

Electrical Resistivity

A Shocking New Way To See Greene County.

Presented by Environmental

October 15, 2019

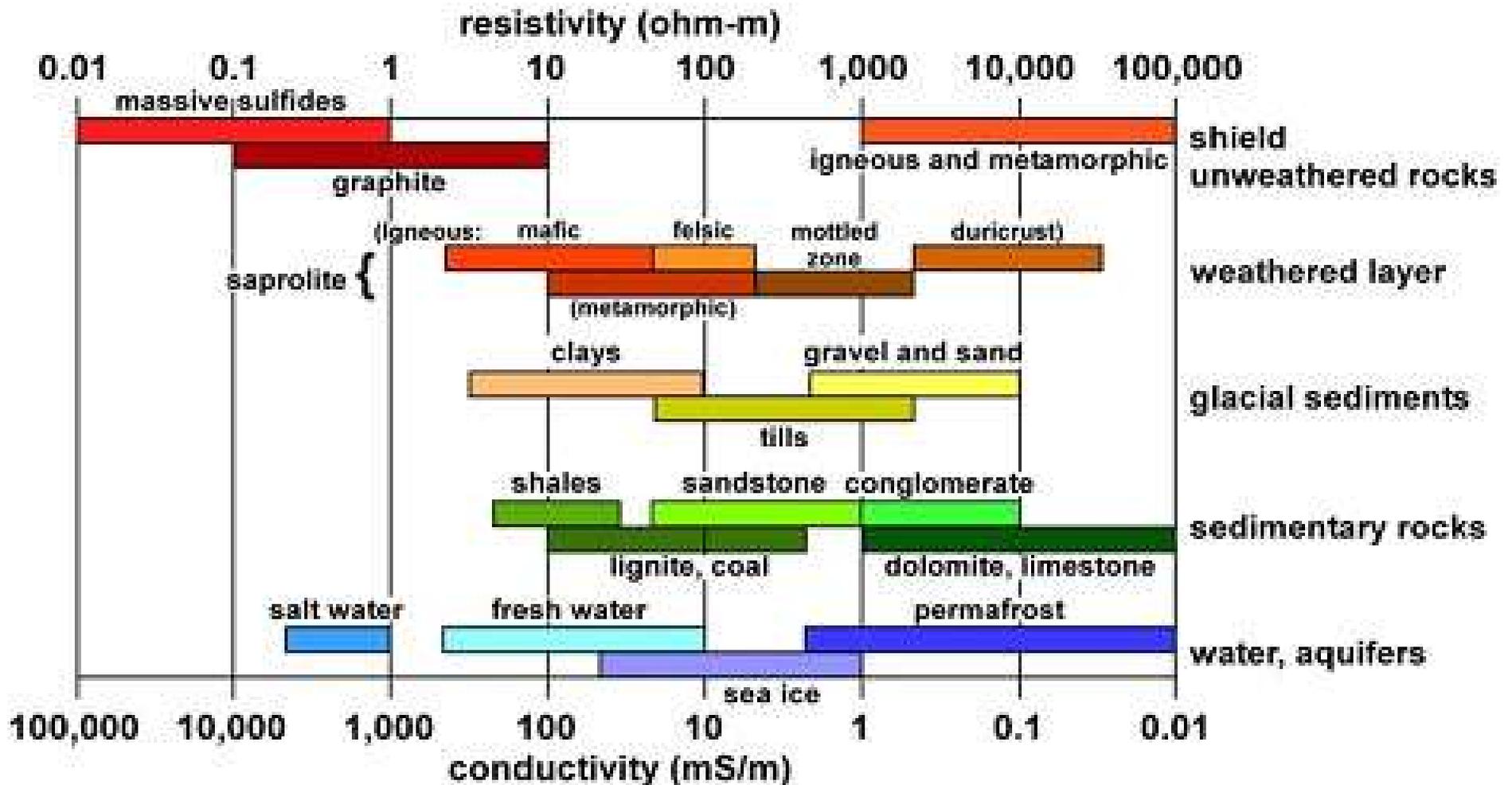


**RESISTANCE
IS NOT FUTILE
IT'S VOLTAGE
DIVIDED BY CURRENT**

What is Electrical Resistivity?

Simply put, it is the resistance that electrical current encounters when moving through materials.

