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MEMORANDUM

David Bailey, General Manager
Mid-East Texas GCD
101 W. Main, Suite 115
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September 7, 2026

RE: Review of the Mitsui E&P USA Hydrogeologic Report, Proposed Water Wells #3 and #4, MEP Pate Property (Freestone County)

The Mid-East Texas Groundwater Conservation District (METGCD) requested that INTERA review the hydrogeologic report prepared by R. W. Harden & Associates, Inc. (RWH&A), dated July 28, 2026, in support of Mitsui E&P USA, LLC's (MEP) application to drill and operate proposed Water Wells #3 and #4 on the MEP Pate Property in Freestone County, Texas. The application would increase permitted production by 1,015.26 acre-feet per year, bringing aggregated production from four wells on the property to 1,451.04 acre-feet per year (472,822,835 gallons) across 483.68 contiguous acres. Because the aggregated capacity exceeds the District's 500 gpm threshold, both a local and a regional assessment of drawdown impacts are required. This memorandum summarizes our review of those analyses and presents an independent verification of the local Carrizo drawdown impacts.

The proposed well locations and completions are summarized in Table 1. All four wells target the Carrizo Sand of the Carrizo-Wilcox Group, with screened intervals between 325 and 470 feet below ground level. Well locations relative to the District and county boundaries, the Carrizo subcrop, and the registered off-site wells are shown in Figure 1.

Independent verification of the local analysis. INTERA reproduced RWH&A's local drawdown analysis using TTim (Bakker, 2013), a multi-aquifer analytic-element extension of the Theis (1935) solution. For a single confined layer with a fully penetrating well, TTim returns the Theis solution exactly; our implementation agrees with the analytical solution to within 0.0 percent at all test points, so any disagreement with RWH&A reflects their analysis rather than our tool.

RWH&A's stated Table 4 parameters are per-well transmissivities of 19,760 to 23,170 gal/day/ft and a storage coefficient of 1×10^{-4} . Using those values with *one well pumping alone*, we reproduce the drawdown curves published in their Figures 2 and 3. The aquifer parameters, solution method, and software therefore all agree.

The published figures show single-well drawdown, not the well field. RWH&A's Figures 2 and 3 present one chart per well and, as confirmed above, plot that well pumping in isolation. Their Table 5, by contrast, incorporates interference from all four wells: at off-site well 189471. The report therefore uses two different

conventions without identifying either, and the composite response of the full well field is never presented graphically. Figure 2 of this memorandum shows the difference: over the distances that govern the Area of Influence, the four-well field produces roughly three and a half times the drawdown of the single-well curves that were published.

Vertical leakage from adjacent units. RWH&A's single-layer treatment correctly applies the District's default analytical framework, but it implicitly assumes that all water produced is drawn from storage within the Carrizo alone. At this location the Carrizo is bounded above by the Reklaw Formation and below by the Calvert Bluff Formation; both are represented as leaky in the Central Carrizo-Wilcox GAM. Pumping-induced head decline in the Carrizo would create vertical gradients allowing water to leak in from those units, so the single-layer analysis is expected to overstate drawdown within the Carrizo.

To test the sensitivity of the predicted drawdowns to this assumption, INTERA constructed a three-layer analytic model in TTim comprising the Reklaw (Layer 1, above the Carrizo), the Carrizo (Layer 2, the pumped unit), and the Calvert Bluff (Layer 3, below). Layer thicknesses and properties for the bounding units were taken from the Central Carrizo-Wilcox GAM v3.02 nodes at the site. The model was run twice: once with RWH&A's Carrizo properties and once with GAM-derived Carrizo properties. Results are summarized in Table 3 and Figure 3.

Allowing vertical flow reduces predicted 50-year drawdown at the pumping wells by approximately 26 percent, from 83.5 ft single-layer to 61.5 ft three-layer at Well #1 using RWH&A's Carrizo properties, and at off-site wells by roughly 44 percent. Leakage is negligible over the first day and becomes dominant over decades. RWH&A's single-layer estimates therefore remain a conservative upper bound on drawdown in the Carrizo, which is the protective direction for the District.

