Memo

To: April Meneghetti, REHS
Director of Environmental Health County of Yolo, Department of Community Services
Division of Environmental Health

From: John Fawcett, Winters CA

cc: Kristin Sicke, Yolo Groundwater Sustainability Agency

Date: January 2, 2024

Re: REVIEW COMMENTS ON TECHNICAL MEMORANDUM TITLED YOLO COUNTY TEMPORARY WELL PERMITTING PROCEDURES TO ADDRESS EXECUTIVE ORDERN-3-23

Below are comments and questions regarding LSCE's December 15, 2023, Technical Memorandum (TM) updating well permitting procedures in response to the Governor's 2023 executive order concerning ongoing drought and climate change stresses on the state's groundwater supplies. The Comments/Questions refer to the Yolo County Community Services Department, Environmental Health Division (County), which is responsible for well permitting in Yolo County, the Yolo Groundwater Sustainability Agency (YGSA), which is charged with sustainably managing groundwater within Yolo Groundwater Subbasin, proposed permit requirements for Focus Areas (FAs) within the subbasin, proposed requirements for a Hydrogeologist Report (HR), and the Governor's 2023 Executive Order N-3-23 (EO).

Comment/Question 1: Page 5, Procedure for GSA Verification Required by EO Section 4A.

The TM states the GSA provides written verification that the extraction of groundwater from any applicable proposed well would not: (i) be inconsistent with an adopted sustainable management program, and (ii) decrease the likelihood of achieving a sustainability goal. The YGSA is currently developing requirements for a Hydrogeologist Report (HR) for new wells located in Focus Areas recently identified by the YSGA (WYA, October 2023).

A. The LSCE TM should be amended to be consistent with the current YGSA well permit requirements for new wells proposed in the Focus Areas.

B. Both the YSGA concern over Focus Areas and the subject TM refer to a need for a Hydrogeologist Report. It seems that a new well permit applicant may need to submit an HR to the YGSA and the County if the well is within a Focus Area. Please clarify how the contents of the HR reports may vary and whether conditions in the FAs are adequately accounted for in the methodologies presented in the updated TM.

Comment/Question 2: Table 1: Well spacing varies with the geologic and aquifer characteristics.

The TM presents well separation distances for just two areas based on "different hydrogeologic settings:" the "Valley Floor" and "Upland" areas. By comparison, the YGSA Groundwater Sustainability Plan (GSP, Section 2.4) establishes six management areas (MA) within the Yolo Subbasin for implementation of project and management actions to achieve groundwater sustainability. In developing these MAs, YSGA considered "geologic, aquifer, and topographic characteristics". It would seem that geologic, aquifer, and topographic characteristics vary significantly throughout the Subbasin while the County's TM's presents a broad generalization of conditions for well spacing determination (Table 1). This approach seems blind to the concerns that have led to identifying Focus Areas and significant concerns raised by stakeholders. . Therefore, why does the County's TM only consider two hydrogeologic areas when the GSP identifies six hydrogeologic units and, more recently, the additional Focus Areas of concern?

Comment/Question 3: Page 5, states "Applicants seeking a permit for a replacement well must complete Exhibit C."

The TM does not have an Exhibit A or B. Should Exhibit C be changed to Exhibit A?

Comment/Question 4: Page 6, The County requires minimum well separation distances for ensuring proposed new wells or well alterations are unlikely to interfere with the function and operation of nearby wells, and refers to Table 1.

Table 1 shows the minimum required horizontal distances from nearby active wells according to the proposed well pumping capacity and proposed well location. The TM should present information on the methodology and assumptions used to derive the well separation distances presented Table 1. The County prepared a TM on December 16, 2022 titled "DOCUMENTATION OF METHODS USED TO DEVELOP WELL SEPARATION DISTANCES TO ADDRESS EXECUTIVE ORDER N-7-22 SECTION 9" that provided a summary of the methods used to develop the well separation distances. The updated TM being reviewed should also present the methods and parameter selections used to calculate the minimum well separation distances presented on Table 1. Include the December 16 TM (or the updated version), as a reference, if appropriate.

Comment/Question 5: Page 6: as a follow-up to Comment/Question 4, the County's December 16, 2022 TM referenced above states:

> *"The selection of well separation distances was based on analyses of likely pumping drawdown impacts at different distances from a pumping well under a range of well operational considerations and aquifer properties representative of conditions in the County. The propagation of pumping drawdown depends on the duration and intensity of the well pumping and hydrogeologic characteristics related to the aquifer's ability to store and transmit water. An analytical modeling approach based on application of the Theis equation (Theis, 1935) was utilized to estimate the amount of water level drawdown expected at different distances from the pumping well. Important inputs for the analytical modeling include well operational parameters of well pumping rate and duration and aquifer parameters of transmissivity (T) and storactivity (S)."*