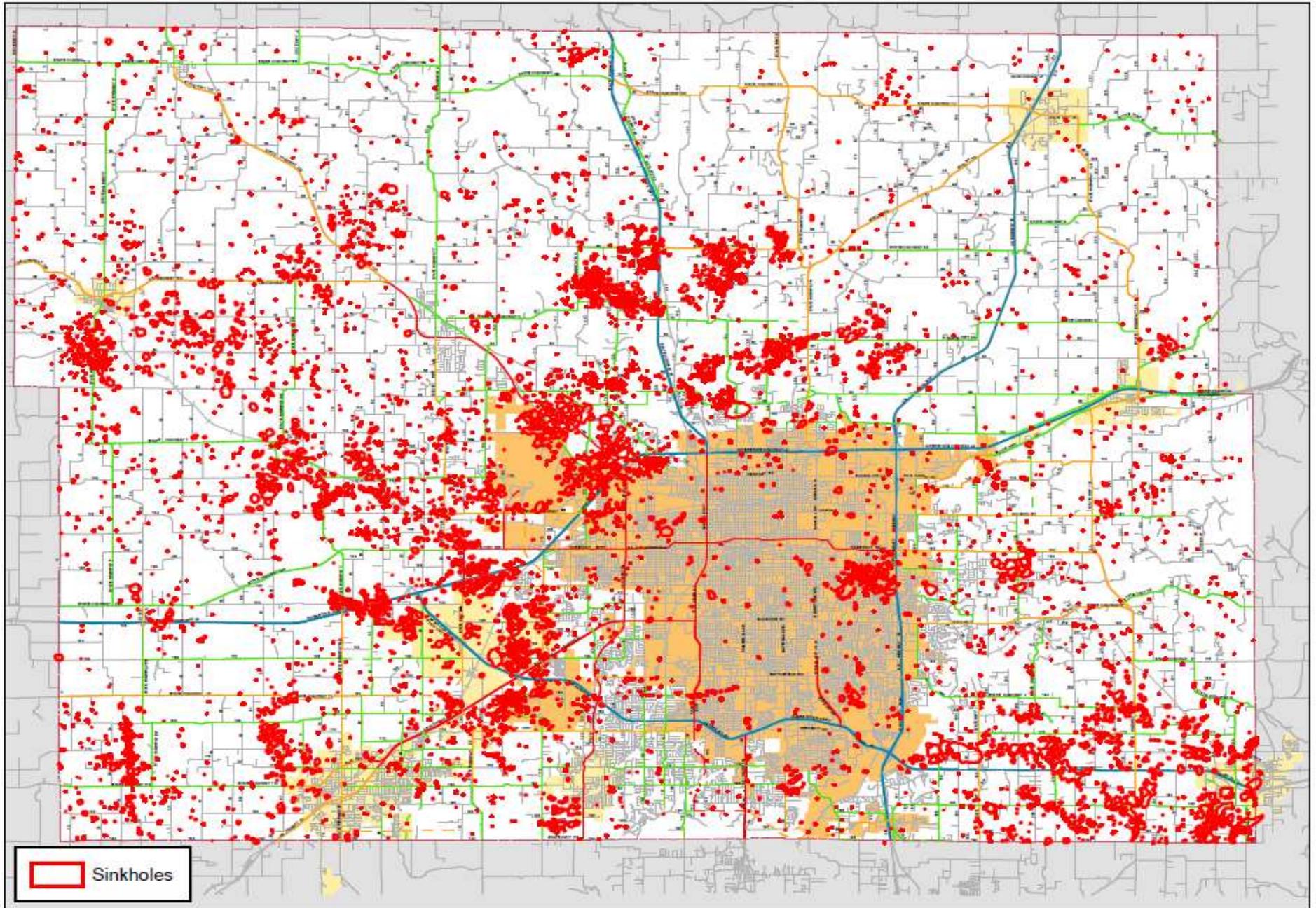
Everything Has Resistance and we can measure it to determine what is below our feet.



