



DEPARTMENT OF PUBLIC HEALTH

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Policy: Second Dwelling Units and On-Site Waste Water Treatment Systems on Parcels Less Than Five Acres (Effective January 14, 2013)

Merced County Department of Public Health, Division of Environmental Health (MCDEH) is currently not allowing a second dwelling relying on On-Site Wastewater Treatment Systems (OWTS) on parcels smaller than 5 acres in accordance with the November 18, 2005 Central Valley Regional Water Quality Control Board (CVRWQCB) letter (attached, see page 4) and consistent with the recently adopted (June of 2012) State Water Resources Control Board, Water Quality Control Policy for Siting, Design, Operation and Maintenance of Onsite Wastewater Treatment Systems.

The 2010 California Residential Code defines a dwelling unit as “A single unit providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation”. An existing single dwelling unit is considered the primary dwelling unit.

Adding to the existing/primary dwelling unit (and likely adding to the existing septic system) will be allowed under the following conditions:

- The addition must share a common wall with the existing dwelling unit.
- The shared wall must have a doorway connecting the addition to the existing dwelling unit.

Additions to an existing house must be connected to the dwelling part of the house. For example, the connection may not be exclusively to a garage or breezeway. An allowable addition may have bedroom(s), bathroom(s), and a kitchen.

We are allowing additional sewage connections to an existing septic system, or a second septic system on parcels less than 5 acres, if the change is not likely to cause an increase in total sewage flow on the parcel - for example: adding a bathroom in a shop, adding an outdoor kitchen, adding a pool house with a bathroom. In these cases, the sewage flow is merely shifting from the dwelling fixtures to the alternate fixtures.

We are allowing an existing septic system to be expanded as part of a septic system repair, to prevent septic system failure, or to accommodate an expansion of a dwelling, as long as the dwelling expansion meets the conditions above and the septic system expansion complies with MCDEH's current *Minimum Design Standards*.

Rationale:

- The Central Valley Regional Water Quality Control Board has concerns about overall density of sewage systems (more than 1.2 million OWTS's Statewide) and the amount of sewage applied compared to the annual rainfall. The Regional Board does not want Merced County to allow more than one dwelling on a parcel smaller than 5 acres. We share their concerns and are respecting their recommendation.
- An addition to an existing dwelling unit usually takes up less square footage on the parcel than does a second dwelling. Leach field replacement area is more likely to be retained with the addition.
- An addition is more likely to be occupied by one or two persons, who are more likely to share food preparation and laundry activities with the other occupants of the dwelling, resulting in a minimal increase in sewage flow. A second dwelling is more likely to have duplication of sewage-producing activities and to be occupied by a larger number of people, producing a greater amount of sewage.

01/14/2013

Ron Rowe, Environmental Health Director

Date



California Regional Water Quality Control Board

Central Valley Region

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Arnold
Schwarzenegger
Governor

18 November 2005

Mr. Jeff Palsgaard, Director
Merced County Environmental Health
777 W. 22nd Street
Merced, California 95340

MERCED COUNTY ONSITE WASTEWATER TREATMENT SYSTEM DENSITY

Your letter dated 18 August 2005 responded to recent Regional Board staff letters commenting on several proposed rural subdivisions in Merced County reliant on onsite wastewater treatment systems (OWTS) with respect to their potential to adversely impact groundwater quality. On 3 November, we met to discuss the County's 1-acre-minimum lot requirement for parcels with OWTS and private wells, specifically, whether this requirement is appropriate and adequately protective of groundwater. We also discussed the potential water quality impacts from second residence units on parcels zoned for a single-family residences, a land development policy described in California Government Code Section 65852.2. This letter provides Water Board staff technical commentary on the issues addressed in your letter and during our recent meeting.

Your 18 August letter indicates the following. The County has had a 1-acre lot minimum for the development of OWTS-reliant residential zoning for the past 30 years. The County reviewed the Central Valley Water Board's *Guidelines for Waste Disposal from Land Developments* (Guidelines) and determined the County OWTS requirements meet or exceed the Guidelines. The County has one of the most stringent well ordinances in the State. The County requires sampling of every new domestic well for "general mineral, inorganic, DBCP/EDB, and bacteria." The County has an established groundwater monitoring program that involves periodic sampling of 18 domestic wells throughout the County, and that the water quality results from wells in areas typified by 1-acre lot subdivisions have not indicated any significant increases in nitrate levels. Your letter enclosed a technical article¹ that describes the use of a mass balance model to identify minimum densities of OWTS-reliant residential lots to ensure groundwater impacts from nitrate do not exceed the applicable water quality objective of 45 mg/L (or 10 mg/L as nitrogen); a summary sheet containing values from or derived by the technical article; and, a 1979 technical report, *Areawide Waste Treatment Management Plan, Lake Yosemite Study Area*, by John Carollo Engineers.

