SJRA GRP Review Committee Meeting

May 19, 2025

Lone Star Groundwater Conservation District Comments on SJRA GRP April 21, 2025 Meeting Item 3.2.2

Status of Aquifers Presentation
by Committee Member Benjamin Slotnick, PhD

Overview: SJRA GRP April 21, 2025 Meeting Item 3.2.2

- **The presentation included in SJRA GRP April 21, 2025 meeting Item 3.2.2 contains discussion of hydrogeologic data and opinions formed based on the review of that data**
- **Some details of the presentation appear to be a misinterpretation of the aquifer, water well and water level data**
- **Opinions expressed at the SJRA GRP meeting in Item 3.2.2:**
    - **'…trend is not sustainable, if this deepening continues for another 2 or 3 years, we are going to be in trouble'**
    - **'MUD 119 Well at greatest risk of potential failure' (GRP meeting slide 26 of 39)**
    - **The relationship shown between static water levels and aquifer sands (GRP meeting slide 29 of 39)**
    - **'What gets me concerned, now with the 2023 levels, you are only 20 to 30 feet above the top of the Evangeline and if you are only 20 to 30 feet above the top of the Evangeline that means that there may not be that much more life in the Evangeline and that this particular aquifer may no longer be viable that much longer'**
    - **…that a lot of water has been pumped out of the Evangeline and that is a red flag for longevity**

Sources of Water to MUDS in Zip Code 77386 (East of 45, South of Conroe)

Chicot Aquifer

- Can be used as a supplemental water supply
- Often utilized by exempt well owners and smaller water systems
- Higher transmissivity values relative to Evangeline Aquifer
- Historically stable water levels
- Can be limited by Lone Star Groundwater Conservation District (LSGCD) well spacing requirements

Evangeline Aquifer

- Capable of producing larger quantities of water from a moderate depth
- Generally good water quality
- Can be limited by LSGCD well spacing requirements

Sources of Water to MUDS in Zip Code 77386 (East of 45, South of Conroe)

Jasper Aquifer

- Capable of producing larger quantities of water from a deeper depth
- A large amount of available drawdown remaining
- Potential for water quality issues:
  - Higher water temperature, elevated iron, fluoride at or near the TCEQ Secondary Standard of 2 mg/l
  - Acceptable, but higher chloride and TDS concentrations
  - Commonly includes minor natural gas and hydrogen sulfide
- Water quality issues can be treated
  - blending with other sources of water to meet TCEQ standards
  - gas aeration