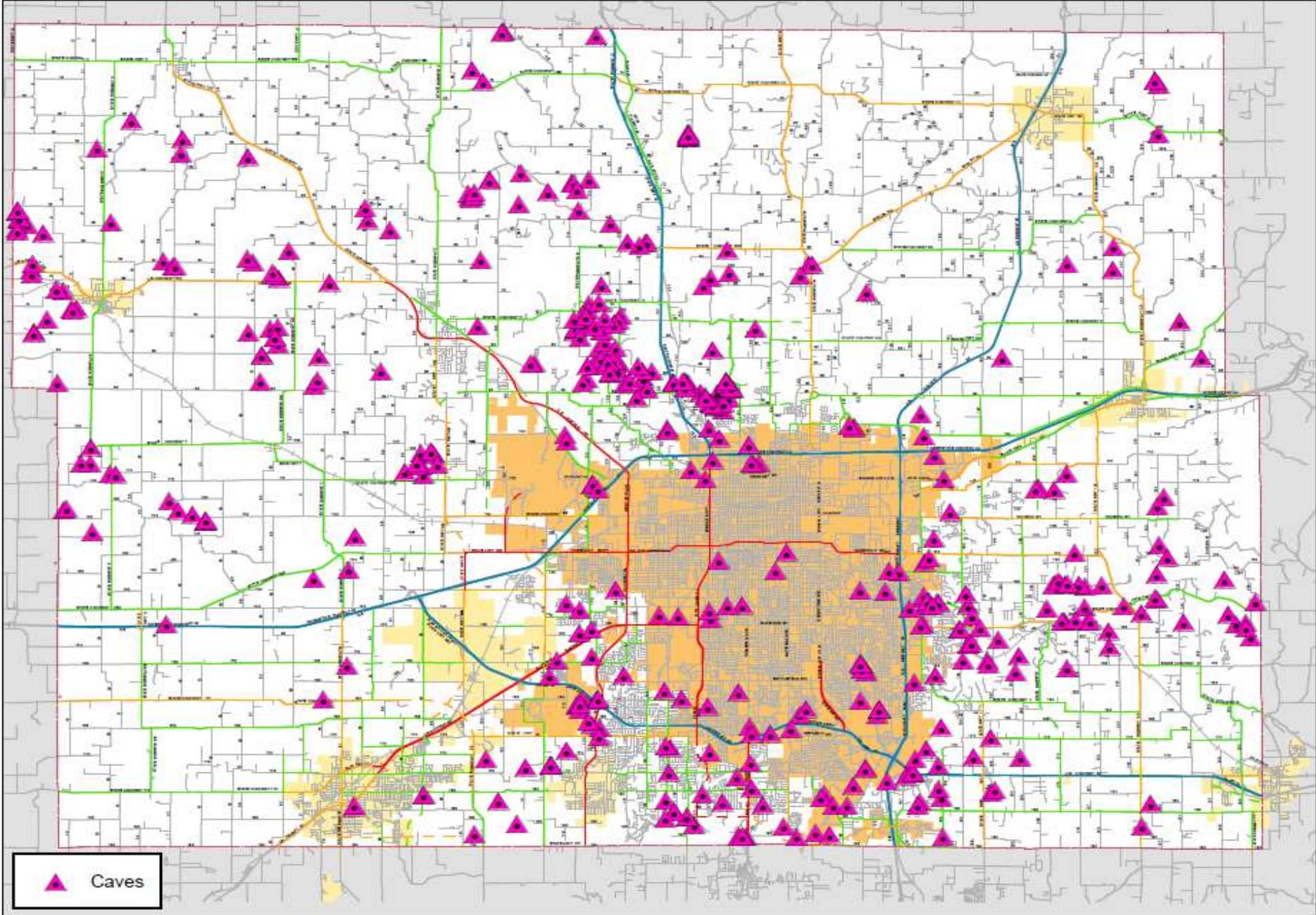


**This is great
and all but
what is the
point of the
science
lesson?**

Greene County has 7,555- Sinkholes

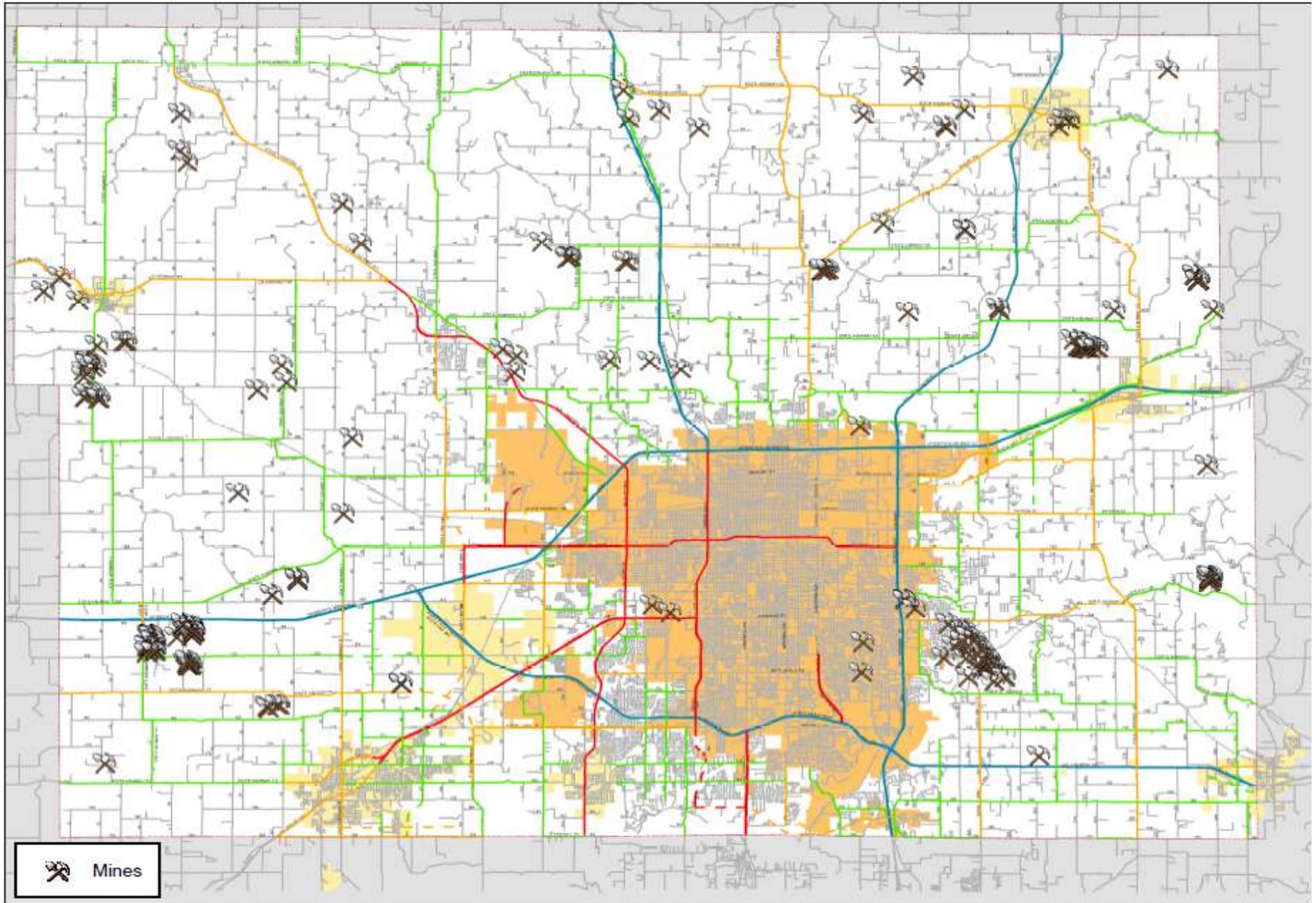


