

Maintaining a sustainable potable water supply

Investing in multi-level groundwater monitoring wells provides water quality certainty prior to production well construction



POST
WELL DRILLING
800-525-3411

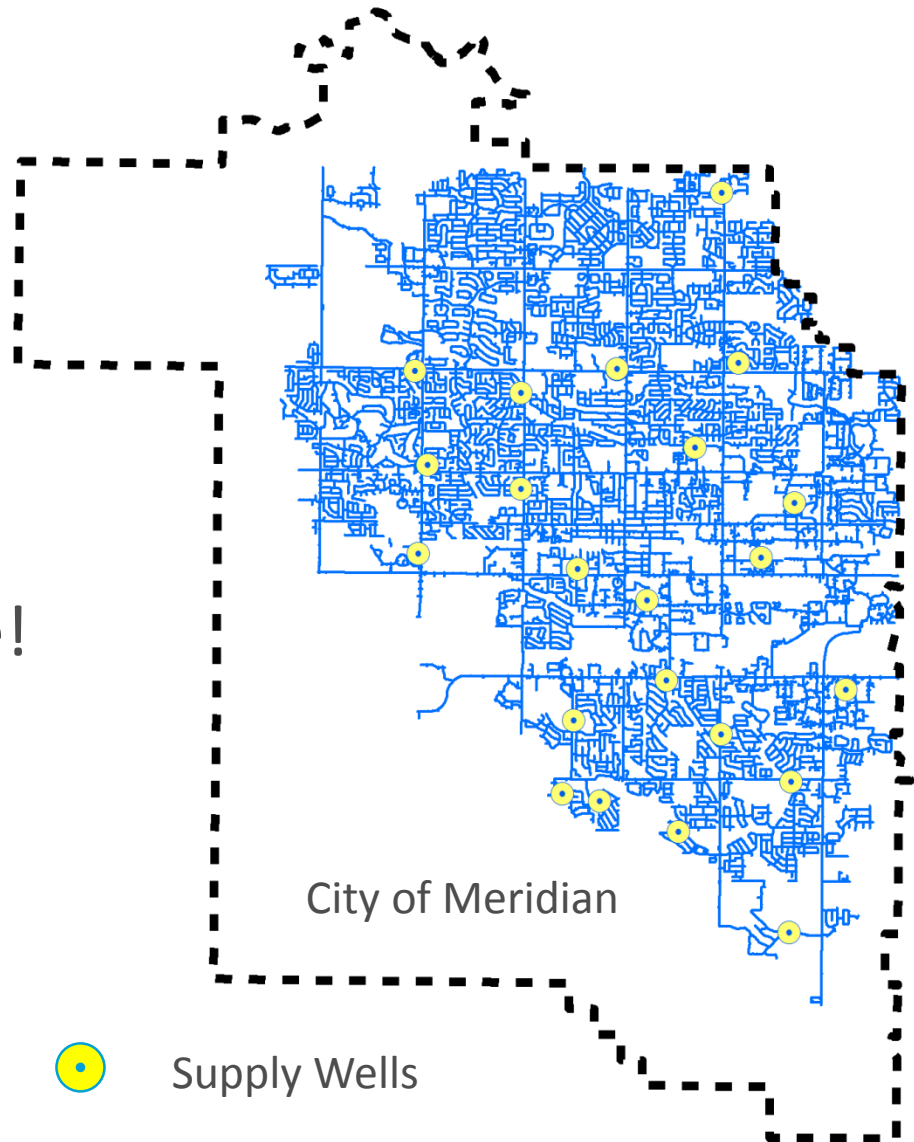
City of Meridian Water System and Water Quality

- Kyle Radek

Meridian Water Supply and Distribution System

History

- 23 Wells
- Pump directly into distribution system
- Water is everywhere!
- It's wet and cheap

