LOCAL AGENCY MANAGEMENT PROGRAM

ONSITE WASTEWATER TREATMENT SYSTEMS

Submitted to:

Regional Water Quality Control Board, Lahontan Region 6

City of California City

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DRAFT

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Section 1: Introduction

Introduction

This document present the proposed Local Agency Management Program (LAMP) pertaining to the oversight of Onsite Wastewater Treatment Systems (OWTS) for the City of California City, County of Kern, State of California.

ONSITE WASTEWATER TREATMENT SYSTEMS Policy

The Onsite Wastewater Treatment Systems Policy was created to meet the requirements of Assembly Bill (AB) 885 to promote consistent, statewide standards for the regulation of Onsite Wastewater Treatment Systems. The policy was adopted by the State Water Board in June 2012 and became effective May 13, 2013. A copy of the Onsite Wastewater Treatment Systems (OWTS) is presented in Appendix 'B'. This policy categorized Onsite Wastewater Treatment Systems into the following tiers:

Tier	Description *
0	Applies to all existing systems which function properly, do not meet the conditions of a failing system, and are not contributing to pollution of any waterways.
1	Applies to all new and / or replacement OWTS which meet low risk siting and design requirements in areas which do not have an approved LAMP as specified in Tier 2.
2	Applies to any new and / or replacement OWTS which do not fall into the Tier 3 adjacent to impaired waterways, or in prohibition areas category. This tier is referred to as the LAMP and allows the City to apply standards that differ from State.
3	Describes all systems currently located within areas denoted as impaired waterways. These systems have been identified as potential sources of pollution, and need to abide by the Advanced Protection Management Program prescribed in Tier 3 of the OWTS Policy.
4	A temporary classification for all systems that have been found to be failing, and / or needing repair. Once the system has been repaired, it will be placed in either Tier 0, Tier 2, or Tier 3.

*See Appendix 'A' for definitions

With development in the City of California City continuing to increase, the requirements defined by Tier 1 of the Onsite Wastewater Treatment Systems Policy do not meet the future development needs of the City. The Local Agency Management Program specifically addresses wastewater issues, requirements, and scope of coverage for Onsite Wastewater Treatment Systems installation and maintenance. It also allows for the continued use and installation of

Onsite Wastewater Treatment Systems. The requirements for the Local Agency Management Program are derived from the Kern County Public Health Service Department, Environmental Health Division, current California Plumbing Code, and the Lahontan Basin Plan requirements for private sewage disposal systems.

Diversity

The requirements for the Onsite Wastewater Treatment Systems necessities flexibility due to the difference in soil conditions, depth to quality groundwater, typical high desert climates, population and growth.

Construction

This Local Agency Management Program (LAMP) addresses the various construction needs throughout the City of California City and includes information regarding construction requirements within the City in addition to providing an effective means to manage the Onsite Wastewater Treatment Systems on a routine basis.

This Local Agency Management Program has been prepared with respect to the requirements of the State Water Resources Control Board's (SWRCB) Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment System, dated June 19, 2012. Titled Onsite Wastewater Treatment Systems Policy, "OWTS" see Appendix 'B'.

The Onsite Wastewater Treatment Systems "OWTS" provides the multi-tiered strategy for design, construction, permitting and management of the Onsite Wastewater Treatment Systems. It is requested this Local Agency Management Program for the City of California City be approved for Onsite Wastewater Treatment Systems management under Tier 2 of the June 19, 2012 Onsite Wastewater Treatment System (OWTS) Policy. This Local Agency Management Program will allow the City of California City to continue providing local management of OWTS by conforming to the Local Agency Management Program requirements for the City of California City. This Local Agency Management Program will ensure environmental protections and provide the best opportunity for coordinated and comprehensive management of Onsite Wastewater Treatment Systems to ensure public health and groundwater quality within the City of California City.

This Local Agency Management Program is intended to apply to all Onsite Wastewater Treatment Systems within the City of California City having wastewater design flows of up to 10,000 GPD. Any Onsite Wastewater Treatment Systems with a design flow exceeding 10,000 GPD per this Local Agency Management Program would be regulated by the Lahontan Region

6 Water Quality Control Board. It is the intent of the City of California City to be responsible for permitting, oversee the installation, inspection and regulating the Onsite Wastewater Treatment Systems within the City limits.

Geographical Area

The City California City is located in eastern Kern County. (See Figure 1.) The first development of the City was constructed in 1958; and the City incorporated in 1965. With an area of approximately 203 square miles, it is geographically one of California's largest cities. The current population is approximately 13,000 people including inmates in a 2300 bed private prison. The City is developed with two main areas referred to as the First Community and the Second Community. The First Community has an area of approximately 16 square miles and houses a population of about 9500 in primarily single-family residences and the community's commercial core. The Second Community has an area of approximately 109 square miles with little population and no commercial. Other developed areas within the City includes the Rancho Tract approximately 1 square miles in area located south of the First Community and Wonder Acres approximately 0.28 square miles in area located west of the First Community at the cities western boundary (See Figure 1).

Approximately 63 percent of the existing residences in the First Community are connected to the City sewer system approximately (6,000 units) and approximately 37 percent, approximately (3,515 units) utilize onsite wastewater treatment and disposal septic tanks, leach lines and seepage pits. Multifamily and commercial development are calculated with Equivalent Dwelling Units (EDU) for sewer effluent flows. (An equivalent dwelling unit, EDU, is a source of wastewater which is equal to that produced by a typical single-family residence). A typical single family resident is 2.7 person/residence per the City Water Master Plan.

The California Regional Water Quality Control Board, Lahontan Region 6, has in a 1989 Memorandum of Understanding with the City of California City (see Appendix C), documents that development in Memorandum-mapped – Areas of the community 'A' shall not exceed two equivalent dwelling units per acre. The Memorandum-mapped areas in the study area are shown on Figure 2.

Also shown on that Figure 2 are "Specific Zones", areas that are at least partially sewered, denoted as Zones 1 through 9 that were not included in the Memorandum of Understanding – mapped two units per acre limitation. The 75 Memorandum-mapped areas occupy about 5,706 acres, the sewered "Specific Zones" occupy about 555 acres. Further denoted on Figure 2 are other areas not subject to the mapped two-units per acre restriction: Cache Creek, the golf course/park and surrounding areas, the northeast industrial area and "border" areas principally north of Mendiburu Road.

Depicted on Figure 3 is the City's current existing sewer density per the 1989 Memorandum of Understanding for the First Community. Comparison of that system to Figure 2 shows that all sewer assessment districts are not fully sewered; that much of the residential development in the park/golf course uncontrolled area is sewered and that some of the Memorandum of Understanding septic tank control area is sewered. The City maintains an account of residential building permits with septic tanks to monitor the 2 EDU per acre restriction. An effective sewer system construction methodology is considered and will be discussed later. The 1996 passage of Proposition 218 which, among other provisions, effectively prohibited the charging of fees or assessments for later installation of sewer facilities which significantly reduced the City's ability to proactively plan and fund for such facilities.

Local Agency Management Program Requirements and Regulations

The Local Agency Management Program provides minimum standards and requirements for the treatment and disposal of sewage through the use of Onsite Wastewater Treatment System when no connection to a sewer is available to protect public health, safety and welfare. The following describes the minimum standards, and requirements for the Onsite Wastewater Treatment System under the Local Agency Management Program, as well as detailing the Onsite Wastewater Treatment System that are exceptions, and therefore not covered under this Local Agency Management Program.

Support of Onsite Wastewater Disposal

When a community sewer main is not available and a new property improvement will generate wastewater, the property owner must demonstrate the following to the City of California City Public Works in order to verify the lot will support onsite wastewater disposal:

- Soils are conducive to onsite wastewater disposal (Soils testing).
- Sewer is not available within 100 feet of improved property and 200 feet of unimproved property. California City Sewer Ordinance.
- Enough area is available to install a septic system that meets proper setback for new construction, (expansion area must be available).
- Onsite Wastewater Treatment System will not impact ground or surface water.
- Onsite Wastewater Treatment System is sized appropriately to serve the intended land use.

Applicability of Local Agency Management Program Standards

Local Agency Management Program standards apply to all Onsite Wastewater Treatment System which:

- Are newly constructed, replace, subject to a major repair and discharge liquid waste below ground.
- Have affected, or have the potential to affect, groundwater or other water quality or health hazards.

Requirements

The Local Agency Management Program addresses the minimum requirements for monitoring the discharge for Onsite Wastewater Treatment System located within the City of California City. This Local Agency Management Program may include one, or more, of the following to achieve this purpose:

- Differing system requirements
- Differing siting control (i.e., system density and setback requirements)
- Requirements for owners to enter agreements regarding monitoring and maintenance.
- Creation of an onsite management district (also known as a designated maintenance area)
- Additional area as required for system expansion.

Exceptions

There are specific Onsite Wastewater Treatment System which are not included in the Local Agency Management Program. These exceptions require individual discharge requirements, or a waiver of individual waste discharge requirements issued by the Lahontan RWQCB Region 6. Exception include:

- Onsite Wastewater Treatment System having a projected wastewater flow of over 10,000 gallons per day (GPD).
- Onsite Wastewater Treatment System receiving high strength wastewater.
- Wastewater treatment plants of any kind or size.

City of California City Onsite Wastewater Treatment System Requirements

1. The on-site soil characteristics to comply with established "Minimum Criteria for Individual Waste Disposal System" per requirements of the current California Plumbing Code for private sewage disposal systems.
2. The discharge is composed of domestic wastewater only; and

One of the following;

1. The development consists of single-family residences, multi-family residences, non-residential or of mixed occupancy and the cumulative development density in the specified area, as defined on Map "A" Figure 2 which is made a part of this Onsite Wastewater Treatment System requirement, does not exceed two equivalent dwelling units (EDU's) per acre or (500 gallons/acre/day wastewater flow). The estimated wastewater flow from non-residential or mixed occupancy developments shall be determined using the current California Plumbing Code; or
2. The development consists only of a single-family home on an individual lot, which has a minimum net area of 15,000 square feet; or
3. The project is in a class that has been designated exempt from Lahontan Region 6 Board review in writing under signature of the Lahontan Regional Board Executive Officer; or
4. The project/development has been granted an exemption by the Lahontan Regional Board and complies with the City's standard for use of septic tank wastewater disposal system per the Onsite Wastewater Treatment System.

The City shall <u>not</u> issue construction permits without Lahontan Region 6 Board approval for the following projects:

A. Projects that involve domestic wastewater discharge from residential, commercial or industrial development, if the cumulative development density in the specified area as defined on Map "A" Figure 1 is in excess of two EDUs/acre or 500 gallons/acre/day as determined by the Board (except in exempted areas); or
B. Projects that will have industrial wastewater discharges; or
C. Projects that do not comply with the City's standards for use of septic tank / seepage pit wastewater disposal systems per the Onsite Wastewater Treatment System; or
D. Projects located within the existing waste discharge prohibition areas.
E. Projects utilizing package wastewater package treatment plants with on-site disposal systems.

City Oversite

Oversight of Onsite Wastewater Treatment System installation and maintenance is a multiple City agency effort. The following provides an overview of the primary agencies involved in The City of Californian City oversite activities.

Building and Safety Division

The Building and Safety Division is responsible for:

- Issuing permits for new construction, replacement and repair of Onsite Wastewater Treatment System.
- Reviewing plot plans for new and replacement Onsite Wastewater Treatment System.
- Retaining permit information regarding new construction, replacement systems, repairs.
- Complying with Local Agency Management Program reporting requirements regarding issued permits for new and replacement Onsite Wastewater Treatment System.

The following must be provided by the Building and Safety Division to the Lahontan Region 6 RWQCB annually for new, replacement (and/ or) repaired Onsite Wastewater Treatment System, along with information provided by other divisions:

- Location
- Number of permits issued
- Description of permits (i.e., replacement, an/or repair)
- Tier the permit was issued under (Tier 2)

The City of California City Building and Safety Department requires Lahontan Region 6 and Kern County Environmental Health approval for any Onsite Wastewater Treatment System proposal located within a prohibition area.

Note: Obtaining a local land use / Building Permit is contingent upon obtaining an Onsite Wastewater Treatment System approval, obtaining a Land Use / Building Permit is not a substitute for an Onsite Wastewater Treatment System permit issued by the City of California City Division of Building and Safety, nor does it guarantee issuance of an Onsite Wastewater Treatment System permit.

Code Enforcement

The City of California City Building and Safety Department is responsible for:

Investigating complaints for overflowing/failed septic tanks for single family residences, and two-unit dwellings, which includes:

- Requiring property owner to obtain applicable permit from the Building and Safety Department for repairs, or replacement of failing systems.
- Retaining information regarding complaints and investigations for overflowing or failed septic system, and subsequent action taken.

Complying with the Local Agency Management Program reporting requirements for complaint investigations, which includes:

- Providing information to the RWQCB Lahontan Region 6 annually pertaining to Onsite Wastewater Treatment System operation and maintenance, including number, and location of the complaints.
- Identifying investigated complaints, and
- Determining how the complaints were resolved.

Division of Kern County Public Health Services (KCPHS)

This division is responsible for:

- Review and approval of alternative treatment system.
- Issuing permits for alternative treatment systems.
- Alternative treatment proposals for new and replacement septic systems in:
- High risk residential areas
- High risk Commercial and industrial projects.
- Assisting the City of California City for investigating complaints for Onsite Wastewater Treatment System.

Note: Percolation soils reports required for all alternative system.

Section 2: Hydrology

The City of California City is located in eastern Kern County North of Highway 58 and east of Highway 14. The City experiences typical high desert rain fall of the Tehachapi Mountains and typical rain fall due east of the Tehachapi Pass summit. The community of Mojave is due south with Edwards Air force Base located south and southeast of the City. The City of California City is located in Region 6 of the Lahontan Regional Water Quality Control Board. The Cities topography generally slopes from southwest to the northeast at an average gradient of 1%.

Drainage Pattern

The prevalent pattern of drainage in the city is overland flow in a northeasterly direction to Cache Creek. The major watercourse flowing through California City are Yerba Rusche Creek and Tierra Del Sol Creek. There are 11 other drain sheds identified in California City's First Community making a total of 13. Other natural drainage channels are present within the City limits on a smaller scale.

Hydrology

Hydrologic studies conducted for the City of California City Drainage Master Plan utilized the rational method as developed by the Natural Resource Conservation Service (NRCS), and the unit hydrograph methods to compute runoff. The Rational method and unit hydrograph method, and the data and criteria they incorporate, are consistent with the generally accepted methods of analyzing storm water runoff in Kern County.

The Rational method combines subarea runoff with flow from other subareas, routes the flow through the drainage system, and determines the peak flow rate in each reach. The unit hydrograph method adds the dimension of time and how runoff rates are distributed as a result of one inch of effective rainfall during a given period of time. Incorporating actual storm data and water loss due to absorption, the study developed the hydrograph for the drainage shed. The hydrograph method provides a more accurate peak flow for larger areas and storm water volume needed for analysis of retarding basins.

The basic formula for the rational method is:

Q = CIA, where:

Q = Runoff in cubic feet per second (CFS)

C = Runoff Coefficient

I = Intensity of rainfall in inches per hour

A = Land area in acres

Flood Frequency

Drainage facilities are designed to provide protection from storms of a specified recurrence interval. Events with lower recurrence intervals (higher intensity) would generate high runoff while events with higher recurrence intervals will generate lower runoff.

The level of protection used for the City of California City are the 10 – year and the 100 – year storms or the Intermediate Storm Design Discharge (ISDD) and the Capital Storm Design Discharge (CSDD) respectively. Local storm drains are sized for the ISDD and regional facilities are sized for the CSDD. Regional facilities are generally recommended for areas in excess of one square mile or where the CSDD fills the pipe system and the resulting flow carried in the street is deeper than one foot above gutter flow line.

The relationship between the rainfall intensity and the duration of the storm is a complex inverse function. It can be characterized by stating that rainfall intensities for a given recurrence interval can be very high for short period of time regressing to lower average values as the time period increases.

Climatology

This regional climate is characterized as arid, with hot dry summers and mild to moist winter with occasional thunder showers during the winter and summer months. Snowfall can occur during the winter months, however it is generally short – lived and not severe. The mean annual precipitation for the City of California City is average 4". The average high temperature is 80.6 degrees F with the maximum average of 103.6 degrees F in July and the minimum average high of 60 degrees in January. The areas are also subject to high prevailing winds. A review of available climatic and hydrological data was completed to define various return interval rainfall. A review of the Isohyets as published by NOAA for southern California indicate the following rainfall totals for the 2-year and 100-year return periods:

Rainfall Total for Storm Duration and Return Period

Storm Duration	2-year return	100-year return
6 hour	0.70 inches	1.7 inches
24 hour	1.00 inches	3.0 inches

Rainfall Intensity Duration (inches/hour)

Return Periods

Duration	5 year	10 year	25 year	50 year	100 year
10 min	1.7	2.1	2.6	2.9	3.4
60 min	0.6	0.7	0.9	1.0	1.2

This information is derived by the rational method to determine runoff for local areas of less than one square mile and to provide times of concentration needed for unit hydrograph analysis. The unit hydrograph method is used to determine storm water runoff from upstream contributing areas and on site areas contributing to regional drainage facilities. Runoff coefficients are taken from Soils Conservation Service (SCS). The unit hydrograph method is a computerized program developed by the US Army Corps of Engineers used for hydrological analysis.

FEMA (Special Flood Hazard Area)

The City of California City has areas of special flood hazard identified by the FEMA, flood study map(s), on file at the City of California City and of record with FEMA. These maps identify areas within the city that are subject to certain building restriction including on-site wastewater disposal systems. These requirements are documented in the City of California City Flood Plan Ordinance, Chapter 11 of the City of California City Municipal Code.

Abbreviated Stetson Ground Water Report, December 2008

In July 2008, Stetson Engineering Inc. from Covina California entered into an agreement with the City of California City to provide professional engineering services for conducting an evaluation of the City's groundwater resources to support the preparation of the City Underground Water Management Plan (UWMP). In compliance with the City direction, Stetson's work focused on availability of groundwater in the Freemont Valley Groundwater Basin, the primary source of the City's water supply.

This study documents the groundwater depth and capacity, with present and future demands.

See Appendix 'D' for abbreviated report documentation groundwater size, quantity, depth of ground water table, and resources.

City of California City Type of Soils

The City of California City being very large in surface area has different hydrologic soil groups ranging from slow infiltration to very slow infiltration. See hydrologic soil groups defined as follows with area depiction map Figure 5. This information can assist the siting of Onsite Wastewater Treatment System.

Note: On site soils testing required for percolation data and type for size specific design.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Berkley, California
May 1967
HYDROLOGIC SOIL GROUPS

Definition and Scope:

Hydrologic soil groups are used for estimating the runoff potential of soils on watersheds. Four groups are used based on soil properties that influence runoff.

Assumptions:

Classification is at the end of long-duration storms occurring after prior wetting and opportunity for swelling, and without the protective effect of vegetation.

Criteria:

Group A – Soils having high infiltration rates even when thoroughly wetted, consisting chiefly of deep, well to excessively drained sands and / or gravel. These soils have a high rate of water transmission and would result in a low runoff potential.

Group B – Soils having slow infiltration rates when thoroughly wetted, consisting chiefly of moderately deep to deep, moderately well to well drained soils with moderately course textures. These soils have a moderate rate of water transmission.

<u>Group C</u> – Soils having slow infiltration rates when thoroughly wetted, consisting chiefly of (1) soils with a layer that impedes the downward movement of water or (2) soils with moderately fine to fine texture and a slow infiltration rate. These soils have a slow rate of water transmission.

<u>Group D</u> – Soils having very slow infiltration rates when thoroughly wetted, consisting chiefly of (1) clay soils with a high swelling potential, (2) soils with a high permanent water table, (3) soils with claypan or clay layer at or near the surface, and (4) shallow soils over nearly impervious materials. These soils have a very slow rate of water transmission.

References:

(1) United State Department of Agriculture. National Engineering Handbook, "Hydrology," Section 4. Soil Cons. Ser.

(2) General Soil Map, Kern County 7-E-18286-0-C Soil Conservation

This information provide a general assessment of the area and is not a substitute for site-specific investigation for onsite wastewater treatment systems. This provides a general indication of the management and design issues likely to be encountered in each area. It does not take into account local constraints such as setback or other conditions that may be found on a flood plains proposed site.

Ground Water Quality Control

Ground water quality is maintained by the soils ability to filter the effluent from the wastewater treatment system. The process requires a depth and soil type for treatment of wastewater discharged through sub-surface dispersal systems. This is accomplished mainly through a combination of physical filtering, biological and chemical processes, and dilution. Ongoing water well testing is accomplished to ensure quality control of the ground water table is maintained.

Section 3: Siting, Design, Construction and Management

Site evaluation is required to ensure performance of an Onsite Wastewater Treatment System. The site evaluation addresses horizontal clearance requirements, vertical "soils types and ground water depths" and, regulations. Site evaluation is required for all new construction and performed by a California registered Civil (and /or) Geotechnical Engineer. Site evaluation for onsite wastewater treatment system OWTS design shall be with respect to soil types as documented in the 2013 California Plumbing code as shown below in Table 1.

Table 1. Design criteria of five typical soils. (2013 California Plumbing Code) and Kern County Public Health Services Departments, Environmental Health Division.

TABLE 1

Type	Soil	Required sq. ft. of leaching area/ 100 gal. (m^2/L)	Maximum absorption capacity in gals./sq. ft. of leaching area for a 24 hr. period (L/m^2)
1	Coarse sand or gravel	20 (0.005)	5.0 (203.7)
2	Fine Sand	25 (0.006)	4.0 (162.9)
3	Sandy loam or sandy clay	40 (0.010)	2.5 (101.8)
4	Clay with considerable sand or gravel	90 (0.022)	1.1 (44.8)
5	Clay with small amount of sand or gravel	120 (0.030)	0.8 (32.6)

Siting requirements for Onsite Wastewater Treatment System include the following:

1. Space shall be allowed on the lot for expansion of the original absorption facility. See Areas, (Square footages) per Table 2 to satisfy initial expansion area requirements for disposal fields. An expansion area capable of accommodating at least 50% of the original installation is required for soil Types 1, 2, and 3 soils; at least 87% in Type 4 soil; and 125% in Type 5 soil.

Table 2 minimum size of disposal site (square feet) required according to 2013 California Plumbing Code soil type in disposal area.

TABLE 2

Kern County Public Health Services Department, Environmental Health Division

Soil Type in Disposal Area	Required minimum size of disposal site (square feet)*
1	2,000
2	2,500
3	4,500
4	13,000
5	21,000

*Exclusive of any areas occupied by structures, setbacks, and easements on the lot and in accordance with the requirements of the 2013 California Plumbing Code and these standards.

The minimum disposal area required by the Table 2 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.

2. The following minimum setbacks Table 3 are required:

TABLE 3

System	All Water Wells	Water Supply Line Pressure	Dwelling	Property Line
Sewer or water-tight septic tank	100 feet	10'	5'	10'
Leaching Field	100 feet	25'	20'	5'
Seepage Pit	150 feet	50'	20'	10'

*Reference: Manual of septic-tank practice 1967
US Department of health, Education and Welfare

Note: The setback distances may be modified where deemed necessary by the Director of Public Works with approval of Lahontan Region 6 Water Quality Control Board.

Percolation Testing and Requirements

Percolation testing is conducted to confirm the ground water separation requirement for the proposed site and to determine the size of the dispersal field for the project.

Percolation tests shall be in accordance with the U.S. Public Health Service test procedure (Manual of Septic Tank Practice, Part I) and the 2013 California Plumbing Code. All percolation testing to be done by a California Registered licensed Civil Engineer or Geotechnical Engineer. Number of percolation tests to be determined by soil condition, type and project. Table 4 as follow presents percolation vs. soil type per 2013 California Plumbing Code.

TABLE 4

Percolation rates corrected with current California Plumbing Code soil types.

Kern County Public Health Services Department, Environmental Health Division

Percolation Rate Minutes/Inch	California Plumbing Code Soil Type
Less than one	1
1 to 3	2
3+ to 10	3
10+ to 25	4
25+ to 60	5
Greater than 60	Unacceptable

Wastewater Flow Rates

Flow rates are determined using current California Plumbing Code and residential Equivalent Dwelling Units (EDUs) based on land use. Flow rates from EDU's are based on the following:

Average flow rate per capita =	100 gallons per day
Number of residents per dwelling units =	2.7

Average flow rate per EDU = 270 gallons per day

EDU's for residential land use areas are calculated by directly counting lots from current land use map(s). For non-residential land uses, EDU's per acre are determined from sewer loads per acre divided by 270 gpd. This results in EDU's per acre for each land use within the area evaluated, resulting density per acre for EDU are show in following Table 5.

TABLE 5

Land Use	Description	Practical Density (EDU's per acre)
R-1	Medium Density Residential	6
R-2	Medium Low Density Residential	4
R-3	Low Density Residential	2
RM 1/2	High Density Residential	6
C1/2/3/4/5/ and G	Commercial and Government	18
M1	Light Manufacturing	3
M2	Heavy Industrial	30
O/RA	Open Space Recreational	0

*Reference: Sanitary Sewer System Master Plan for California City by Quad Knopf September 2002.

Onsite Wastewater Treatment System Criteria

The following criteria addresses minimum depth of soil for system design and ground water protection.

Minimum depth of permeable soil beneath the bottom of the proposed dispersal field shall be 5 feet. Permeable soil is defined as having a percolation rate of 60 minutes per inch and shall not include rock formations that contain continuous channels, cracks or fractures. Maximum depth of soil fill covering any portion of the area proposed for installation of a dispersal system shall be 12".

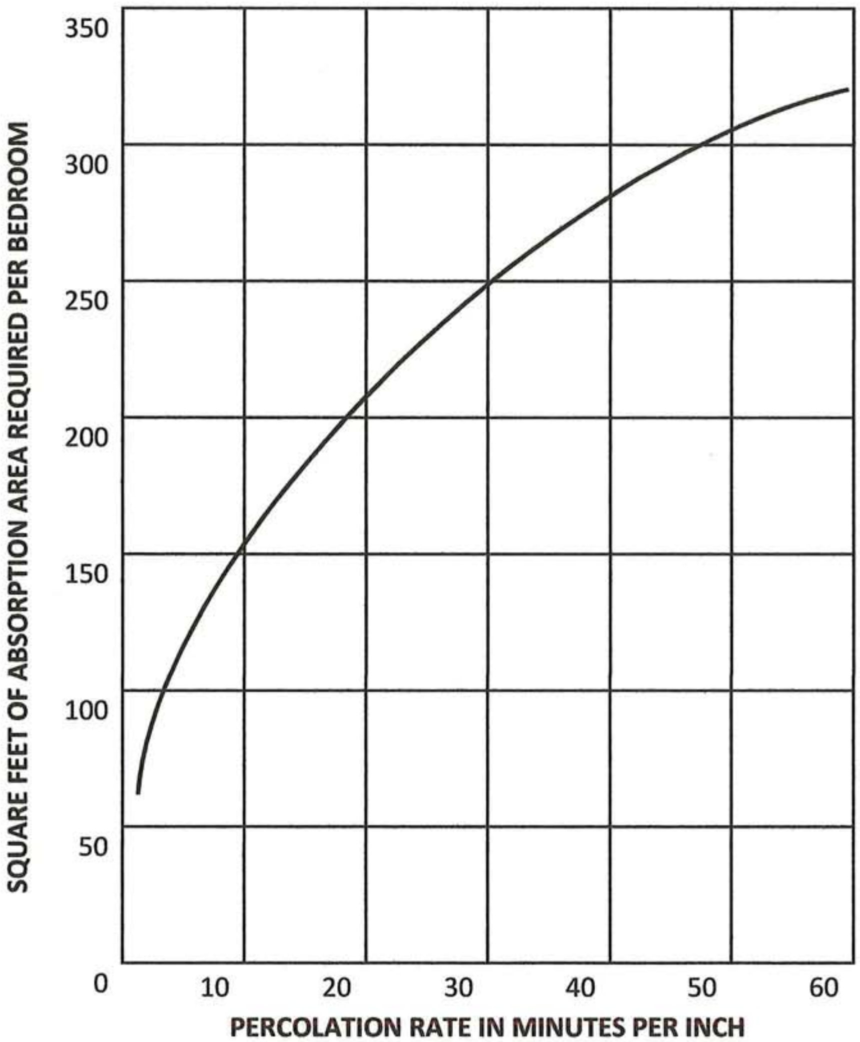
Ground water separation between septic system trenches and seepage pit are shown below in Table 6.

TABLE 6

Percolation Rate (Minutes/Inch)	Vertical Distance Leach Field (feet)	Vertical Distance Seepage Pit (feet)
Less than 1	Not Permitted	Not Permitted
1-5	20	20
6-30	8	20
31-60	5	20
More than 60	Not permitted	Not Permitted

*Manual of Septic Tank Practice, US Department of Health Education and Welfare 1967.

Percolation rates as a function of square foot of absorption area per bedroom is shown below – Manual of Septic Tank Practice, US Department of Health Education and Welfare 1967.



Septic Tank Capacity and Design

Construction and installation requirements for septic tanks are reviewed and approved by the City of California City Building Department. The City Building Department will issue building permits for the proposed septic system and perform necessary Field construction inspection.

The septic tank capacity for a single family residence is based on the number of bedrooms per single family residence. Table 7 below provides a summary of the septic tank capacity requirements for a single family residence (SFR).