The GSP prepared by the YGSA, section 2.1.3.4 Aquifer Properties, indicates the aquifer system is represented by three layers which generally correspond to alluvium in the shallow zone (#1), upper Tehama Formation or intermediate and deep zones (#2), and the lower Tehama Formation or deepest zone (#3). The GSP Table 2-1 (shown below) shows a large range in S and T values among the layers. The County's December 16, 2022 TM referenced above also presents a large range of T and S values. What

were the actual T and S values used for the TM's Table 1 spacing requirements, and how did these values compare to the T and S values assumed for the YGSA MUs discussed above? How sensitive were the well separation distances to differing assumptions of T and S values? How do the TM well horizontal well separation distances relate to wells constructed with different screened intervals and or wells with multiple screened intervals?

Comment/Question 6: Page 6, and as a follow-up to Comment/Question 4 and 5: Table 1 relates the proposed well flow rate and the required horizontal distance from nearby wells and does not consider the well depth or the vertical well screened intervals in either the proposed well or the nearby wells.

For purposes of discussion, consider a new, 950 gallon per minute (gpm) agricultural well that is to constructed in the Central Yolo MA area of the Yolo Subbasin. Assume the new proposed well is to be constructed with multiple well screen intervals: a shallow zone (260 to 300 feet), two intermediate to deep zones (460 to 560 feet and 600 to 660 feet), and a deep zone 720 to 780). Since the proposed well flow is less than 2,000 gpm, a hydrogeological study (HR) is not needed as part of the County's permit process, and Table 1 presented in the TM applies. Next assume there are two existing nearby wells, just over 500 feet away, one of which is screened from 180 to 280 feet and the other from 500 to 520 feet. Since the proposed well flow rate (950 gpm) and the horizontal setback distance (>500 feet) meet the Table 1 criteria presented in the TM, the proposed well would hypothetically be approved by the County. Presumably, per the TM, the YSGA would also review the well permit application, but the County's position would be to approve the well permit application because it meets the Table 1 requirements. For the example described above, does the methodology in the County's TM comply with the Governor's Executive Order, Section 4 of EO N-3-23 requirements that all well permit applications ("with limited exceptions") be evaluated and a determination that the well will not likely interfere with the operation and function of existing nearby wells?

It is noted that the County's December 16, 2022 TM titled "DOCUMENTATION OF METHODS USED TO DEVELOP WELL SEPARATION DISTANCES TO ADDRESS EXECUTIVE ORDER N-7-22 SECTION 9 referenced above, 'will not likely "interfere with the operation and function" of existing nearby wells means the water level decline in nearby wells will be less than 5 feet when the new well is operating.

Table 2-1. Summary of Aquifer Parameters Data in the Yolo Subbasin IGSM (WRIME 2006).

Zone (Layer)	Location/General Area	Transmissivity feet²/day	Hydraulic Conductivity feet/day	Storage Coefficient unitless
Shallow (1)	Yolo County	3,000 to 46,000		7.3E-02
	RD 108	26,000 to 52,000	13 to 67	8.0E-02 to 9.0E-02
	RD108, RD 787, RD730, Yolo-Zamora WD	26,000 to 65,000	64	6.0E-02 to 1.2E-01
	Yolo-Zamora WD	9,000 to 26,000	48	7.0E-02 to 9.0E-02
	Woodland	10,000 to 105,000		3.1E-02
	Cache Creek above Moore's Siphon	25,000 to 260,000		
	Knights Landing Ridge Drainage District	26,000 to 52,000	21	6.0E-02 to 1.1E-01
Intermediate & Deep (2)	Dunnigan WD	5,600 to 13,000		9.0E-04 to 2.3E-03
	Yolo County			6.5E-02 to 7.2E-02
	RD108, RD 787, RD730, Yolo-Zamora WD	26,000 to 65,000	19 to 119	6.0E-02 to 1.2E-01
	Yolo-Zamora WD	9,000 to 26,000	41 to 118	7.0E-02 to 9.0E-02
	Davis	4,000 to 18,000		
	Capay Valley	9,000 to 10,000		
	Cache Creek below Moore's Siphon	1,000 to 18,000	400	
	Knights Landing Ridge Drainage District	26,000 to 52,000	21 to 139	6.0E-02 to 1.1E-01

Comment/Question 7: Impact Monitoring

The County's proposed permit process incorporates no data regarding well yields, or well construction features, nor does it distinguish completion intervals as noted above, nor consideration of YGSAs Focus Area concerns. Submission of a qualified Hydrogeologist Report and satisfaction of setback requirements seemingly absolve a new groundwater pumper from further requirements even if nearby wells are adversely impacted. Therefore, the County's permit process, in coordination with the YGSA, must include steps by which evidence may be presented by adjacent stakeholders that warrants further restrictions on the permittee if that evidence indicates impacts to wells as determined by the County or the YGSA.