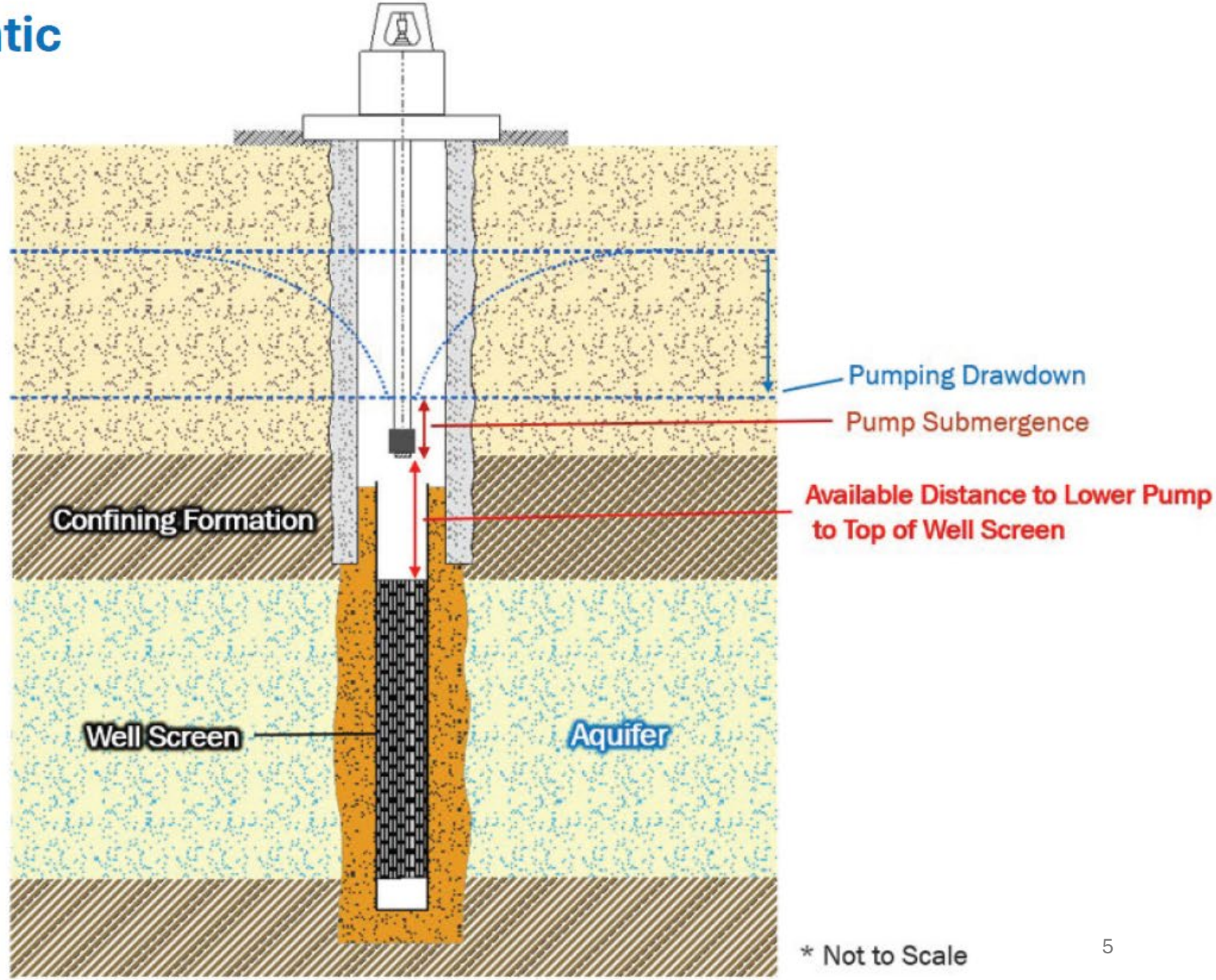
Catahoula Formation

- Contains brackish groundwater in this area of Montgomery County
- Similar water quality issues to the Jasper (higher temperature, chloride and TDS)
- Treatment and disposal

- Surface Water

Lone Star Groundwater Conservation District promotes the use of other water supplies as