TABLE 7

Number of Bedrooms	Gallons of Septic Tank Capacity
1-2	750
3	1,000
4	1,200
5-6	1,500

*2013 California Plumbing Code

See Table 8 show typical septic tank specification.

TABLE 8

Component	Requirement
Capacity	Minimum of 750 gallons
Two Compartments	The first compartment must be equal to two-thirds the total tank volume.
Materials	Must be: • Water-tight • Properly vented, and • Made out of durable, and non-corrosive material.
Construction	All tanks must be listed and approved by: • IAPMO, or • An American National Standard Institute (ANSI) accredited testing organization.
Access Opening	Access to each tank compartment must have a manhole at least 20 inches in diameter.
Access Risers	A riser must: • Extend from each manhole opening to, or above, the surface of the ground, and • Be a size larger than the manhole opening.
Effluent Filter	The outlet of the tank must be filled with an effluent filter capable of: • Screening solids with a diameter in excess of three-sixteenths of an inch, and • Conforming to National Sanitation Foundation (NSF)/ANSI standard 46.
Tank Connections	Tank connections must comply with standards required by the Building and Safety Division.

Seepage Pit Capacity and Design

Seepage pit as with all soil absorption systems, should never be used if there is a likelihood of contaminating underground water. When seepage pits are to be used, the pit excavation to terminate 20 feet minimum above ground water table.

Seepage pit capacity design is per Manual of Septic Tank Practice, US Department of Health, Education, and Welfare.

Alternative onsite wastewater treatment systems

Any alternative onsite wastewater treatment system proposed to be submitted to the City Department of Public Works and to Lahontan Region 6 Water Quality Board for review and approval. Alternative Wastewater Treatment Systems are Onsite Wastewater Treatment Systems utilizing dispersal field consisting of components other than a conventional or supplemental treatment system such as "mound", "at grade" and "evapo-transpiration" systems.

Alternative system must be designed by a Qualified Professional in conformance with Lahontan Regional Board and State guidelines.

Prior to final approval, the property owner is required to record a notice stating that an alternative system has been installed on the property. This "Notice to Property Owner" shall run with the land and will act as constructive notice to any future property owner that the property is served by an alternative wastewater treatment system and is therefore subject to an operating permit with regular maintenance, monitoring and reporting requirements. A copy of the recorded document shall be provided to the City of California City. City Public Works prior to final inspection of the alternative waste disposal system.

Section 4: Onsite Wastewater Treatment System Management

This City of California City maintains a current log of building permit activities with onsite wastewater treatment system within the First Community. This log keeps a current septic tank count that evaluates the 7 dwelling units per acre requirements. This density requirement is currently in effect per the City of California City and Lahontan Region 6 1989 Memorandum of Understanding. (See Appendix 'C' Figure 3, and Figure 4). Management issues also include onsite wastewater treatment system for building additions and remodel in addition to new construction. Size and project review occur at the application process followed up by field inspections, testing, and design as required. The onsite wastewater system(s) management also requires processing of all permits and response to any complaints received by the City of California City. Maintenance (and/or) repair work may be required from time to time as a result of normal servicing. System aging, and observation from field inspections, maintenance (and/or) repair work is performed by permit issued and inspected by the City of California City.

Qualification of Professional(s), Contractor(s), and Maintenance Service

There are various personnel involved with the Onsite Wastewater Treatment System(s) (OWTS). Minimum requirements are associated with each OWTS activity.

Site evaluation requiring field review, soils percolation testing, ground water evaluation, flood and topography to be done by a registered license California Civil Engineer. System design by City of California City standard (and/or) by a registered license California Civil Engineer. Onsite wastewater treatment system construction and installation requires a California license contractor; Class-A (General Engineering Contractor), (or) Class-36 (Plumbing Contractor), (or) C-42 (Sanitation System Contractor). Servicing of septic tank pumping requires current permit issued and regulated by Kern County Public Health Services Department Environmental Health Division.

Education and Outreach

The City of California City provides education and outreach of the Onsite Wastewater Treatment System by City Council public meeting, agenda items, City website posting, and notices posted at City Hall. City of California City personnel are available to meet with the public and answer questions on a routine basis.

The primary method of education and outreach is by direct interaction between City of California City staff and the public. The City routinely receives and responds to phone calls and office visits by private property owners, consultants and contractors with questions about the regulations and or the permit process. As part of California City role in the planning process, the City staff will regularly answer questions and provide information to the applicants, consultants and contractor.

The City of California City will promote on going education as new information becomes available. Also, the City of California will involve other intent group of real estate and building industry to enhance the use of Onsite Wastewater Treatment System by use of the Local Agency Management Program.

Septage Management

Septage is the partially treated waste from the Onsite Wastewater Treatment System. It generally consists of the wastes that are disposed of through a structure's plumbing system that neither drain out into the soil or are converted to gases by the bacteria in the tank. In the septic tank where primary treatment takes place, the waste separates into three district layers; the upper scum layer, the middle clarified layer and the lower sludge layer. Over time the scum and sludge layers accumulates to the point where the biologically active clarified area is minimized. When this occurs the tank should to be pumped. The liquid waste pumped from the tank is referred to as septage. Septage is essentially sewage and like sewage must disposed of in a manner that protects public health.

The City of California City does not have any septage receiving facilities in the City Wastewater Treatment Plant. The Wastewater Treatment Plant is not designed for the high bed and solids loading received from septic tank pumping. The City continues to monitor any septic tank pumping operations for any illegal dumping that may occur into the City wastewater disposal system.

Onsite Maintenance District or Zones

The City of California city maintains a district or zone(s) of onsite wastewater treatment systems. This district or zone are described per the 1989 City of California City Memorandum of Understanding with Lahontan Region 6 Water Quality Control Board (see Figure 2, 3, 4 and Appendix 'C'). The 1989 Memorandum of Understanding criteria is the same criteria as presents in the Local Agency Management Program for future onsite wastewater treatment systems. It is anticipated that future activities may requires additional City management activities that would address proposed development within the City limits of the City of California City.

Regional Salt and Nutrient Management Plans

The City of California City maintains wastewater quality test data for ground water testing each year. This information evaluates a large range of water table contaminants including salts and nitrate. Current test data indicates contaminant are at acceptable levels.

Watershed Management Coordination

The City of California City obtains its water from six groundwater wells and an imported water supply from the Antelope Valley-East Kern Water District (AVEK). Groundwater wells typically produce approximately 93 percent of the City water supply. The water wells draw from the underground Freemont Valley aquifer located beneath a portion of the First Community. Groundwater depth is approximately 330 to 390 feet below ground surface (bgs). The water wells produce between 800 and 1000 GPM each. There is no significant source of water supply in the second Community. All water for the Second Community originates in the First Community from wells or the Antelope Valley East Kern supply.

Antelope Valley East Kern is a state water supply contractor with an entitlement to surface water from the California Water Project. AVEK delivers water to Rosamond, Mojave, Edwards Air Force Base, Boron and other communities in the Antelope Valley, East Kern. AVEK water is delivered from the East Branch of the California Aqueduct to a raw water pipeline (West Feeder) and is treated at a 14 MGD water treatment plant located in Rosamond. Treated water is conveyed via the Central Feeder to the Mojave Reservoirs, a 32 MG tank farm. From the Mojave Reservoir, water is conveyed by gravity via the North Feeder pipeline which branches into the California City feeder, an 18 inch pipeline. The California City feeder is 43,200 feet long. AVEK water flows by gravity to the California City turnout at California City Blvd. and Randsburg-Mojave Road.

AVEK has a State Water Project entitlement of 141,400 acre-feet per year and utilizes approximately 70,000 to 80,000 acre-feet per year. State Water Project water is subject to reductions in supply based on water supply availability, particularly in northern California, the source of supply. AVEK water delivery is also subject to Aqueduct interruptions. The AVEK water supply is thus not 100 percent reliable and is considered a supplemental water supply. The City of California City is required to purchase a minimum of 0.5 acre-feet per month. Each year the City must make a request to AVEK for the amount of water desired for the year.

In addition to AVEK, the City of California city works closely with the County of Kern regarding watershed, water quality and septic tank issues.

Evaluating Proximity to City Sewer Systems

The City of California City Sewer Municipal Code Section requires improved properties to connect to existing sewer main systems if the lateral distance is up to 100 ft. maximum, and up to 200 ft. maximum for unimproved properties. For properties that fall outside the mandatory sewer main system hookup, the City is implementing a grinder pump system with a pressure main to connect to existing sewer main. Sewer main system using onsite grinder pump / pressure main system will eliminate the present typical septic tank / seepage pit system usage.

The grinder pump / pressure main system is also to be employed for replacement of existing failed septic tank / seepage pit system.

Procedure for construction (or) repair permit issuance with respect to Onsite Wastewater Treatment System (OWTS)

The City of California City performs all permit issuance activity at the Building and Safety Department. Maintain City water system maps including City well locations. The plan check permit issuance activity will include review of existing water well location for proposed onsite wastewater treatment system construction / remedial work area distance requirements, (Horizontal and Vertical).

Cesspool Status (New/Existing)

Cesspool are not allowed in the City of California City. If City staff discovers a cesspool that is in use, the owner will be notified and required to replace the cesspool with an onsite wastewater treatment system. Cesspool removal and replacement with approved onsite wastewater treatment system will be accomplished as soon as possible to protect the health, safety, and welfare of the property owner(s), public, and government.

Section 5: Management of the Local Agency Management Program (LAMP)

The City of California City will retain permanent records of all new maintenance, (or) abandon onsite wastewater treatment systems. This records consist of building permit applications, City inspection record and professional site evaluations. This information is available upon request to the public and government agencies. The City of California City will continue to monitor the quality of the groundwater by continued City water well testing and testing for any proposed new City water well.

The City of California City will submit an annual report by February 1 to Region 6 Lahontan Water Quality Board with complete ground water well analysis in addition, every fifth year the City of California City will submit an evaluation of the monitoring program and an assessment of ground water quality with respect to onsite wastewater treatment system. This five year report will also address any revision that may be required. The first annual report will be required one year after approval of the Region 6 Lahontan Water Quality Board Management Program (LAMP).

The annual ground quality testing data will be provided in electronic deliverable format.

Section 6: Prohibitions

The following are not allowed in the City of California City.

1. Cesspools. The use of cesspools for sewage disposal is not authorized or allowed per this Local Agency Management Program (LAMP).

2. Onsite wastewater treatment system. Onsite Wastewater Treatment System applies only to a maximum the City of California City daily flow volume of waste produced at 10,000 gpd or less, if waste produced is more than 10,000 gpd, method of treatment and dispersal must be approved by Region 6 Lahontan Water Control Board.

3. Onsite wastewater treatment system. Surface discharge of wastewater from an onsite wastewater treatment system is not allowed with the City of California City. The onsite wastewater treatment system must consist of a septic tank and subsurface dispersal system for absorption and leaching of the effluent into the soil or seepage pit with adequate surface area for proper effluent dispersal.

Appendix 'A' Definitions

Alluvium

Sediment deposited by a river.

Disposal field

The required absorption area on square feet per one hundred (100) gallons of septic tank liquid capacity.

Domestic Water

Water plumbed to a dwelling or structure which is intended to be used for, but not limited to, drinking, food preparation, dish washing and bathing. Domestic water must also be potable.

Easement

A grant of one (1) or more of the property rights by the owner to or for the use by the public, a corporation, or another person or entity.

Effluent

The liquid outflow of any facility designed to treat, convey or retain wastewater.

Expansion Area

Additional seepage pits or subsurface drain fields, equivalent to at least one hundred (100) percent of the required original system that may be installed if the original system cannot absorb all the sewage.

Floodplain

A land area adjoining a river, stream, watercourse or lake which is likely to be flooded, including alluvial cones, wherein streams may change their course.

FEMA Federal Emergency Management Agency

GPD Gallons per day

Groundwater

Water stored underground in the spaces between rocks or sediments.

LAMP Local Agency Management Program

Leach bed

The joining of leach line trenches into one large square area.

Leach line

A series of horizontal trenches that hold a level perforated pipe that is used to distribute the wastewater throughout a rock absorption system where it eventually soaks into the soil particles.

MG Million Gallons

MGD Million Gallons per Day

OWTS Onsite Wastewater Treatment System

Percolation Test

A test conducted in order to determine the proper porosity for proposed disposal systems. Test must be accomplished by registered civil engineers, certified engineering geologists, or approved registered Environmental Health Specialist.

Potable Water

Water safe for drinking, culinary and domestic purposes and meets all requirements of the health officer.

Public Entity

A local agency which is empowered to plan, design, finance, construct, operate, maintain, and to abandon, if necessary, any sewerage system, the expansion of any sewerage system and the 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.

RWQCB Regional Water Quality Control Board

Seepage Pit

A covered pit with an open-jointed or perforated lining which septic tank effluent seeps into the surrounding soil, sometimes called a leaching pit or leaching pool.

Septic Tank

A water tight, covered receptacle designed and constructed to receive the discharge of sewage from a building sewer, to separate solids from the liquid, to digest organic matter, to store digested solids through a period of detention, and to allow the clarified anaerobic liquids to discharge for final disposal.

Setback

The required minimum distance between a proposed sewage disposal system and those items listed in the California Plumbing Code, Appendix K.

Sewage

Any combination of water-carried waste, discharged from buildings.

Sewage system

A network of wastewater collection, conveyance, treatment and disposal facilities interconnected by sewers, and owned by the districts.

Private system: a private sewerage disposal system or any part thereof, or the building sewer to the point of connection to a public sewer main which typically parallels the center line of the roadway. A private system is sometimes referred to as private disposal system.

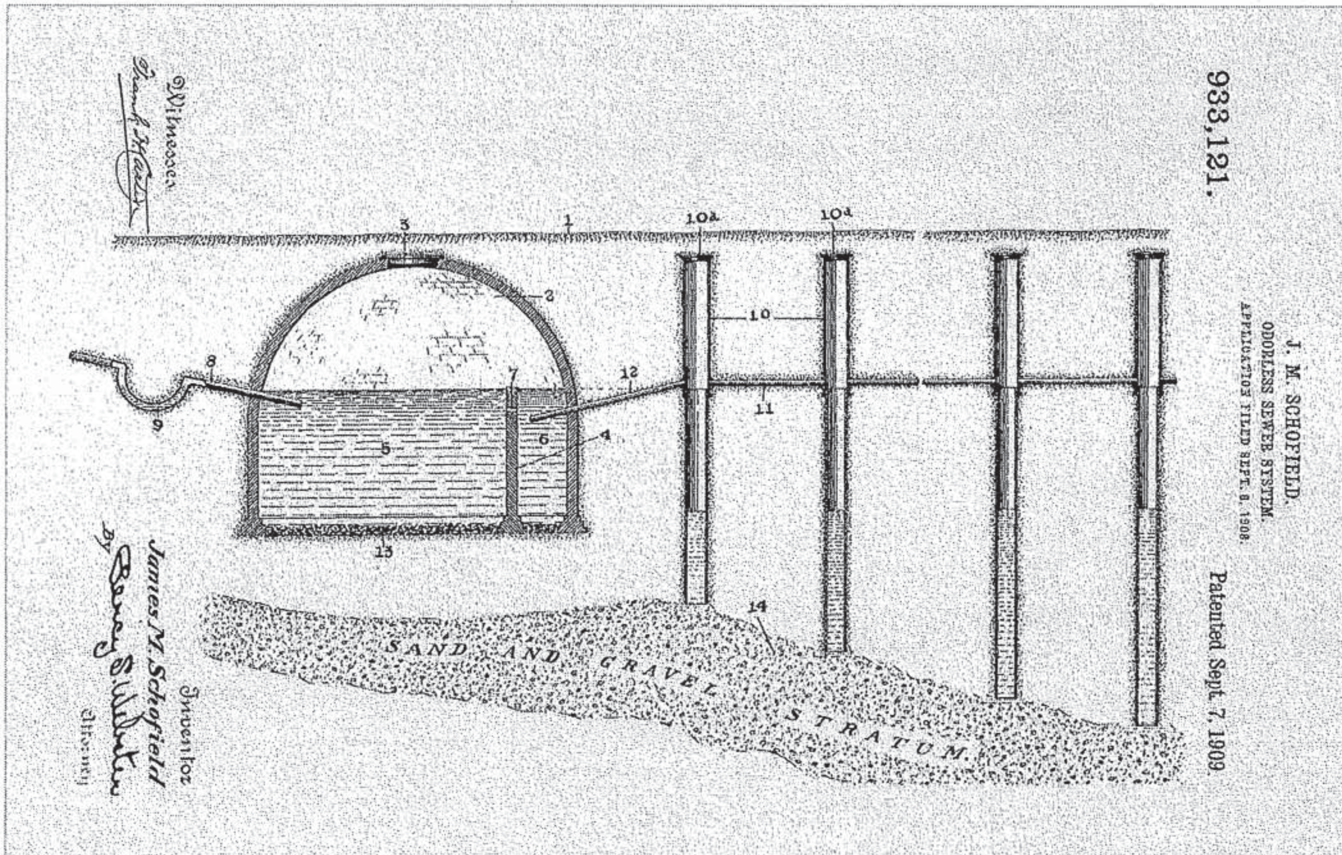
Public system: a common sewerage system or any part thereof which is operated by the county, or by a county service area, or by any political subdivision or public entity.

Streams

Surface: a continual or seasonal flow of water in a definite channel having a bed of banks.

Non-classified: a flow of water within a well-defined course only during a period for storm.

Appendix 'B' Onsite Wastewater Treatment System (OWTS) Policy



OWTS POLICY

Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems

June 19, 2012

CALIFORNIA
Water Boards

STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

State of California
Edmund G. Brown Jr., Governor

California Environmental Protection Agency
Matthew Rodriquez, Secretary

State Water Resources Control Board
http://www.waterboards.ca.gov

Charles R. Hoppin, Chair
Frances Spivy-Weber, Vice Chair
Tam M. Doduc, Member
Steven Moore, Member

Thomas Howard, Executive Director
Jonathan Bishop, Chief Deputy Director
Caren Trgovcich, Chief Deputy Director

Adopted by the State Water Resources Control Board on June 19, 2012
Approved by the Office of Administrative Law on November 13, 2012
Effective Date of the Policy: May 13, 2013

Preamble – Purpose and Scope – Structure of the Policy

Preamble

Onsite wastewater treatment systems (OWTS) are useful and necessary structures that allow habitation at locations that are removed from centralized wastewater treatment systems. When properly sited, designed, operated, and maintained, OWTS treat domestic wastewater to reduce its polluting impact on the environment and most importantly protect public health. Estimates for the number of installations of OWTS in California at the time of this Policy are that more than 1.2 million systems are installed and operating. The vast majority of these are functioning in a satisfactory manner and meeting their intended purpose.

However there have been occasions in California where OWTS for a varied list of reasons have not satisfactorily protected either water quality or public health. Some instances of these failures are related to the OWTS not being able to adequately treat and dispose of waste as a result of poor design or improper site conditions. Others have occurred where the systems are operating as designed but their densities are such that the combined effluent resulting from multiple systems is more than can be assimilated into the environment. From these failures we must learn how to improve our usage of OWTS and prevent such failures from happening again.

As California's population continues to grow, and we see both increased rural housing densities and the building of residences and other structures in more varied terrain than we ever have before, we increase the risks of causing environmental damage and creating public health risks from the use of OWTS. What may have been effective in the past may not continue to be as conditions and circumstances surrounding particular locations change. So necessarily more scrutiny of our installation of OWTS is demanded of all those involved, while maintaining an appropriate balance of only the necessary requirements so that the use of OWTS remains viable.

Purpose and Scope of the Policy

The purpose of this Policy is to allow the continued use of OWTS, while protecting water quality and public health. This Policy recognizes that responsible local agencies can provide the most effective means to manage OWTS on a routine basis. Therefore as an important element, it is the intent of this policy to efficiently utilize and improve upon where necessary existing local programs through coordination between the State and local agencies. To accomplish this purpose, this Policy establishes a statewide, risk-based, tiered approach for the regulation and management of OWTS installations and replacements and sets the level of performance and protection expected from OWTS. In particular, the Policy requires actions for water bodies specifically identified as part this Policy where OWTS contribute to water quality degradation that adversely affect beneficial uses.

This Policy only authorizes subsurface disposal of domestic strength, and in limited instances high strength, wastewater and establishes minimum requirements for the permitting, monitoring, and operation of OWTS for protecting beneficial uses of waters of the State and preventing or correcting conditions of pollution and nuisance. And finally, this Policy also conditionally waives the requirement for owners of OWTS to apply for and receive Waste Discharge Requirements in order to operate their systems when they meet the conditions set forth in the Policy. Nothing in this Policy supersedes or requires modification of Total Maximum Daily Loads or Basin Plan prohibitions of discharges from OWTS.

This Policy also applies to OWTS on federal, state, and Tribal lands to the extent authorized by law or agreement.

Structure of the Policy

This Policy is structured into ten major parts:

Definitions
Definitions for all the major terms used in this Policy are provided within this part and wherever used in the Policy the definition given here overrides any other possible definition.
[Section 1]

Responsibilities and Duties
Implementation of this Policy involves individual OWTS owners; local agencies, be they counties, cities, or any other subdivision of state government with permitting powers over OWTS; Regional Water Quality Control Boards; and the State Water Resources Control Board.
[Sections 2, 3, 4, and 5]

Tier 0 – Existing OWTS
Existing OWTS that are properly functioning, and do not meet the conditions of failing systems or otherwise require corrective action (for example, to prevent groundwater impairment) as specifically described in Tier 4, and are not determined to be contributing to an impairment of surface water as specifically described in Tier 3, are automatically included in Tier 0.
[Section 6]

Tier 1 – Low-Risk New or Replacement OWTS
New or replacement OWTS that meet low risk siting and design requirements as specified in Tier 1, where there is not an approved Local Agency Management Program per Tier 2.
[Sections 7 and 8]

Tier 2 – Local Agency Management Program for New or Replacement OWTS
California is well known for its extreme range of geological and climatic conditions. As such, the establishment of a single set of criteria for OWTS would either be too restrictive so as to protect for the most sensitive case, or would have broad allowances that would not be protective enough under some circumstances. To accommodate this

extreme variance, local agencies may submit management programs ("Local Agency Management Programs") for approval, and upon approval then manage the installation of new and replacement OWTS under that program.

Local Agency Management Programs approved under Tier 2 provide an alternate method from Tier 1 programs to achieve the same policy purpose, which is to protect water quality and public health. In order to address local conditions, Local Agency Management Programs may include standards that differ from the Tier 1 requirements for new and replacement OWTS contained in Sections 7 and 8. As examples, a Local Agency Management Program may authorize different soil characteristics, usage of seepage pits, and different densities for new developments. Once the Local Agency Management Program is approved, new and replacement OWTS that are included within the Local Agency Management Program may be approved by the Local Agency. A Local Agency, at its discretion, may include Tier 1 standards within its Tier 2 Local Agency Management Program for some or all of its jurisdiction. However, once a Local Agency Management Program is approved, it shall supersede Tier 1 and all future OWTS decisions will be governed by the Tier 2 Local Agency Management Program until it is modified, withdrawn, or revoked.
[Section 9]

Tier 3 – Impaired Areas
Existing, new, and replacement OWTS that are near impaired water bodies may be addressed by a TMDL and its implementation program, or special provisions contained in a Local Agency Management Program. If there is no TMDL or special provisions, new or replacement OWTS within 600 feet of impaired water bodies listed in Attachment 2 must meet the specific requirements of Tier 3.
[Section 10]

Tier 4 – OWTS Requiring Corrective Action
OWTS that require corrective action or are either presently failing or fail at any time while this Policy is in effect are automatically included in Tier 4 and must follow the requirements as specified.
[Section 11]

Conditional Waiver of Waste Discharge Requirements
The requirement to submit a report of waste discharge for discharges from OWTS that are in conformance with this policy is waived.
[Section 12]

Effective Date
When this Policy becomes effective.
[Section 13]

Financial Assistance
Procedures for local agencies to apply for funds to establish low interest loan programs for the assistance of OWTS owners in meeting the requirements of this Policy.
[Section 14]

Preamble – Purpose and Scope – Structure of the Policy

Attachment 1
AB 885 Regulatory Program Timelines.

Attachment 2

Tables 4 and 5 specifically identify those impaired water bodies that have Tier 3 requirements and must have a completed TMDL by the date specified.

Attachment 3

Table 6 shows where one Regional Water Board has been designated to review and, if appropriate, approve new Local Agency Management Plans for a local agency that is within multiple Regional Water Boards' jurisdiction.

What Tier Applies to my OWTS?

Existing OWTS that conform to the requirements for Tier 0 will remain in Tier 0 as long as they continue to meet those requirements. An existing OWTS will temporarily move from Tier 0 to Tier 4 if it is determined that corrective action is needed. The existing OWTS will return to Tier 0 once the corrective action is completed if the repair does not qualify as major repair under Tier 4. Any major repairs conducted as corrective action must comply with Tier 1 requirements or Tier 2 requirements, whichever are in effect for that local area. An existing OWTS will move from Tier 0 to Tier 3 if it is adjacent to an impaired water body listed on Attachment 2, or is covered by a TMDL implementation plan.

In areas with no approved Local Agency Management Plan, new and replacement OWTS that conform to the requirements of Tier 1 will remain in Tier 1 as long as they continue to meet those requirements. A new or replacement OWTS will temporarily move from Tier 1 to Tier 4 if it is determined that corrective action is needed. The new or replacement OWTS will return to Tier 1 once the corrective action is completed. A new or replacement OWTS will move from Tier 1 to Tier 3 if it is adjacent to an impaired water body, or is covered by a TMDL implementation plan.

In areas with an approved Local Agency Management Plan, new and replacement OWTS that conform to the requirements of the Tier 2 Local Agency Management Plan will remain in Tier 2 as long as they continue to meet those requirements. A new or replacement OWTS will temporarily move from Tier 2 to Tier 4 if it is determined that corrective action is needed. The new or replacement OWTS will return to Tier 2 once the corrective action is completed. A new or replacement OWTS will move from Tier 2 to Tier 3 if it is adjacent to an impaired water body, or is covered by a TMDL implementation plan, or is covered by special provisions for impaired water bodies contained in a Local Agency Management Program.

Preamble – Purpose and Scope – Structure of the Policy

Existing, new, and replacement OWTS in specified areas adjacent to water bodies that are identified by the State Water Board as impaired for pathogens or nitrogen and listed in Attachment 2 are in Tier 3. Existing, new, and replacement OWTS covered by a TMDL implementation plan, or covered by special provisions for impaired water bodies contained in a Local Agency Management Program are also in Tier 3. These OWTS will temporarily move from Tier 3 to Tier 4 if it is determined that corrective action is needed. The new or replacement OWTS will return to Tier 3 once the corrective action is completed.

Existing, new, and replacement OWTS that do not conform with the requirements to receive coverage under any of the Tiers (e.g., existing OWTS with a projected flow of more than 10,000 gpd) do not qualify for this Policy's conditional waiver of waste discharge requirements, and will be regulated separately by the applicable Regional Water Board.

Definitions

1.0 Definitions. The following definitions apply to this Policy:

"303 (d) list" means the same as "**Impaired Water Bodies.**"

"At-grade system" means an OWTS dispersal system with a discharge point located at the preconstruction grade (ground surface elevation). The discharge from an at-grade system is always subsurface.

"Average annual rainfall" means the average of the annual amount of precipitation for a location over a year as measured by the nearest National Weather Service station for the preceding three decades. For example the data set used to make a determination in 2012 would be the data from 1981 to 2010.

"Basin Plan" means the same as "water quality control plan" as defined in Division 7 (commencing with Section 13000) of the Water Code. Basin Plans are adopted by each Regional Water Board, approved by the State Water Board and the Office of Administrative Law, and identify surface water and groundwater bodies within each Region's boundaries and establish, for each, its respective beneficial uses and water quality objectives. Copies are available from the Regional Water Boards, electronically at each Regional Water Boards website, or at the State Water Board's *Plans and Policies* web page (http://www.waterboards.ca.gov/plans_policies/).

"Bedrock" means the rock, usually solid, that underlies soil or other unconsolidated, surficial material.

"CEDEN" means California Environmental Data Exchange Network and information about it is available at the State Water Boards website or http://www.ceden.org/index.shtml.

"Cesspool" means an excavation in the ground receiving domestic wastewater, designed to retain the organic matter and solids, while allowing the liquids to seep into the soil. Cesspools differ from seepage pits because cesspool systems do not have septic tanks and are not authorized under this Policy. The term cesspool does not include pit-privies and out-houses which are not regulated under this Policy.

"Clay" means a soil particle; the term also refers to a type of soil texture. As a soil particle, clay consists of individual rock or mineral particles in soils having diameters <0.002 mm. As a soil texture, clay is the soil material that is comprised of 40 percent or more clay particles, not more than 45 percent sand and not more than 40 percent silt particles using the USDA soil classification system.

"Cobbles" means rock fragments 76 mm or larger using the USDA soil classification systems.

"Dispersal system" means a leachfield, seepage pit, mound, at-grade, subsurface drip field, evapotranspiration and infiltration bed, or other type of system for final wastewater treatment and subsurface discharge.

