAVEMENT MARKINGS SHALL CONFORM TO CALTRANS STANDARD PLANS A20A THROUGH A24C.

3. STORAGE LENGTH FOR LEFT AND RIGHT TURN LANES VARY, BASED ON NEED DUE TO DECLARATION AND ANTICIPATED VOLUMES. THE LENGTH SHALL MATCH LENGTH TO BEGINNING OF TURN BAY TAPERS WHERE EXISTING IN MEDIAN OR IN CURB AND GUTTER.

4. SIGNS SHALL BE PLACED IN ACCORDANCE WITH STANDARD T-1 & T-2.

5. PLACEMENT OF WARNING SIGNS SHALL BE BASED ON THE MUTCD (MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES)

6. TRANSITION TAPERS SHALL BE ADJUSTED IN THE FIELD TO PROVIDE SMOOTH TRANSITION OF TRAFFIC.
GENERAL NOTES

1. FIGURES 6-13 THROUGH 6-55 OF THE CALTRANS TRAFFIC MANUAL SHALL BE USED AS A DESIGN GUIDE FOR STRIPPING, SIGNING & MARKING PLANS.

2. STRIPING DETAILS AND PAVEMENT MARKINGS SHALL CONFORM TO CALTRANS STANDARD PLANS A20A THROUGH A24C.

3. STORAGE LENGTH FOR LEFT AND RIGHT TURN LANES VARY BASED ON NEED DUE TO DECELERATION AND ANTICIPATED VOLUMES. THE LENGTH SHALL MATCH LENGTH TO BEGINNING OF TURN BAY TAPERS WHERE EXISTING IN MEDIAN OR CURB AND GUTTER.

4. SIGNS SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD T-1 & T-2.

5. PLACEMENT OF WARNING SIGNS SHALL BE BASED ON SEC. 2C.05 OF THE CALIFORNIA MUTCD (MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES).

6. TRANSITION TAPERS SHALL BE ADJUSTED IN THE FIELD TO PROVIDE SMOOTH TRANSITION OF TRAFFIC.
3 TYPE OM2-2V OBJECT MARKERS
PER CALTRANS
STD PLAN A73

L1 - LENGTH OF FULL WIDTH SECTION
L2 - LENGTH OF DELINEATOR TRANSITION

FLOWLINE
FULL HALF WIDTH
DIRECTION OF TRAVEL
CL OR EDGE OF MEDIAN

TYPE OM1-3 MARKER

1 LANE

CHANNELIZERS @ 25' - 50' O.C.
CHANNELIZERS ARE RIGID BASE, SURFACE MOUNT
TYPE F REFLECTOR

\[
\begin{array}{c|c}
L1 & L2 \\
\hline
\frac{1}{4} \text{ MILE} & \text{NO TRANSITION NECESSARY} \\
& \text{OM2-2V OBJECT MARKERS ONLY} \\
& \text{WITH OM1-3 MARKER} \\
\frac{1}{4} \text{ MILE} & \text{TO} \\
\frac{1}{2} \text{ MILE} & 200' \\
\text{OVER} \frac{1}{2} \text{ MILE} & 500' \text{ MIN OR MORE,} \\
& \text{FOR ACTUAL MOVE OVER} \\
& \text{USE DESIGN SPEED} \\
\end{array}
\]

REFERENCE:
1. SEC. 6-06 OF THE CALTRANS TRAFFIC MANUAL FOR USE OF CHANNELIZERS
2. CALTRANS STD PLAN A73C FOR DETAILS
R/W REQUIRED AT ALL CORNERS TO PROVIDE FOR CONTROLLER

R/W BACK OF SIDEWALK

3' MIN

TYPICAL INTERCONNECT CONDUIT AND PULL BOXES WHEN REQUIRED PER STD. T-16

BACK OF SIDEWALK

PULL BOX AT BACK OF CURB

NO. 5 PULL BOX PER CALTRANS STANDARD PLAN ES-8, CURRENT EDITION, WITH LID MARKED "TRAFFIC SIGNAL" (SEE DIMENSIONS BELOW)

1-4" SCHEDULE 40
CONDUITS INSTALLED IN CONFORMANCE TO SEC. 86-2.05 OF THE CALTRANS STANDARD SPECIFICATIONS, CURRENT EDITION.

PULL BOXES ARE REQUIRED AT BOTH ENDS OF CONDUIT. WHERE PAVING IS EXISTING, CONDUIT SHALL EXTEND ACROSS ENTIRE PAVED WIDTH AND SHALL BE INSTALLED BY BORING EXISTING PAVEMENT, UNLESS OTHER METHOD IS ALLOWED.

SEPARATE CONDUIT AND PULL BOXES MAY BE REQUIRED ON CERTAIN CROSSINGS WHERE INTERCONNECT IS REQUIRED ALONG SAID STREET. (SEE STD. T-16)

THIS STANDARD APPLIES AT ALL INTERSECTIONS OF 2 MAJOR STREETS OR ANY INTERSECTION DESIGNATED FOR FUTURE SIGNAL INSTALLATION.
PIN | FUNCTION | WIRE COLOR | MODEM HARNESS | TB-1 | WIRE COLOR | INTERCONNECT CABLE
---|----------|------------|---------------|------|------------|------------------
A | AUDIO IN | WHITE | TB1-3 | WHITE |
B | AUDIO IN | BLACK | TB1-4 | BLACK |
C | AUDIO OUT | RED | TB1-5 | C |
E | AUDIO OUT | GREEN | TB1-6 | GREEN |

INTERCONNECT DETAIL

MULTI-DUCT
TRAFFIC SIGNAL INTERCONNECT SHALL BE INSTALLED ALONG ALL ARTERIAL AND COLLECTOR STREETS OR AS DIRECTED AS PART OF THE STANDARD STREET IMPROVEMENT. OMISSION OF INTERCONNECT CONDUIT ALONG ARTERIAL OR COLLECTOR STREETS MAY BE ALLOWED WHERE ACCEPTABLE ALTERNATE MEANS OF COMMUNICATION IS APPROVED BY THE COUNTY TRAFFIC ENGINEER.

ALL OTHER ROUTES
INSTALL 2" SCHEDULE 40 CONDUIT UNDER SIDEWALK WITH PULL BOXES AT 400'(120m) MAXIMUM INTERVAL. PULL BOXES SHALL BE NO. 9 WITH EXTENSIONS AND KNOCKOUTS. CONDUIT SHALL BE BROUGHT INTO PULL BOXES PARALLEL TO THE EXISTING SURFACE (HORIZONTAL). THE TOTAL ANGULAR BEND OF CONDUIT BETWEEN PULL BOXES SHALL NOT EXCEED 180 DEGREES. A PULL ROPE CONFORMING TO SECTION 85–2.05C “INSTALLATION” OF THE STANDARD SPECIFICATION SHALL BE INCLUDED IN ALL INTERCONNECT CONDUIT FOR INSTALLATION OF FUTURE CONDUCTORS.

NOTE
TO BE USED ONLY WHEN CONDUIT IS ALLOWED TO BE PLACED AT GUTTER UP LINE. IN ALL OTHER CASES, CONDUIT IS TO BE LOCATED UNDER SIDEWALK AREA.

LIDS SHALL READ “TRAFFIC SIGNAL.”