an alternative to groundwater use where other supplies are available.

Water Well Schematic



Montgomery County MUD 119 Well 2

- GM Services Performance Test (3/6/2024)
  - all parameters are listed as Excellent
    - including 114 feet of pump submergence

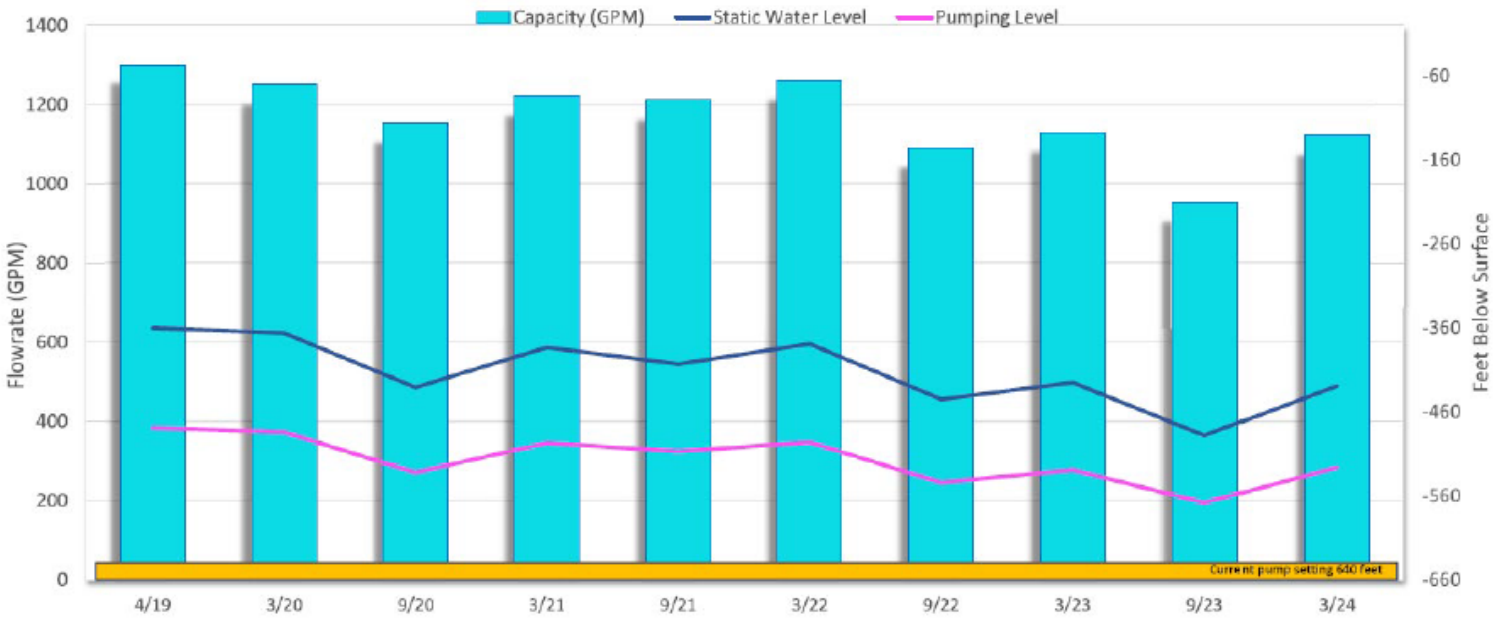
G-M SERVICES
Operation Support Specialists