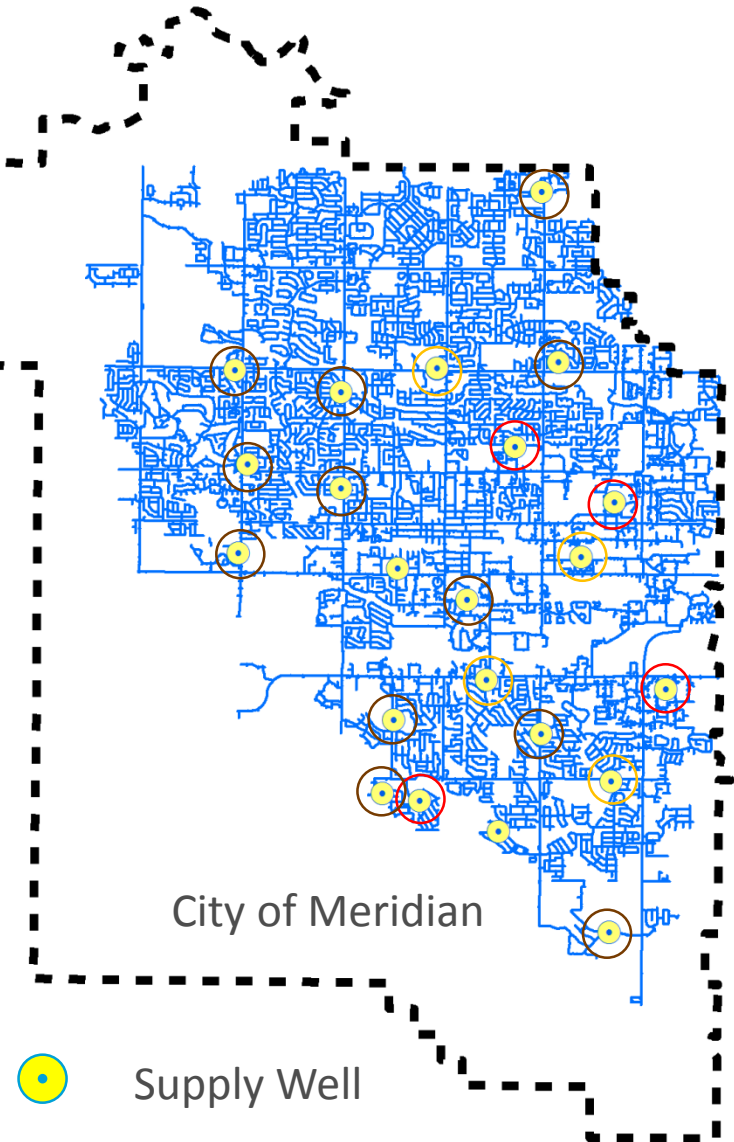


Meridian Water Supply

- Changes

- 2000 Radionuclide Rule
- Customer expectations for secondary contaminants (Brown Water)