Substituting GAM-derived Carrizo properties changes the picture. Transmissivity computed from GAM hydraulic conductivity over the screened interval is 12,394 gal/day/ft, roughly 60 percent of the 20,000 gal/day/ft RWH&A assumed, and predicted drawdown at the pumping wells rises accordingly, to 89.3 feet at Well #1 after 50 years, above both the single-layer and three-layer applicant-property results.

Area of Influence. The District defines the Area of Influence (AOI) as the radius at which drawdown after 50 years of continuous pumping at the maximum annual rate equals 25 feet, or 2.5 miles, whichever is greater. RWH&A report a 25-foot radius of approximately 2.3 miles and applied the 2.5-mile floor.

Our results for that radius, computed for the aggregated four-well field with vertical leakage allowed, are given in Table 4. Using RWH&A's Carrizo transmissivity the 25-foot radius is 2.5 miles, consistent with their reported 2.3 miles. Using GAM-derived properties it is 4.8 miles. The applicant's assumed transmissivity approximately halves the Area of Influence.

We do not regard that as a deficiency. RWH&A's transmissivity is site-specific, estimated from static water level and specific capacity data collected at Wells #1 and #2 in May 2026, while the GAM values are regional and calibrated at a 1.38-mile cell scale. For predicting drawdown in the immediate vicinity of the well field the site-specific estimate is the better basis, and we accept it. The District should nonetheless be aware that the AOI is sensitive to this choice, and that a regional-property basis would roughly double the area over which registered wells would need to be identified and evaluated.

Regional (GAM) analysis. Regional drawdowns were estimated by RWH&A using the Groundwater Availability Model for the Central Portion of the Sparta, Queen City, and Carrizo-Wilcox Aquifers (v3.02, MODFLOW-USG; TWDB, 2020), with MEP's existing and proposed pumping added to model Layer 7 in the District's RunS-19.wel file from stress period 17 (1/1/2027) through stress period 70 (1/1/2080). We confirm that Layer 7 is the Carrizo Aquifer: the per-layer node counts in the model match Table 4.2.1a of the GAM report

exactly. Reported incremental drawdowns are less than 0.01 foot for METGCD as a whole and for Free-stone, Leon, and Madison Counties. INTERA finds the regional analysis was performed correctly and that the proposed pumping has negligible impact on the District's Desired Future Conditions.

Conclusions. INTERA finds RWH&A's drawdown calculations to be technically sound and their regional analysis to be correctly performed. The Carrizo beneath the well field will remain fully saturated, with artesian levels projected to stay well above the top of the aquifer over the 50-year evaluation period. We recommend that RWH&A present drawdown-versus-distance curves for the *aggregated* four-well field, and re-derive the Area of Influence from the composite 50-year curve rather than from single-well curves.

None of these findings indicate that the proposed production would cause unreasonable impacts. Predicted drawdowns at off-site Carrizo wells remain a modest fraction of the available head, and the regional analysis demonstrates compliance with the current Desired Future Conditions.

If you or any Board members have questions or would like to discuss this further, please feel free to contact me at (619) 723-8297 or via email at rharmon@intera.com.

Sincerely,

Dr. Ryan Harmon
Senior Hydrogeologist
INTERA Incorporated

Table 1: MEP proposed and existing wells on the Pate Property, as reported in Table 2 of the RWH&A hydrogeologic report. Coordinates are NAD27 decimal degrees.