PERFORMANCE TEST REVIEW

Hydraulic Performance of pump is 1122 GPM @ 547' field head	Excellent	X	Good	Marginal
Overall efficiency is 68 percent	Excellent	X	Good	Satisfacto
Pump Submergence 114 feet	Excellent	X	Good	Marginal
Vibration Analysis	Vibration analysis not completed this tes			
Suspended Solids Testing	Excellent	X	Good	Marginal
Brass Observed in SST	None	X	Trace	Substant
Flowmeter Accuracy is 98.1 percent				

- Basis for much of today's talk

Poor



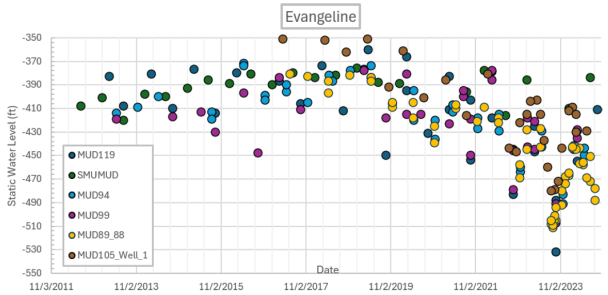
	4/19	3/20	9/20	3/21	9/21	3/22	9/22	3/23	9/23	3/24
Capacity (GPM)	1301	1249	1154	1221	1211	1261	1091	1130	953	1122
Static Water Level	-360	-366	-431	-383	-403	-379	-445	-425	-488	-429
Pumping Level	-479	-484	-532	-497	-507	-496	-544	-529	-568	-526

Slides 24, 25 & 26 of 39: GRP Committee 4/21/25 Meeting Slide Deck

Aquifer Water Level Responses, Well Pumping Rates and Pump Submergence:

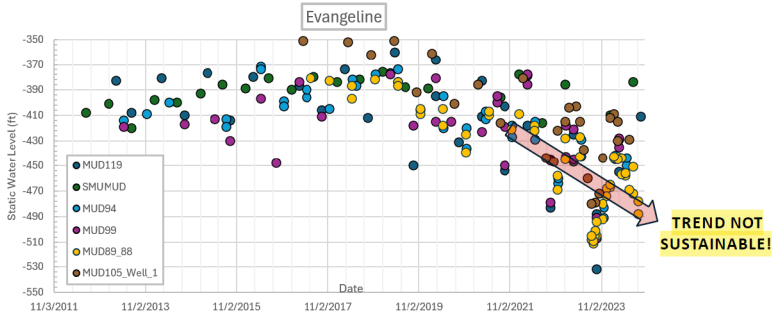
- Related to changes in local and regional groundwater pumping
- Increase in pumping – decline in water level
- Decrease in pumping – stabilization and / or rise in water level