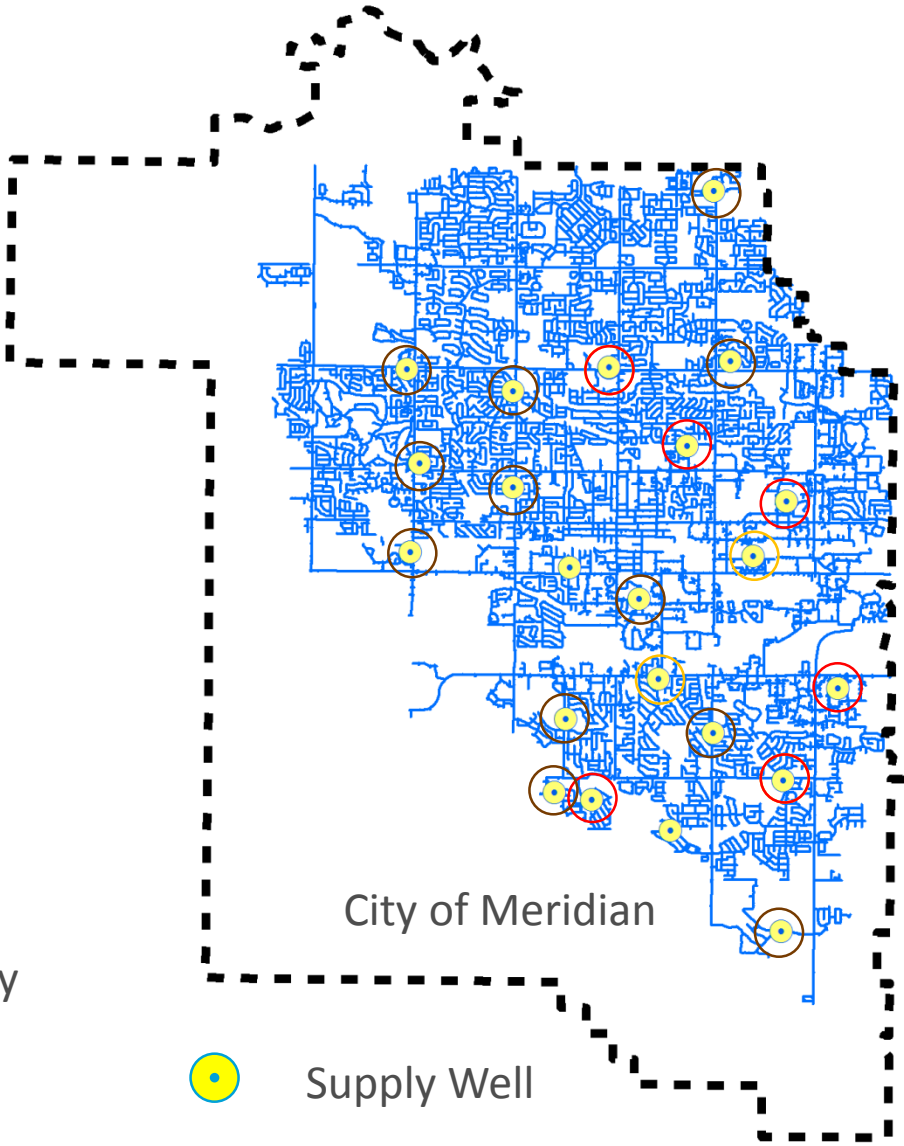
- Supply Wells over Uranium MCL
- Supply Wells with Uranium under MCL
- Supply Wells over Secondary MCLs (Fe, Mn)



Meridian Water Supply

- Operational Response
 - Pump wells without secondary contaminants ○

- Supply Wells over Uranium MCL
- Supply Wells with Uranium under MCL
- Supply Wells over Secondary MCLs (Fe, Mn)