443- Caves

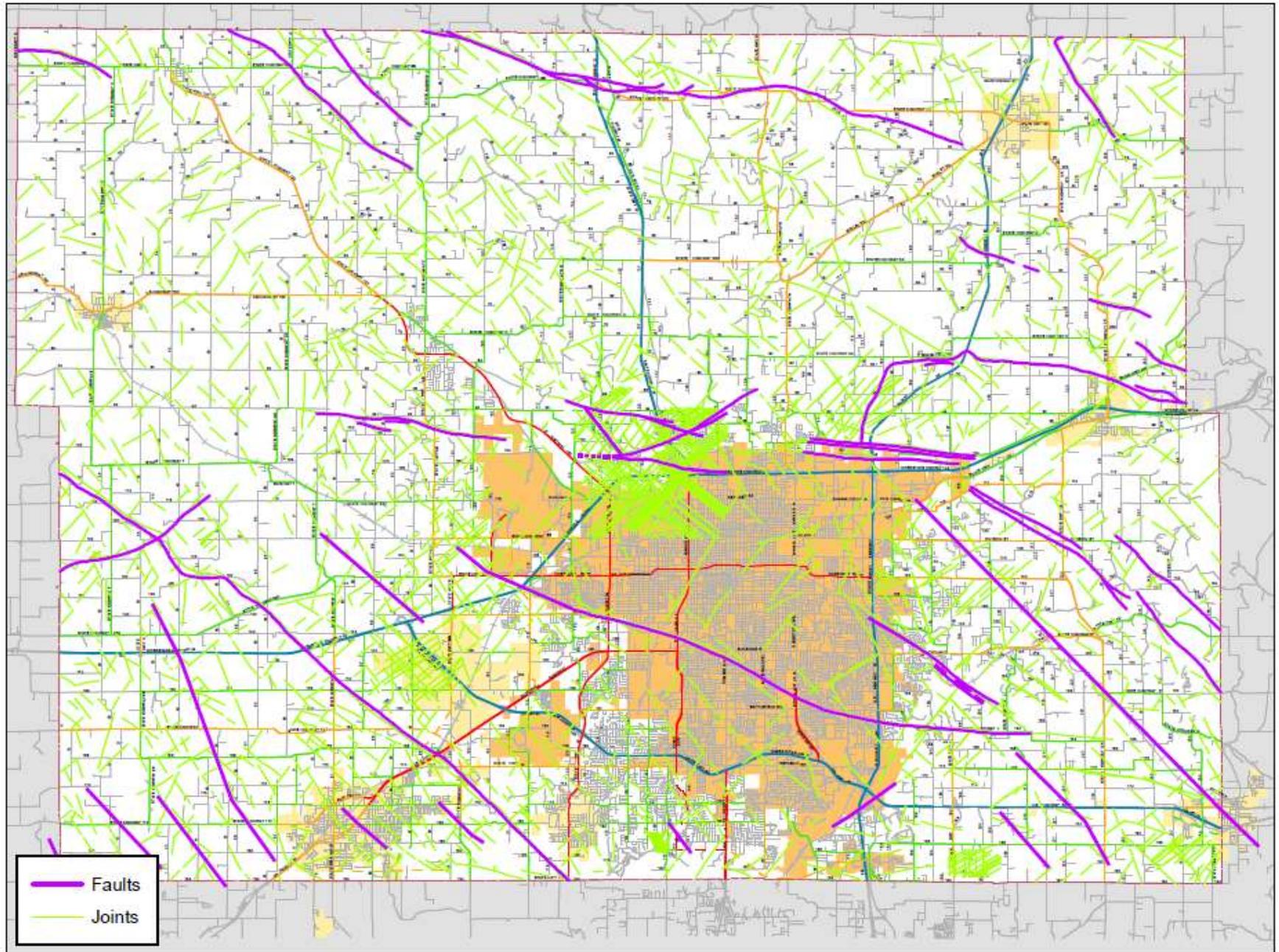


298- Mines

The vast majority of mines in Greene County are lead and zinc mines but there some small coal pits near Republic.