Definitions

"Domestic wastewater" means wastewater with a measured strength less then high-strength wastewater and is the type of wastewater normally discharged from, or similar to, that discharged from plumbing fixtures, appliances and other household devices including, but not limited to toilets, bathtubs, showers, laundry facilities, dishwashing facilities, and garbage disposals. Domestic wastewater may include wastewater from commercial buildings such as office buildings, retail stores, and some restaurants, or from industrial facilities where the domestic wastewater is segregated from the industrial wastewater. Domestic wastewater may include incidental RV holding tank dumping but does not include wastewater consisting of a significant portion of RV holding tank wastewater such as at RV dump stations. Domestic wastewater does not include wastewater from industrial processes.

"Dump Station" means a facility intended to receive the discharge of wastewater from a holding tank installed on a recreational vehicle. A dump station does not include a full hook-up sewer connection similar to those used at a recreational vehicle park.

"Domestic well" means a groundwater well that provides water for human consumption and is not regulated by the California Department of Public Health.

"Earthen material" means a substance composed of the earth's crust (i.e. soil and rock).

"EDF" see "electronic deliverable format."

"Effluent" means sewage, water, or other liquid, partially or completely treated or in its natural state, flowing out of a septic tank, aerobic treatment unit, dispersal system, or other OWTS component.

"Electronic deliverable format" or **"EDF"** means the data standard adopted by the State Water Board for submittal of groundwater quality monitoring data to the State Water Board's internet-accessible database system Geotracker (http://geotracker.waterboards.ca.gov/).

"Escherichia coli" means a group of bacteria predominantly inhabiting the intestines of humans or other warm-blooded animals, but also occasionally found elsewhere. Used as an indicator of human fecal contamination.

"Existing OWTS" means an OWTS that was constructed and operating prior to the effective date of this Policy, and OWTS for which a construction permit has been issued prior to the effective date of the Policy.

"Flowing water body" means a body of running water flowing over the earth in a natural water course, where the movement of the water is readily discernible or if water is not present it is apparent from review of the geology that when present it does flow, such as in an ephemeral drainage, creek, stream, or river.

"Groundwater" means water below the land surface that is at or above atmospheric pressure.

Definitions

"High-strength wastewater" means wastewater having a 30-day average concentration of biochemical oxygen demand (BOD) greater than 300 milligrams-per-liter (mg/L) or of total suspended solids (TSS) greater than 330 mg/L or a fats, oil, and grease (FOG) concentration greater than 100 mg/L prior to the septic tank or other OWTS treatment component.

"IAPMO" means the International Association of Plumbing and Mechanical Officials.

"Impaired Water Bodies" means those surface water bodies or segments thereof that are identified on a list approved first by the State Water Board and then approved by US EPA pursuant to Section 303(d) of the federal Clean Water Act.

"Local agency" means any subdivision of state government that has responsibility for permitting the installation of and regulating OWTS within its jurisdictional boundaries; typically a county, city, or special district.

"Major repair" means either: (1) for a dispersal system, repairs required for an OWTS dispersal system due to surfacing wastewater effluent from the dispersal field and/or wastewater backed up into plumbing fixtures because the dispersal system is not able to percolate the design flow of wastewater associated with the structure served, or (2) for a septic tank, repairs required to the tank for a compartment baffle failure or tank structural integrity failure such that either wastewater is exfiltrating or groundwater is infiltrating.

"Mottling" means a soil condition that results from oxidizing or reducing minerals due to soil moisture changes from saturated to unsaturated over time. Mottling is characterized by spots or blotches of different colors or shades of color (grays and reds) interspersed within the dominant color as described by the USDA soil classification system. This soil condition can be indicative of historic seasonal high groundwater level, but the lack of this condition may not demonstrate the absence of groundwater.

"Mound system" means an aboveground dispersal system (covered sand bed with effluent leachfield elevated above original ground surface inside) used to enhance soil treatment, dispersal, and absorption of effluent discharged from an OWTS treatment unit such as a septic tank. Mound systems have a subsurface discharge.

"New OWTS" means an OWTS permitted after the effective date of this Policy.

"NSF" means NSF International (a.k.a. National Sanitation Foundation), a not for profit, non-governmental organization that develops health and safety standards and performs product certification.

"Oil/grease interceptor" means a passive interceptor that has a rate of flow exceeding 50 gallons-per-minute and that is located outside a building. Oil/grease interceptors are used for separating and collecting oil and grease from wastewater.

Definitions

"Onsite wastewater treatment system(s)" (OWTS) means individual disposal systems, community collection and disposal systems, and alternative collection and disposal systems that use subsurface disposal. The short form of the term may be singular or plural. OWTS do not include "graywater" systems pursuant to Health and Safety Code Section 17922.12.

"Percolation test" means a method of testing water absorption of the soil. The test is conducted with clean water and test results can be used to establish the dispersal system design.

"Permit" means a document issued by a local agency that allows the installation and use of an OWTS, or waste discharge requirements or a waiver of waste discharge requirements that authorizes discharges from an OWTS.

"Person" means any individual, firm, association, organization, partnership, business trust, corporation, company, State agency or department, or unit of local government who is, or that is, subject to this Policy.

"Pit-privy" (a.k.a. outhouse, pit-toilet) means self-contained waterless toilet used for disposal of non-water carried human waste; consists of a shelter built above a pit in the ground into which human waste falls.

"Policy" means this Policy for Siting, Design, Operation and Management of OWTS.

"Pollutant" means any substance that alters water quality of the waters of the State to a degree that it may potentially affect the beneficial uses of water, as listed in a Basin Plan.

"Projected flows" means wastewater flows into the OWTS determined in accordance with any of the applicable methods for determining average daily flow in the *USEPA Onsite Wastewater Treatment System Manual, 2002,* or for Tier 2 in accordance with an approved Local Agency Management Program.

"Public Water System" is a water system regulated by the California Department of Public Health or a Local Primacy Agency pursuant to Chapter 12, Part 4, California Safe Drinking Water Act, Section 116275 (h) of the California Health and Safety Code.

"Public Water Well" is a ground water well serving a public water system. A spring which is not subject to the California Surface Water Treatment Rule (SWTR), CCR, Title 22, sections 64650 through 64666 is a public well.

"Qualified professional" means an individual licensed or certified by a State of California agency to design OWTS and practice as professionals for other associated reports, as allowed under their license or registration. Depending on the work to be performed and various licensing and registration requirements, this may include an individual who possesses a registered environmental health specialist certificate or is currently licensed as a professional engineer or professional geologist. For the purposes of performing site evaluations, Soil Scientists certified by the Soil Science Society of America are considered qualified professionals. A local agency may modify this definition as part of its Local Agency Management Program.

Definitions

"Regional Water Board" is any of the Regional Water Quality Control Boards designated by Water Code Section 13200. Any reference to an action of the Regional Water Board in this Policy also refers to an action of its Executive Officer, including the conducting of public hearings, pursuant to any general or specific delegation under Water Code Section 13223.

"Replacement OWTS" means an OWTS that has its treatment capacity expanded, or its dispersal system replaced or added onto, after the effective date of this Policy.

"Sand" means a soil particle; this term also refers to a type of soil texture. As a soil particle, sand consists of individual rock or mineral particles in soils having diameters ranging from 0.05 to 2.0 millimeters. As a soil texture, sand is soil that is comprised of 85 percent or more sand particles, with the percentage of silt plus 1.5 times the percentage of clay particles comprising less than 15 percent.

"Seepage pit" means a drilled or dug excavation, three to six feet in diameter, either lined or gravel filled, that receives the effluent discharge from a septic tank or other OWTS treatment unit for dispersal.

"Septic tank" means a watertight, covered receptacle designed for primary treatment of wastewater and constructed to:

1. Receive wastewater discharged from a building;
2. Separate settleable and floating solids from the liquid;
3. Digest organic matter by anaerobic bacterial action;
4. Store digested solids; and
5. Clarify wastewater for further treatment with final subsurface discharge.

"Service provider" means a person capable of operating, monitoring, and maintaining an OWTS in accordance to this Policy.

"Silt" means a soil particle; this term also refers to a type of soil texture. As a soil particle, silt consists of individual rock or mineral particles in soils having diameters ranging from between 0.05 and 0.002 mm. As a soil texture, silt is soil that is comprised as approximately 80 percent or more silt particles and not more than 12 percent clay particles using the USDA soil classification system.

"Single-family dwelling unit" means a structure that is usually occupied by just one household or family and for the purposes of this Policy is expected to generate an average of 250 gallons per day of wastewater.

"Site" means the location of the OWTS and, where applicable, a reserve dispersal area capable of disposing 100 percent of the design flow from all sources the OWTS is intended to serve.

"Site Evaluation" means an assessment of the characteristics of the site sufficient to determine its suitability for an OWTS to meet the requirements of this Policy.

Definitions

"Soil" means the naturally occurring body of porous mineral and organic materials on the land surface, which is composed of unconsolidated materials, including sand-sized, silt-sized, and clay-sized particles mixed with varying amounts of larger fragments and organic material. The various combinations of particles differentiate specific soil textures identified in the soil textural triangle developed by the United States Department of Agriculture (USDA) as found in Soil Survey Staff, USDA; *Soil Survey Manual, Handbook 18,* U.S. Government Printing Office, Washington, DC, 1993, p. 138. For the purposes of this Policy, soil shall contain earthen material of particles smaller than 0.08 inches (2 mm) in size.

"Soil Structure" means the arrangement of primary soil particles into compound particles, peds, or clusters that are separated by natural planes of weakness from adjoining aggregates.

"Soil texture" means the soil class that describes the relative amount of sand, clay, silt and combinations thereof as defined by the classes of the soil textural triangle developed by the USDA (referenced above).

"State Water Board" is the State Water Resources Control Board

"Supplemental treatment" means any OWTS or component of an OWTS, except a septic tank or dosing tank, that performs additional wastewater treatment so that the effluent meets a predetermined performance requirement prior to discharge of effluent into the dispersal field.

"SWAMP" means Surface Water Ambient Monitoring Program and more information is available at: http://www.waterboards.ca.gov/water_issues/programs/swamp/

"Telemetric" means the ability to automatically measure and transmit OWTS data by wire, radio, or other means.

"TMDL" is the acronym for "total maximum daily load." Section 303(d)(1) of the Clean Water Act requires each State to establish a TMDL for each impaired water body to address the pollutant(s) causing the impairment. In California, TMDLs are usually adopted as Basin Plan amendments and contain implementation plans detailing how water quality standards will be attained.

"Total coliform" means a group of bacteria consisting of several *genera* belonging to the family *Enterobacteriaceae*, which includes Escherichia coli bacteria.

"USDA" means the U.S. Department of Agriculture.

"Waste discharge requirement" or **"WDR"** means an operation and discharge permit issued for the discharge of waste pursuant to Section 13260 of the California Water Code.

Responsibilities and Duties

Responsibilities and Duties

2.0 OWTS Owners Responsibilities and Duties

2.1 All new, replacement, or existing OWTS within an area that is subject to a Basin Plan prohibition of discharges from OWTS, must comply with the prohibition. If the prohibition authorizes discharges under specified conditions, the discharge must comply with those conditions and the applicable provisions of this Policy.

2.2 Owners of OWTS shall adhere to the requirements prescribed in local codes and ordinances. Owners of new and replacement OWTS covered by this Policy shall also meet the minimum standards contained in Tier 1, or an alternate standard provided by a Local Agency Management Program per Tier 2, or shall comply with the requirements of Tier 3 if near an impaired water body and subject to Tier 3, or shall provide corrective action for their OWTS if their system meets conditions that place it in Tier 4.

2.3 Owners of OWTS shall comply with any and all permitting conditions imposed by a local agency that do not directly conflict with this Policy, including any conditions that are more stringent than required by this Policy.

2.4 To receive coverage under this Policy and the included waiver of waste discharges, OWTS shall only accept and treat flows of domestic wastewater. In addition, OWTS that accept high-strength wastewater from commercial food service buildings are covered under this Policy and the waiver of waste discharge requirements if the wastewater does not exceed 900 mg/L BOD and there is a properly sized and functioning oil/grease interceptor (a.k.a grease trap).

2.5 Owners of OWTS shall maintain their OWTS in good working condition including inspections and pumping of solids as necessary, or as required by local ordinances, to maintain proper function and assure adequate treatment.

2.6 The following owners of OWTS shall notify the Regional Water Board by submitting a Report of Waste Discharge for the following:

2.6.1 a new or replacement OWTS that does not meet the conditions and requirements set forth in either a Local Agency Management Program if one is approved, an existing local program if it is less than 60 months from the effective date of the Policy and a Local Agency Management Program is not yet approved, or Tier 1 if no Local Agency Management Program has been approved and it is more than 60 months after the effective date of this Policy;

2.6.2 any OWTS, not under individual waste discharge requirements or a waiver of individual waste discharge requirements issued by a Regional Water Board, with the projected flow of over 10,000 gallons-per-day;

2.6.3 any OWTS that receives high-strength wastewater, unless the waste stream is from a commercial food service building;

2.6.4 any OWTS that receives high-strength wastewater from a commercial food service building: (1) with a BOD higher than 900 mg/L, or (2) that does not have a properly sized and functioning oil/grease interceptor.

2.7 All Reports of Waste Discharge shall be accompanied by the required application fee pursuant to California Code of Regulations, title 23, section 2200.

3.0 Local Agency Requirements and Responsibilities

3.1 Local agencies, in addition to implementing their own local codes and ordinances, shall determine whether the requirements within their local jurisdiction will be limited to the water quality protection afforded by the statewide minimum standards in Tier 0, Tier 1, Tier 3, and Tier 4, or whether the local agency will implement a Local Agency Management Program in accordance with Tier 2. Except for Tier 3, local agencies may continue to implement their existing OWTS permitting programs in compliance with the Basin Plan in place at the effective date of the Policy until 60 months after the effective date of this Policy, or approval of a Local Agency Management Program, whichever comes first, and may make minor adjustments as necessary that are in compliance with the applicable Basin Plan and this Policy. Tier 3 requirements take effect on the effective date of this Policy. In the absence of a Tier 2 Local Agency Management Program, to the extent that there is a direct conflict between the applicable minimum standards and the local codes or ordinances (such that it is impossible to comply with both the applicable minimum standards and the local ordinances or codes), the more restrictive standards shall govern.

3.2 If preferred, the local agency may at any time provide the State Water Board and all affected Regional Water Board(s) written notice of its intent to regulate OWTS using a Local Agency Management Program with alternative standards as authorized in Tier 2 of this Policy. A proposed Local Agency Management Program that conforms to the requirements of that Section shall be included with the notice. A local agency shall not implement a program different than the minimum standards contained in Tier 1 and 3 of this Policy after 60 months from the effective date of this Policy until approval of the proposed Local Agency Management Program is granted by either the Regional Water Board or State Water Board. All initial program submittals desiring approval prior to the 60 month limit shall be received no later than 36 months from the effective date of this Policy. Once approved, the local agency shall adhere to the Local Agency Management Program, including all requirements, monitoring, and reporting. If at any time a local agency wishes to modify its Local Agency Management Program, it shall provide the State Water Board and all affected Regional Water Board(s) written notice of its intended modifications and will continue to implement its existing Local Agency Management Program until the modifications are approved.

3.3 All local agencies permitting OWTS shall report annually to the Regional Water Board(s). If a local agency's jurisdictional area is within the boundary of multiple Regional Water Boards, the local agency shall send a copy of the annual report to each Regional Water Board. The annual report shall include the following information (organized in a tabular spreadsheet format) and summarize whether any further actions are warranted to protect water quality or public health:

3.3.1 number and location of complaints pertaining to OWTS operation and maintenance, and identification of those which were investigated and how they were resolved;

3.3.2 shall provide the applications and registrations issued as part of the local septic tank cleaning registration program pursuant to Section 117400 et seq. of the California Health and Safety Code;

3.3.3 number, location, and description of permits issued for new and replacement OWTS and which Tier the permit is issued.

3.4 All local agencies permitting OWTS shall retain permanent records of their permitting actions and will make those records available within 10 working days upon written request for review by a Regional Water Board. The records for each permit shall reference the Tier under which the permit was issued.

3.5 A local agency shall notify the owner of a public well or water intake and the California Department of Public Health as soon as practicable, but not later than 72 hours, upon its discovery of a failing OWTS as described in sections 11.1 and 11.2 within the setbacks described in sections 7.5.6 through 7.5.10.

3.6 A local agency may implement this Policy, or a portion thereof, using its local authority to enforce the policy, as authorized by an approval from the State Water Board or by the appropriate Regional Water Board.

3.7 Nothing in the Policy shall preclude a local agency from adopting or retaining standards for OWTS in an approved Local Agency Management Program that are more protective of the public health or the environment than are contained in this Policy.

3.8 If at any time a local agency wishes to withdraw its previously submitted and approved Tier 2 Local Agency Management Program, it may do so upon 60 days written notice. The notice of withdrawal shall specify the reason for withdrawing its Tier 2 program, the effective date for cessation of the program and resumption of permitting of OWTS only under Tiers 1, 3, and 4.

4.0 Regional Water Board Functions and Duties

4.1 The Regional Water Boards have the principal responsibility for overseeing the implementation of this Policy.

4.2 Regional Water Boards shall incorporate the requirements established in this Policy by amending their Basin Plans within 12 months of the effective date of this Policy, pursuant to Water Code Section 13291(e). The Regional Water

Boards may also consider whether it is necessary and appropriate to retain or adopt any more protective standards. To the extent that a Regional Water Board determines that it is necessary and appropriate to retain or adopt any more protective standards, it shall reconcile those region-specific standards with this Policy to the extent feasible, and shall provide a detailed basis for its determination that each of the more protective standards is necessary and appropriate.

4.2.1 Notwithstanding 4.2 above, the North Coast Regional Water Board will continue to implement its existing Basin Plan requirements pertaining to OWTS within the Russian River watershed until it adopts the Russian River TMDL, at which time it will comply with section 4.2 for the Russian River watershed.

4.3 The Regional Water Board designated in Attachment 3 shall review, and if appropriate, approve a Local Agency Management Program submitted by the local agency pursuant to Tier 2 in this Policy. Upon receipt of a proposed Local Agency Management Program, the Regional Water Board designated in Attachment 3 shall have 90 days to notify the local agency whether the submittal contains all the elements of a Tier 2 program, but may request additional information based on review of the proposed program. Approval must follow a noticed hearing with opportunity for public comment. If a Local Agency Management Program is disapproved, the Regional Water Board designated in Attachment 3 shall provide a written explanation of the reasons for the disapproval. A Regional Water Board may approve a Local Agency Management Program while disapproving any proposed special provisions for impaired water bodies contained in the Local Agency Management Program. If no action is taken by the respective Regional Water Board within 12 months of the submission date of a complete Local Agency Management Program, the program shall be forwarded to the State Water Board for review and approval pursuant to Section 5 of this Policy.

4.3.1 Where the local agency's jurisdiction lies within more than one Regional Water Board, staff from the affected Regional Water Boards shall work cooperatively to assure that water quality protection in each region is adequately protected. If the Regional Water Board designated in Attachment 3 approves the Local Agency Management Program over the written objection of an affected Regional Water Board, that Regional Water Board may submit the dispute to the State Water Board under Section 5.3.

4.3.2 Within 30 days of receipt of a proposed Local Agency Management Program, a Regional Water Board will forward a copy to and solicit comments from the California Department of Public Health regarding a Local Agency Management Program's proposed policies and procedures, including notification to local water purveyors prior to OWTS permitting.

4.4 Once a Local Agency Management Program has been approved, any affected Regional Water Board may require modifications or revoke authorization of a local agency to implement a Tier 2 program, in accordance with the following:

Responsibilities and Duties

4.4.1 The Regional Water Board shall consult with any other Regional Water Board(s) having jurisdiction over the local agency before providing the notice described in section 4.4.2.

4.4.2 Written notice shall be provided to the local agency detailing the Regional Water Board's action, the cause for such action, remedies to prevent the action from continuing to completion, and appeal process and rights. The local agency shall have 90 days from the date of the written notice to respond with a corrective action plan to address the areas of non-compliance, or to request the Regional Water Board to reconsider its findings.

4.4.3 The Regional Water Board shall approve, approve conditionally, or deny a corrective action plan within 90 days of receipt. The local agency will have 90 days to begin implementation of a corrective action plan from the date of approval or 60 days to request reconsideration from the date of denial. If the local agency fails to submit an acceptable corrective action plan, fails to implement an approved corrective action plan, or request reconsideration, the Regional Water Board may require modifications to the Local Agency Management Program, or may revoke the local agency's authorization to implement a Tier 2 program.

4.4.4 Requests for reconsideration by the local agency shall be decided by the Regional Water Board within 90 days and the previously approved Local Agency Management Program shall remain in effect while the reconsideration is pending.

4.4.5 If the request for reconsideration is denied, the local agency may appeal to the State Water Board and the previously approved Local Agency Management Program shall remain in effect while the appeal is under consideration. The State Water Board shall decide the appeal within 90 days. All decisions of the State Water Board are final.

4.5 The appropriate Regional Water Board shall accept and consider any requests for modification or revocation of a Local Agency Management Program submitted by any person. The Regional Water Board will notify the person making the request and the local agency implementing the Local Agency Management Program at issue by letter within 90 days whether it intends to proceed with the modification or revocation process per Section 4.4 above, or is dismissing the request. The Regional Water Board will post the request and its response letter on its website.

4.6 A Regional Water Board may issue or deny waste discharge requirements or waivers of waste discharge requirements for any new or replacement OWTS within a jurisdiction of a local agency without an approved Local Agency Management Program if that OWTS does not meet the minimum standards contained in Tier 1.

4.7 The Regional Water Boards will implement any notifications and enforcement requirements for OWTS determined to be in Tier 3 of this Policy.

4.8 Regional Water Boards may adopt waste discharge requirements, or conditional waivers of waste discharge requirements, that exempt individual OWTS from requirements contained in this Policy.

5.0 State Water Board Functions and Duties

5.1 As the state agency charged with the development and adoption of this Policy, the State Water Board shall periodically review, amend and/or update this Policy as required.

5.2 The State Water Board may take any action assigned to the Regional Water Boards in this Policy.

5.3 The State Water Board shall resolve disputes between Regional Water Boards and local agencies as needed within 12 months of receiving such a request by a Regional Water Board or local agency, and may take action on its own motion in furtherance of this Policy. As part of this function, the State Water Board shall review and, if appropriate, approve Local Agency Management Programs in cases where the respective Regional Water Board has failed to consider for approval a Local Agency Management Program. The State Water Board shall approve Local Agency Management Programs at a regularly noticed board hearing and shall provide for public participation, including notice and opportunity for public comment. Once taken up by the State Water Board, Local Agency Management Programs shall be approved or denied within 180 days.

5.4 A member of the public may request the State Water Board to resolve any dispute regarding the Regional Water Board's approval of a Local Agency Management Program if the member of the public timely raised the disputed issue before the Regional Water Board. Such requests shall be submitted within 30 days after the Regional Water Board's approval of the Local Agency Management Program. The State Water Board shall notify the member of the public, the local agency, and the Regional Water Board within 90 days whether it intends to proceed with dispute resolution.

5.5 The State Water Board shall accept and consider any requests for modification or revocation of a Local Agency Management Program submitted by any person, where that person has previously submitted said request to the Regional Water Board and has received notice from the Regional Water Board of its dismissal of the request. The State Water Board will notify the person making the request and the local agency implementing the Local Agency Management Program at issue by letter within 90 days whether it intends to proceed with the modification or revocation process per Section 4.4 above, or is dismissing the request. The State Water Board will post the request and its response letter on its website.

5.6 The State Water Board or its Executive Director, after approving any Impaired Water Bodies [303 (d)] List, and for the purpose of implementing Tier 3 of this Policy, shall update Attachment 2 to identify those water bodies where: (1) it is likely that operating OWTS will subsequently be determined to be a contributing source of pathogens or nitrogen and therefore it is anticipated that OWTS would receive a loading reduction, and (2) it is likely that new OWTS installations discharging within 600 feet of the water body would contribute to the impairment. This identification shall be based on information available at the time of 303 (d) listing and may be further updated based on new information. Updates to Attachment 2 will be processed as amendments to this Policy.

5.7 The State Water Board will make available to local agencies funds from its Clean Water State Revolving Fund loan program for mini-loan programs to be operated by the local agencies for the making of low interest loans to assist private property owners with complying with this Policy.

Tier 0 – Existing OWTS

Tier 0 – Existing OWTS

Existing OWTS that are properly functioning and do not meet the conditions of failing systems or otherwise require corrective action (for example, to prevent groundwater impairment) as specifically described in Tier 4, and are not determined to be contributing to an impairment of surface water as specifically described in Tier 3, are automatically included in Tier 0.

6.0 Coverage for Properly Operating Existing OWTS

6.1 Existing OWTS are automatically covered by Tier 0 and the herein included waiver of waste discharge requirements if they meet the following requirements:

6.1.1 have a projected flow of 10,000 gallons-per-day or less;

6.1.2 receive only domestic wastewater from residential or commercial buildings, or high-strength wastewater from commercial food service buildings that does not exceed 900 mg/L BOD and has a properly sized and functioning oil/grease interceptor (a.k.a. grease trap);

6.1.3 continue to comply with any previously imposed permitting conditions;

6.1.4 do not require supplemental treatment under Tier 3;

6.1.5 do not require corrective action under Tier 4; and

6.1.6 do not consist of a cesspool as a means of wastewater disposal.

6.2 A Regional Water Board or local agency may deny coverage under this Policy to any OWTS that is:

6.2.1 Not in compliance with Section 6.1;

6.2.2 Not able to adequately protect the water quality of the waters of the State, as determined by the Regional Water Board after considering any input from the local agency. A Regional Water Board may require the submission of a report of waste discharge to receive Region specific waste discharge requirements or waiver of waste discharge requirements so as to be protective.

6.3 Existing OWTS currently under waste discharge requirements or individual waiver of waste discharge requirements will remain under those orders until notified in writing by the appropriate Regional Water Board that they are covered under this Policy.

Tier 1 – Low Risk New or Replacement OWTS

Tier 1 – Low Risk New or Replacement OWTS

New or replacement OWTS meet low risk siting and design requirements as specified in Tier 1, where there is not an approved Local Agency Management Program per Tier 2.

7.0 Minimum Site Evaluation and Siting Standards

7.1 A qualified professional shall perform all necessary soil and site evaluations for all new OWTS and for existing OWTS where the treatment or dispersal system will be replaced or expanded.

7.2 A site evaluation shall determine that adequate soil depth is present in the dispersal area. Soil depth is measured vertically to the point where bedrock, hardpan, impermeable soils, or saturated soils are encountered or an adequate depth has been determined. Soil depth shall be determined through the use of soil profile(s) in the dispersal area and the designated dispersal system replacement area, as viewed in excavations exposing the soil profiles in representative areas, unless the local agency has determined through historical or regional information that a specific site soil profile evaluation is unwarranted.

7.3 A site evaluation shall determine whether the anticipated highest level of groundwater within the dispersal field and its required minimum dispersal zone is not less than prescribed in Table 2 by estimation using one or a combination of the following methods:

7.3.1 Direct observation of the highest extent of soil mottling observed in the examination of soil profiles, recognizing that soil mottling is not always an indicator of the uppermost extent of high groundwater; or

7.3.2 Direct observation of groundwater levels during the anticipated period of high groundwater. Methods for groundwater monitoring and determinations shall be decided by the local agency; or

7.3.3 Other methods, such as historical records, acceptable to the local agency.

7.3.4 Where a conflict in the above methods of examination exists, the direct observation method indicating the highest level shall govern.

7.4 Percolation test results in the effluent disposal area shall not be faster than one minute per inch (1 MPI) or slower than one hundred twenty minutes per inch (120 MPI). All percolation test rates shall be performed by presoaking of percolation test holes and continuing the test until a stabilized rate is achieved.

7.5 Minimum horizontal setbacks from any OWTS treatment component and dispersal systems shall be as follows:

7.5.1 5 feet from parcel property lines and structures;

7.5.2 100 feet from water wells and monitoring wells, unless regulatory or legitimate data requirements necessitate that monitoring wells be located closer;

7.5.3 100 feet from any unstable land mass or any areas subject to earth slides identified by a registered engineer or registered geologist; other setback distance are allowed, if recommended by a geotechnical report prepared by a qualified professional.

7.5.4 100 feet from springs and flowing surface water bodies where the edge of that water body is the natural or levied bank for creeks and rivers, or may be less where site conditions prevent migration of wastewater to the water body;

7.5.5 200 feet from vernal pools, wetlands, lakes, ponds, or other surface water bodies where the edge of that water body is the high water mark for lakes and reservoirs, and the mean high tide line for tidally influenced water bodies;

7.5.6 150 feet from a public water well where the depth of the effluent dispersal system does not exceed 10 feet;

7.5.7 Where the effluent dispersal system is within 1,200 feet from a public water systems' surface water intake point, within the catchment of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies, the dispersal system shall be no less than 400 feet from the high water mark of the reservoir, lake or flowing water body.

7.5.8 Where the effluent dispersal system is located more than 1,200 feet but less than 2,500 feet from a public water systems' surface water intake point, within the catchment of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies, the dispersal system shall be no less than 200 feet from the high water mark of the reservoir, lake or flowing water body.