In your letter, you stated your belief that the County's 1-acre minimum lot size requirement for OWTS-reliant residential lots is appropriate and adequately protective of groundwater, and indicated that the County will perform a site-specific analysis for all minor and major subdivisions using the mass balance equation described in the technical article, continue biannual monitoring of domestic wells, and continue implementing the Guidelines and County requirements for OWTS. In performing the site-specific

¹ Hantzsche, N. N., and E. J. Finnemore. 1992. Predicting Ground-Water Nitrate Impacts. *Ground Water*, v. 30, no. 4, pp. 490-499.

analysis, the County will increase the minimum lot size “if the analysis indicates that groundwater quality from a 1-acre lot may be negatively impacted.”

Guidelines. The Guidelines articulates several principals and policies that the Water Board applies in reviewing water quality factors related to land developments. These state, in part, the following:

There are many areas within the Central Valley that are not conducive to individual waste treatment and disposal systems. In these areas, connection to an adequate community sewerage system is the most satisfactory method of disposing of sewage. The [Water] Board believes that individual disposal systems should not be used where community systems are available and that every effort should be made to secure public sewer extensions, particularly in urban areas. Where connection to a public sewer is not feasible and a number of residences are to be served, due consideration should be given to construction of a community sewage treatment and disposal system.

In recent Water Board staff letters commenting on several proposed subdivisions in Merced County near urban areas (e.g., City of Atwater), staff noted that the County’s authorization of residential development typified by 1-acre-minimum, OWTS-reliant lots, has the potential of unreasonably degrading groundwater, and recommended the County first determine whether shallow groundwater in areas proposed for such development has sufficient assimilative capacity for waste constituents discharged from residential OWTS.

Lake Yosemite Study Area Technical Report. The report described the results of an evaluation performed in the late 1970s of existing OWTS-reliant development and groundwater quality within the Study Area. The Regional Board partially funded the evaluation through a grant under Section 208 of the federal Water Pollution Control Act of 1972 and Regional Board staff contributed to the evaluation effort. It described land uses as residential and agricultural; noted that the most significant land use change since 1971 was the increase in residential development; offered a “crude estimate” of the nitrogen loading to groundwater from the area’s existing 774 OWTS-reliant parcels; uniformly distributed the estimated loading across the entire 15.9-square-mile Study Area, even though development, while generally dispersed, was concentrated in the southern and western portion of the Study Area; presented groundwater monitoring data for domestic wells in the Study Area that indicates a 4- to 5-fold increase in nitrate concentrations from 1970 to 1978; attributed the nitrate increase to the release following a very wet rainfall season of nitrate stored in the soil and possibly to the delayed impact to groundwater from orchard fertilization practices; and suggested that other factors contributory to the nitrate increase include residential landscape fertilizing and the presence of horses on rural residential lots.

In our recent review, we identified several deficiencies in the report.² The deficiency most germane to the County’s current efforts is the report’s conclusion that the 4- to 5-fold increase in nitrate concentrations from 1970 to 1978 cannot be attributed to OWTS-reliant residential development. This conclusion, which is the primary basis used to support the report’s recommendation that the County maintain its 1-acre-lot zoning policy, is based on its assumption that the nitrogen load from OWTS-reliant development was uniformly distributed across the entire Study Area. Elsewhere, the report repeatedly states this conclusion as fact, even though it is based entirely on assumption, not evidence.

² The technical report enclosed in the County’s 18 August 2005 letter does not display the engineering stamp of the professional(s) responsible for its preparation; the groundwater data presented in the technical report does not reflect first-encountered groundwater, but deeper (and, hence more diluted) groundwater extracted for domestic use; many nitrate values presented for groundwater wells in Figure 10 (Nitrates 1970) and Figure 11 (Nitrates 1978) are exactly the same.

While Regional Board staff accepted this assumption when the report was released, we question it today as it does not reflect the actual discharge situation and inappropriately reduces the nitrogen impacts from OWTS-reliant developments to de minimus levels.