By comparing Static Water Table, we can…



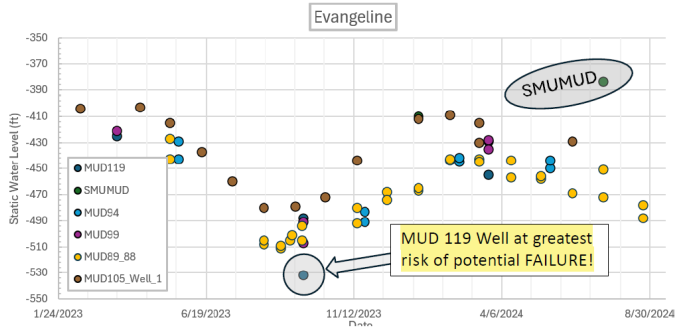
- Long-term subsurface response
  - Looked good until early 2020 when deepening began, we think primarily related to extended dry seasons starting in 2020, but exacerbated by additional home building (e.g., MUD 119)

No matter the location of the Evangeline well…



- The static water level of this aquifer has been deepening since Spring 2020
  - Regardless if district receiving surface water or not (e.g., MUD 99)
- Deepening has impacted MUD 119 the most; SMUMUD the least

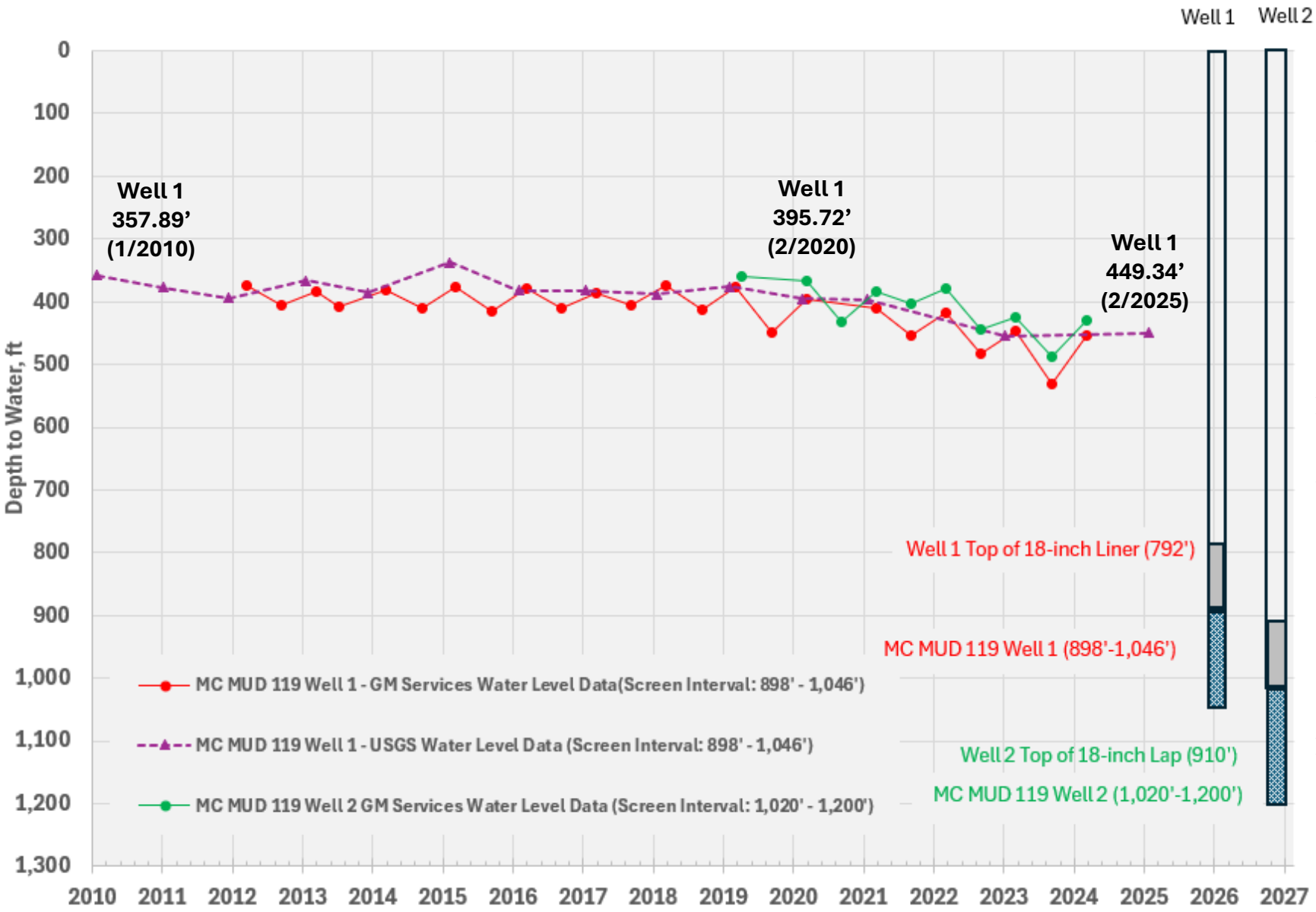
If we focus on last 18 months…



- Districts generate well reports at differing time cadences
  - Those that collect data more often have a much better understanding (e.g.; MUD89)
- SMUMUD only well to not have same impact (will look into why)
- Shows deepest water levels in September, which we have not yet reached in 2024

- **Well screened interval?**
- **Frequency of past measurements?**
  - **Summer water level trend would be similar summer**
- **'Looked good' compared to what?**
  - **MC MUD 89 Well 1 average static water level decline:**
    - **February 2005-January 2025: 5.0 feet per year**
    - **January 2020-January 2025: 7.6 feet per year**
- **'Trend Not Sustainable'**
  - **Arrow shown through two years of drought**
- **How is the MUD 119 well at the greatest risk of failure?**
  - **Available data does not support 'failure'**
    - **There is some impact to well pumping rates with water level decline**

Montgomery County MUD 119 Wells 1 and 2



MC MUD 119 Well 1 average static water level decline:

- **January 2010- February 2025: <u>6.0 feet per year</u>**
- **February 2020-February 2025: <u>10.7 feet per year</u>**

Well 1 Pump Submergence (9/2023):

532' static water level
606' pumping water level
700' pump setting
94' pump submergence
(Excellent – GM Services)

Approx. 300 feet of Available Drawdown in Well 1 based on 2025 static water level

Well 2 Pump Submergence (9/2023):

488' static water level
568' pumping water level
640' pump setting
72' pump submergence
(Excellent – GM Services)

Approx. 440 feet of Available Drawdown in Well 2 based on 2024 static water level