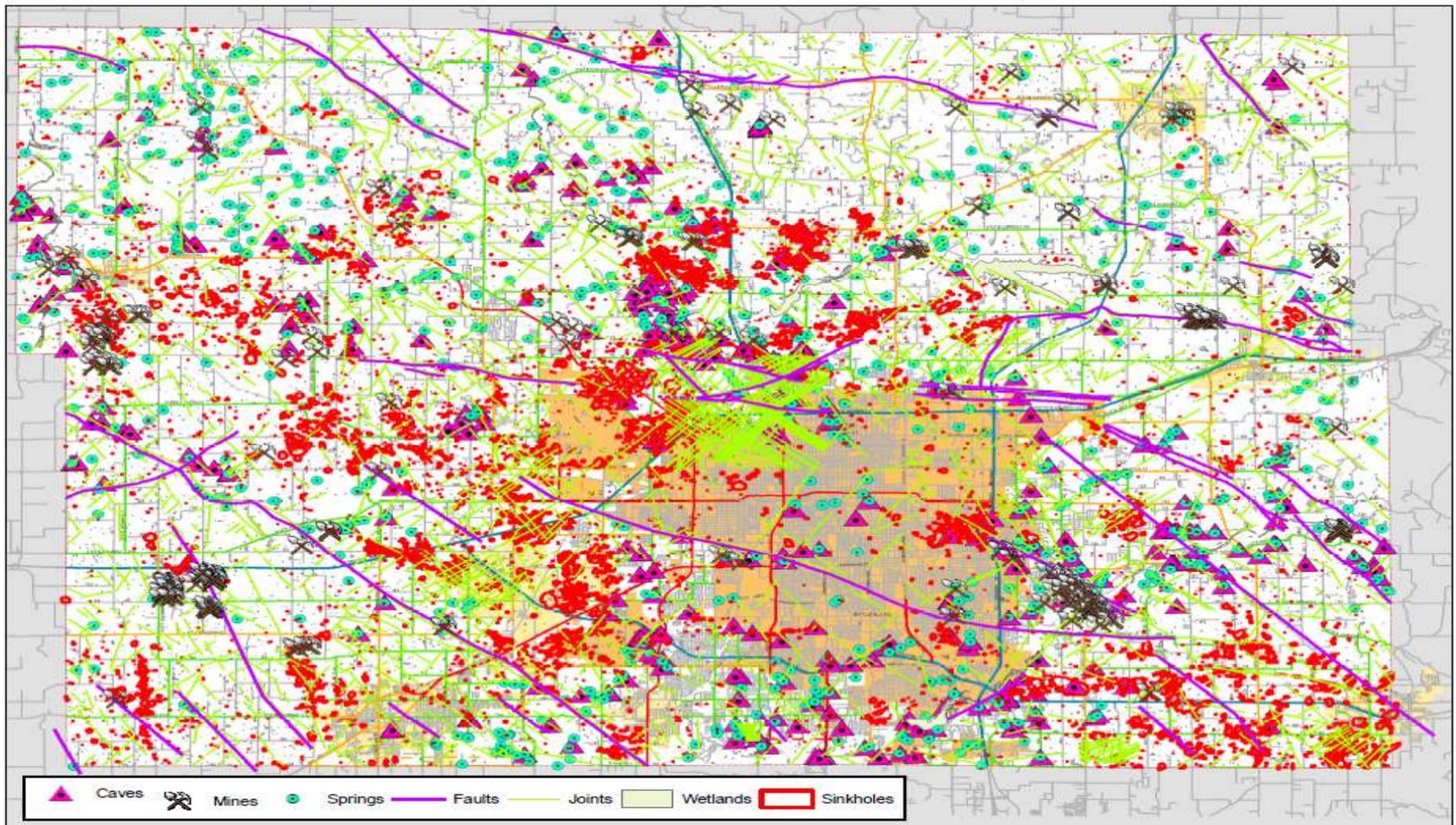
Joints and Faults



Our faults are part of the larger Bolivar/ Mansfield fault zone and in turn part of the New Madrid Fault Zone system. The joints are relief cracks formed by tectonic forces.

All of the KNOWN geologic features combined. We truly are influenced by our geology.

Because of the density and complexity of our geology it is important that we continue to explore, discover and study our geology.



A very typical cross section into our subsurface.
Note the enlarged joint(up/down) and the bedding plane(right left)

To see this type of geology one would need to either have a road cut such as this or geophysical equipment such as electrical resistivity.



Resistivity Gives Us...

The Ability to see the subsurface

- ✓ Depth to bedrock
- ✓ Voids
- ✓ Groundwater
- ✓ Geologic features

Identify problems before development

Much broader and more detailed look than other techniques

A common technique today as in the past is to drill a number of borings into the ground to determine what is subsurface.

This gives you a very limited view of the subsurface.

Issues with Borings



The green x's are locations of the drilled borings.

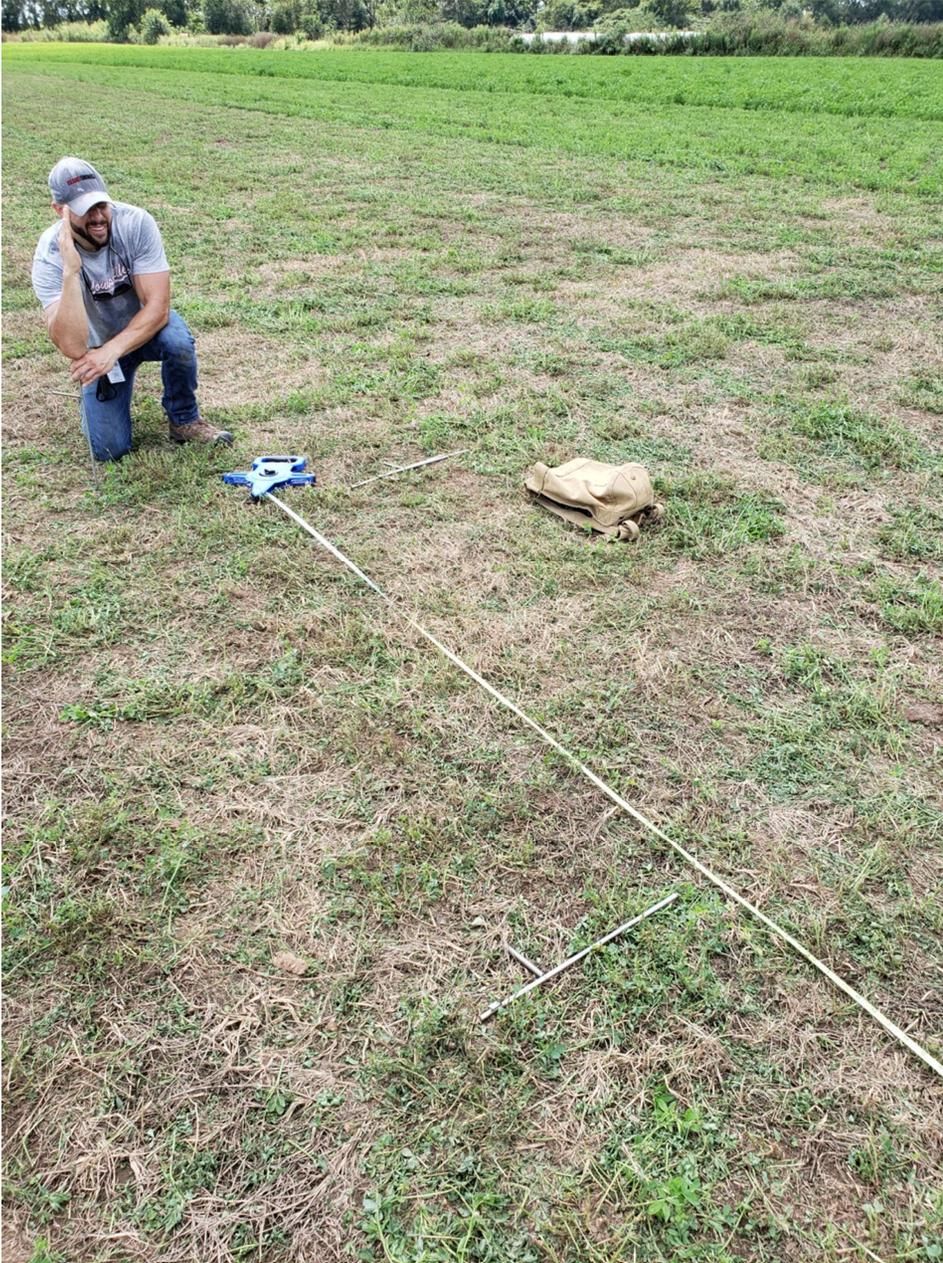
The question is what is in between them.