Mass Balance Modal. In lieu of monitoring, or requiring developers to monitor, first-encountered groundwater potentially impacted by 1-acre-minimum lot subdivisions, the County proposes to use the mass balance model described in the technical article by Hantzsche and Finnemore as a means of quantifying nitrogen impacts to groundwater from new OWTS-reliant developments. In general, the model incorporates only a vertical component of groundwater recharge (i.e., dilution) to evaluate nitrate-nitrogen impacts on groundwater from OWTS-reliant developments. Specifically, the model assumes waste constituents in OWTS effluent is discharged uniformly across the entire residential parcel, relies on dilution by recharge from precipitation for nitrate pollution control, incorporates only the vertical component of groundwater recharge (i.e., from rainfall), ignores other sources of nitrogen besides atmospheric deposition and OWTS discharges, and ignores lateral groundwater flow (and, consequently, nitrogen loading from upgradient groundwater). Model inputs are (1) volume rate of wastewater entering the soil averaged over the gross developed area, (2) average recharge rate of rainfall, (3) background nitrate-nitrogen concentration of rainfall recharge at the water table, (4) total nitrogen concentration of the wastewater, and (5) fraction of nitrate loss due to denitrification in the soil.

In our discussion of the model on 3 November, we concurred that the model is very sensitive to the input representing the average recharge rate of rainfall. Annual average rainfall in Merced County is about 12 inches. Determining the percentage of annual rainfall that actually reaches the water table requires site-specific information and, lacking that, best professional judgment. The selection of other model inputs requires interpretation and proper application of engineering or geologic sciences. Inputs should reflect site-specific conditions (e.g., soil type, hydrology, occupants per residence, per capita wastewater generation rates), accurately represent physical processes taking place (e.g., denitrification), and recognize the reduced effectiveness of OWTS treatment over time. Model inputs should also inherently incorporate sufficient safety factors to be protective of groundwater quality. To insure the adequacy of the County's use of the model to evaluate new developments, model inputs should be prepared by or under the direction of a professional engineer or geologist registered to practice in California pursuant to California Business and Professions Code, Sections 6735, 7835, and 7835.1.

In our meeting, you indicated that the County has re-considered its use of the model to evaluate the nitrogen impact to groundwater from new developments, and now plans to retain a qualified professional to perform a technical evaluation of the County's 1-acre-minimum lot requirement for OWTS-reliant development with respect to its adequacy in protecting groundwater from unreasonable degradation from waste constituents in OWTS effluent in addition to nitrate (e.g., pathogens, pharmaceuticals, personal care products). We recommended the County provide the Water Board with a copy of the professional's proposed scope of work for our review and comment. We also recommend that the evaluation consider, and the report of the evaluation results include, water quality monitoring data obtained through implementation of the County's ongoing groundwater monitoring program.

As a result of Regional Board staff questioning the groundwater impacts of OWTS development during the CEQA process of subdivision applications, the County has delayed its consideration of several proposed 1-acre-lot, OWTS-reliant developments until this evaluation is complete, which is now not expected to occur until sometime next year. The County requests to immediately resume processing these pending developments using current criteria. We appreciate the County's effort to evaluate land development practices with respect to their adequacy in protecting groundwater and acknowledge the

County's responsibility to process development applications in a timely manner. Until the evaluation is complete, we recommend the County either require site-specific technical documentation of available assimilative capacity for nitrate in first-encountered groundwater to accommodate proposed OWTS-reliant developments or approve only developments served by alternative OWTS designed to reduce the mass of nitrogen released. Such alternative systems effectively link aerobic and anaerobic transformation processes and include septic tank/recirculating sand filter (RSF) designs that return the nitrified RSF effluent to the septic tank for denitrification. Additional nitrogen removal by plant uptake can be achieved through effluent disposal via injection near the topsoil in landscaped areas. To ensure these systems are properly operated, the County should establish a "district" or "zone of benefit" or some other agency to assume responsibility for the successful operation and proper maintenance of these alternative OWTS.

Lastly, while policy encouraging the development of second units on parcels zoned for single-family residences may be accommodated in areas with community sewer, we recommend the County Environmental Health Department not approve second units on parcels of five acres or less unless and until the County determines the minimum parcel size necessary to accommodate the entire wastewater flow from the primary and secondary residential units in a manner that is protective of groundwater.

If you have any questions regarding this matter, please call me at (559) 445-5035.

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