MEP Well	METGCD ID	Latitude (NAD27)	Longitude (NAD27)	Total Depth (ft bgl)	Screen (ft bgl)	Target Aquifer
Well #1	707615	31.5147	-96.0597	510	350–450	Carrizo
Well #2	707597	31.5213	-96.0531	530	390–470	Carrizo
Well #3	Proposed	31.5117	-96.0514	500	325–450	Carrizo
Well #4	Proposed	31.5133	-96.0450	500	380–470	Carrizo

Table 2: Effect of vertical leakage at the four MEP wells. The three-layer model comprises the Reklaw, Carrizo, and Calvert Bluff Formations with properties from the Central Carrizo-Wilcox GAM v3.02; in the applicant-property case only the Carrizo takes RWH&A's values. All four wells pump simultaneously, so every value includes well interference.

Location (225 gpm per well, 50 years)	RWH&A Table 5 (ft)	Three layer, applicant (ft)	Three layer, GAM (ft)
Well #1	72	61.5	89.3
Well #2	66	53.8	89.0
Well #3	73	62.6	91.9
Well #4	72	61.2	89.7

Table 3: Area of Influence. Radius at which drawdown after 50 years of continuous pumping at the maximum annual production rate reaches 25 feet, computed for the aggregated four-well field with vertical leakage allowed. The District rule applies the greater of this radius and 2.5 miles.

Basis	25-ft radius (miles)	Resulting AOI (miles)
Three layer with leakage, applicant Carrizo properties	2.5	2.5
Three layer with leakage, GAM properties	4.8	4.8
RWH&A reported	2.3	2.5