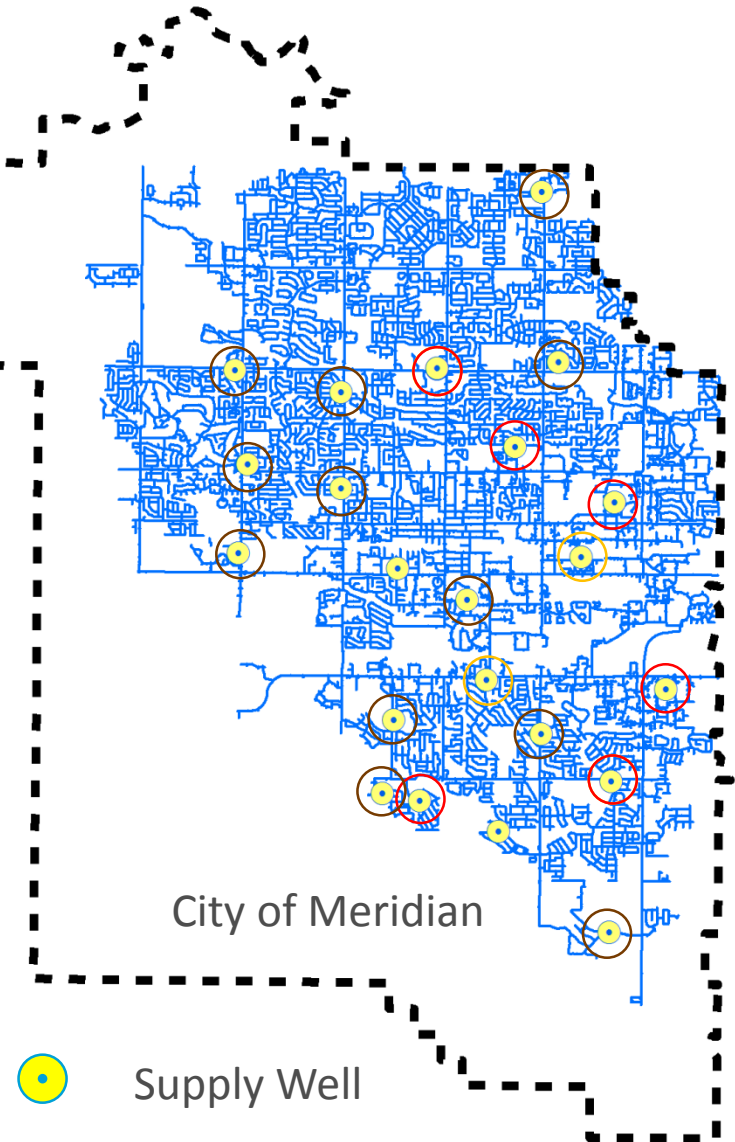


Meridian Water Supply

- Paradigm Shift

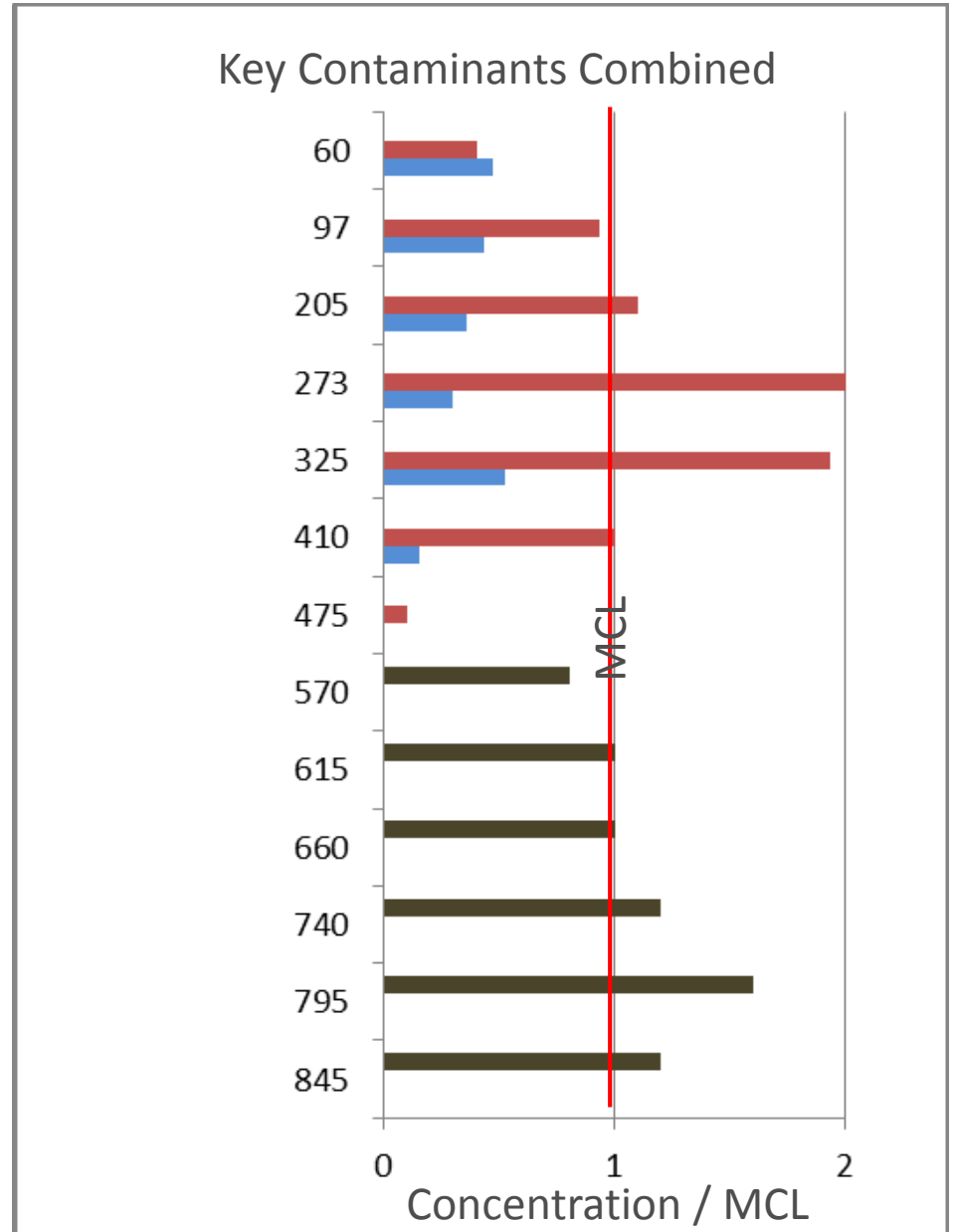
- Invest in Test Wells
- Build knowledge base