Resistivity fills in those gaps.

The Set Up



The equipment (yellow boxes) in the shade to keep them cool as possible on a hot September day.



Measure twice and divide by 56

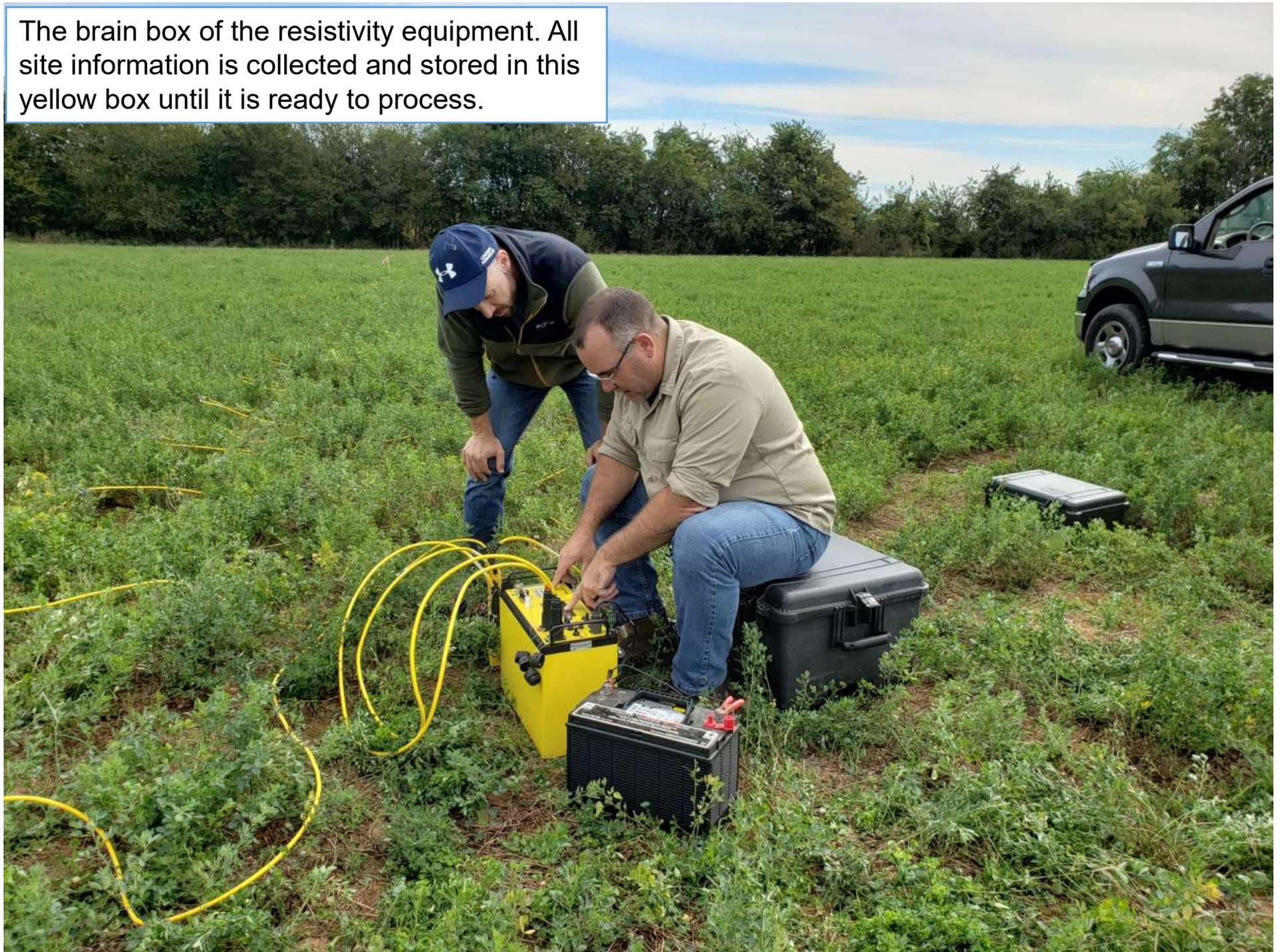
Each survey line must be measured accurately to allow a proper set up and for the equipment to make the most precise readings.