7.6 Prior to issuing a permit to install an OWTS the permitting agency shall determine if the OWTS is within 1,200 feet of an intake point for a surface water treatment plant for drinking water, is in the drainage catchment in which the intake point is located, and located such that it may impact water quality at the intake point such as being upstream of the intake point for a flowing water body. If the OWTS is within 1,200 feet of an intake point for a surface water treatment plant for drinking water, is in the drainage catchment in which the intake point is located, and is located such that it may impact water quality at the intake point:

7.6.1 The permitting agency shall provide a copy of the permit application to the owner of the water system of their proposal to install an OWTS within 1,200 feet of an intake point for a surface water treatment. If the owner of the water system cannot be identified, then the permitting agency will notify California Department of Public Health Drinking Water Program.

7.6.2 The permit application shall include a topographical plot plan for the parcel showing the OWTS components, the property boundaries, proposed structures, physical address, and name of property owner.

7.6.3 The permit application shall provide the estimated wastewater flows, intended use of proposed structure generating the wastewater, soil data, and estimated depth to seasonally saturated soils.

7.6.4 The public water system owner shall have 15 days from receipt of the permit application to provide recommendations and comments to the permitting agency.

7.7 Natural ground slope in all areas used for effluent disposal shall not be greater than 25 percent.

7.8 The average density for any subdivision of property made by Tentative Approval pursuant to the Subdivision Map Act occurring after the effective date of this Policy and implemented under Tier 1 shall not exceed the allowable density values in Table 1 for a single-family dwelling unit, or its equivalent, for those units that rely on OWTS.

Table 1: Allowable Average Densities per Subdivision under Tier 1.

Average Annual Rainfall (in/yr)	Allowable Density (acres/single family dwelling unit)
0 - 15	2.5
>15 - 20	2
>20 - 25	1.5
>25 - 35	1
>35 - 40	0.75
>40	0.5

8.0 Minimum OWTS Design and Construction Standards

8.1 OWTS Design Requirements

8.1.1 A qualified professional shall design all new OWTS and modifications to existing OWTS where the treatment or dispersal system will be replaced or expanded. A qualified professional employed by a local agency, while acting in that capacity, may design, review, and approve a design for a proposed OWTS, if authorized by the local agency.

8.1.2 OWTS shall be located, designed, and constructed in a manner to ensure that effluent does not surface at any time, and that percolation of effluent will not adversely affect beneficial uses of waters of the State.

8.1.3 The design of new and replacement OWTS shall be based on the expected influent wastewater quality with a projected flow not to exceed 3,500 gallons per day, the peak wastewater flow rates for purposes of sizing hydraulic components, the projected average daily flow for purposes of sizing the dispersal system, the characteristics of the site, and the required level of treatment for protection of water quality and public health.

Tier 1 – Low Risk New or Replacement OWTS

8.1.4 All dispersal systems shall have at least twelve (12) inches of soil cover, except for pressure distribution systems, which must have at least six (6) inches of soil cover.

8.1.5 The minimum depth to the anticipated highest level of groundwater below the bottom of the leaching trench, and the native soil depth immediately below the leaching trench, shall not be less than prescribed in Table 2.

Table 2: Tier 1 Minimum Depths to Groundwater and Minimum Soil Depth from the Bottom of the Dispersal System

Percolation Rate	Minimum Depth
Percolation Rate ≤1 MPI	Only as authorized in a Tier 2 Local Agency Management Program
1 MPI< Percolation Rate ≤ 5 MPI	Twenty (20) feet
5 MPI< Percolation Rate ≤ 30 MPI	Eight (8) feet
30 MPI< Percolation Rate ≤ 120 MPI	Five (5) feet
Percolation Rate > 120 MPI	Only as authorized in a Tier 2 Local Agency Management Program
MPI = minutes per inch	

8.1.6 Dispersal systems shall be a leachfield, designed using not more than 4 square-feet of infiltrative area per linear foot of trench as the infiltrative surface, and with trench width no wider than 3 feet. Seepage pits and other dispersal systems may only be authorized for repairs where siting limitations require a variance. Maximum application rates shall be determined from stabilized percolation rate as provided in Table 3, or from soil texture and structure determination as provided in Table 4.

8.1.7 Dispersal systems shall not exceed a maximum depth of 10 feet as measured from the ground surface to the bottom of the trench.

Tier 1 – Low Risk New or Replacement OWTS

Table 3: Application Rates as Determined from Stabilized Percolation Rate

Percolation Rate (minutes per Inch)	Application Rate (gallons per day per square foot)	Percolation Rate (minutes per Inch)	Application Rate (gallons per day per square foot)	Percolation Rate (minutes per Inch)	Application Rate (gallons per day per square foot)
<1	Requires Local Manage-ment Program	31	0.522	61	0.197
1	1.2	32	0.511	62	0.194
2	1.2	33	0.5	63	0.19
3	1.2	34	0.489	64	0.187
4	1.2	35	0.478	65	0.184
5	1.2	36	0.467	66	0.18
6	0.8	37	0.456	67	0.177
7	0.8	38	0.445	68	0.174
8	0.8	39	0.434	69	0.17
9	0.8	40	0.422	70	0.167
10	0.8	41	0.411	71	0.164
11	0.786	42	0.4	72	0.16
12	0.771	43	0.389	73	0.157
13	0.757	44	0.378	74	0.154
14	0.743	45	0.367	75	0.15
15	0.729	46	0.356	76	0.147
16	0.714	47	0.345	77	0.144
17	0.7	48	0.334	78	0.14
18	0.686	49	0.323	79	0.137
19	0.671	50	0.311	80	0.133
20	0.657	51	0.3	81	0.13
21	0.643	52	0.289	82	0.127
22	0.629	53	0.278	83	0.123
23	0.614	54	0.267	84	0.12
24	0.6	55	0.256	85	0.117
25	0.589	56	0.245	86	0.113
26	0.578	57	0.234	87	0.11
27	0.567	58	0.223	88	0.107
28	0.556	59	0.212	89	0.103
29	0.545	60	0.2	90	0.1
30	0.533			>90 - 120	0.1

Tier 1 – Low Risk New or Replacement OWTS

Table 4: Design Soil Application Rates

(Source: USEPA Onsite Wastewater Treatment Systems Manual, February 2002)

Soil Texture (per the USDA soil classification system)	Soil Structure Shape	Grade	Maximum Soil Application Rate(gallons per day per square foot) [1]
Coarse Sand, Sand, Loamy Coarse Sand, Loamy Sand	Single grain	Structureless	0.8
Fine Sand, Very Fine Sand, Loamy Fine Sand, Loamy Very Fine Sand	Single grain	Structureless	0.4
Coarse Sandy Loam, Sandy Loam	Massive	Structureless	0.2
	Platy	Weak	0.2
		Moderate, Strong	Prohibited
	Prismatic, Blocky, Granular	Weak	0.4
		Moderate, Strong	0.6
Fine Sandy Loam, very fine Sandy Loam	Massive	Structureless	0.2
	Platy	Weak, Moderate, Strong	Prohibited
	Prismatic, Blocky, Granular	Weak	0.2
		Moderate, Strong	0.4
Loam	Massive	Structureless	0.2
	Platy	Weak, Moderate, Strong	Prohibited
	Prismatic, Blocky, Granular	Weak	0.4
		Moderate, Strong	0.6
Silt Loam	Massive	Structureless	Prohibited
	Platy	Weak, Moderate, Strong	Prohibited
	Prismatic, Blocky, Granular	Weak	0.4
		Moderate, Strong	0.6
Sandy Clay Loam, Clay Loam, Silty Clay Loam	Massive	Structureless	Prohibited
	Platy	Weak, Moderate, Strong	Prohibited
	Prismatic, Blocky, Granular	Weak	0.2
		Moderate, Strong	0.4
Sandy Clay, Clay, or Silty Clay	Massive	Structureless	Prohibited
	Platy	Weak, Moderate, Strong	Prohibited
	Prismatic, Blocky, Granular	Weak	Prohibited
		Moderate, Strong	0.2

[1] Soils listed as prohibited may be allowed under the authority of the Regional Water Board, or as allowed under an approved Local Agency Management Program per Tier 2.

8.1.8 All new dispersal systems shall have 100 percent replacement area that is equivalent and separate, and available for future use.

8.1.9 No dispersal systems or replacement areas shall be covered by an impermeable surface, such as paving, building foundation slabs, plastic sheeting, or any other material that prevents oxygen transfer to the soil.

8.1.10 Rock fragment content of native soil surrounding the dispersal system shall not exceed 50 percent by volume for rock fragments sized as cobbles or larger and shall be estimated using either the point-count or line-intercept methods.

8.1.11 Increased allowance for IAPMO certified dispersal systems is not allowed under Tier 1.

8.2 OWTS Construction and Installation

8.2.1 All new or replacement septic tanks and new or replacement oil/grease interceptor tanks shall comply with the standards contained in Sections K5(b), K5(c), K5(d), K5(e), K5(k), K5(m)(1), and K5(m)(3)(ii) of Appendix K, of Part 5, Title 24 of the 2007 California Code of Regulations.

8.2.2 All new septic tanks shall comply with the following requirements:

8.2.2.1 Access openings shall have watertight risers, the tops of which shall be set at most 6 inches below finished grade; and

8.2.2.2 Access openings at grade or above shall be locked or secured to prevent unauthorized access.

8.2.3 New and replacement OWTS septic tanks shall be limited to those approved by the International Association of Plumbing and Mechanical Officials (IAPMO) or stamped and certified by a California registered civil engineer as meeting the industry standards, and their installation shall be according to the manufacturer's instructions.

8.2.4 New and replacement OWTS septic tanks shall be designed to prevent solids in excess of three-sixteenths (3/16) of an inch in diameter from passing to the dispersal system. Septic tanks that use a National Sanitation Foundation/American National Standard Institute (NSF/ANSI) Standard 46 certified septic tank filter at the final point of effluent discharge from the OWTS and prior to the dispersal system shall be deemed in compliance with this requirement.

Tier 1 – Low Risk New or Replacement OWTS

8.2.5 A Licensed General Engineering Contractor (Class A), General Building Contractor (Class B), Sanitation System Contractor (Specialty Class C-42), or Plumbing Contractor (Specialty Class C-36) shall install all new OWTS and replacement OWTS in accordance with California Business and Professions Code Sections 7056, 7057, and 7058 and Article 3, Division 8, Title 16 of the California Code of Regulations. A property owner may also install his/her own OWTS if the as-built diagram and the installation are inspected and approved by the Regional Water Board or local agency at a time when the OWTS is in an open condition (not covered by soil and exposed for inspection).

Tier 2 – Local Agency OWTS Management Program

Tier 2 – Local Agency OWTS Management Program

Local agencies may submit management programs for approval, and upon approval then manage the installation of new and replacement OWTS under that program. Local Agency Management Programs approved under Tier 2 provide an alternate method from Tier 1 programs to achieve the same policy purpose, which is to protect water quality and public health. In order to address local conditions, Local Agency Management Programs may include standards that differ from the Tier 1 requirements for new and replacement OWTS contained in Sections 7 and 8. As examples, a Local Agency Management Program may authorize different soil characteristics, usage of seepage pits, and different densities for new developments. Once the Local Agency Management Program is approved, new and replacement OWTS that are included within the Local Agency Management Program may be approved by the Local Agency. A Local Agency, at its discretion, may include Tier 1 standards within its Tier 2 Local Agency Management Program for some or all of its jurisdiction. However, once a Local Agency Management Program is approved, it shall supersede Tier 1 and all future OWTS decisions will be governed by the Tier 2 Local Agency Management Program until it is modified, withdrawn, or revoked.

9.0 Local Agency Management Program for Minimum OWTS Standards

The Local Agency Management Program for minimum OWTS Standards is a management program where local agencies can establish minimum standards that are differing requirements from those specified in Tier 1 (Section 7 and Section 8), including the areas that do not meet those minimum standards and still achieve this Policy's purpose. Local Agency Management Programs may include any one or combination of the following to achieve this purpose:

- Differing system design requirements;
- Differing siting controls such as system density and setback requirements;
- Requirements for owners to enter monitoring and maintenance agreements; and/or
- Creation of an onsite management district or zone.

9.1 Where different and/or additional requirements are needed to protect water quality the local agency shall consider the following, as well as any other conditions deemed appropriate, when developing Local Agency Management Program requirements:

9.1.1 Degree of vulnerability to pollution from OWTS due to hydrogeological conditions.

9.1.2 High Quality waters or other environmental conditions requiring enhanced protection from the effects of OWTS.

9.1.3 Shallow soils requiring a dispersal system installation that is closer to ground surface than is standard.

9.1.4 OWTS is located in area with high domestic well usage.

9.1.5 Dispersal system is located in an area with fractured bedrock.

9.1.6 Dispersal system is located in an area with poorly drained soils.

9.1.7 Surface water is vulnerable to pollution from OWTS.

9.1.8 Surface water within the watershed is listed as impaired for nitrogen or pathogens.

9.1.9 OWTS is located within an area of high OWTS density.

9.1.10 A parcel's size and its susceptibility to hydraulic mounding, organic or nitrogen loading, and whether there is sufficient area for OWTS expansion in case of failure.

9.1.11 Geographic areas that are known to have multiple, existing OWTS predating any adopted standards of design and construction including cesspools.

9.1.12 Geographic areas that are known to have multiple, existing OWTS located within either the pertinent setbacks listed in Section 7.5 of this Policy, or a setback that the local agencies finds is appropriate for that area.

9.2 The Local Agency Management Program shall detail the scope of its coverage, such as the maximum authorized projected flows for OWTS, as well as a clear delineation of those types of OWTS included within and to be permitted by the program, and provide the local site evaluation, siting, design, and construction requirements, and in addition each of the following:

9.2.1 Any local agency requirements for onsite wastewater system inspection, monitoring, maintenance, and repairs, including procedures to ensure that replacements or repairs to failing systems are done under permit from the local governing jurisdiction.

9.2.2 Any special provisions applicable to OWTS within specified geographic areas near specific impaired water bodies listed for pathogens or nitrogen. The special provisions may be substantive and/or procedural, and may include, as examples: consultation with the Regional Water Board prior to issuing permits, supplemental treatment, development of a management district or zone, special siting requirements, additional inspection and monitoring.

9.2.3 Local Agency Management Program variances, for new installations and repairs in substantial conformance, to the greatest extent practicable. Variances are not allowed for the requirements stated in sections 9.4.1 through 9.4.9.

9.2.4 Any educational, training, certification, and/or licensing requirements that will be required of OWTS service providers, site evaluators, designers, installers, pumpers, maintenance contractors, and any other person relating to OWTS activities.

9.2.5 Education and/or outreach program including informational materials to inform OWTS owners about how to locate, operate, and maintain their

OWTS as well as any Water Board order (e.g., Basin Plan prohibitions) regarding OWTS restrictions within its jurisdiction. The education and/or outreach program shall also include procedures to ensure that alternative onsite system owners are provided an informational maintenance or replacement document by the system designer or installer. This document shall cite homeowner procedures to ensure maintenance, repair, or replacement of critical items within 48 hours following failure. If volunteer well monitoring programs are available within the local agency's jurisdiction, the outreach program shall include information on how well owners may participate.

9.2.6 An assessment of existing and proposed disposal locations for septage, the volume of septage anticipated, and whether adequate capacity is available.

9.2.7 Any consideration given to onsite maintenance districts or zones.

9.2.8 Any consideration given to the development and implementation of, or coordination with, Regional Salt and Nutrient Management Plans.

9.2.9 Any consideration given to coordination with watershed management groups.

9.2.10 Procedures for evaluating the proximity of sewer systems to new or replacement OWTS installations.

9.2.11 Procedures for notifying the owner of a public water system prior to issuing an installation or repair permit for an OWTS, if the OWTS is within 1,200 feet of an intake point for a surface water treatment plant for drinking water, is in the drainage area catchment in which the intake point is located, and is located such that it may impact water quality at the intake point such as upstream of the intake point for a flowing water body, or if the OWTS is within a horizontal sanitary setback from a public well.

9.2.12 Policies and procedures that will be followed when a proposed OWTS dispersal area is within the horizontal sanitary setback of a public well or a surface water intake point. These policies and procedures shall either indicate that supplemental treatment as specified in 10.9 and 10.10 of this policy are required for OWTS that are within a horizontal sanitary setback of a public well or surface water intake point, or will establish alternate siting and operational criteria for the proposed OWTS that would similarly mitigate the potential adverse impact to the public water source.

9.2.13 Any plans for the phase-out or discontinuance of cesspool usage.

9.3 The minimum responsibilities of the local agency for management of the Local Agency Management Program include:

9.3.1 Maintain records of the number, location, and description of permits issued for OWTS where a variance is granted.

9.3.2 Maintain a water quality assessment program to determine the general operation status of OWTS and to evaluate the impact of OWTS discharges, and assess the extent to which groundwater and local surface water quality may be adversely impacted. The focus of the assessment should be areas with characteristics listed under section 9.1. The assessment program will include monitoring and analysis of water quality data, review of complaints, variances, failures, and any information resulting from inspections. The assessment may use existing water quality data from other monitoring programs and/or establish the terms, conditions, and timing for monitoring done by the local agency. At a minimum this assessment will include monitoring data for nitrates and pathogens, and may include data for other constituents which are needed to adequately characterize the impacts of OWTS on water quality. Other monitoring programs for which data may be used include but are not limited to any of the following:

9.3.2.1. Random well samples from a domestic well sampling program.

9.3.2.2. Routine real estate transfer samples if those are performed and reported.

9.3.2.3. Review of public system sampling reports done by the local agency or another municipality responsible for the public system.

9.3.2.4. Water quality testing reports done at the time of new well development if those are reported.

9.3.2.5. Beach water quality testing data performed as part of Health and Safety Code Section 115885.

9.3.2.6. Receiving water sampling performed as a part of a NPDES permit.

9.3.2.7. Data contained in the California Water Quality Assessment Database.

9.3.2.8. Groundwater sampling performed as part of Waste Discharge Requirements.

9.3.2.9. Groundwater data collected as part of the Groundwater Ambient Monitoring and Assessment Program and available in the Geotracker Database.

9.3.3 Submit an annual report by February 1 to the applicable Regional Water Board summarizing the status of items 9.3.1 through 9.3.2 above. Every fifth year, submit an evaluation of the monitoring program and an assessment of whether water quality is being impacted by OWTS, identifying any changes in the Local Agency Management Program that will be undertaken to address impacts from OWTS. The first report will commence one year after approval of the local agency's Local Agency Management Program. In addition to summarizing monitoring data collected per 9.3.2 above, all groundwater monitoring data generated by the local agency shall be submitted in EDF format for inclusion into

Geotracker, and surface water monitoring shall be submitted to CEDEN in a SWAMP comparable format.

9.4 The following are not allowed to be authorized in a Local Agency Management Program:

9.4.1 Cesspools of any kind or size.

9.4.2 OWTS receiving a projected flow over 10,000 gallons per day.

9.4.3 OWTS that utilize any form of effluent disposal that discharges on or above the post installation ground surface such as sprinklers, exposed drip lines, free-surface wetlands, or a pond.

9.4.4 Slopes greater than 30 percent without a slope stability report approved by a registered professional.

9.4.5 Decreased leaching area for IAPMO certified dispersal systems using a multiplier less than 0.70.

9.4.6 OWTS utilizing supplemental treatment without requirements for periodic monitoring or inspections.

9.4.7 OWTS dedicated to receiving significant amounts of wastes dumped from RV holding tanks.

9.4.8 Separation of the bottom of dispersal system to groundwater less than two (2) feet, except for seepage pits, which shall not be less than 10 feet.

9.4.9 Installation of new or replacement OWTS where public sewer is available. The public sewer may be considered as not available when such public sewer or any building or exterior drainage facility connected thereto is located more than 200 feet from any proposed building or exterior drainage facility on any lot or premises that abuts and is served by such public sewer. This provision does not apply to replacement OWTS where the connection fees and construction cost are greater than twice the total cost of the replacement OWTS and the local agency determines that the discharge from the OWTS will not affect groundwater or surface water to a degree that makes it unfit for drinking or other uses.

9.4.10 Except as provided for in sections 9.4.11 and 9.4.12, new or replacement OWTS with minimum horizontal setbacks less than any of the following:

9.4.10.1 150 feet from a public water well where the depth of the effluent dispersal system does not exceed 10 feet in depth.

9.4.10.2 200 feet from a public water well where the depth of the effluent dispersal system exceeds 10 feet in depth.

9.4.10.3 Where the effluent dispersal system is within 600 feet of a public water well and exceeds 20 feet in depth the horizontal setback required to achieve a two-year travel time for microbiological contaminants shall be evaluated. A qualified professional shall conduct this evaluation. However in no case shall the setback be less than 200 feet.

9.4.10.4 Where the effluent dispersal system is within 1,200 feet from a public water systems' surface water intake point, within the catchment of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies, the dispersal system shall be no less than 400 feet from the high water mark of the reservoir, lake or flowing water body.

9.4.10.5 Where the effluent dispersal system is located more than 1,200 feet but less than 2,500 feet from a public water systems' surface water intake point, within the catchment area of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies, the dispersal system shall be no less than 200 feet from the high water mark of the reservoir, lake or flowing water body.

9.4.11 For replacement OWTS that do not meet the above horizontal separation requirements, the replacement OWTS shall meet the horizontal separation to the greatest extent practicable. In such case, the replacement OWTS shall utilize supplemental treatment and other mitigation measures, unless the permitting authority finds that there is no indication that the previous system is adversely affecting the public water source, and there is limited potential that the replacement system could impact the water source based on topography, soil depth, soil texture, and groundwater separation.

9.4.12 For new OWTS, installed on parcels of record existing at the time of the effective date of this Policy, that cannot meet the above horizontal separation requirements, the OWTS shall meet the horizontal separation to the greatest extent practicable and shall utilize supplemental treatment for pathogens as specified in section 10.8 and any other mitigation measures prescribed by the permitting authority.

9.5 A Local Agency Management Program for OWTS must include adequate detail, including technical information to support how all the criteria in their program work together to protect water quality and public health.

9.6 A Regional Water Board reviewing a Local Agency Management Program shall consider, among other things, the past performance of the local program to adequately protect water quality, and where this has been achieved with criteria differing from Tier 1, shall not unnecessarily require modifications to the program for purposes of uniformity, as long as the Local Agency Management Program meets the requirements of Tier 2.

Tier 3 – Impaired Areas

Tier 3 – Advanced Protection Management Programs for Impaired Areas

Existing, new, and replacement OWTS that are near impaired water bodies may be addressed by a TMDL and its implementation program, or special provisions contained in a Local Agency Management Program. If there is no TMDL or special provisions, new or replacement OWTS within 600 feet of impaired water bodies listed in Attachment 2 must meet the applicable specific requirements of Tier 3.

10.0 Advanced Protection Management Program

An Advanced Protection Management Program is the minimum required management program for all OWTS located near a water body that has been listed as impaired due to nitrogen or pathogen indicators pursuant to Section 303(d) of the Clean Water Act. Local agencies are authorized to implement Advanced Protection Management Programs in conjunction with an approved Local Agency Management Program or, if there is no approved Local Agency Management Program, Tier 1. Local agencies are encouraged to collaborate with the Regional Water Boards by sharing any information pertaining to the impairment, provide advice on potential remedies, and regulate OWTS to the extent that their authority allows for the improvement of the impairment.

10.1 The geographic area for each water body's Advanced Protection Management Program is defined by the applicable TMDL, if one has been approved. If there is not an approved TMDL, it is defined by an approved Local Agency Management Program, if it contains special provisions for that water body. If it is not defined in an approved TMDL or Local Agency Management Program, it shall be 600 linear feet [in the horizontal (map) direction] of a water body listed in Attachment 2 where the edge of that water body is the natural or levied bank for creeks and rivers, the high water mark for lakes and reservoirs, and the mean high tide line for tidally influenced water bodies, as appropriate. OWTS near impaired water bodies that are not listed on Attachment 2, and do not have a TMDL and are not covered by a Local Agency Management Program with special provisions, are not addressed by Tier 3.

10.2 The requirements of an Advanced Protection Management Program will be in accordance with a TMDL implementation plan, if one has been adopted to address the impairment. An adopted TMDL implementation plan supersedes all other requirements in Tier 3. All TMDL implementation plans adopted after the effective date of this Policy that contain load allocations for OWTS shall include a schedule that requires compliance with the load allocations as soon as practicable, given the watershed-specific circumstances. The schedule shall require that OWTS implementation actions for OWTS installed prior to the TMDL implementation plan's effective date shall commence within 3 years after the TMDL implementation plan's effective date, and that OWTS implementation actions for OWTS installed after the TMDL implementation plan's effective date shall commence immediately. The TMDL implementation plan may use some or all of the Tier 3 requirements and shall establish the applicable area of implementation for OWTS requirements within the watershed. For those impaired water bodies that do have an adopted TMDL addressing the impairment, but the TMDL does not assign a load allocation to OWTS, no further action is required unless the TMDL is modified at some point in the future to include actions for OWTS. Existing, new, and replacement OWTS that are near impaired water bodies and are covered by a Basin Plan prohibition must also comply with the terms of the prohibition, as provided in Section 2.1.

10.3 In the absence of an adopted TMDL implementation plan, the requirements of an Advanced Protection Management Program will consist of any special provisions for the water body if any such provisions have been approved as part of a Local Agency Management Program.

10.4 The Regional Water Boards shall adopt TMDLs for impaired water bodies identified in Attachment 2, in accordance with the specified dates.

10.4.1 If a Regional Water Board does not complete a TMDL within two years of the time period specified in Attachment 2, coverage under this Policy's waiver of waste discharge requirements shall expire for any OWTS that has any part of its dispersal system discharging within the geographic area of an Advanced Protection Management Program. The Regional Water Board shall issue waste discharge requirements, general waste discharge requirements, waivers of waste discharge requirements, or require corrective action for such OWTS. The Regional Water Board will consider the following when establishing the waste discharge requirements, general waste discharge requirements, waivers of waste discharge requirements, or requirement for corrective action:

10.4.1.1 Whether supplemental treatment should be required.

10.4.1.2 Whether routine inspection of the OWTS should be required.

10.4.1.3 Whether monitoring of surface and groundwater should be performed.

10.4.1.4 The collection of a fee for those OWTS covered by the order.

10.4.1.5 Whether owners of previously-constructed OWTS should file a report by a qualified professional in accordance with section 10.5.

10.4.1.6 Whether owners of new or replacement OWTS should file a report of waste discharge with additional supporting technical information as required by the Regional Water Board.

10.5 If the Regional Water Board requires owners of OWTS to submit a qualified professional's report pursuant to Section 10.4.1.5, the report shall include a determination of whether the OWTS is functioning properly and as designed or requires corrective actions per Tier 4, and regardless of its state of function, whether it is contributing to impairment of the water body.

10.5.1 The qualified professional's report may also include, but is not limited to:

10.5.1.1 A general description of system components, their physical layout, and horizontal setback distances from property lines, buildings, wells, and surface waters.

10.5.1.2 A description of the type of wastewater discharged to the OWTS such as domestic, commercial, or industrial and classification of it as domestic wastewater or high-strength waste.

10.5.1.3 A determination of the systems design flow and the volume of wastewater discharged daily derived from water use, either estimated or actual if metered.

10.5.1.4 A description of the septic tank, including age, size, material of construction, internal and external condition, water level, scum layer thickness, depth of solids, and the results of a one-hour hydrostatic test.

10.5.1.5 A description of the distribution box, dosing siphon, or distribution pump, and if flow is being equally distributed throughout the dispersal system, as well as any evidence of solids carryover, clear water infiltration, or evidence of system backup.

10.5.1.6 A description of the dispersal system including signs of hydraulic failure, condition of surface vegetation over the dispersal system, level of ponding above the infiltrative surface within the dispersal system, other possible sources of hydraulic loading to the dispersal area, and depth of the seasonally high groundwater level.

10.5.1.7 A determination of whether the OWTS is discharging to the ground's surface.

10.5.1.8 For a water body listed as an impaired water body for pathogens, a determination of the OWTS dispersal system's separation from its deepest most infiltrative surface to the highest seasonal groundwater level or fractured bedrock.

10.5.1.9 For a water body listed as an impaired water body for nitrogen, a determination of whether the groundwater under the dispersal field is reaching the water body, and a description of the method used to make the determination.

10.6 For new, replacement, and existing OWTS in an Advanced Protection Management Program, the following are not covered by this Policy's waiver but may be authorized by a separate Regional Water Board order:

10.6.1 Cesspools of any kind or size.

10.6.2 OWTS receiving a projected flow over 10,000 gallons per day.

10.6.3 OWTS that utilize any form of effluent disposal on or above the ground surface.

10.6.4 Slopes greater than 30 percent without a slope stability report approved by a registered professional.

Tier 3 – Impaired Areas

10.6.5 Decreased leaching area for IAPMO certified dispersal systems using a multiplier less than 0.70.

10.6.6 OWTS utilizing supplemental treatment without requirements for periodic monitoring or inspections.

10.6.7 OWTS dedicated to receiving significant amounts of wastes dumped from RV holding tanks.

10.6.8 Separation of the bottom of dispersal system to groundwater less than two (2) feet, except for seepage pits, which shall not be less than 10 feet.

10.6.9 Minimum horizontal setbacks less than any of the following:

10.6.9.1 150 feet from a public water well where the depth of the effluent dispersal system does not exceed 10 feet in depth;

10.6.9.2 200 feet from a public water well where the depth of the effluent dispersal system exceeds 10 feet in depth:

10.6.9.3 Where the effluent dispersal system is within 600 feet of a public water well and exceeds 20 feet in depth the horizontal setback required to achieve a two-year travel time for microbiological contaminants shall be evaluated. A qualified professional shall conduct this evaluation. However in no case shall the setback be less than 200 feet.