- Supply Wells over Uranium MCL
- Supply Wells with Uranium under MCL
- Supply Wells over Secondary MCLs (Fe, Mn)



Meridian Water Supply

- Build multi-zone test wells.
- Characterize the aquifer
- Understand what sub-aquifers contribute
- Plan for the future



City of Meridian Well 30 Case Study

- Kevin Boggs

The Challenge?

Hydrogeologic Setting – Water Quality Uncertainty

Alluvial aquifer

- Generally gravel, sand, and clay
- Numerous domestic wells
- Numerous “subaquifers” and semi-confining units

Oxidized

- Uranium
- Arsenic
- High TDS

Clay

Lacustrine (lake) deposits

- Gravel, sand, silt, and clay
- Domestic, irrigation, municipal wells
- Numerous “subaquifers” and semi-confining units

Confined

- Ammonia
- Sulfide
- Iron and manganese

The Solution?

Permanent, Multi-Level Monitoring Wells



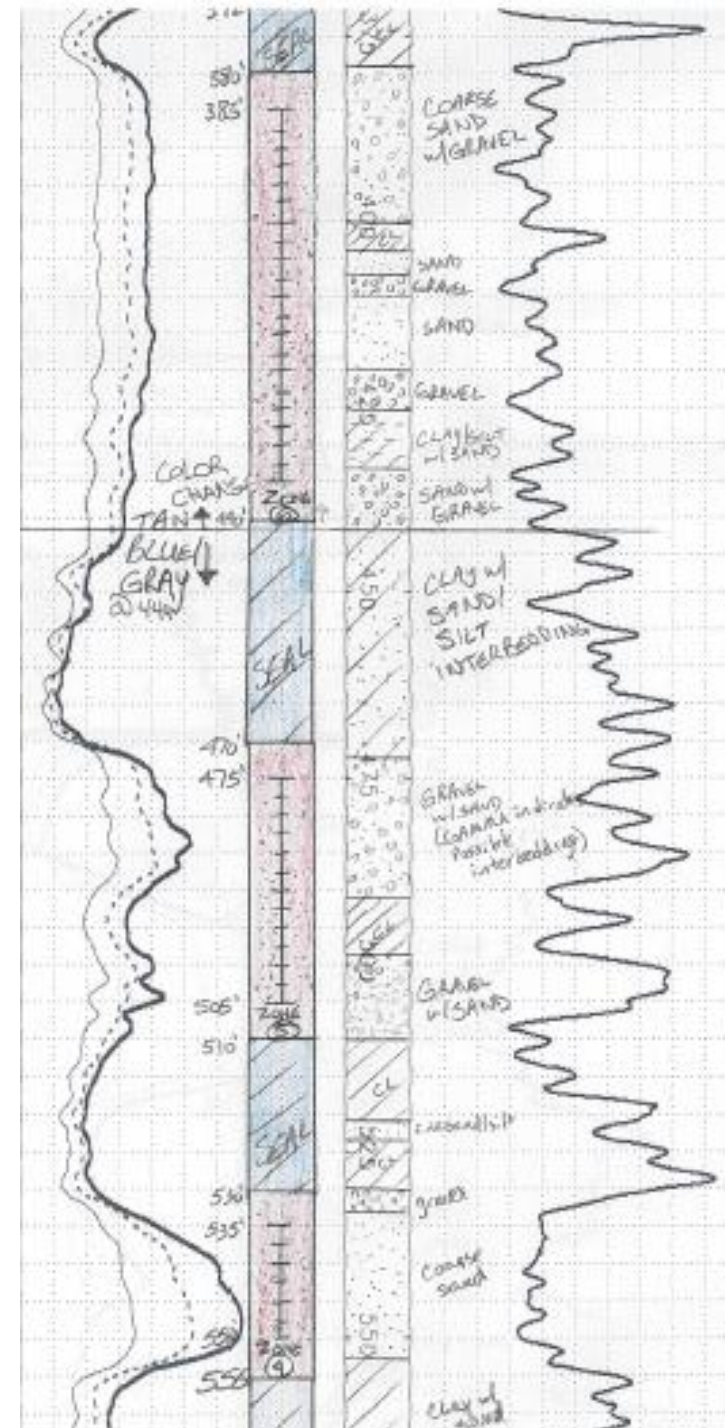
Permanent Multi-Level Monitoring Wells

Pros and Con

- Pros
 - Water quality certainty
 - Diagnostic capability
 - Long-term water quality and head data
- Con
 - Cost



Data Collected from Monitoring Well Drives Production Well Design City of Meridian Well 30



Data Collected from Monitoring Well Drives

Production Well Design

City of Meridian Well 30



NH₄	0.08	ZONE 8