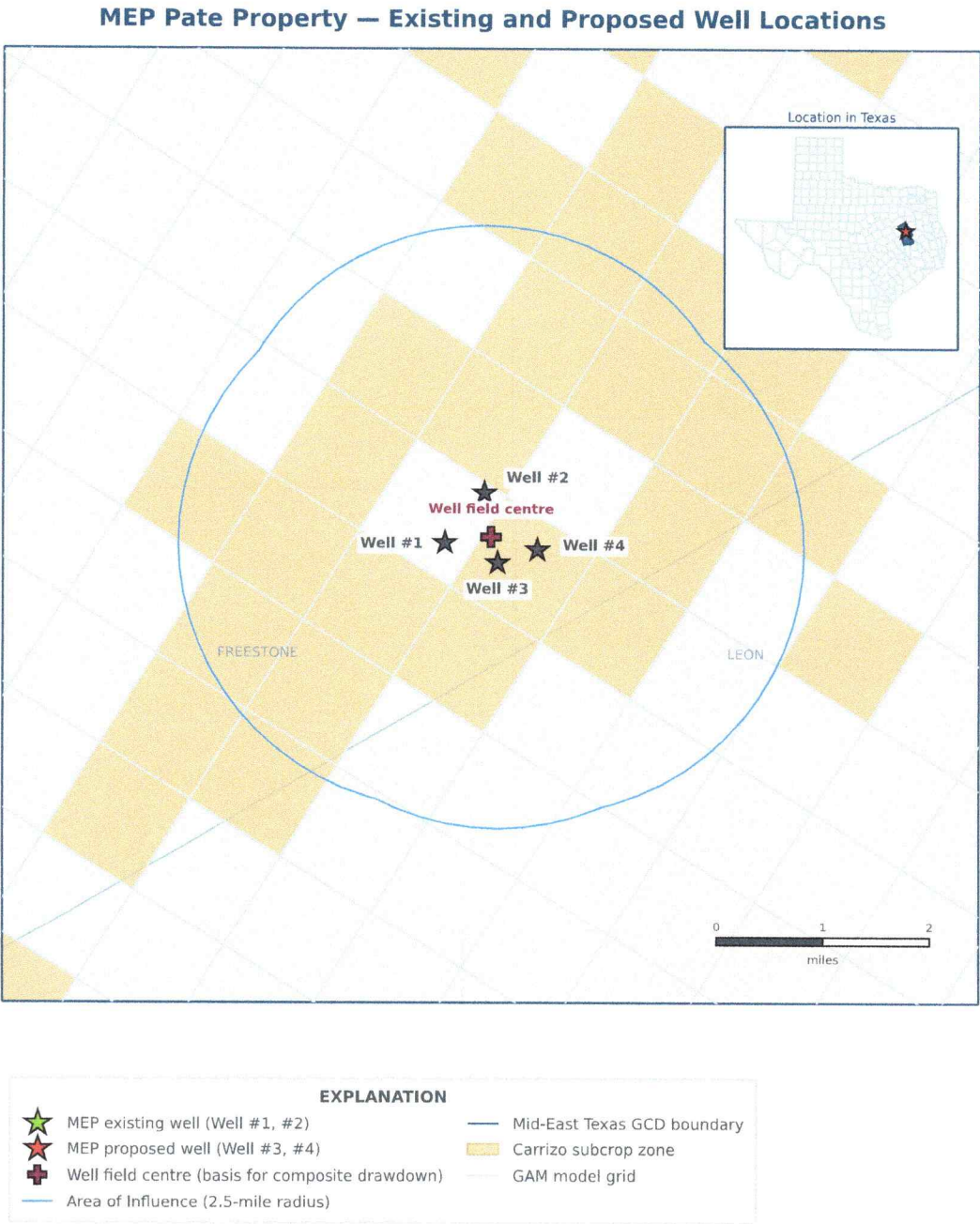


Figure 1: MEP Pate Property well locations relative to the District and county boundaries and the Carrizo subcrop zone as defined in the GAM. The Area of Influence shown is the 2.5-mile District rule floor applied by RWH&A.

RWH&A's published curves are single-well; the four-well field response is substantially larger
 All panels use the applicant's Table 4 parameters. Top row reproduces their published convention; bottom row is the composite field response.