**Don't forget
your bug spray
and sunscreen**



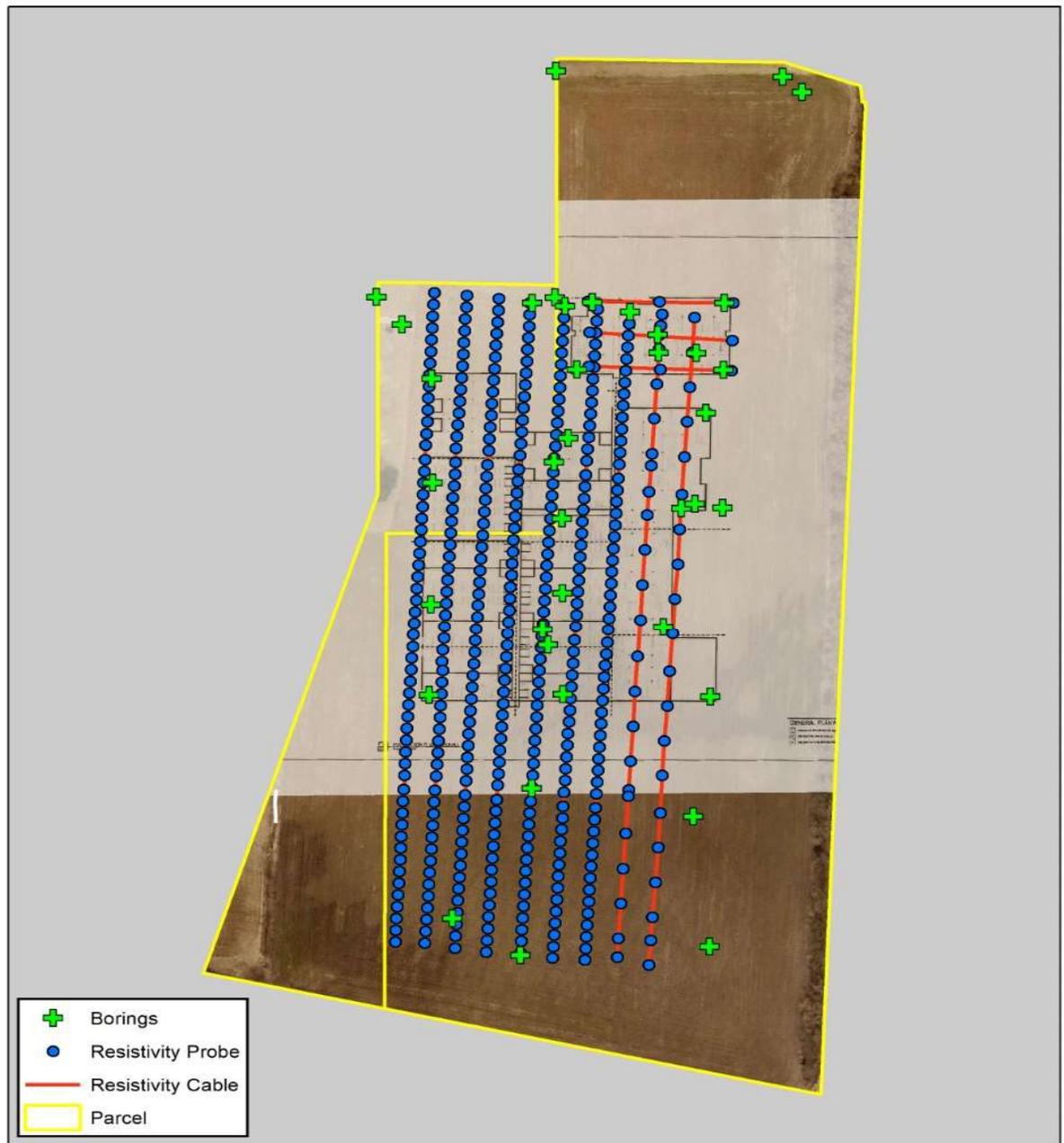
One can see the array of probes and cables looped on the survey site.

The brain box of the resistivity equipment. All site information is collected and stored in this yellow box until it is ready to process.