As	0.005	
Fe	<0.05	
Mn	<0.05	
NO₃	3.6	
H₂S	<0.05	
U	28/25.6	

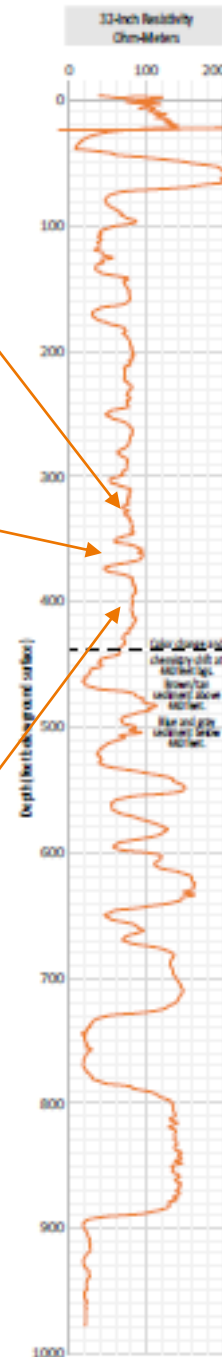
310 to 345
feet bgs

NH₄	0.04	ZONE 7
As	0.003	
Fe	<0.05	
Mn	<0.05	
NO₃	1.7	
H₂S	<0.05	
U	12/10.4	

350 to 370
feet bgs

NH₄	0.06	ZONE 6
As	0.006	
Fe	<0.05	
Mn	<0.05	
NO₃	1.3	
H₂S	<0.05	
U	12/10.6	

375 to 440
feet bgs



Three Ports Respond to Production Well Pumping

Port	Water Level (static prior to any pumping today)	Water Level (after 30 minutes of pumping Production Well 30 at 350 gpm)	Drawdown (feet)
1	47.64	47.59	0.05
2	55.63	55.57	0.06
3	54.93	54.88	0.05
4	54.95	54.89	0.06
5	53.00	52.99	0.01
6	53.32	56.05	-2.73
7	53.35	54.00	-0.65
8	53.37	53.95	-0.58
9	53.47	53.49	-0.02
10	53.43	53.46	-0.03
11	53.46	53.47	-0.01
12	53.24	53.25	-0.01
13	50.67	50.67	0.00

Production Well Water Quality

- Present preliminary result if available

Investment in Permanent, Multi-Depth Monitoring Wells Provides Water Quality Certainty

• Monitoring Well

- \$250K investment
- 13 separate zones, both shallow and deep aquifer
- Permanent monitoring capability to assess future issue should they arise
- Water quality certainty with depth and ability to monitoring into future



• Production Well

- Monitoring well drove design



Thank you