10.6.9.4 Where the effluent dispersal system is within 1,200 feet from a public water systems' surface water intake point, within the catchment of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies, the dispersal system shall be no less than 400 feet from the high water mark of the reservoir, lake or flowing water body.

10.6.9.5 Where the effluent dispersal system is located more than 1,200 feet but less than 2,500 feet from a public water systems' surface water intake point, within the catchment of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies, the dispersal system shall be no less than 200 feet from the high water mark of the reservoir, lake or flowing water body.

10.6.9.6 For replacement OWTS that do not meet the above horizontal separation requirements, the replacement OWTS shall meet the horizontal separation to the greatest extent practicable. In such case, the replacement OWTS shall utilize supplemental treatment and other mitigation measures.

10.6.9.7 For new OWTS, installed on parcels of record existing at the time of the effective date of this Policy, that cannot meet the above horizontal separation requirements, the OWTS shall meet the horizontal separation to the greatest extent practicable and shall utilize supplemental treatment for pathogens as specified in section 10.10 and any other mitigation measures as prescribed by the permitting authority.

10.7 The requirements contained in Section 10 shall not apply to owners of OWTS that are constructed and operating, or permitted, on or prior to the date that the nearby water body is added to Attachment 2 who commit by way of a legally binding document to connect to a centralized wastewater collection and treatment system regulated through WDRs as specified within the following timeframes:

10.7.1 The owner must sign the document within forty-eight months of the date that the nearby water body is initially listed on Attachment 2.

10.7.2 The specified date for the connection to the centralized community wastewater collection and treatment system shall not extend beyond nine years following the date that the nearby water body is added to Attachment 2.

10.8 In the absence of an adopted TMDL implementation plan or Local Agency Management Program containing special provisions for the water body, all new or replacement OWTS permitted after the date that the water body is initially listed in Attachment 2 that have any discharge within the geographic area of an Advanced Protection Management Program shall meet the following requirements:

10.8.1 Utilize supplemental treatment and meet performance requirements in 10.9 if impaired for nitrogen and 10.10 if impaired for pathogens,

10.8.2 Comply with the setback requirements of Section 7.5.1 to 7.5.5, and

10.8.3 Comply with any applicable Local Agency Management Program requirements.

10.9 Supplemental treatment requirements for nitrogen

10.9.1 Effluent from the supplemental treatment components designed to reduce nitrogen shall be certified by NSF, or other approved third party tester, to meet a 50 percent reduction in total nitrogen when comparing the 30-day average influent to the 30-day average effluent.

10.9.2 Where a drip-line dispersal system is used to enhance vegetative nitrogen uptake, the dispersal system shall have at least six (6) inches of soil cover.

Tier 3 – Impaired Areas

10.10 Supplemental treatment requirements for pathogens

10.10.1 Supplemental treatment components designed to perform disinfection shall provide sufficient pretreatment of the wastewater so that effluent from the supplemental treatment components does not exceed a 30-day average TSS of 30 mg/L and shall further achieve an effluent fecal coliform bacteria concentration less than or equal to 200 Most Probable Number (MPN) per 100 milliliters.

10.10.2 The minimum soil depth and the minimum depth to the anticipated highest level of groundwater below the bottom of the dispersal system shall not be less than three (3) feet. All dispersal systems shall have at least twelve (12) inches of soil cover.

10.11 OWTS in an Advanced Protection Management Program with supplemental treatment shall be designed to meet the applicable performance requirements above and shall be stamped or approved by a Qualified Professional.

10.12 Prior to the installation of any proprietary treatment OWTS in an Advanced Protection Management Program, all such treatment components shall be tested by an independent third party testing laboratory.

10.13 The ongoing monitoring of OWTS in an Advanced Protection Management Program with supplemental treatment components designed to meet the performance requirements in Sections 10.9 and 10.10 shall be monitored in accordance with the operation and maintenance manual for the OWTS or more frequently as required by the local agency or Regional Water Board.

10.14 OWTS in an Advanced Protection Management Program with supplemental treatment components shall be equipped with a visual or audible alarm as well as a telemetric alarm that alerts the owner and service provider in the event of system malfunction. Where telemetry is not possible, the owner or owner's agent shall inspect the system at least monthly while the system is in use as directed and instructed by a service provider and notify the service provider not less than quarterly of the observed operating parameters of the OWTS.

10.15 OWTS in an Advanced Protection Management Program designed to meet the disinfection requirements in Section 10.10 shall be inspected for proper operation quarterly while the system is in use by a service provider unless a telemetric monitoring system is capable of continuously assessing the operation of the disinfection system. Testing of the wastewater flowing from supplemental treatment components that perform disinfection shall be sampled at a point in the system after the treatment components and prior to the dispersal system and shall be conducted quarterly based on analysis of total coliform with a minimum detection limit of 2.2 MPN. All effluent samples must include the geographic coordinates of the sample's location. Effluent samples shall be taken by a service provider and analyzed by a California Department of Public Health certified laboratory.

Tier 3 – Impaired Areas

10.16 The minimum responsibilities of a local agency administering an Advanced Protection Management Program include those prescribed for the Local Agency Management Programs in Section 9.3 of this policy, as well as monitoring owner compliance with Sections 10.13, 10.14,and 10.15.

Tier 4 – OWTS Requiring Corrective Action

Tier 4 – OWTS Requiring Corrective Action

OWTS that require corrective action or are either presently failing or fail at any time while this Policy is in effect are automatically included in Tier 4 and must follow the requirements as specified. OWTS included in Tier 4 must continue to meet applicable requirements of Tier 0, 1, 2 or 3 pending completion of corrective action.

11.0 Corrective Action for OWTS

11.1 Any OWTS that has pooling effluent, discharges wastewater to the surface, or has wastewater backed up into plumbing fixtures, because its dispersal system is no longer adequately percolating the wastewater is deemed to be failing, no longer meeting its primary purpose to protect public health, and requires major repair, and as such the dispersal system must be replaced, repaired, or modified so as to return to proper function and comply with Tier 1, 2, or 3 as appropriate.

11.2 Any OWTS septic tank failure, such as a baffle failure or tank structural integrity failure such that either wastewater is exfiltrating or groundwater is infiltrating is deemed to be failing, no longer meeting its primary purpose to protect public health, and requires major repair, and as such shall require the septic tank to be brought into compliance with the requirements of Section 8 in Tier 1 or a Local Agency Management Program per Tier 2.

11.3 Any OWTS that has a failure of one of its components other than those covered by 11.1 and 11.2 above, such as a distribution box or broken piping connection, shall have that component repaired so as to return the OWTS to a proper functioning condition and return to Tier 0, 1, 2, or 3.

11.4 Any OWTS that has affected, or will affect, groundwater or surface water to a degree that makes it unfit for drinking or other uses, or is causing a human health or other public nuisance condition shall be modified or upgraded so as to abate its impact.

11.5 If the owner of the OWTS is not able to comply with corrective action requirements of this section, the Regional Water Board may authorize repairs that are in substantial conformance, to the greatest extent practicable, with Tiers 1 or 3, or may require the owner of the OWTS to submit a report of waste discharge for evaluation on a case-by-case basis. Regional Water Board response to such reports of waste discharge may include, but is not limited to, enrollment in general waste discharge requirements, issuance of individual waste discharge requirements, or issuance of waiver of waste discharge requirements. A local agency may authorize repairs that are in substantial conformance, to the greatest extent practicable, with Tier 2 in accordance with section 9.2.3 if there is an approved Local Agency Management Program, or with an existing program if a Local Agency Management Program has not been approved and it is less than 5 years from the effective date of the Policy.

Tier 4 – OWTS Requiring Corrective Action

11.6 Owners of OWTS will address any corrective action requirement of Tier 4 as soon as is reasonably possible, and must comply with the time schedule of any corrective action notice received from a local agency or Regional Water Board, to retain coverage under this Policy.

11.7 Failure to meet the requirements of Tier 4 constitute a failure to meet the conditions of the waiver of waste discharge requirements contained in this Policy, and is subject to further enforcement action.

Waiver – Effective Date – Financial Assistance

Conditional Waiver of Waste Discharge Requirements

12.0 In accordance with Water Code section 13269, the State Water Board hereby waives the requirements to submit a report of waste discharge, obtain waste discharge requirements, and pay fees for discharges from OWTS covered by this Policy. Owners of OWTS covered by this Policy shall comply with the following conditions:

12.0.1 The OWTS shall function as designed with no surfacing effluent.

12.0.2 The OWTS shall not utilize a dispersal system that is in soil saturated with groundwater.

12.0.3 The OWTS shall not be operated while inundated by a storm or flood event.

12.0.4 The OWTS shall not cause or contribute to a condition of nuisance or pollution.

12.0.5 The OWTS shall comply with all applicable local agency codes, ordinances, and requirements.

12.0.6 The OWTS shall comply with and meet any applicable TMDL implementation requirements, special provisions for impaired water bodies, or supplemental treatment requirements imposed by Tier 3.

12.0.7 The OWTS shall comply with any corrective action requirements of Tier 4.

12.1 This waiver may be revoked by the State Water Board or the applicable Regional Water Board for any discharge from an OWTS, or from a category of OWTS.

Effective Date

13.0 This Policy becomes effective six months after its approval by the Office of Administrative Law, and all deadlines and compliance dates stated herein start at such time.

Financial Assistance

14.0 Local Agencies may apply to the State Water Board for funds from the Clean Water State Revolving Fund for use in mini-loan programs that provide low interest loan assistance to private property owners with costs associated with complying with this Policy.

14.1 Loan interest rates for loans to local agencies will be set by the State Water Board using its policies, procedures, and strategies for implementing the Clean Water State Revolving Fund program, but will typically be one-half of the States most recent General Obligation bond sale. Historically interest rates have ranged between 2.0 and 3.0 percent.

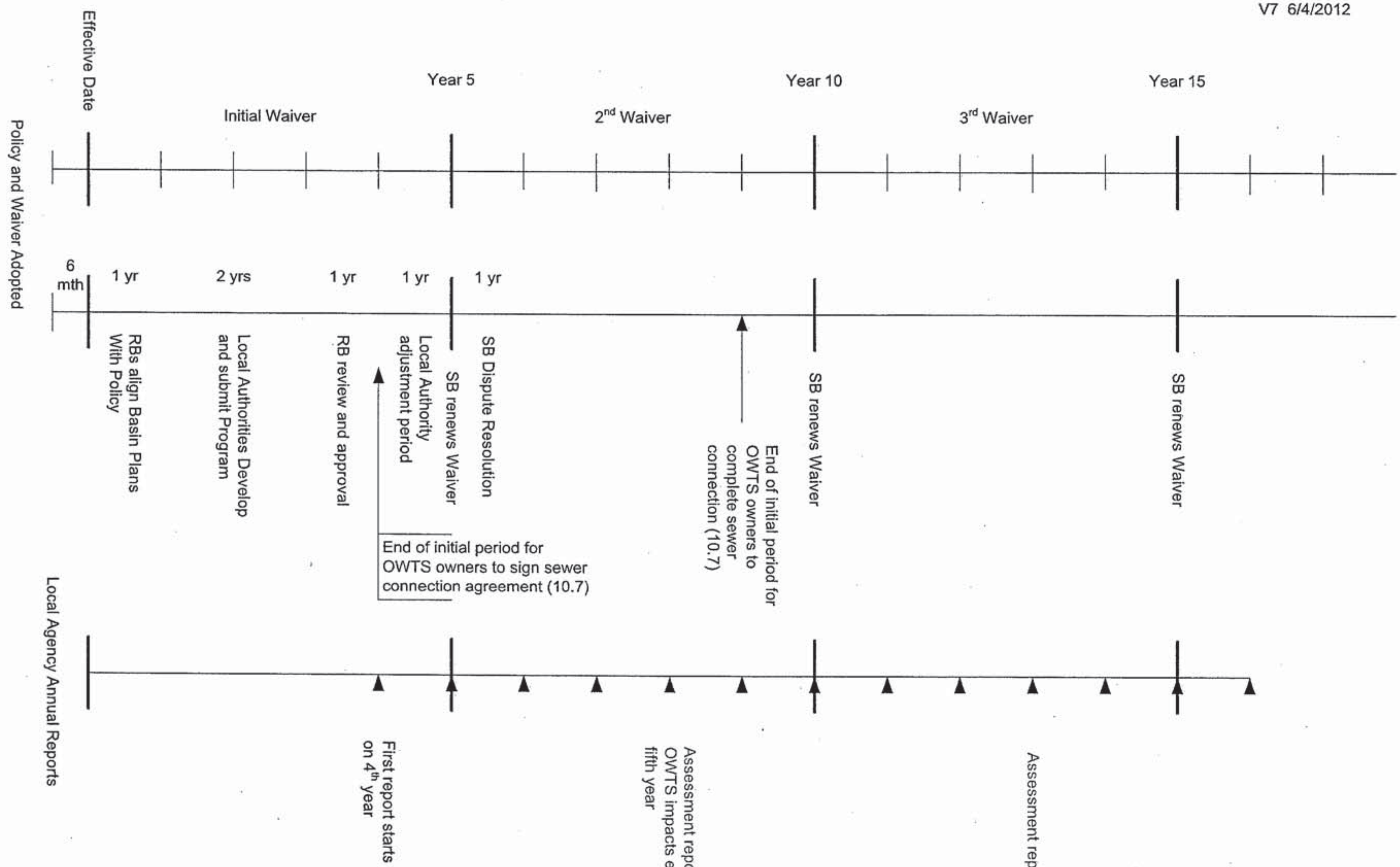
14.2 Local agencies may add additional interest points to their loans made to private entities to cover their costs of administering the mini-loan program.

14.3 Local agencies may submit their suggested loan eligibility criteria for the min-loan program they wish to establish to the State Water Board for approval, but should consider the legislative intent stated in Water Code Section 13291.5 is that assistance is encouraged for private property owners whose cost of complying with the requirements of this policy exceeds one-half of one percent of the current assessed value of the property on which the OWTS is located.

Attachment 1

OWTS Policy Time Lines

V7 6/4/2012



SB – State Water Board
RB – Regional Water Board

Attachment 2

The tables below specifically identify those impaired water bodies where: (1) it is likely that operating OWTS will subsequently be determined to be a contributing source of pathogens or nitrogen and therefore it is anticipated that OWTS would receive a loading reduction, and (2) it is likely that new OWTS installations discharging within 600 feet of the water body would contribute to the impairment. Per this Policy (Tier 3, Section 10) the Regional Water Boards must adopt a TMDL by the date specified in the table. The State Water Board, at the time of approving future 303 (d) Lists, will specifically identify those impaired water bodies that are to be added or removed from the tables below.

Table 5. Water Bodies impaired for pathogens that are subject to Tier 3 as of 2012.

REGION NO	REGION NAME	WATERBODY NAME	COUNTIES	TMDL Completion Date
1	North Coast	Clam Beach	Humboldt	2020
1	North Coast	Luffenholtz Beach	Humboldt	2020
1	North Coast	Moonstone County Park	Humboldt	2020
1	North Coast	Russian River HU, Lower Russian River HA, Guerneville HSA, mainstem Russian River from Fife Creek to Dutch Bill Creek	Sonoma	2016
1	North Coast	Russian River HU, Lower Russian River HA, Guerneville HSA, Green Valley Creek watershed	Sonoma	2016
1	North Coast	Russian River HU, Middle Russian River HA, Geyserville HSA, mainstem Russian River at Healdsburg Memorial Beach and unnamed tributary at Fitch Mountain	Sonoma	2016
1	North Coast	Russian River HU, Middle Russian River HA, mainstem Laguna de Santa Rosa	Sonoma	2016
1	North Coast	Russian River HU, Middle Russian River HA, mainstem Santa Rosa Creek	Sonoma	2016
1	North Coast	Trinidad State Beach	Humboldt	2020
2	San Francisco Bay	China Camp Beach	Marin	2014
2	San Francisco Bay	Lawsons Landing	Marin	2015
2	San Francisco Bay	Pacific Ocean at Bolinas Beach	Marin	2014

Attachment 2

REGION NO.	REGION NAME	WATERBODY NAME	COUNTIES	TMDL Completion Date
2	San Francisco Bay	Pacific Ocean at Fitzgerald Marine Reserve	San Mateo	2016
2	San Francisco Bay	Pacific Ocean at Muir Beach	Marin	2015
2	San Francisco Bay	Pacific Ocean at Pillar Point Beach	San Mateo	2016
2	San Francisco Bay	Petaluma River	Marin, Sonoma	2017
2	San Francisco Bay	Petaluma River (tidal portion)	Marin, Sonoma	2017
2	San Francisco Bay	San Gregorio Creek	San Mateo	2019
3	Central Coast	Pacific Ocean at Point Rincon (mouth of Rincon Cr, Santa Barbara County)	Santa Barbara	2015
3	Central Coast	Rincon Creek	Santa Barbara, Ventura	2015
4	Los Angeles	Canada Larga (Ventura River Watershed)	Ventura	2017
4	Los Angeles	Coyote Creek	Los Angeles, Orange	2015
4	Los Angeles	Rincon Beach	Ventura	2017
4	Los Angeles	San Antonio Creek (Tributary to Ventura River Reach 4)	Ventura	2017
4	Los Angeles	San Gabriel River Reach 1 (Estuary to Firestone)	Los Angeles	2015
4	Los Angeles	San Gabriel River Reach 2 (Firestone to Whittier Narrows Dam	Los Angeles	2015
4	Los Angeles	San Gabriel River Reach 3 (Whittier Narrows to Ramona)	Los Angeles	2015
4	Los Angeles	San Jose Creek Reach 1 (SG Confluence to Temple St.)	Los Angeles	2015
4	Los Angeles	San Jose Creek Reach 2 (Temple to I-10 at White Ave.)	Los Angeles	2015
4	Los Angeles	Sawpit Creek	Los Angeles	2015
4	Los Angeles	Ventura River Reach 3 (Weldon Canyon to Confl. w/ Coyote Cr)	Ventura	2017
4	Los Angeles	Walnut Creek Wash (Drains from Puddingstone Res)	Los Angeles	2015
5	Central Valley	Wolf Creek (Nevada County)	Nevada, Placer	2020
5	Central Valley	Woods Creek (Tuolumne County)	Tuolumne	2020
7	Colorado River	Alamo River	Imperial	2017

Attachment 2

REGION NO	REGION NAME	WATERBODY NAME	COUNTIES	TMDL Completion Date
7	Colorado River	Palo Verde Outfall Drain and Lagoon	Imperial, Riverside	2017
8	Santa Ana	Canyon Lake (Railroad Canyon Reservoir)	Riverside	2019
8	Santa Ana	Fulmor, Lake	Riverside	2019
8	Santa Ana	Goldenstar Creek	Riverside	2019
8	Santa Ana	Los Trancos Creek (Crystal Cove Creek)	Orange	2017
8	Santa Ana	Lytle Creek	San Bernardino	2019
8	Santa Ana	Mill Creek Reach 1	San Bernardino	2015
8	Santa Ana	Mill Creek Reach 2	San Bernardino	2015
8	Santa Ana	Morning Canyon Creek	Orange	2017
8	Santa Ana	Mountain Home Creek	San Bernardino	2019
8	Santa Ana	Mountain Home Creek, East Fork	San Bernardino	2019
8	Santa Ana	Silverado Creek	Orange	2017
8	Santa Ana	Peters Canyon Channel	Orange	2017
8	Santa Ana	Santa Ana River, Reach 2	Orange, Riverside	2019
8	Santa Ana	Temescal Creek, Reach 6 (Elsinore Groundwater sub basin boundary to Lake Elsinore Outlet)	Riverside	2019
8	Santa Ana	Seal Beach	Orange	2017
8	Santa Ana	Serrano Creek	Orange	2017
8	Santa Ana	Huntington Harbour	Orange	2017

Attachment 2

Table 6. Water Bodies impaired for nitrogen that are subject to Tier 3.

REGION NO.	REGION NAME	WATERBODY NAME	COUNTIES	TMDL Completion Date
1	North Coast	Russian River HU, Middle Russian River HA, mainstem Laguna de Santa Rosa	Sonoma	2015
2	San Francisco Bay	Lagunitas Creek	Marin	2016
2	San Francisco Bay	Napa River	Napa, Solano	2014
2	San Francisco Bay	Petaluma River	Marin, Sonoma	2017
2	San Francisco Bay	Petaluma River (tidal portion)	Marin, Sonoma	2017
2	San Francisco Bay	Sonoma Creek	Sonoma	2014
2	San Francisco Bay	Tomales Bay	Marin	2019
2	San Francisco Bay	Walker Creek	Marin	2016
4	Los Angeles	Malibu Creek	Los Angeles	2016
4	Los Angeles	San Antonio Creek (Tributary to Ventura River Reach 4)	Ventura	2013
8	Santa Ana	East Garden Grove Wintersburg Channel	Orange	2017
8	Santa Ana	Grout Creek	San Bernardino	2015
8	Santa Ana	Rathbone (Rathbun) Creek	San Bernardino	2015
8	Santa Ana	Summit Creek	San Bernardino	2015
8	Santa Ana	Serrano Creek	Orange	2017

Attachment 3

Regional Water Boards, upon mutual agreement, may designate one Regional Water Board to regulate a person or entity that is under the jurisdiction of both (Water Code Section 13228). The following table identifies the designated Regional Water Board for all counties within the State for purposes of reviewing and, if appropriate, approving new Local Agency Management Plans.

Table 7. Regional Water Board designations by County.

County	Regions with Jurisdiction	Designated Region
Alameda	2,5	2
Alpine	5,6	6
Amador	5	5
Butte	5	5
Calaveras	5	5
Colusa	5	5
Contra Costa	2,5	2
Del Norte	1	1
El Dorado	5,6	5
Fresno	5	5
Glenn	5,1	5
Humboldt	1	1
Imperial	7	7
Inyo	6	6
Kern	3,4,5,6	5
Kings	5	5
Lake	5,1	5
Lassen	5,6	6
Los Angeles	4,6	4
Madera	5	5
Marin	2,1	2
Mariposa	5	5
Mendocino	1	1
Merced	5	5
Modoc	1,5,6	5
Mono	6	6
Monterey	3	3
Napa	2,5	2
Nevada	5,6	5
Orange	8,9	8

County	Regions with Jurisdiction	Designated Region
Placer	5,6	5
Plumas	5	5
Riverside	7,8,9	7
Sacramento	5	5
San Benito	3,5	3
San Bernardino	6,7,8	6
San Diego	9,7	9
San Francisco	2	2
San Joaquin	5	5
San Luis Obispo	3,5	3
San Mateo	2,3	2
Santa Barbara	3	3
Santa Clara	2,3	2
Santa Cruz	3	3
Shasta	5	5
Sierra	5,6	5
Siskiyou	1,5	1
Solano	2,5	5
Sonoma	1,2	1
Stanislaus	5	5
Sutter	5	5
Tehama	5	5
Trinity	1	1
Tulare	5	5
Tuolumne	5	5
Ventura	4,3	4
Yolo	5	5
Yuba	5	5

Appendix 'C' March 1969 Memorandum of Understanding Lahontan Region 6 and City of California City

SEPTIC TANK GUIDELINES

Memorandum of Understanding
Between the
California Water Quality Control Board
Lahontan Region
and the
City of California City

This Memorandum of Understanding is entered into by and between the California Regional Water Quality Control Board, Lahontan Region (hereinafter Board), and the City of California City (hereinafter City). Its purpose is to expedite the overall review process for proposed land developments and to provide a clear operating policy for the Board and the City on the implementation of the Board's guidelines for wastewater disposal from land developments.

Section 13260 of the California Water Code requires any person discharging waste or proposing to discharge waste that may affect waters of the State, except to a community sewer system, to file a report of waste discharge with the regional board of that region. Implementation of this code section has included regulation of individual waste systems wherever warranted.

In 1973, the Board adopted guidelines to (1) establish the conditions under which waivers of the filing requirement would be in the public interest (pursuant to California Water Code Section 13269); (2) establish minimum criteria for the use of individual systems; and (3) prevent pollution or nuisance caused by the discharges from leaching or percolating systems.

On January 14, 1988, the Regional Board adopted revisions to the "Guidelines for Waste Disposal from Land Developments". In conjunction with these revisions, the Regional Board also adopted the "Regional Board Guidelines for Implementation of Criteria for Individual Waste Disposal Systems". These implementation guidelines list general and specific provisions in considering exemptions to the maximum density criteria (2 EDUs per acre) for individual waste disposal systems in both new and existing land developments.

This requirement also applies to domestic wastewater discharges from new commercial and industrial developments with wastewater discharge volumes exceeding two EDUs per acre density (500 gal/day/acre based on 250 gal/day/EDU). On June 16, 1988, the State Water Resources Control Board approved the revisions. For purposes of this Memorandum of Understanding, gross acreage is that area which encompasses the entire net lot area plus any underlying fee title within the adjacent right(s)-of-way, if any.

Inasmuch as the City has incorporated into its review criteria the "Minimum Criteria for Subsurface Discharge of Sewage" contained in the Board's guidelines, and has consistently applied these criteria in its review of proposed developments, it is not against the public interest for the Board to reduce its oversight work by eliminating redundant review of proposed projects.

It is agreed that:

I. The City is authorized to issue construction permits for projects that utilize individual subsurface disposal systems without Regional Board approval under the following conditions:

A. All of the following:

1. The on-site soil characteristics comply with established "Minimum Criteria for Individual Waste Disposal Systems as adopted by Resolution 6-88-15; and

2. The discharge is composed of <u>domestic</u> wastewater only; and

B. One of the following:

1. The development consists of single-family residences, multiple-family residences, non-residential or of mixed occupancy and the cumulative development density in the specified area, as defined on Map "A" which is made a part of this memorandum, does not exceed two equivalent dwelling units (EDUs) per acre (500 gallons/acre/day wastewater

flow). The estimated wastewater flow from non-residential or mixed occupancy developments shall be determined using Table I-2 and I-3 in the Uniform Plumbing Code and occupant loads as determined by Table 33A in the Uniform Building Code; or

2. The development consists only of a single-family home on an individual lot, subdivided prior to January 14, 1988, which has a minimum net area of 15,000 square feet; or

3. The project is in a class that has been designated exempt from Regional Board review in writing under signature of the Regional Board Executive Officer; or

4. The project/development has been granted an exemption by the Board and complies with the City's standards for use of septic tank wastewater disposal systems.

II. The City shall not issue construction permits without Regional Board approval for the following projects:

A. Projects that involve domestic wastewater discharge from residential, commercial or industrial development if the cumulative development density in the specified area as defined on Map "A" is in excess of two EDUs/acre or 500 gallons/acre/day as determined by the Board (except in exempted areas); or

B. Projects that will have industrial wastewater discharges; or

C. Projects that do not comply with the City's standards for use of septic tank wastewater disposal systems; or

D. Projects located within existing waste discharge prohibition areas (unless in areas exempted in I.B. above); or

E. Projects utilizing package wastewater treatment plants with on-site disposal; or

III. The City, at its discretion, may defer consideration of projects, based on water quality impacts, to the Board for any projects even if it appears that compliance with Section I. of this Memorandum of Understanding has been achieved.

IV. The City, at its discretion, may require the formation of a public entity (as defined in the State of California Government Code Section 53090 et seq.) to maintain septic systems in residential developments of one hundred (100) lots or more.

V. The Board may review permits issued by the City at its discretion. Copies of permits will be made available upon request for review in City offices.

VI. The Board, upon reviewing permits issued by the City, may require proposals be submitted and/or waste discharge requirements (permits) be obtained for all other types of waste discharges such as stormwater runoff and solid waste leachate.

VII. The City, on its own initiative or at the request of an applicant and upon providing the information specified in the implementation guidelines, may apply for individual, large scale, or area-wide exemptions.

VIII. The applicant, for projects found in compliance with the Board's guidelines, will be notified of acceptance by issuance of a City building permit or by issuance of a Board clearance letter.

IX. The City shall maintain a record of all documents submitted and reviewed under this Memorandum of Understanding. This record shall be kept as a note on the construction permit for each project.

X. This Memorandum of Understanding shall be effective immediately after execution of this agreement and shall remain in full force until terminated by a prior thirty (30) day written notice by either party.

XI. This Memorandum of Understanding may be amended as mutually agreed to by the City and the Regional Board.

XII. All notices and communications under this Memorandum of Understanding shall be addressed to the following:

Peggy L. Rosler
City of California City
City Manager
21000 Hacienda Blvd.
California City, Ca 93505

O.R. Butterfield
California Regional Water Quality Control Board, Lahontan Region
15371 Bonanza Road
Victorville, Ca 92392-2494

This Memorandum of Understanding is executed on the date of the most recent signature below, by the following authorized representatives of the parties.