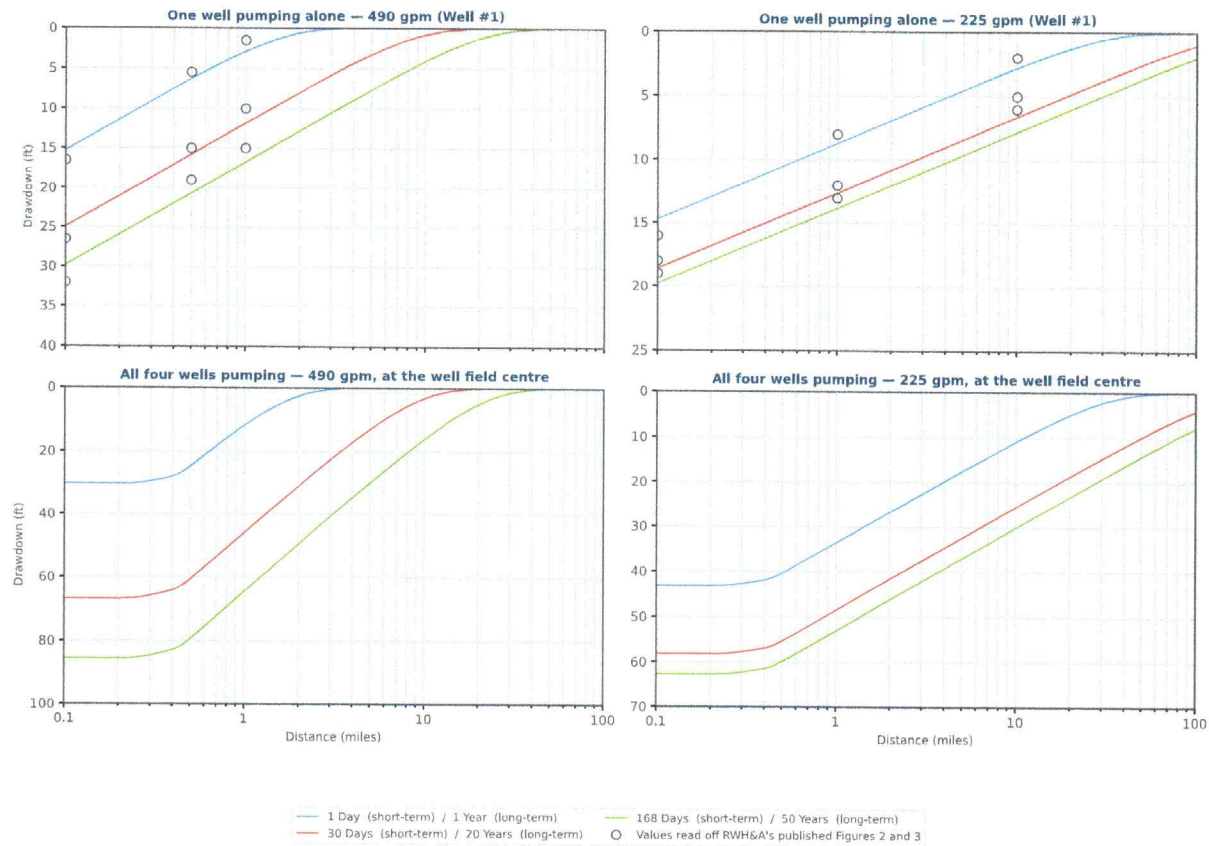


Figure 2: Reconciliation of RWH&A's published drawdown curves. The top row is one well pumping alone, matching the convention used in their Figures 2 and 3; open circles are values read from those published charts. The bottom row is the composite response of all four wells pumping, evaluated about the well field centre. All four panels use RWH&A's Table 4 parameters, so the difference between the rows is superposition alone.

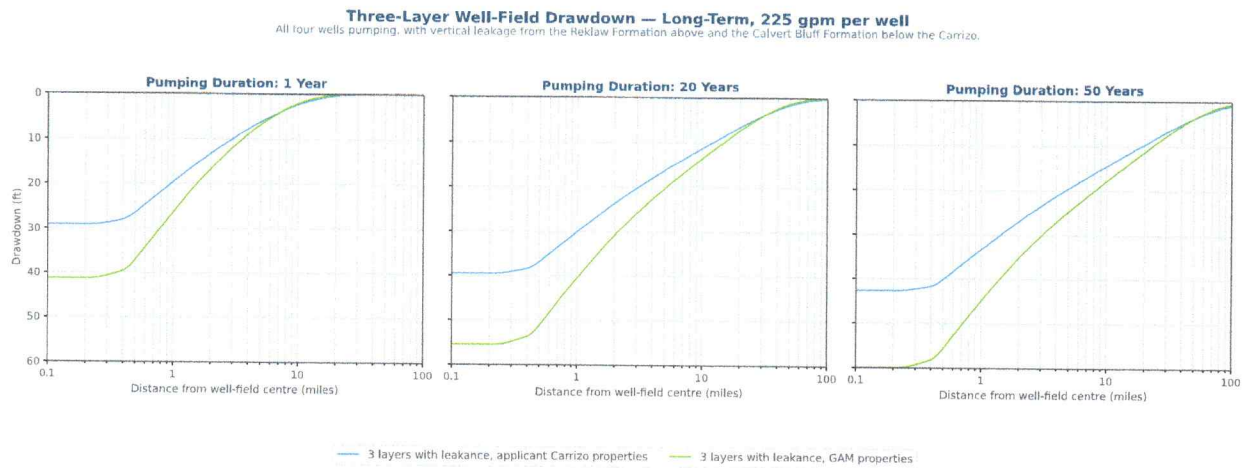


Figure 3: Long-term drawdown from the aggregated four-well field at the maximum annual production rate of 225 gpm per well, computed about the well field centre. Both curves are the three-layer model allowing vertical leakage from the Reklaw Formation above and the Calvert Bluff Formation below the Carrizo; they differ only in the Carrizo properties. The GAM's lower transmissivity produces greater drawdown throughout.