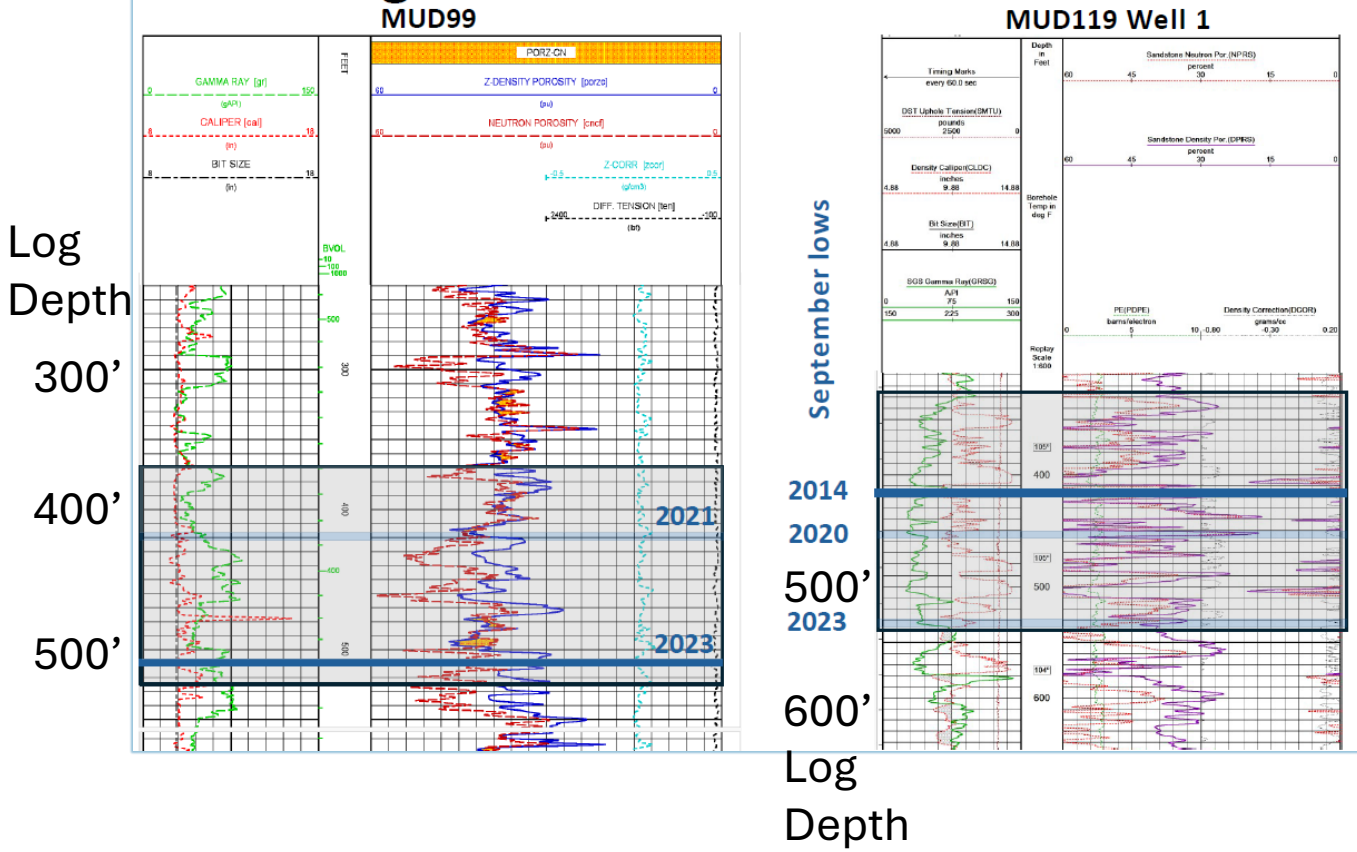
MUD 119 Well at greatest risk of Failure?

- **No risk of immediate aquifer related failure in either of the MC MUD 119 Wells**

- **Agree that there is variation in sand and clay thickness within the Evangeline Aquifer**
- **Slide 29 of 39 is misleading as it shows measured water level depths placed on sand intervals that are hundreds of feet above the well screened interval in the Evangeline Aquifer**
- **The sand intervals shown on slide 29 of 39 would have different water levels than those shown on the slide**

Well Logs reveal Stratigraphic Heterogeneity in Evangeline

*MC MUD 119 Water Plant 2 Well 1 (Well 2)