Peggy L. Rosler
City Manager

Date 3/20/89

O.R. Butterfield
Executive Officer

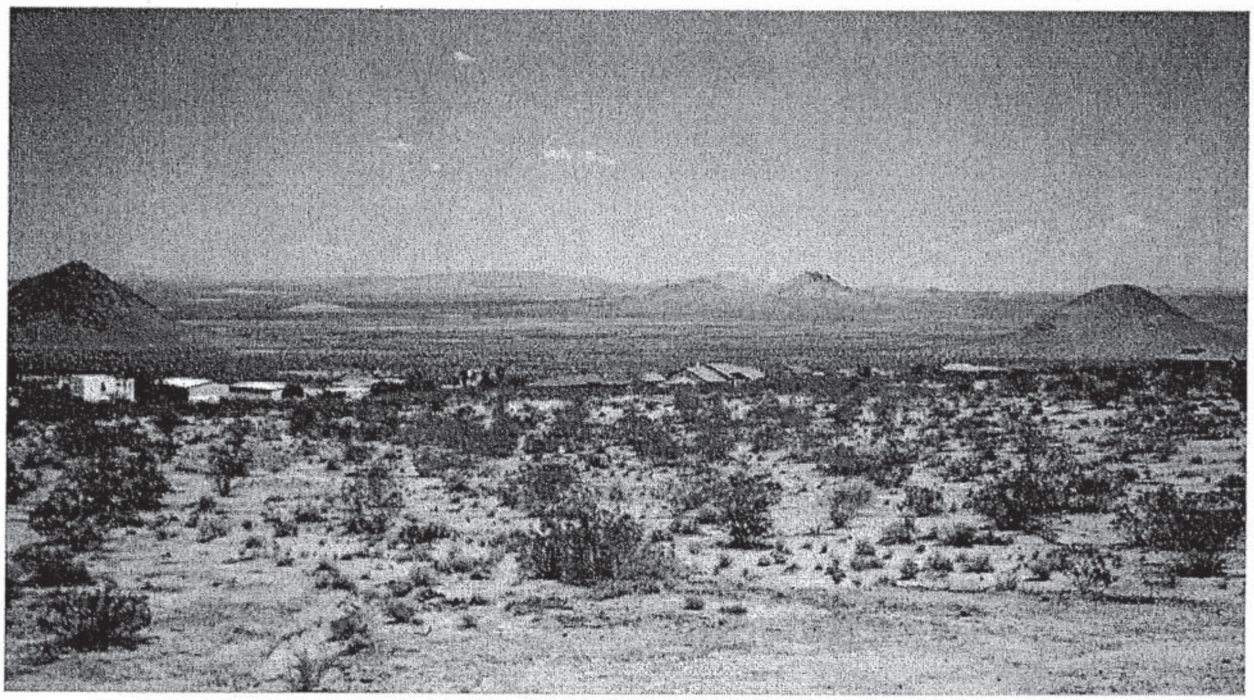
Date 3-24-89

Appendix 'D' Abbreviated Stetson Evaluation Report of Groundwater Resources City of California City

EVALUATION OF GROUNDWATER RESOURCES IN CALIFORNIA CITY

CITY OF CALIFORNIA CITY

DECEMBER 2008



STETSON ENGINEERS INC.

861 VILLAGE OAKS DRIVE – COVINA, CALIFORNIA 91724

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EXECUTIVE SUMMARY

In July 2007, Stetson Engineers Inc. (Stetson) was retained by the City of California City (City) to conduct an evaluation of the groundwater resources within the City. Although the City overlies several groundwater basins, the Stetson evaluation, in compliance with the City staff direction, focuses only on the Freemont Valley Groundwater Basin (FVGB), which has been the City's primary water supply source.

Results of this evaluation indicate the FVGB appears to be divided hydrogeologically into two subbasins by the Muroc Fault: the Mojave City Subbasin on the south and the California City Subbasin on the north. In the Mojave City Subbasin, groundwater generally flows easterly from the western boundary toward the City of Mojave and then northeasterly toward the Muroc Fault. When the groundwater level is high, groundwater appears to flow across the Muroc Fault and cascade into the California City Subbasin. This subsurface flow was estimated to reach up to 5,500 acre-feet in 1952. Groundwater in the California City Subbasin generally flows from the surrounding boundaries toward the Koehn Lake, a low depression located in the central part of the subbasin.

Based on its topography and hydrogeology, the FVGB covers a surface area of approximately 216,000 acres of the Freemont Valley, of which 143,000 acres are in the California City Subbasin and 73,000 acres are in the Mojave City Subbasin. The FVGB was estimated to contain approximately 8,300,000 acre-feet of groundwater in the 1950s, which is considered to be full, consisting of 5,700,000 acre-feet in the California City Subbasin and 2,600,000 acre-feet in the Mojave City Subbasin. Due to the prolonged drought period from 1945 to 1964 and excessive extractions for agricultural uses in the 1960s and 1970s, groundwater levels throughout the FVGB declined significantly and reached approximately 100 feet drop in the groundwater elevation in the vicinity of the Koehn Lake. As a result, the FVGB groundwater storage was estimated to reduce to 6,900,000 acre-feet in 2007, consisting of 4,400,000 acre-feet in the California City Subbasin and 2,500,000 acre-feet in the Mojave City Subbasin. Within the City boundary, the FVGB groundwater storage was estimated at approximately 1,980,000 acre-feet in 1955 and 1,650,000 acre-feet in 2007.

Recharge to the FVGB is derived primarily from direct percolation of precipitation on the valley floor, percolation of runoff from the surrounding watersheds, and subsurface flow from the Antelope Valley Groundwater Basin (AVGB) through an alluvial narrows between the Castle Butte and the Twin Buttes. The annual recharge to the FVGB was estimated by separate spreadsheet groundwater balance models for the Mojave City and California City Subbasins, which were developed exclusively for this evaluation by Stetson, using historic precipitation from 1945 to 2007 at the Mojave, Tehachapi, and Randsburg Stations. The annual precipitation averaged from 5.44 inches at Mojave to 6.04 inches at Randsburg and 10.83 inches at Tehachapi. The historic water levels at Well 30S/37E-36G01 in the California City Subbasin and Well 12N/12W-35R01 in the Mojave City Subbasin were used for model calibration.

The simulated annual groundwater recharge to the Mojave City Subbasin varied from zero to approximately 16,100 acre-feet including 9,500 acre-feet from direct percolation of precipitation on the valley floor and 6,600 acre-feet from percolation of runoff from the surrounding watersheds. On the average, the Mojave City Subbasin has received approximately 3,100 af/yr, including 2,700 af/yr from direct percolation of precipitation on the valley floor and 400 af/yr from percolation of runoff from the surrounding watersheds.

The simulated annual groundwater recharge to the California City Subbasin varied from approximately 2,600 (subsurface inflow from the AVGB) to 82,100 acre-feet including 18,400 acre-feet from direct percolation of precipitation on the valley floor, 61,100 acre-feet from percolation of runoff from the surrounding watersheds, and 2,600 acre-feet of subsurface flow from the AVGB. On the average, it has received approximately 13,100 af/yr, including 5,200 af/yr from direct percolation of precipitation on the valley floor, 5,000 af/yr from percolation of runoff from the surrounding watersheds, 300 af/yr of subsurface flow from the Mojave City Subbasin, and 2,600 af/yr of subsurface flow from the AVGB. Although the estimated groundwater recharge for each subbasin is reasonable and consistent with previous estimates, it is considered qualitative because of uncertainties of the groundwater production used in the spreadsheet groundwater balance models. Nevertheless, the simulated groundwater recharge of 16,200 af/yr (13,100 af/yr for the California City Subbasin and 3,100 af/yr for the Mojave City Subbasin) may be considered as the estimated safe yield for the FVGB.

Within the City boundary, the average groundwater recharge to the FVGB was estimated at approximately 5,300 af/yr. This average groundwater recharge may be considered as the safe yield of the FVGB within the California City boundary.

Based on the simulated groundwater recharges, the City's future water demands under worst-case conditions, which were projected to reach 12,655 af/yr in 2025, could be met by groundwater in the California City Subbasin if groundwater extractions from other producers in this subbasin are not significant. This may not be the case.

In order to meet the future water demands while preventing further overdrafting the groundwater resources of the FVGB, the City may consider (1) to reduce the City's water demands by conservation and/or limitation of growth, (2) to increase the City's water supply by developing groundwater in the Mojave City Subbasin, (3) to start a City groundwater elevation monitoring program by measuring the static water levels in the City's wells on a monthly basis, (4) to coordinate with other major groundwater producers in the FVGB and with the federal, state, regional, and local agencies to develop and implement a basinwide groundwater monitoring program and a basinwide groundwater management plan to collect necessary and reliable data to manage the groundwater resources of the FVGB, (5) to develop and adopt an alternative groundwater management plan under Assembly Bill 3030 to protect the City's groundwater supply, and (6) to refine the spreadsheet groundwater balance models when adequate and accurate data become available to obtain better estimates for the groundwater recharge to the FVGB.

I. INTRODUCTION

On July 7, 2008, Stetson entered an agreement with the City to provide professional engineering services for conducting an evaluation of the City's groundwater resources to support the preparation of the City's Urban Water Management Plan (UWMP). The scope of work for Stetson's engineering services includes a kick-off meeting, data collection, a field trip, a review of available data and information, an evaluation of the availability and suitability of groundwater for potable water supply, and coordination, presentation, and report preparation. During the kick-off meeting on July 23, 2008, City staff indicated that the quantity of reliable groundwater supplies, not quality, is the most important issue and that Stetson evaluation should focus on the FVGB, the primary source of the City's water supply.

This report (Report) is prepared, as part of the Stetson scope of work, to summarize the data collected, the evaluation performed, and conclusions on the availability of groundwater within the City.

II. WATER SUPPLIES AND DEMANDS IN CALIFORNIA CITY

The City, which was incorporated in 1965 with a surface area of approximately 208 square miles (mi^2), is located in the high desert 100 miles north of the City of Los Angeles and 60 miles east of the City of Bakersfield in the Kern County. The City limit extends from the Kern-San Bernardino Counties line on the east to State Road (SR) 14 on the west and from SR 58 on the south to the Township 30S/31S boundary on the north, as shown on Plate II-1. The City had its origins in 1958 when Mr. Nat Mendelsohn, a real estate developer and sociology professor, purchased 80,000 acres of Mojave Desert land with the aim of master-planning California's next great city. He designed a model city, which he hoped would one day rival the City of Los Angeles, around a Central Park with a 26-acre artificial lake. The City population was 8,385 at the 2000 census and was estimated at 12,659 in July 2006 [1].

The City overlies three groundwater basins in the South Lahontan Hydrologic Region, named the Freemont Valley, Antelope Valley, and Harper Valley Basins by the California Department of Water Resources (DWR) as shown on Plate II-2 [2], but the FVGB has been the City's primary source of water supply. Currently, the City owns and operates five (5) water production wells (Wells No. 2, 3, 10, 14, and 15) with a total pumping capacity of approximately 4,425 gallons per minute (gpm) [3]. The City just completed a new well in May 2006, i.e. Well No. 16. When this well is placed into service, the total pumping capacity will reach approximately 5,200 gpm. The locations of the City's wells are shown on Plate II-3.

The City has purchased State Water Project water from the Antelope Valley-East Kern Water District (AVEK) since 1981 through a connection (turn-out) located on California City Boulevard at Randsburg-Mojave Road. The AVEK connection has a gravity feed capacity of approximately 1,700 to 2,000 gpm [3]. The location of the AVEK connection is shown on Plate II-3.

The City's annual water demand increased from approximately 3,713 acre-feet per year (af/yr) in 2000 to approximately 4,542 af/yr in 2007, as shown on Plate II-4. The annual groundwater demand ranged from approximately 3,032 acre-feet per year (af/yr) in 2003 to approximately 3,528 af/yr in 2004 at an average of approximately 3,300 af/yr. The annual State Water Project water demand ranged from approximately 234 af/yr in 2001 to approximately 1,459 af/yr in 2007 at an average of approximately 700 af/yr. Annual water supplies from the City's wells and the AVEK connection between 2000 and 2007 are shown in Table II-1.

The City's future water demands were estimated by multiplying the projected population with an estimated per capita average daily demand (CADD). The City population in 2025 was estimated to be 17,062 at a 2.0-percent growth rate, 23,870 at a 3.5-percent growth rate, and 33,226 at a 5.0-percent growth rate. As a result, the City's water demands in 2025 were projected to vary from 6,498 to 12,655 af/yr when using a CADD of 340 gallons per capita per day (gpcd) and from 4,683 to 9,119 af/yr when using a CADD of 245 gpcd [3].

III. DATA COLLECTION AND REVIEW

In addition to data and information provided by the City, Stetson also searched available data and information from its in-house library and from various federal, state, regional, and local agencies. The documents were scanned and selected documents were reviewed to evaluate the availability of groundwater resources in the FVGB. A list of the documents obtained by Stetson is included as Appendix A.

IV. FIELD TRIP

As part of the Stetson scope of work, Stetson staff conducted a field trip to the FVGB on Monday, August 25, 2008. The primary objective of the field trip is to observe on-site conditions of the City's existing production wells including Waterman and Wonder Acres Wells and the FVGB. The Stetson field trip was assisted and guided by Mr. Glenn Metzger from the City's Utilities Department.

During the Stetson visit, all the City's wells were operated, except for Well No. 3 and Well No. 16. Pumping equipment at Waterman Well has been removed, and Wonder Acres Well was not operable. Stetson staff also visited the City's Well No. 1, which is an inactive well being used as an observation well monitored by the United States Geological Survey (USGS). The water level in this well was measured at 362.17 feet below the top of casing at 12:55 PM using an electronic sounder. The coordinates of the wells visited by Stetson were also recorded using a Garmin GPS III Plus unit. The locations of the wells are shown on Plate IV-1. The well coordinates are included in Table IV-1. Pictures of the wells taken during the field trip were included as Appendix B.

Stetson staff drove across the FVGB on SR 14, Randsburg Red Rock Road, and Garlock Road and stopped at several pre-selected points to observe the on-site conditions of the FVGB. The first point, located at Sequoia Boulevard and Carson Drive, was selected to observe the watershed boundary and the narrows between the Twin Buttes and the Castle Butte through which groundwater from the AVGB flows into the FVGB. The second point, located at Hacienda Boulevard and Wilson Road, was selected to observe the cross section across the narrows between the Twin Buttes and the Castle Butte and potential traces of the Muroc Fault across the FVGB. The third and fourth points; located at SR 14 and Phillips Road and at SR 14 and the Jawbone gas station, respectively; were selected to observe the southern and central portions of the FVGB. The fifth point, located at Randsburg Red Rock Road and Last Chance Canyon, was selected to observe the Koehn Lake. The sixth point, located at Garlock Road and U.S. Highway 395 (US 395), was selected to observe the northern portion of the FVGB. The locations of these points are shown on Plate IV-1. Pictures taken at these points are included as Appendix C.

During the entire field trip, the sky was clear and the temperature was hot. The hottest temperature was 104 °F. No running water was observed in creeks and streams identified on the USGS quadrangle maps.

V. EVALUATION OF FREEMONT VALLEY GROUNDWATER BASIN

V.1. Groundwater Basin Boundaries

The FVGB underlines the Freemont Valley in the eastern Kern County and the northwestern San Bernardino County, identified by the DWR as Groundwater Basin Number 6-46, as shown on Plate II-2. The FVGB is bounded on the northwest by the Garlock Fault zone against impermeable crystalline rocks of the El Paso Mountains and the Sierra Nevada; on the east by crystalline rocks of the Summit Range, Red Mountains, Castle Butte, Bissell Hills, and Rosamond Hills; and on the southwest by the AVGB along a groundwater divide approximated by a line connecting the mouth of the Oak Creek through the Middle Butte to exposed basement rock near the Gem Hill. The surface area of the FVGB is estimated at 335,000 acres by the DWR [4].

Based on the DWR description, the FVGB boundaries were refined on the USGS quadrangle maps (1:24,000 scale) using available data and information including wells identified on the maps, the watershed boundaries, historic groundwater level data, and observations during the field trips. The refined boundaries of the FVGB, as shown on Plate V-1, are generally similar to the DWR boundaries, except for those on the south and southeast. On the southeast, the low hills along the watershed boundary between the Galileo Hill and the Radio Tower Hills were considered to separate the FVGB from the AVGB. The watershed boundary of the Oak Creek and an interpreted groundwater divide along the hills from the Standard Hill through the Sanborn Hill to the Radio Tower Hills were considered as the FVGB boundary on the south.

Since the Muroc Fault appears to traverse the FVGB and to act as a barrier to the FVGB groundwater flow, it was considered as an intrabasin boundary dividing the FVGB into two subbasins: the California City subbasin on the north, and the Mojave City subbasin on the south. Based on these boundaries, the surface area of the FVGB was measured at approximately 215,783 acres including 142,451 acres in the California City Subbasin and 73,332 acres in the Mojave City Subbasin. The surface area measurements are shown on Plate V-2.

V.2. Geology

The FVGB geologic formations may be divided into two main groups, consolidated rocks of Tertiary and pre-Tertiary age, and unconsolidated deposits of Quaternary age. The consolidated rocks form the mountains and hills surrounding the valley area and the basement complex underlying the unconsolidated deposits to make up the sides and bottom of the FVGB. The unconsolidated deposits form the FVGB [5]. These geologic formations are described in the California geologic maps (Bakersfield, Trona, Los Angeles, and San Bernardino Sheets) published by the Division of Mines and Geology, Department of Conservation [6-9].

The consolidated rocks lying between the Tehachapi Mountains and the El Paso Mountains along the FVGB western boundary consist primarily of Mesozoic granitic rocks (granite and adamellite or tonalite and diorite), Pre-Cenozoic granitic and metamorphic rocks, middle and/or lower Pliocene marine rocks, Miocene volcanic rocks (andesite or basalt), Paleozonic marine rocks (limestone or dolomite), and Paleocene non-marine rocks. The FVGB eastern boundary is formed by undivided Precambrian metamorphic rocks (primarily schist) of the Rand Mountains and Mesozoic granitic rocks of the low hills from the Rand Mountains through the Castle Butte, Twin Buttes, Radio Tower Hills, De Stazo Hill, and Sanborn Hill to the Standard Hill, as shown on Plate V-3. The consolidated rocks are considered impermeable [5].

The unconsolidated deposits consist primarily of Recent Quaternary alluvium in the valley floor and Pleistocene Quaternary non-marine deposits in the alluvial fans along the low hills of the eastern boundary, the FVGB northern tip, and the alluvial fans between the Oak Creek and the Cache Creek along the western boundary. Quaternary lake deposits are also present in the low lying area lower than the elevation of 2,000 feet above mean sea level (msl), and salt deposits are observed within the dry bed of the Koehn Lake, the lowest area in the Freemont Valley, as shown on Plate V-3. *"The older alluvium of Pleistocene age underlies most of the valley floor. It consists mainly of poorly sorted arkosic gravel, sand, silt, and clay. The older alluvium is oxidized and generally unconsolidated, but in some place it is slightly cemented. This formation is permeable, extends below the water table, yields water freely to wells, and is the most important water-bearing unit in the area."* [5] According to available drillers' logs, these unconsolidated materials are interbedded with layers of shale at various thickness in many places, especially in the central portion of the FVGB.

The thickness of the unconsolidated deposits was estimated in several previous reports. *"It is estimated that the 1,000 foot thickness referred to by Kennedy is the upper 1,000 feet of saturated sediments. The average depth from ground surface to water table in these basins is about 200 feet. Therefore, the 1,000 foot thickness of saturated sediments represents a total thickness of about 1,200 feet immediately below ground surface."* [10] In the DWR report, *"Alluvium is about 1,190 feet thick (Bader 1969; DWR 1964) along the margin of the basin and thins toward the middle of the basin, where it is interbedded with thick layers of lacustrine silt and clay near Koehn Lake."* [4] The most recent report indicates that *"Well data from Koehler (1977) showed an alluvial thickness of 500 to 800 feet north of the Cantil Fault and an alluvial thickness of 400 to 900 feet south of the fault. Information from water supply wells completed on* *the plant site suggest that the thickness reported by Koehler (1977) of 800 feet may be low, as the total depths of the wells on the site vary from about 800 to 1,700 feet below ground surface (bgs). If the wells were completed in alluvial materials, these depths suggest that unconsolidated materials may be thicker than reported by Koehler (1977) in the area of the plant site."* [11]

In order to have a better understanding of the thickness of the unconsolidated deposits in the FVGB, several cross sections were generated using available drillers' logs and well depths published in the DWR reports [5, 12-13] and the USGS quadrangle maps (1:24,000 scale). The locations of these cross sections are shown on Plate V-1. The A-A'cross section following the longitudinal axis of the FVGB from the vicinity of the City of Mojave on the south to US 395 on the north, indicates that the thickness of the unconsolidated deposits varies from approximately 280 feet in the south to approximately 800 feet at the Muroc Fault line in the Mojave City Subbasin, as shown on Plate V-4a. In the California City Subbasin, it varies from approximately 700 feet at the Muroc Fault in the south to approximately 800 feet in the vicinity of the Koehn Lake, and then pinches out at the FVGB northern tip near US 395, as shown on Plates V-4a through V-4c. The B-B' cross section, which traverses the central FVGB near the town of Cantil, indicates that the thickness of the unconsolidated deposits is relatively uniform at approximately 800 feet in the middle portion and then pinches out to the consolidated rocks at approximately 7,000 feet from the west and east boundaries, as shown on Plate V-5. The C-C' cross section, which traverses the southern part of the FVGB near the City of Mojave, indicates that the thickness of the unconsolidated deposits is approximately 450 feet in the eastern portion of the cross section but pinches out to the consolidated rocks at approximately 16,000 feet from the western boundary, as shown on Plate V-5. The D-D' cross section, which follows the longitudinal axis of the narrows between the Castle Butte and the Twin Buttes, indicates that the thickness of the unconsolidated deposits in the narrows varies from approximately 300 feet in the AVGB to approximately 700 feet in the FVGB, as shown on Plate V-6. The E-E' cross section, which traverses the narrows near the Freemont Valley watershed boundary, indicates that the thickness of the unconsolidated deposits is approximately 450 feet at the center and pinches out at the edges, as shown on Plate V-6.

Several named and unnamed faults in the Freemont Valley are identified on the California geologic maps, as shown on Plate V-3. The longest one is the Garlock Fault and El Paso Fault system that runs along the north and west sides of the Freemont Valley and separates the consolidated rocks of the Tehachapi, Piute, and El Paso Mountains from the FVGB. These faults form restrictive groundwater barriers on the west and northwest sides of the FVGB [4]. The Cantil Valley Fault, which appears to be a branch of the Garlock Fault, runs from the Garlock Fault near the town of Cantil, bisects the FVGB through the Koehn Lake, and rejoins the Garlock Fault approximately 9 miles east of US 395. According to the DWR, effects of the Cantil Valley Fault are not known [4], but recent studies indicate that it is a partial barrier to groundwater flow [11]. The Randsburg-Mojave Fault runs along the northeastern side of the Freemont Valley and separates the consolidated rocks of the Rand Mountains from the FVGB. The Muroc Fault traverses the southern portion of the FVGB and forms a partial barrier to groundwater flow [4]. The unnamed faults include a fault running parallel to the Muroc Fault across the narrows between the Castle Butte and the Twin Buttes, and a southeast-northwest fault running from the

Castle Butte to the vicinity of the Pine Tree Canyon mouth. The effects of these unnamed faults on groundwater in the FVGB are not known.

V.3. Hydrology

The Freemont Valley is a relatively flat area with a depression, the Koehn Lake, in the central portion. The Koehn Lake is a dry lake with the bed elevation at approximately 1,880 feet above mean sea level (msl). In the area north of the Koehn Lake, the ground surface elevation increases toward the surrounding mountains and reaches approximately 3,000 feet msl at the northern tip near the Kern County-San Bernardino County line. In the area south of the Koehn Lake, the ground surface elevation decreases easterly from the base of the Tehachapi and Piute Mountains (approximately 3,300 feet at the mouth of the Oak Creek) toward the Cache Creek and then slopes northeasterly toward the Koehn Lake in the area north of the California City.

In addition to precipitation and runoff on the valley floor, i.e. the FVGB, the Freemont Valley also receives runoff from the watersheds of the Oak Creek, Cache Creek (West), Lone Tree Canyon, Jawbone Canyon, Red Rock Canyon, Last Chance Canyon, Mesquite Canyon, Iron Canyon, Goler Gulch, Hardcash Gulch, and unnamed streams on the west side and from the water sheds of the Fiddler Gulch, Cache Creek, and unnamed streams on the east, as shown on Plate V-1. The total area of these watersheds is approximately 432,606 acres, as shown on Plate V-2. Surface water in the Freemont Valley drains toward the Koehn Lake, except in the Oak Creek watershed in the southernmost part of the Freemont Valley, where it drains southeasterly toward the Rogers Lake.

There are three precipitation stations with long-term records located within the Freemont Valley watershed: Tehachapi, Mojave, and Randsburg. The approximate locations of these precipitation stations are shown on Plate IV-1. Available historic records obtained from the National Data Centers of the National Oceanic and Atmospheric Administration (NOAA) [12] indicates that precipitation is highest at the Tehachapi Station and lowest at the Mojave Station. Annual precipitation at the Tehachapi Station between 1931 and 2007, as shown in Table V-1, ranged from 3.98 inches (in 1959) to 27.77 inches (in 1983) at an average of 10.95 inches. Annual precipitation at the Mojave Station between 1941 and 2007, as shown in Table V-2, ranged from 0.77 inches (in 2007) to 15.51 inches (in 1983) at an average of 5.72 inches. Annual precipitation at the Randsburg Station between 1938 and 2007, as shown in Table V-3, ranged from 0.83 inches (in 1953) to 16.44 inches (in 1992) at an average of 6.32 inches. The cumulative departure curve at the Mojave Station, as shown on Plate V-7, indicates that the Freemont Valley has experienced wet-dry cycles with a prolonged drought period from 1945 to 1964 and a prolonged wet period from 1976 to 1984. Currently, the Freemont Valley is in a dry period starting from 1998. Precipitation on the Freemont Valley floor may have significant losses from evaporation and transpiration; however, during an exceptionally wet season, flashfloods may occur and runoff may originate on or cross the valley floor to reach the playas and the Koehn Lake [13].

The USGS established several streamflow stations in the Freemont Valley watershed on the Oak Creek, Cache Creek, Pine Tree Creek, Cottonwood (Jawbone) Creek, and Goler Gulch, as shown on Plate IV-1; however, the operation of these streamflow stations was discontinued. Available streamflow data at these stations from the USGS Surface-Water Data for USA [14], as shown in Appendix D, indicate that the Freemont Valley may receive significant runoff from its watersheds during wet years. At the Oak Creek Station, the annual runoff from 1957 to 1986 varied from zero to 7,071 af/yr at an average of 889 af/yr. The highest peak streamflow discharge at this station was observed at approximately 1,740 cubic feet per second (cfs) on May 14, 1973. At the Cache Creek Station, the annual runoff from 1962 to 1972 varied from zero to 270 af/yr at an average of 80 af/yr. The highest peak streamflow discharge at this station was observed at approximately 2,100 cfs on June 7, 1972. At the Pine Tree Station, the annual runoff from 1958 to 1979 varied from zero to 1,557 af/yr at an average of 179 af/yr. The highest peak streamflow discharge at this station was observed at approximately 300,000 cfs on August 23, 1961. At the Cottonwood (Jawbone) Creek Station, the annual runoff from 1966 to 1972 varied from zero to 97 af/yr at an average of 40 af/yr. The highest peak streamflow discharge at this station was observed at approximately 51,500 cfs on August 8, 1963. At the Goler Gulch Station, the annual runoff from 1966 to 1972 varied from zero to 46 af/yr at an average of 12 af/yr. The highest peak streamflow discharge at this station was observed at approximately 776 cfs on February 25, 1969.

V.4. Hydrogeology

The USGS divided the FVGB identified by the DWR into six subunits: Koehn, California City, Chaffee, Oak Creek, Gloster, and Willow Springs, as shown on Plate V-8 [10]. The Koehn Subunit is in the western part of the FVGB located within the Freemont Valley watershed and separated from the California City and Chaffee Subunits by the Randsburg-Mojave Fault. This subunit may receive groundwater moving across the Randsburg-Mojave Fault from the California City Subunit. The California Subunit is the portion of the FVGB east of the Randsburg-Mojave Fault and north of the Muroc Fault. This subunit is hydraulically connected to the AVGB by the alluvial filled narrows between the Castle Butte and the Twin Buttes through which groundwater moves from the AVGB to the FVGB. The California Subunit also receives groundwater moving northward across the Muroc Fault from the Chaffee Subunit. The Oak Creek Subunit is the potion of the FVGB identified by the DWR located within the Antelope Valley watershed and west of the Randsburg-Mojave Fault. The Chaffee, Gloster, and Willow Springs Subunits cover the portion of the FVGB identified by the DWR located east of the Randsburg-Mojave Fault and south of the Muroc Fault, but their boundaries are not well defined. *"The area is shown on figure 2 and includes one large ground-water subbasin northeast of Mojave, called the Chaffee area, a relatively large subbasin north of the Rosamond fault near Willow Springs, and several minor basins or subbasins in Antelope Valley in the area east of Willow Springs and north of the Rosamond Hills. The largest of these is the so-called Gloster area between Soledad Mountain and the Rosamond Hills."* [15]

Review of the historic water levels [5,15] and the recent water levels [11] at the wells within the Freemont Valley does not appear to confirm the hydrogeologic effects of the faults in the area, except for the Muroc Fault. The significant difference in the depths to water in Well 32S/36E-22C01 (612.40 feet on January 27, 1958) and 32S/36E-21Q01 (372.88 feet on November 3, 1955), which are located approximately 1.3 miles across the Muroc Fault, confirm the hydrogeologic effects of this fault. It acts as a groundwater barrier and divides the FVGB into two subbasins, named the Mojave City Subbasin and the California Subbasin for the purposes of this evaluation. The depth to water in the Mojave City Subbasin varied from over 300 feet in the alluvial fan areas along the Tehachapi Mountains to less than 150 feet along the low hills between the Soledad Mountains and the Radio Tower Hills. The depth to water in the California City Subbasin varied more drastically from near or above the ground surface in the vicinity of the Koehn Lake to over 600 feet near the Muroc Fault.