Figure 2. Long-Term Drawdowns in the Carrizo Aquifer, MEP Pate Well Field

Continuous pumping at the maximum annual production rate of 225 gpm per well (472.8 million gallons per year aggregate)

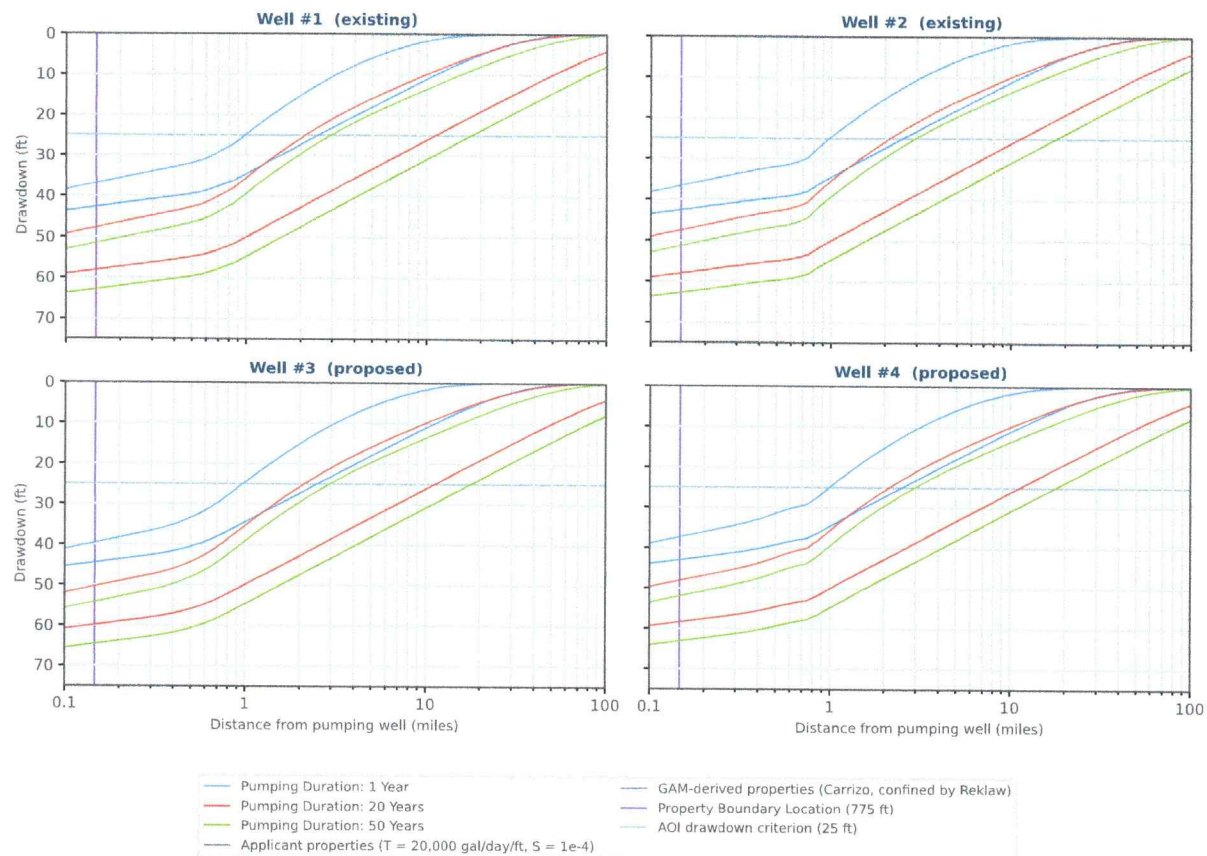


Figure 4: Long-term drawdown at each MEP well from the aggregated four-well field, comparing RWH&A's assumed aquifer properties (solid) against GAM-derived properties for the Carrizo (dashed). The GAM's lower transmissivity produces greater drawdown near the well field; its representation of adjacent leaky units limits drawdown at distance.