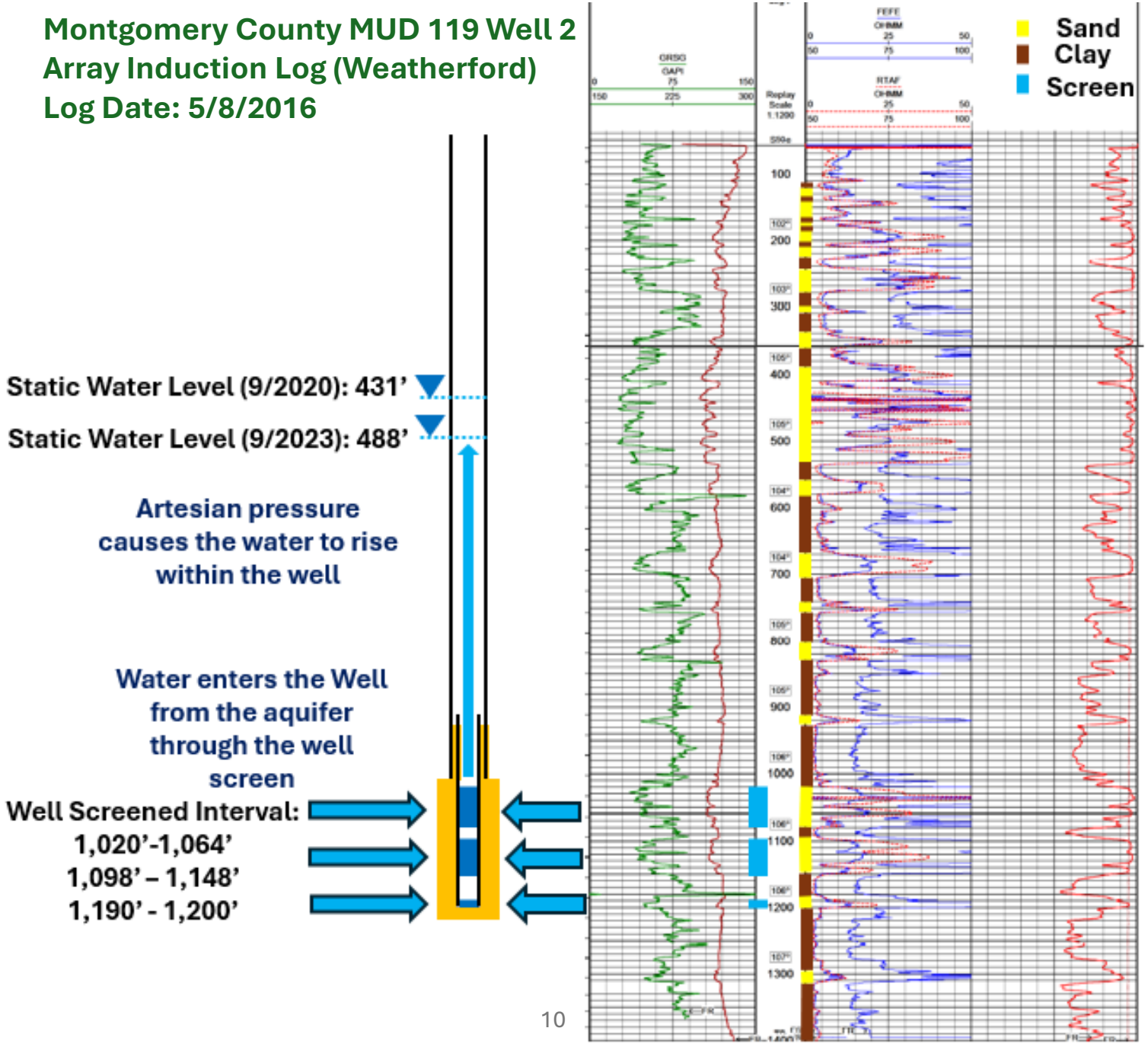


- Stratigraphic signature in Evangeline varies well to well (related to original geologic deposition of the sand
- Impact:
  - Each well will respond differently
  - If more Evangeline wells drilled, location matters!

Montgomery County MUD 119 Well 2

- Well screened interval: 1,020’ – 1,200’
- Water from aquifer enters the well through well screen
- Artesian pressure causes water to rise in well
- Well construction prevents water from shallower sands from entering the well
  - Steel surface casing: set and cemented to a depth of 1,010’
  - Casing, cement and clay isolate sands that are screened
- Large amount of clay in the depth interval of about 580’ to 1,019’ provides some hydrogeologic separation and isolation of the MUD 119 sands highlighted on the previous slide (approx. 410’ to 540’).