Generalized groundwater elevation contours interpreted from the historic water levels at the wells in the FVGB between 1955 and 1958, as shown on Plate V-9, indicate that the FVGB is a closed groundwater basin, i.e. without subsurface outflow. In the Mojave City Subbasin, groundwater appears to flow generally in an easterly direction from the alluvial fan along the Tehachapi Mountains and then "cascade" into the California City along the Muroc Fault. In 1958, groundwater cascading appeared to occur mainly in the vicinity of Wells 32S/36E-23Q01 and 32S/37E-32N01 and created a groundwater mound with the water table rising above the elevation of 2,300 feet msl, as shown on Plate V-9. The rate of cascading groundwater was not estimated during the previous investigations, but the subsurface flow across the Muroc Fault was estimated to vary from 500 to 2,500 af/yr [10] and may reach 20,000 af/yr [16].

In the California City Subbasin, groundwater appears to flow from the alluvial fans along the surrounding mountains and hills toward the depression in the vicinity of the Koehn Lake. In addition to groundwater from the Mojave City Subbasin, the California City Subbasin also receives subsurface flow from the AVGB through the alluvial narrows between the Castle Butte and the Twin Buttes. In the previous investigations, *"... the estimated subsurface flow ranges from 600 to 900 acre-feet per year. The Geological Survey estimated that the annual flow through the one mile cross-section of the narrows was 100 to 500 acre-feet."* [10] These estimates appear to be low. Using a hydraulic gradient of approximately 0.00341 (estimated from the water table shown on Plate V-6), a flow area of approximately 1,800,000 square feet (ft^2) (estimated from the wet area shown on Plate V-6), and a hydraulic conductivity of 50 feet per day (ft/d) or 374 gallons per day per square foot (gpd/ft^2), the subsurface flow from the AVGB to the FVGB was calculated at approximately 2,570 af/yr.

Long-term groundwater level data obtained from the USGS Ground Water Data for USA: Water Levels [17], as shown in Appendix E, indicate that the groundwater levels in the FVGB have declined significantly since 1955, probably due to the prolonged drought period from 1945 to 1964 and excessive groundwater extraction in the FVGB in the late 1950s, 1960s, and 1970s. The hydrograph for Well 29S/39E-33K01, which is located north of the Koehn Lake, indicates a decline in groundwater level of about 100 feet between 1976 and 1984. The water level in this well stabilized between 1985 and 1996 and recovered about 60 feet from 1996 to 2008, as shown on Plate V-10. The hydrograph for Well 30S/37E-36G01, which is located in the central portion of the FVGB just south of the Koehn Lake, indicates a decline of approximately 105 feet between 1953 and 1985. The water level in this well appeared to stabilize between 1985 and 1995 and recovered approximately 15 feet from 1996 to 2008, as shown on Plate V-11. The hydrograph for Well 31S/37E-35N01, which is located in the south central portion of the FVGB just north of the California City, indicates a decline of approximately 28 feet between 1953 and

1980. The water level in this well appeared to stabilize between 1980 and 1991 and recovered approximately 6 feet between 1991 and 2008, as shown on Plate V-12. The hydrograph for Well 32S/37E-26N01, which is the California City's Well No. 1 located in the southern portion of the FVGB, indicates a decline of approximately 20 feet between 1961 and 1980. The water level in this well recovered approximately 13 feet between 1980 and 1984 and then declined approximately 32 feet between 1984 and 2008, as shown on Plate V-13. In the Mojave City Subbasin, the hydrograph for Well 12N/12W-35R01 indicates a decline of approximately 8 feet between 1957 and 1985. The water level in this well stabilized between 1985 and 1992 and then declined approximately 2 feet between 1992 and 2008, as shown on Plate V-14.

To date, the aquifer or aquifer system in the FVGB have not been fully understood. According to the DWR [4], *"groundwater in the alluvium is generally unconfined, although locally confined conditions occur near Koehn Lake."* This is consistent with interpretations in a previous investigation [10] stating *"confined layers of sand and gravel, which thin or lens out downslope to impervious clay near playas such as Koehn Lake, produce the largest yields."* Historic water level data also indicate that portion of the aquifer system in the FVGB, particularly in the vicinity of the Koehn Lake, is under confined conditions. Data and information on the characteristics of the FVGB aquifer system such as conditions (confined or unconfined), transmissivities, hydraulic conductivities, and coefficients of storage are very limited. Results of a pump test, which was conducted between August 30 and October 2, 2007 in the Cinco area, suggest that the aquifer in that area is confined to semi-confined with a transmissivity ranging from approximately 122,000 to 520,000 gallons per day per foot (gpd/ft) (16,310 to 69,520 square feet per day (ft^2/d)) and a coefficient of storage ranging from 0.0003 to 0.0158 [11]. Using the perforation intervals from the video reports, the hydraulic conductivity of the aquifer is calculated to vary from 256 to 959 gallons per day per square foot (gpd/ft^2) (34 to 128 feet per day (ft/d)).

V.5. Groundwater Production

Groundwater has been withdrawn from the FVGB by hundreds of water supply wells to primarily support both domestic and agricultural uses in the Freemont Valley. A list of water supply wells in the FVGB compiled by the DWR is included in Appendix F, and their locations are shown on Plate V-15. According to this list, the FVGB was reported to have 288 water supply wells with a total pumping capacity of 86,060 gpm, including 39 water supply wells with a total pumping capacity of 7,420 gpm in the Mojave City Subbasin and 248 water supply wells with a total pumping capacity of 78,640 gpm in the California City Subbasin. However, the actual pumping capacity of the water supply wells in the FVGB is likely higher because the pumping capacity of many water supply wells was unknown or not reported.

It is unrealistic to obtain the actual total groundwater extraction in the FVGB. According to the DWR, the net water use in the Freemont Valley, which was calculated by multiplying the estimated land use areas by the estimated net water use rate for each land use type, was estimated at approximately 23,300 acre feet in 1950, 22,600 acre-feet in 1957, and 15,500 acre-feet in 1961 [18]. The groundwater production for agricultural uses, however, was reported to reach 60,000 acre-feet in 1976 [19]. Using the reported pumping capacity with an estimated running time of

50 percent, the water supply wells in the FVGB may produce up to 6,000 af/yr from the Mojave City Subbasin and 63,400 af/yr from the California City Subbasin.

In the FVGB, the California City Community Services District (CCCSD) and the Mojave Public Utility District (MPUD) are the major groundwater producers for municipal uses. The CCCSD pumping records from 1953 to 1969, as shown in Table V-4, indicates that relatively large production occurred in the 1950's, ranging from 14,233 af/yr in 1953 to 4,772 af/yr in 1958, when the wells were used for agricultural purposes. From 1959, the CCCSD groundwater production reduced significantly to 1,430 acre-feet in 1969 after irrigation was stopped. During the last eight years, the CCCSD (i.e., California City) groundwater production averaged approximately 3,300 af/yr, as discussed earlier in this report. The MPUD groundwater production was not reported, but was estimated at approximately 1,500 af/yr during the 1960s [10]. Stetson contacted the MPUD for historic and current groundwater production but received no response.

V.6. Groundwater Storage

The groundwater storage in the FVGB was estimated by previous investigations; however, these estimated values vary widely from 1,900,000 acre-feet [20] to 15,000,000 acre-feet [16]. Some investigations provide comparable groundwater storage estimates such as 4,800,000 acre-feet [4], 6,260,000 acre-feet (in 1967) [10], and 4,100,000 acre-feet (in 1976) [19].

In an attempt to independently verify the previous estimates, the FVGB groundwater storage was estimated by multiplying the surface area of each subbasin with its average saturated thickness and the estimated effective porosity. The average saturated thickness of each subbasin was estimated by multiplying the average thickness along the longitudinal axis (cross section A-A') with the adjusted factor along the transverse cross sections (cross sections B-B' and C-C'). The estimated effective porosity is the weighted average of the effective porosities of the formations [21] within the production zone, i.e. the top 1,100 feet, of Well 30S/38E-19P01. The average saturated thicknesses and effective porosity of the FVGB estimated by Stetson are shown in Appendix G.

Based on the estimated average saturated thicknesses and effective porosity, the groundwater storage of the FVGB in 1955, which was considered to be full, was estimated at approximately 8,300,000 acre-feet including 5,700,000 acre-feet in the California City Subbasin and 2,600,000 acre-feet in the Mojave City Subbasin, as shown in Table V-5. The groundwater storage of the FVGB in 1967 and 1976 was estimated at approximately 7,800,000 and 7,100,000 acre-feet, respectively. This estimated groundwater storage appears to be consistent with the value of 6,260,000 acre-feet in 1967 previously estimated by Thomas M. Stetson, Civil and Consulting Engineers [10].

Within the City boundary, the groundwater storage of the FVGB in 1955 was estimated at approximately 1,980,000 acre-feet including 1,610,000 acre-feet in the California City Subbasin and 370,000 acre-feet in the Mojave City Subbasin. This groundwater storage of the FVGB within the City boundary, however, was estimated to reduce to approximately 1,860,000 acre-feet in 1967 and 1,700,000 acre-feet in 1976.

V.7. Groundwater Recharge

Recharge to the FVGB is derived primarily from direct percolation of precipitation on the valley floor and from percolation of runoff from the surrounding watersheds. The California City Subbasin also receives subsurface flows from the AVGB and the Mojave City Subbasin. The subsurface flow from the Mojave City Subbasin, however, does not appear to be perennial due to the hydrogeologic effects of the Muroc Fault. The subsurface flow across the Muroc Fault appears to occur only when the groundwater storage in the Mojave City Subbasin is high enough to allow groundwater to overflow the groundwater barrier created by the Muroc Fault. This subsurface flow appears to stop when the groundwater level in the Mojave City Subbasin is lower than the barrier crest, which was estimated at the elevation of approximately 2,420 feet msl based on historic water levels at Well 32S/36E-35D1.

Like the FVGB groundwater storage, the average groundwater recharge to the FVGB estimated by previous investigations varies widely, ranging from 3,300 to 56,000 af/yr, as shown in Table V-6. Again, in an attempt to provide a better understanding of the groundwater recharge to the FVGB, groundwater recharges were re-estimated using spreadsheet groundwater balance models developed for the FVGB subbasins.

The spreadsheet groundwater balance model for the Mojave City Subbasin includes components for direct percolation of precipitation on the valley floor, percolation of runoff from the Tehachapi Mountains watershed, subsurface outflow to the California City Subbasin, and groundwater extraction, as shown on Plate V-16. The spreadsheet groundwater balance model was simulated annually from 1945 through 2007 using historic precipitation at the Mojave Station for estimating direct percolation of precipitation on the subbasin valley floor and historic precipitation at the Tehachapi Station for estimating percolation of runoff from the surrounding watersheds. The subsurface outflow to the California City Subbasin was calculated as the difference between the simulated storage and the estimated full storage of the Mojave City Subbasin (i.e., 2,600,000 acre-feet). There was no outflow to the California City Subbasin if the difference is negative. Since the historic groundwater production in the Mojave City Subbasin is not known, it was roughly estimated based on available data and information such as the total pumping capacity for each year during calibration.

The spreadsheet groundwater balance model for the Mojave City Subbasin was calibrated against the historic water level at Well 12N/12W-35R01, as shown on Plate V-14. Since the annual groundwater extraction between the late 1940s and the early 1960s was low, an estimated low value was assigned to match the historic water levels during this period by adjusting the coefficients for direct percolation of precipitation on the valley floor and percolation of runoff from the surrounding watersheds. When a good match was obtained, the calibrated coefficients were kept unchanged for the rest of the simulation period and annual groundwater extractions were assigned to match with the historic water level trend at Well 12N/12W-35R01, as shown on Plate V-17. The simulation results, as shown in Table V-7, indicate that the groundwater recharge to the Mojave City Subbasin between 1945 and 2007 may vary from zero to approximately 16,100 acre-feet including approximately 9,500 acre-feet from direct percolation of precipitation on the valley floor and approximately 6,600 acre-feet from percolation of runoff from the surrounding watersheds. The groundwater recharge to the Mojave City Subbasin averaged approximately 3,100 af/yr, including approximately 2,700 af/yr from direct percolation of precipitation on the valley floor and 400 af/yr from percolation of runoff from the surrounding watersheds. A diagram of the groundwater recharge to the Mojave City Subbasin is shown on Plate V-18. The simulation results show significant outflow from the Mojave City Subbasin to the California City Subbasin in 1945, 1952, 1957, and 1958, which is consistent with the observed water levels along the Muroc Fault, as shown on Plate V-9. There was no simulated outflow after 1958, as shown on Plate V-19.

The spreadsheet groundwater balance model for the California City Subbasin includes components for direct percolation of precipitation on the valley floor, percolation of runoff from the Piute, El Paso, and Rand Mountains watersheds, subsurface inflows from the Mojave City Subbasin and the AVGB, and groundwater extraction, as shown on Plate V-20. The spreadsheet groundwater balance model was simulated annually from 1945 through 2007 using historic precipitation at the Mojave Station for estimating direct percolation of precipitation on the subbasin valley floor, historic precipitation at the Tehachapi Station for estimating percolation of runoff from the Piute and El Paso Mountains watersheds, and historic precipitation at the Randsburg Station for estimating percolation from runoff from the Rand Mountains watershed. The subsurface inflow from the Mojave City Subbasin was obtained from the spreadsheet groundwater balance model for the Mojave City Subbasin. The subsurface inflow from the AVGB was assumed to be at 2,572 af/yr, as discussed in Section V.4. The California City Subbasin was assumed to be full in 1945 with the groundwater storage of approximately 5,660,000 acre-feet. Since the historic groundwater extraction in the California City Subbasin is not known, it was roughly estimated based on available data and information such as the total pumping capacity for each year during calibration.

The spreadsheet groundwater balance model for the California City Subbasin was calibrated against the historic water levels at Well 30S/37E-36G01, as shown on Plate V-11. The same procedures used for calibrating the spreadsheet groundwater balance model for the Mojave City Subbasin were used. The calibration results, as shown on Plate V-21, indicate a good match. The simulation results, as shown in Table V-8, indicate that the groundwater recharge to the California City Subbasin between 1945 to 2007 may vary from 2,572 (subsurface inflow from the AVGB) to approximately 82,100 acre-feet including approximately 18,400 acre-feet from direct percolation of precipitation on the valley floor, approximately 36,800 acre-feet from percolation of runoff from the Piute and El Paso Mountains watersheds, approximately 24,300 acre-feet from percolation of runoff from the Rand Mountains watershed, and approximately 2,600 acre-feet of subsurface flow from the AVGB. The groundwater recharge to the California City Subbasin averaged approximately 13,100 af/yr, including approximately 5,200 af/yr from direct percolation of precipitation on the valley floor, 1,800 af/yr from percolation of runoff from the Piute and El Paso Mountains watersheds, 3,200 af/yr from percolation of runoff from the Rand Mountains watershed, 300 af/yr of subsurface flow from the Mojave City Subbasin, and

2,600 af/yr of subsurface flow from the AVGB. A diagram of the groundwater recharge to the California City Subbasin is shown on Plate V-18.

As a result, the total groundwater recharge to the FVGB averaged approximately 16,200 af/yr. Although this estimated groundwater recharge is consistent with the value of 16,100 acre-feet previously estimated by Thomas M. Stetson, Civil and Consulting Engineers [10], it is still considered qualitative because of the uncertainties of the groundwater extractions in the FVGB, which is a controlling factor of the spreadsheet groundwater balance models. This total groundwater recharge may be considered as the safe yield of the FVGB since it is *"the amount of naturally occurring groundwater which can be economically and legally withdrawn from an aquifer on a sustained basis without impairing the native groundwater quality or creating an undesirable effect such as environmental damage."* [22]

The average groundwater recharge to the FVGB within the City boundary was estimated at approximately 5,300 af/yr. This consists of 1,900 af/yr from direct percolation of precipitation on the valley floor, 500 af/yr from percolation of runoff from the Rand Mountains watershed, 300 af/yr of subsurface outflow from the Mojave City Subbasin, and 2,600 af/yr of subsurface outflow from the AVGB. This average groundwater recharge may be considered as the safe yield of the FVGB within the City boundary.

V.8. Groundwater Quality

Groundwater quality of the FVGB appears to meet all drinking water standards established by the Title 22 of the California Department of Public Health (CDPH), except in some places where the constituent concentrations may exceed their maximum contaminant levels (MCLs). Historic water quality data [5,15] indicate that groundwater in the northern portion of the California City Subbasin north of Randsburg Red Rock Road appears to have the best quality. The constituent concentration at Well 29S/40E-22E02 in 1995 was 349 milligrams per liter (mg/l) for total dissolved solids (TDS), 115 mg/l for sodium, and 39 mg/l for chloride. The CDPH secondary MCLs for TDS are 500 mg/l (recommended level), 1,000 mg/l (upper level), and 1,500 mg/l (short-term level). The CDPH secondary MCLs for chloride are 250 mg/l (recommended level), 500 mg/l (upper level), and 600 mg/l (short-term level). There are no CDPH MCLs for sodium.

Groundwater in the vicinity of the Koehn Lake appears to have the lowest quality. The TDS, sodium, and chloride concentrations in Well 30S/38E-03B01 near Saltdale reached 101,000 mg/l, 36,400 mg/l, and 55,800 mg/l, respectively, in 1962. The groundwater quality appears to improve from the north to the south. The TDS concentration range varied between 600 and 1,000 mg/l in the area north of the Koehn Lake, between 500 and 700 mg/l in the area south of the Koehn Lake, and between 400 and 600 mg/l in the southern portion of the California City Subbasin. The sodium concentration range varied between 120 and 200 mg/l in the area north of the Koehn Lake, between 80 and 170 mg/l in the area south of the Koehn Lake, and between 80 and 150 mg/l in the southern portion of the California City Subbasin. The chloride concentration range varied between 80 to 300 mg/l in the area north of the Koehn Lake, between 80 and 170 mg/l in the area south of the Koehn Lake, and between 80 and 150 mg/l in the southern portion of the California City Subbasin.

In the Mojave City Subbasin, groundwater in the southern portion south of the City of Mojave appears to have a better quality than that in the northern portion near the Muroc Fault. The constituent concentrations in the southern portion ranged between 250 and 450 mg/l for TDS, between 45 and 100 mg/l for sodium, and between 10 and 70 mg/l for chloride. The constituent concentrations in the northern portion ranged between 600 and 800 mg/l for TDS, between 60 and 100 mg/l for sodium, and between 50 and 70 mg/l for chloride.

Groundwater in the California City Subbasin within the City appears to meet all CDPH drinking water standards. The 2006 concentrations of groundwater from the City wells ranged from 456 to 610 mg/l for TDS, 63 to 131 mg/l for chloride, 120 to 150 mg/l for sodium, and 1.6 to 7.2 mg/l as NO_3 for nitrate [23]. The CDPH MCL for nitrate is 45 mg/l as NO_3.

VI. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

In July 2008, Stetson entered an agreement with the City to provide professional engineering services for conducting an evaluation of the City's groundwater resources to support the preparation of the City UWMP. In compliance with the City direction, Stetson's work focused on the availability of groundwater in the FVGB, the primary source of the City's water supply.

The FVGB covers an area of approximately 216,000 acres of the Freemont Valley bounded by the Tehachapi, Piute, and El Paso Mountains on the north and west, the Rand Mountains and the low hills from the Galileo Hill to the Radio Tower Hills on the east, and the low hills from the Radio Tower Hills to the Standard Hill and the watershed boundary from the Standard Hill to the mouth of the Oak Creek on the south. The consolidated rocks forming the mountains, hills, and the basement complex make up the sides and bottom of the FVGB, which has a trough shape dipping from its north and south ends to the lowest area in the central portion near the Koehn Lake. The FVGB consists of unconsolidated deposits such as gravels, sands, and silt interbedded with layers of clay and shale of various thicknesses, especially in the Koehn Lake area. The thickness of the unconsolidated deposits along the FVGB longitudinal axis varies from approximately 300 feet at the southern boundary to approximately 800 feet in the Koehn Lake area and pinches out at the northern boundary near US 395. According to the results from the recent pump tests conducted in the Cinco area in 2007, the FVGB aquifer system in that area is confined to semi-confined with a transmissivity ranging from approximately 122,000 to 520,000 gpd/ft (16,310 to 69,520 ft^2/d), a hydraulic conductivity ranging from 256 to 959 (gpd/ft^2) (34 to 128 ft/d), and a coefficient of storage ranging from 0.0003 to 0.0158.

Groundwater exists in the FVGB at different depths. In the 1950s, when the FVGB was considered to be full, the depth to water varied from above (artesian conditions) or near the ground surface in the vicinity of the Koehn Lake up to 560 feet in the area just north of the Muroc Fault. From the 1960s, the depth to water in the FVGB declined significantly due to a combination of the prolonged drought period from 1945 to 1964 and an extensive groundwater extraction for agricultural uses, which was reported to reach 60,000 af/yr in 1976. The decline varied from approximately 100 to 105 feet in the northern portion, from 16 to 22 feet in the central portion, and 8 feet in the southern portion. In the 1980s, the depth to water in the FVGB generally stabilized until approximately 1995. Since then, the depth to water in the FVGB has partially recovered in the northern and north-central portions (from 2 to 50 feet), but continued to decline in the south-central and southern portions (from 2 to 16 feet) probably because of significant groundwater extraction for municipal and other uses in the areas.

Water level data between 1955 and 1958 indicate that the Muroc Fault acts as a barrier to groundwater flow and divides the FVGB into two subbasins: the Mojave City Subbasin in the south and the California City Subbasin in the north. Other major faults such as the Garlock Fault, El Paso Fault, Cantil Valley Fault, and Randsburg-Mojave Faults run along the longitudinal axis of the FVGB but do not appear to affect groundwater flow. The groundwater elevation contours generated from the water level data indicate that groundwater in the Mojave City Subbasin appears to flow in an easterly direction from the alluvial fan along the Tehachapi Mountains and then "cascade" into the California City Subbasin along the Muroc Fault when the water level is high. In the California City Subbasin, groundwater appears to flow from the alluvial fans along the surrounding mountains and hills toward the depression in the vicinity of the Koehn Lake. In addition to groundwater from the Mojave City Subbasin, the California City Subbasin also receives subsurface flow from the AVGB through the alluvial narrows between the Castle Butte and the Twin Buttes, which was estimated at approximately 2,572 af/yr. Based on these water level data, the groundwater storage of the FVGB was estimated at approximately 8,300,000 acre-feet including 5,700,000 acre-feet in the California City Subbasin and 2,600,000 acre-feet in the Mojave City Subbasin. The groundwater storage of the FVGB in 2007, however, was estimated to reduce to approximately 6,900,000 acre-feet including 4,400,000 acre-feet in the California City Subbasin and 2,500,000 acre-feet in the Mojave City Subbasin. Within the City boundary, the groundwater storage of the FVGB was estimated at approximately 1,980,000 acre-feet in 1955, 1,860,000 acre-feet in 1967, 1,700,000 acre-feet in 1976, and 1,650,000 in 2007.

Recharge to the FVGB is derived primarily from direct percolation of precipitation on the valley floor, percolation of runoff from the surrounding watersheds, and subsurface flow from the AVGB. The groundwater recharge to the FVGB was estimated using two spreadsheet groundwater balance models developed for the Mojave City and California City Subbasins. Historic precipitations from 1945 to 2007 at the Mojave Station, Tehachapi Station, and Randsburg Station were used to estimate direct percolation of precipitation on the valley floor and percolation from runoff from the western and eastern watersheds, respectively. The average annual precipitation ranges from 5.44 inches at the Mojave Station to 6.04 inches at the Randsburg Station and 10.83 inches at the Tehachapi Station. Since the annual groundwater extraction in the FVGB is not known, the spreadsheet groundwater balance models were calibrated during the period between the late 1940s and the early 1960s when groundwater extraction was minimal to determine the recharge coefficients for direct percolation of precipitation and percolation from runoff. Thereafter, the recharge coefficients were kept unchanged but the groundwater extraction was adjusted within a reasonable range to calibrate against the measured water level in Well 30S/37E-36G01 in the California City Subbasin and Well 12N/12W-35R01 in the Mojave City Subbasin.

The spreadsheet groundwater balance model for the Mojave City Subbasin was simulated first to estimate annual subsurface flow to the California City Subbasin, which was assumed to be the amount of the simulated annual storage above the full storage of 2,600,000 acre-feet. The simulation results indicate that significant subsurface flow ranging from approximately 3,300 to 5,500 acre-feet occurred in 1945, 1952, 1957, and 1958 but has stopped since 1959. The simulation results indicate that the groundwater recharge to the Mojave City Subbasin varied from zero to approximately 16,100 acre-feet including 9,500 acre-feet from direct percolation of precipitation on the valley floor and 6,600 acre-feet from percolation of runoff from the surrounding watersheds. On the average, the Mojave City Subbasin receives approximately 3,100 af/yr, including 2,700 af/yr from direct percolation of precipitation on the valley floor and 400 af/yr from percolation of runoff from the surrounding watersheds.

The simulated annual subsurface flows from the Mojave City Subbasin were used as input for the spreadsheet groundwater balance model for the California City Subbasin. The simulation results indicate that the groundwater recharge to the California City Subbasin varied from approximately 2,600 (subsurface inflow from the AVGB) to 82,100 acre-feet including 18,400 acre-feet from direct percolation of precipitation on the valley floor, 36,800 acre-feet from percolation of runoff from the Piute and El Paso Mountains watersheds, 24,300 acre-feet from percolation of runoff from the Rand Mountains watershed, and 2,600 acre-feet of subsurface flow from the AVGB. On the average, the California City Subbasin receives approximately 13,100 af/yr, including 5,200 af/yr from direct percolation of precipitation on the valley floor, 1,800 af/yr from percolation of runoff from the Piute and El Paso Mountains watershed, 3,200 af/yr from percolation of runoff from the Rand Mountains watershed, 300 af/yr of subsurface flow from the Mojave City Subbasin, and 2,600 af/yr of subsurface flow from the AVGB. Although the estimated groundwater recharge for each subbasin is reasonable and consistent with the previous estimate, it is considered qualitative because of the uncertainties of the groundwater extraction used for the spreadsheet groundwater balance models.

Since the simulated groundwater recharge of 16,200 af/yr (13,100 af/yr for the California City Subbasin and 3,100 af/yr for the Mojave City Subbasin) is the average amount of naturally occurring groundwater that may be used on a sustained basis without further degrading the hydrogeological conditions of the subbasins, it may be considered as the estimated safe yield of the FVGB. Within the City boundary, the average groundwater recharge to or the estimated safe yield of the FVGB was estimated at approximately 5,300 af/yr.

Based on the results from the Stetson evaluation, groundwater in the California City Subbasin appears to be adequate to meet the City's future water demands under worst-case conditions in 2025, which were projected to reach 12,655 af/yr, if groundwater extractions from other users in the subbasin are not significant. Unfortunately, this may not be likely the case although the City will probably remain the largest groundwater producer in the subbasin.

In order to meet the future water demands while preventing further overdrafting the groundwater resources of the FVGB, the City may consider the following measures:

1. Reduce the City's water demands by conservation and/or limitation of growth. Groundwater in the California City Subbasin should be able to support the City's water demands in 2025 if the ADD is reduced from 340 to 245 gpcd at the 5-percent growth

rate (9,119 af/yr), or if the growth rate is limited at 3.5 percent while maintaining the ADD at 340 gpcd (9,092 af/yr). The groundwater resources in the California City Subbasin would be more sustainable with both conservation and growth limitation. In fact, the City's water demands in 2025 would be 6,551 af/yr if the ADD and growth rate are reduced to 245 gpcd and 3.5 percent, respectively.

2. Increase the City's water supply by developing groundwater in the Mojave City Subbasin. Additional wells may be drilled within the City limit just south of the Muroc Fault and northwest of the Radio Tower Hills to meet the City's water demands south of the Muroc Fault. This area is favorable for new wells because the water quality is very good and the depth to water is shallow.

3. Start a City groundwater elevation monitoring program by measuring the static water levels in the City's wells on a monthly basis. These water levels should be measured to the nearest one hundredth of a foot using an electronic sounder. The elevation of the measuring (reference) point at each well should be surveyed to the nearest one hundredth of a foot to obtain accurate elevations of the groundwater table of the California City Subbasin in the area.

4. Coordinate with other major groundwater producers such as MPUD in the FVGB and the federal, state, regional, and local agencies such as the USGS, DWR, California Regional Water Quality Control Board/Lahontan and Los Angeles Regions, Counties of Los Angeles, Kern, and San Bernardino, and AVEK to develop a basinwide groundwater management plan for the FVGB (FVGB Management Plan). The primary objective of the FVGB Management Plan is to optimize the use of the groundwater resources in the FVGB without further degrading its hydrogeologic and water quality conditions. In addition, a basinwide groundwater monitoring program for the FVGB (FVGB Monitoring Program), as part of the FVGB Management Plan, is also developed and implemented to provide necessary and reliable data such as groundwater extraction, water level, and water quality for the development of the FVGB Management Plan and to evaluate management measures or projects in the FVGB.