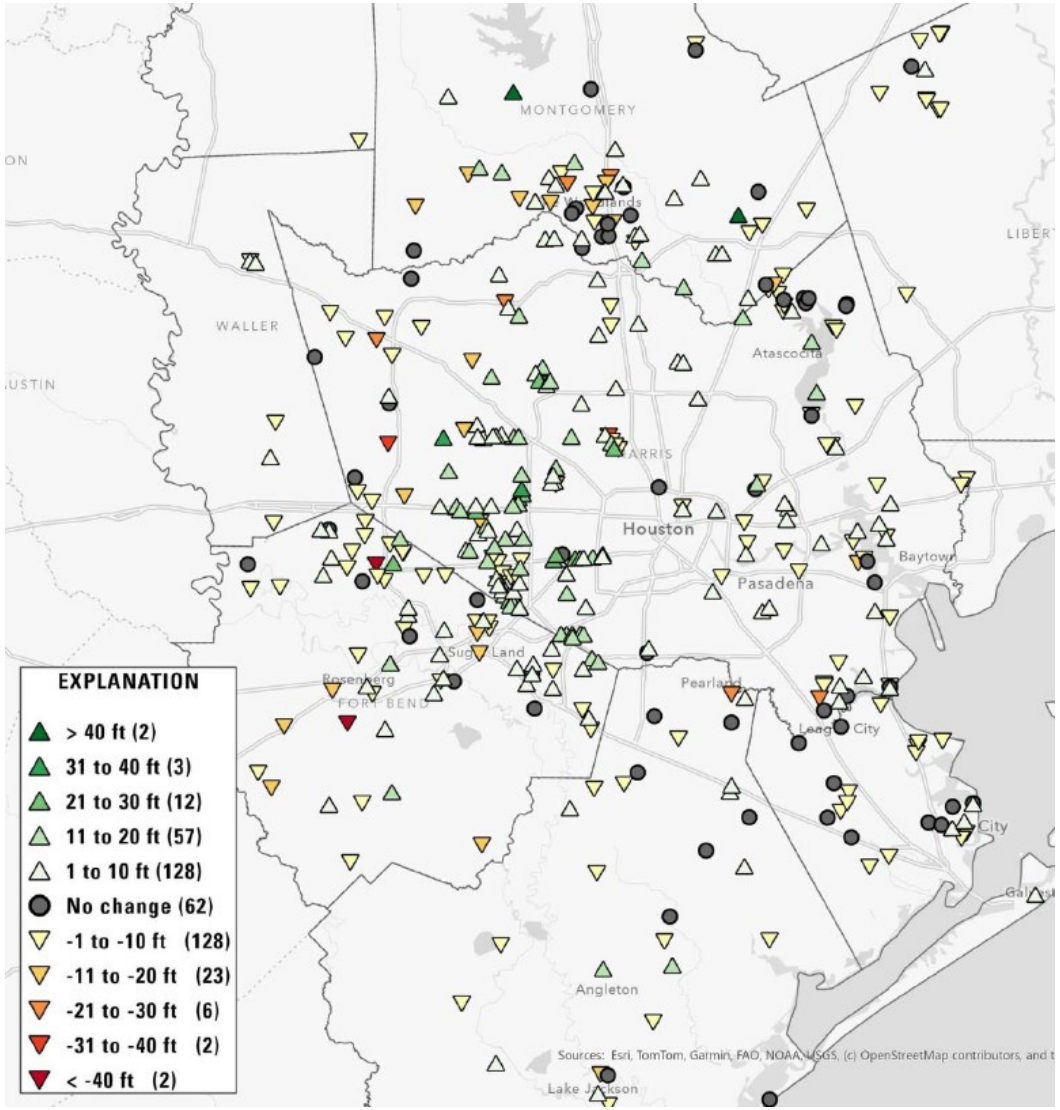
Montgomery County MUD 119 Well 2
Array Induction Log (Weatherford)
Log Date: 5/8/2016



USGS Water Level Change Assessments

- LSGCD is a sponsor of the USGS annual Water Level Change Assessment
  - About 200 monitoring wells in Montgomery County
  - About 150 wells typically measured in each annual cycle
  - The location of and number of wells measured annual varies
    - City of Conroe: All wells completed in the Jasper Aquifer
    - SJRA: Has wells completed in either the Evangeline Aquifer or the Jasper Aquifer
    - SJRA GRP presentation only shows maps for the combined Chicot /Evangeline Aquifer
- The water level collection performed by the USGS and GM Services is very important for districts and others
  - Measured water level data is very similar
- USGS maps the water level changes
- USGS water level change assessments:
  - 1-year cycle
  - 5-year cycle
  - Long-term
    - (Ch/Ev: 1977 to current; Jasper: 2000 to current)

USGS: 2024 to 2025 Chicot / Evangeline Water-Level Change



Reminders

- **Lone Star Groundwater Conservation District (LSGCD) promotes the use of other water supplies as an alternative to groundwater use where other supplies are available.**

- **When groundwater is pumped – it is natural and expected that water levels in wells will decrease. Further, in back-to-back drought years, it is natural and expected that water levels in wells will decrease at a faster rate than in normal years. This does not mean the aquifers are "going dry" or that the aquifer is being "harmed".**

- **Well design and construction, pump settings, operational demands, and local hydrogeology can impact how an individual well or wellfield operates through time. LSGCD has limited or no control on many of the factors that affect well operations.**