5. Alternatively, the City may consider developing and adopting a groundwater management plan under Assembly Bill (AB) 3030 to protect its groundwater supply. AB 3030 allows any local public agency which provides water service to all or a portion of its service area and whose service area includes all or a portion of a groundwater basin to adopt a groundwater management program. The law contains 12 components which may be included in a groundwater management plan. Each component may play some role in evaluating or operating a groundwater basin so that groundwater can be managed to maximize the total water supply while protecting groundwater quality.

6. Refine the estimated groundwater recharges to the California City and Mojave City Subbasins when appropriate data and information from the FVGB Monitoring Program become available, probably from 5 to 10 years. Accurate annual groundwater extraction for this period will be used to refine the recharge coefficients for direct percolation of

precipitation and percolation from runoff in the spreadsheet groundwater balance models for the California City and Mojave City Subbasins.

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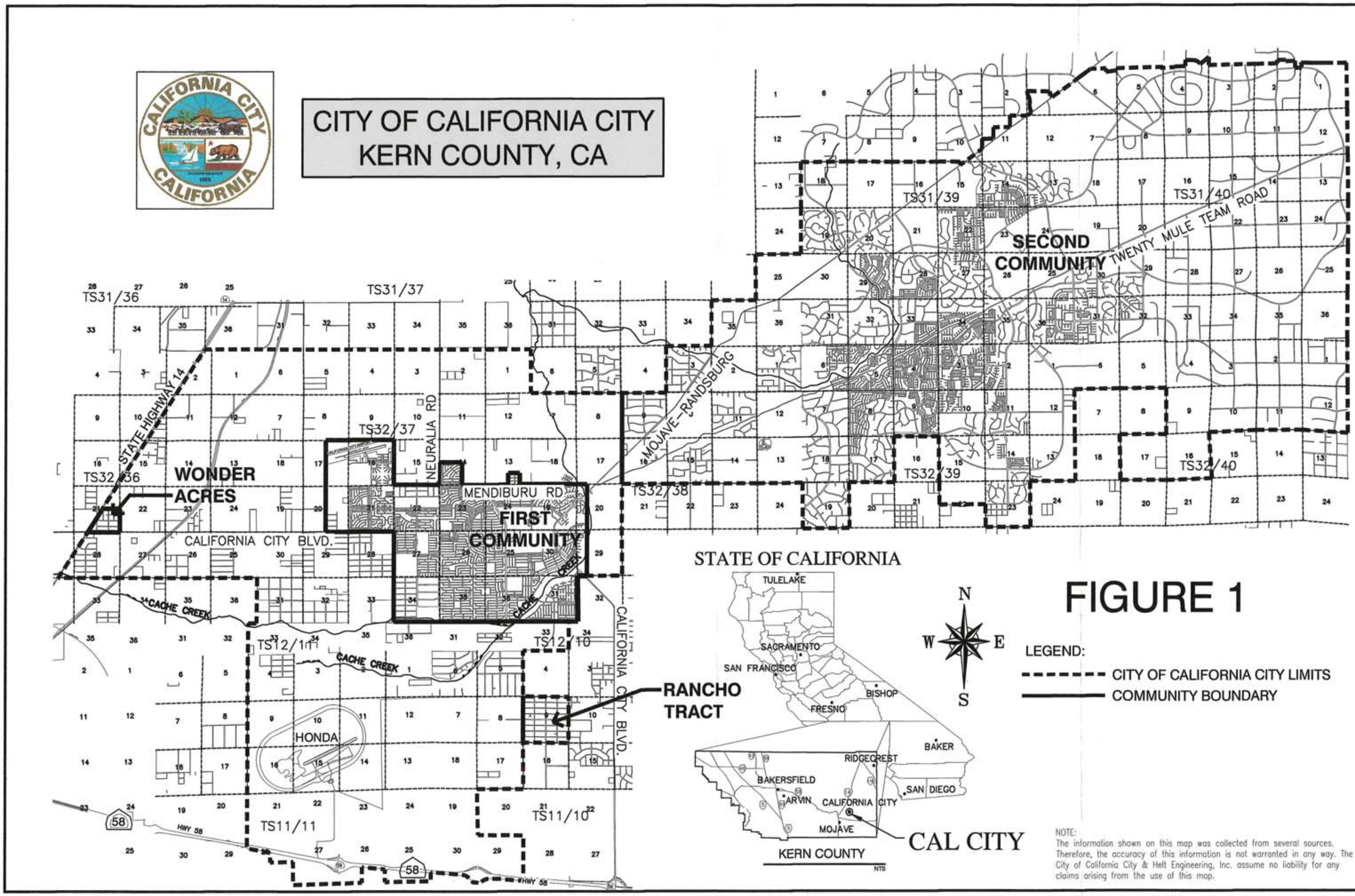
FIGURE 1: Map of City of California City, Kern County



NOTE:
The information shown on this map was collected from several sources. Therefore, the accuracy of this information is not warranted in any way. The City of California City & Helt Engineering, Inc. assume no liability for any claims arising from the use of this map.

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DRAWN BY: RP
CK'D BY: MP,JH
DATE CK'D: 2/23/16

REVISIONS | CK'D BY | DATE CK'D

JOB NO. 15415

CITY OF CALIFORNIA CITY
KERN COUNTY, CALIFORNIA
BASE MAP
CITY BOUNDARIES

SHEET 1 OF 1 SHEETS

FIGURE 2: Lahontan Memorandum Map (Map 'A')

FIGURE 2
Lahontan Memorandum Map (Map 'A')

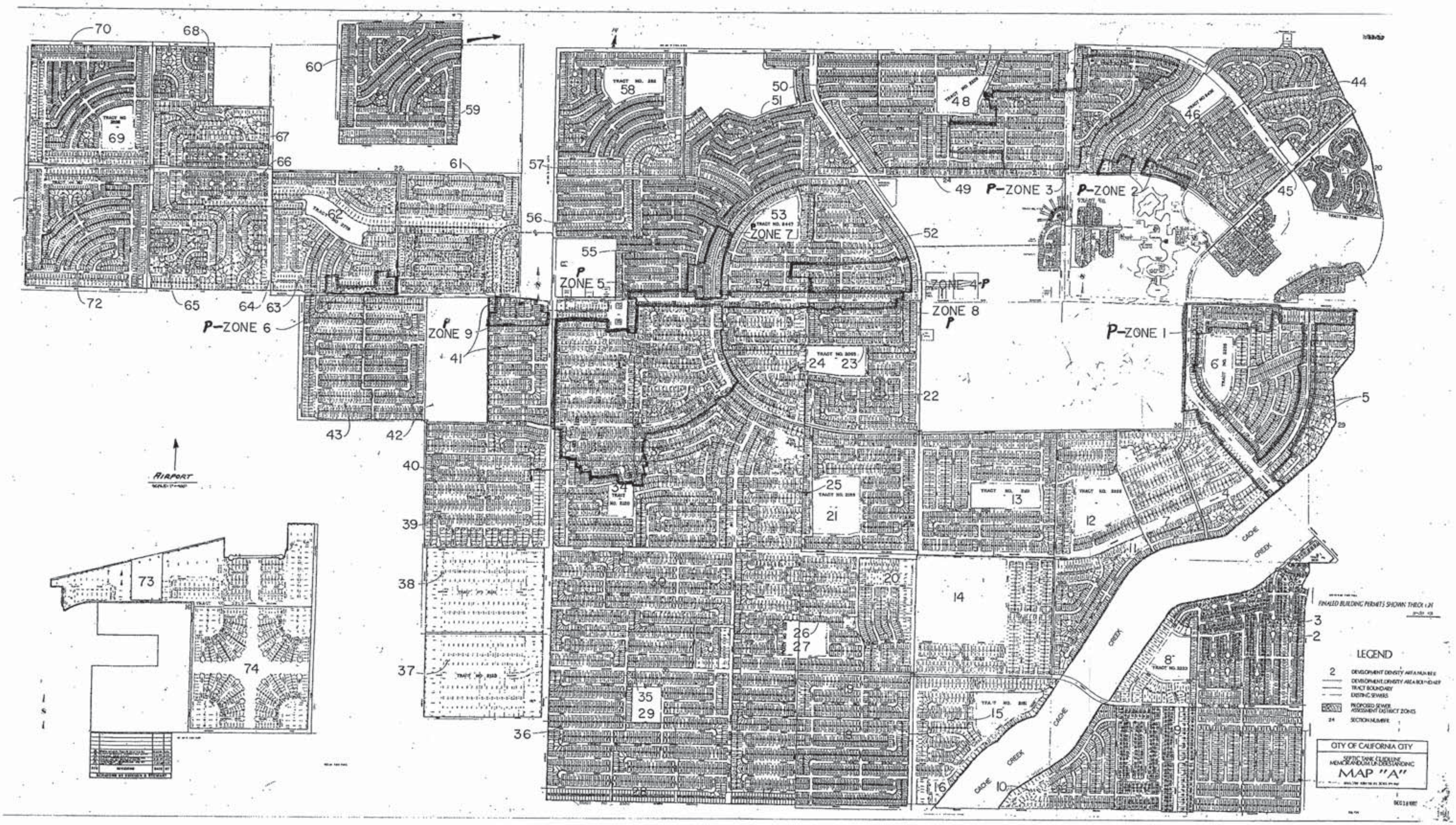

FIGURE 3: City Sewer Density Calculations

CITY OF CALIFORNIA CITY

SEWER DENSITY CALCULATIONS BASED ON TWO (2) DWELLING UNITS PER ACRE

SEWER DENSITY AS OF: 07/14/15

DENSITY ZONE	TRACT #'S IN EACH ZONE	LOTS PER TRACT	ZONE ACRES	# OF D.U. ALLOWED (2 d.u./ac)	PERMITS ISSUED TO DATE	TOTAL # OF LOTS	# OF UNDEVELOPED LOTS to CAP	CURRENT % USED	% CAP at Total Buildout	COMMENTS
D01	2404	153	107.36	215	1	359	214	0.5%	167.0%	
	2461	206								
D02	2404	22	60.83	122	0	230	122	0.0%	188.5%	
	2630	208								
D03	2630	309	84.02	168	8	330	160	4.8%	196.4%	
	2860	20								
	2223	1								
D04	2226	164	60.65	121	23	164	98	19.0%	135.2%	
D05	2226	302	101.35	203	31	302	172	15.3%	149.0%	
D06	2226	92	45.34	91	31	92	60	34.2%	101.5%	
D07	2225	212	74.10	148	32	212	116	21.6%	143.0%	
D08	2223	48	54.96	110	0	73	110.00	0.0%	66.4%	
	2630	20								
	2404	5								
D09	2223	222	82.58	165	1	249	164	0.6%	150.9%	
	2404	27								
D10	2223	205	61.82	124	1	200	123	0.8%	161.8%	
D11	2225	205	65.77	132	2	208	130	1.5%	157.6%	
	2223	3								
D12	2225	205	92.56	185	7	162	178	3.8%	87.5%	
D13	2161	222	89.31	179	38	222	141	21.3%	124.3%	
D14	2163	260	162.28	325	38	260	287	11.7%	80.1%	
D15	2191	132	43.31	87	21	134	66	24.1%	154.0%	
	2223	2								
D16	2191	132	71.55	143	8	132	135	5.6%	92.2%	
D17	2530	299	87.85	176	0	381	176	0.0%	216.5%	
	2122	82								
D18	2530	72	67.78	136	4	239	132	2.9%	175.7%	

	2122	69								
	2119	15								
	2117	2								
	2164	81								
D19	2119	28	60.94	122	16	196	106	13.1%	160.7%	
	2117	3								
	2164	165								
D20	2115	150	67.91	136	1	150	135	0.7%	110.4%	
D21	2159	318	206.83	414	164	543	250	39.6%	131.2%	
	2160	225								
D22	2069	205	72.79	146	64	208	82	44.0%	142.9%	
D23	2067	82	50.06	100	60	173	40	60.0%	173.0%	
	2069	91								
D24	2067	140	44.90	90	67	140	23	74.6%	155.9%	
D25	2116	223	103.37	207	158	328	49	76.3%	158.5%	
	2159	25								
	2120	30								
	2067	50								
D26	2115	130	103.49	207	79	300	128	38.2%	144.9%	
	2119	152								
	2117	1								
	2068	17								
D27	2115	68	78.14	156	29	211	127	18.6%	135.3%	
	2119	125								
	2117	18								
D28	2122	77	77.14	154	0	271	154	0.0%	175.7%	
	2118	115								
	2530	79								
D29	2122	43	108.91	218	14	302	204	6.4%	138.5%	
	2118	39								
	2117	216								
	2068	4								
D30	2068	292	95.74	191	166	292	25	86.7%	152.5%	
D31	2116	135	76.71	153	127	259	26	83.0%	169.3%	
	2120	124								

D32	2067	121	36.41	73	67	121	6	92.0%	166.2%	
D33			80.03	160	112	REPLACED WITH P5				
D34	2120	185	64.77	130	56	193	74	43.1%	148.5%	
	2066	8								
D35	2068	183	111.18	222	109	352	113	49.1%	158.6%	
	2117	169								
D36	2118	118	75.99	152	3	269	149	2.0%	177.0%	
	2117	109								
	2530	42								
D37	2123	84	97.02	194	27	85	167	13.9%	43.8%	
D38	2121	85	101.2	202	1	84	201	0.5%	41.5%	
D39	2317	261	81.25	163	13	261	150	8.0%	160.6%	
D40	2310	122	72.43	145	24	224	121	16.6%	154.5%	
	2317	102								
D41	2310	190	63.66	127	58	194	69	45.6%	152.4%	
D42	2725	301	159.4	319	54	295	265	16.9%	92.5%	
D43	2725	315	72.14	144	59	317	85	40.9%	219.7%	
D44	2436	250	79.59	159	51	250	108	32.0%	157.1%	
D45	2435	150	74.61	149	99	224	50	66.4%	150.3%	
	2436	74								
D46	2436	23	70.42	141	94	153	47	66.7%	108.5%	
	2435	99								
	2252	31								
D47	2227	92	37.16	74	54	126	20	73.0%	170.3%	
	2252	34								
D48	2228	154	73.54	147	84	175	63	57.1%	119.0%	
	2227	11								
	2791	10								
D49	2228	78	51.71	103	24	187	79	23.3%	181.6%	
	2791	109								
D50	2791	180	46.13	92	60	180	32	65.0%	195.1%	
D51	2967	467	119.77	240	0	467	240	0.0%	195.0%	
D52	2305	170	58.08	116	54	173	62	46.5%	148.9%	
D53	2447	123	53.37	107	68	129	39	63.6%	120.6%	

	2305	6							
D54	2447	4	24.08	48	18	80	30	37.4%	166.1%
D55	2629	214	50.60	101	56	213	45	55.3%	210.5%
D56	2629	266	70.89	142	45	266	97	31.7%	187.6%
D57	2811	257	73.57	147	1	257	146	0.7%	174.7%
D58	2811	242	78.18	156	9	337	147	5.8%	216.0%
	5179	95							
D59	2812	324	76.92	154	0	321	154	0.0%	208.7%
D60	2812	300	69.45	139	0	300	139	0.0%	216.0%
D61	2778	265	67.69	135	52	265	83	38.4%	195.7%
D62	2779	172	63.72	127	34	173	93	26.7%	135.8%
D63	2779	263	75.22	150	49	262	101	32.6%	174.2%
D64	2726	130	50.90	102	20	131	82	19.6%	128.7%
D65	2726	205	59.41	119	15	204	104	12.6%	171.7%
D66	2726	165	50.36	101	9	165	92	8.9%	163.8%
D67	2727	243	68.96	138	1	243	137	0.7%	176.2%
D68	2727	141	75.62	151	0	249	151	0.0%	164.9%
	5527-1	108							
D69	2898	262	86.91	174	0	291	174	0.0%	167.4%
D70	2898	288	65.00	130	0	288	130	0.0%	221.5%
D71	2887	235	64.68	129	1	234	128	0.8%	180.9%
D72	2887	408	92.60	185	2	419	183	1.1%	226.2%
D73	2528	162	130.36	261	5	373	256	1.9%	143.1%
D74	2528	274	145.54	291	8	160	283	2.7%	55.0%
TOTAL:			**5780.9**	**11563**	**2688**	**17012**	**8828**	**23.2%**	**147.1%**

PRIORITY DENSITY ZONES									
P1	2226	199	81.93	164	62	198	102	37.8%	120.7%
P2	2435	21	12.27	25	16	24	9	64.0%	96.0%
	2252	3							
P3	2252	174	125.47	251	202	391	49	80.5%	155.8%
	2227	160							
	2228	57							
P4	2305 2447	109	33.21	66	54	109	SEWERED		
P5	2120	36	229.04	458	443	611	15	96.7%	133.4%
	2067	241							

	2066	334								
P6	2779		10.65	21	19	31	SEWERED			
P7	2629	45	18.65	37	23	60	14	62.2%	162.2%	
	2447	15								
P8	2069	21	52.93	106	38	124	68	35.8%	117.0%	
	2305	17								
	2447	28								
	2067	41								
	2629	17								
P9	2310	50	15.70	31	13	46	18	41.9%	148.4%	
TOTAL-P			**579.85**	**1159**	**870**	**1594**	**275**	**75.1%**	**137.5%**	
TOTAL ALL			**6360.7**	**12722**	**3558**	**18606**	**9103**	**28.0%**	**146.3%**	

FIGURE 4: City Density Zone Map

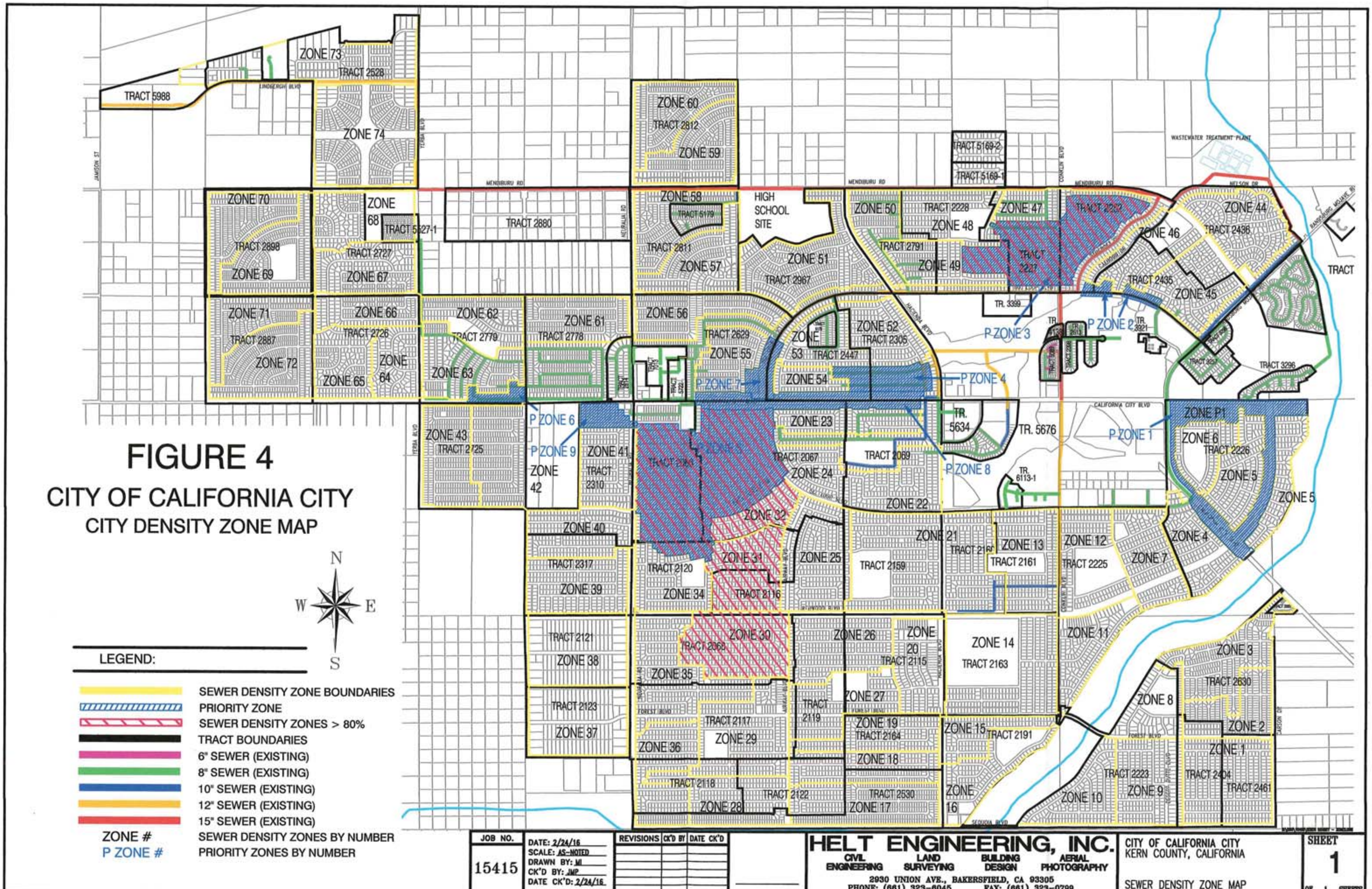
FIGURE 4
CITY OF CALIFORNIA CITY
CITY DENSITY ZONE MAP
N
W
E
S
LEGEND:
SEWER DENSITY ZONE BOUNDARIES
PRIORITY ZONE
SEWER DENSITY ZONES > 80%
TRACT BOUNDARIES
6" SEWER (EXISTING)
8" SEWER (EXISTING)
10" SEWER (EXISTING)
12" SEWER (EXISTING)
15" SEWER (EXISTING)
ZONE # SEWER DENSITY ZONES BY NUMBER
P ZONE # PRIORITY ZONES BY NUMBER
JOB NO.
15415
DATE: 2/24/16
SCALE: AS-NOTED
DRAWN BY: MI
CK'D BY: JMP
DATE CK'D: 2/24/16
REVISIONS CK'D BY DATE CK'D
HELT ENGINEERING, INC.
CIVIL ENGINEERING
LAND SURVEYING
BUILDING DESIGN
AERIAL PHOTOGRAPHY
2930 UNION AVE., BAKERSFIELD, CA 93305
PHONE: (661) 323-6045 FAX: (661) 323-0799
CITY OF CALIFORNIA CITY
KERN COUNTY, CALIFORNIA
SEWER DENSITY ZONE MAP
SHEET
1
OF 1 SHEETS
WASTEWATER TREATMENT PLANT
HIGH SCHOOL SITE
MENDIBURU RD
CALIFORNIA CITY BLVD
ZONE 73
TRACT 2528
TRACT 5988
ZONE 74
ZONE 60
TRACT 2812
ZONE 59
TRACT 5169-2
TRACT 5169-1
ZONE 70
ZONE 68
TRACT 5627-1
TRACT 2880
ZONE 58
TRACT 2898
ZONE 69
TRACT 2727
ZONE 67
TRACT 2811
ZONE 57
ZONE 51
TRACT 2967
ZONE 50
TRACT 2228
ZONE 48
ZONE 47
ZONE 44
ZONE 46
TRACT 2436
TRACT 2791
ZONE 49
TRACT 2435
ZONE 45
ZONE 71
TRACT 2887
ZONE 72
ZONE 66
TRACT 2726
ZONE 65
ZONE 64
ZONE 62
TRACT 2779
ZONE 63
ZONE 61
TRACT 2778
ZONE 56
TRACT 2629
ZONE 55
ZONE 53
TRACT 2447
ZONE 52
TRACT 2305
ZONE 54
P ZONE 1
P ZONE 2
P ZONE 3
P ZONE 4
P ZONE 6
P ZONE 7
P ZONE 8
P ZONE 9
TR. 3399
TRACT 3296
ZONE 43
TRACT 2725
ZONE 41
ZONE 42
TRACT 2310
ZONE 23
TRACT 2067
ZONE 24
TRACT 2069
TR. 5634
TR. 5676
TR. 6113-1
ZONE P1
ZONE 6
TRACT 2226
ZONE 5
ZONE 22
ZONE 4
ZONE 40
TRACT 2317
ZONE 39
ZONE 32
ZONE 31
TRACT 2116
TRACT 2120
ZONE 34
ZONE 25
ZONE 21
TRACT 2159
ZONE 13
TRACT 2161
ZONE 12
TRACT 2225
ZONE 7
TRACT 2121
ZONE 38
ZONE 30
TRACT 2068
ZONE 35
ZONE 26
ZONE 20
TRACT 2115
ZONE 14
TRACT 2163
ZONE 11
ZONE 3
TRACT 2630
TRACT 2123
ZONE 37
TRACT 2117
ZONE 29
TRACT 2119
ZONE 27
ZONE 19
TRACT 2164
ZONE 15
TRACT 2191
ZONE 8
ZONE 2
ZONE 1
ZONE 36
ZONE 18
TRACT 2118
ZONE 28
TRACT 2122
TRACT 2530
ZONE 17
ZONE 16
ZONE 10
TRACT 2223
ZONE 9
TRACT 2404
TRACT 2461

FIGURE 5: California City, Soil Group Area of Depiction Map

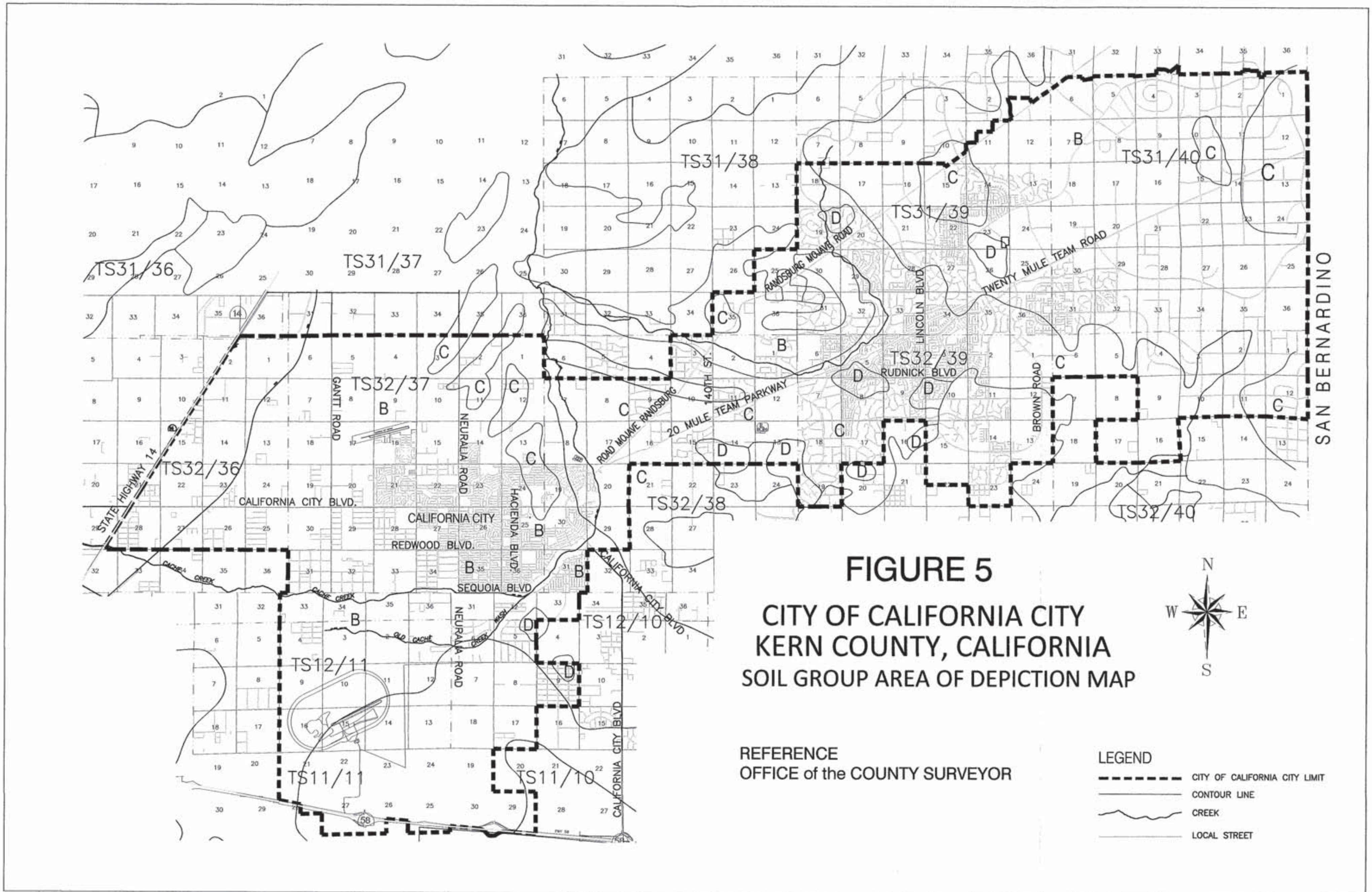

FIGURE 5

CITY OF CALIFORNIA CITY
KERN COUNTY, CALIFORNIA
SOIL GROUP AREA OF DEPICTION MAP