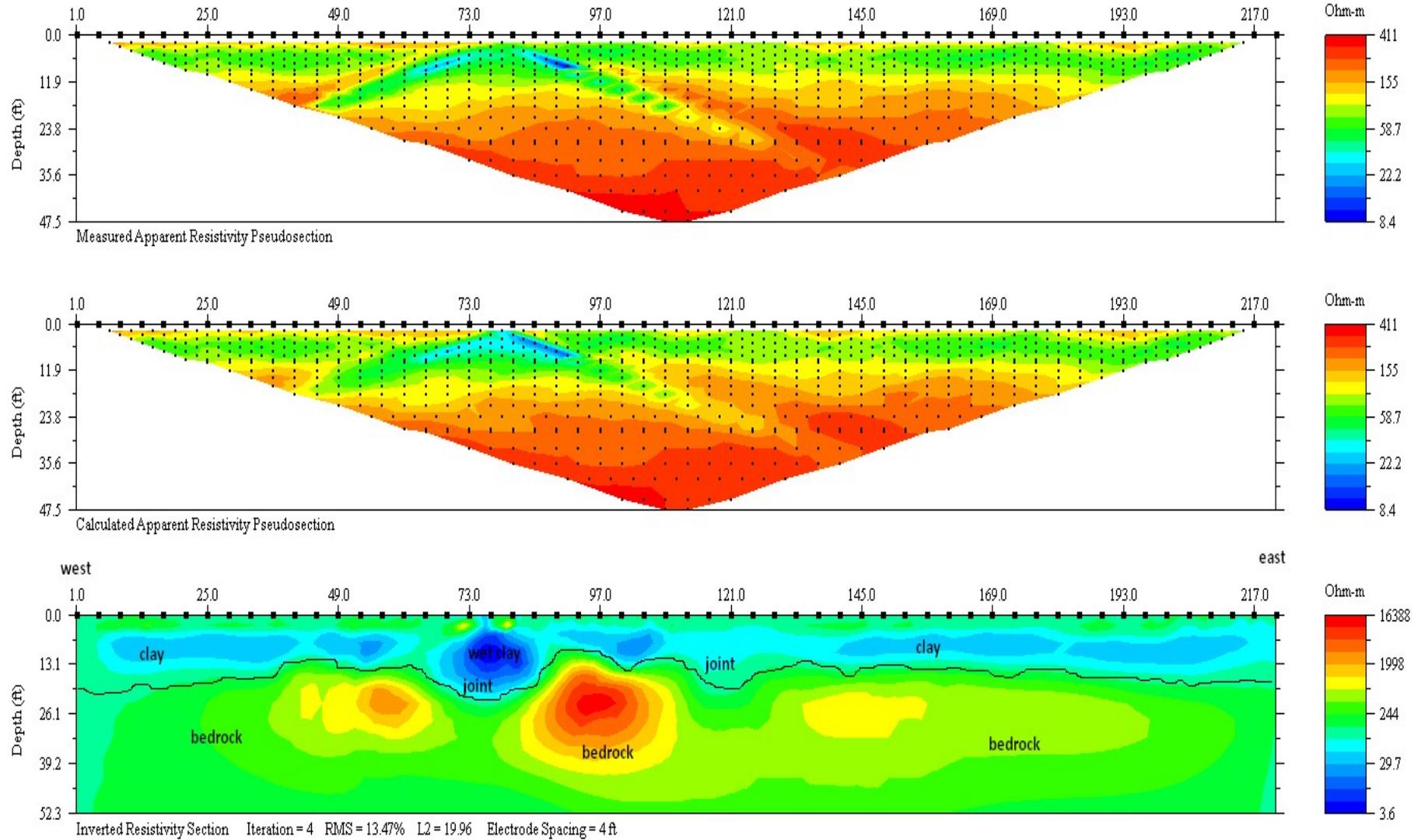
The Layout

Not the green x's and the blue dotted lines connecting them. The blue lines and red are resistivity survey lines that are filling the gaps between the drill holes. Everything is then surveyed in with a highly accurate GPS.



Results

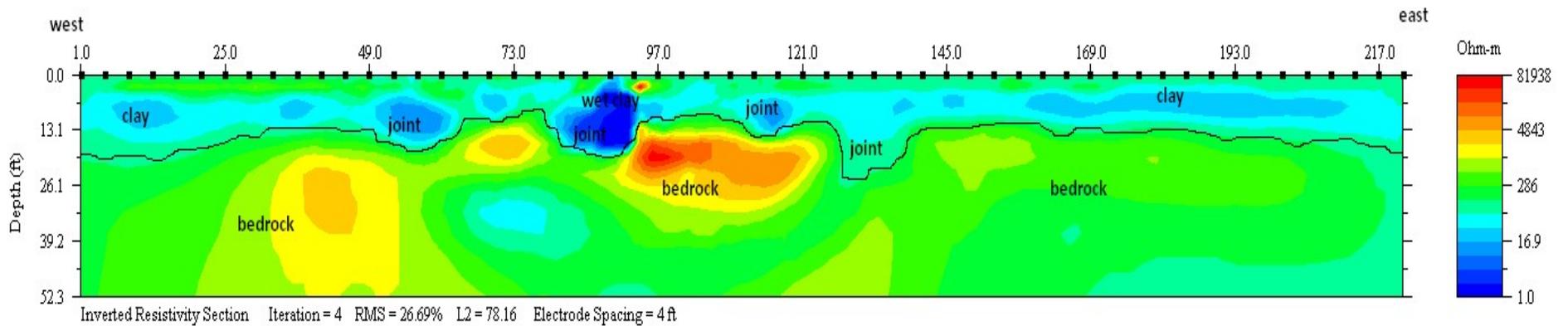
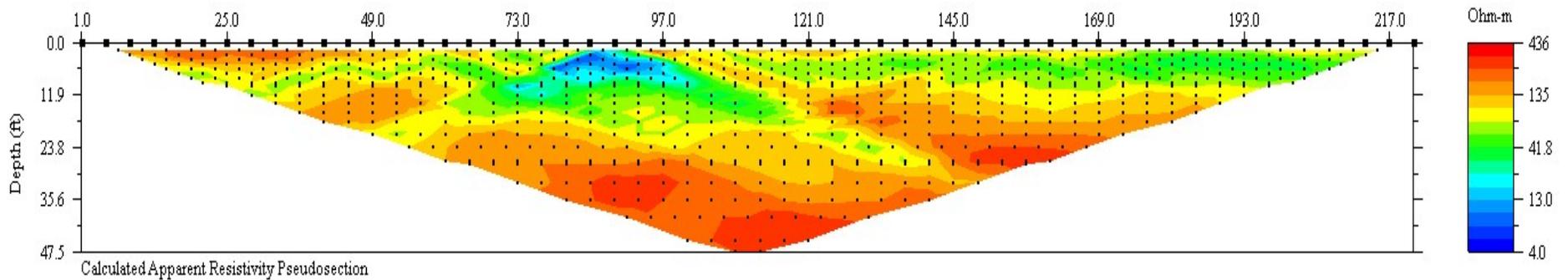
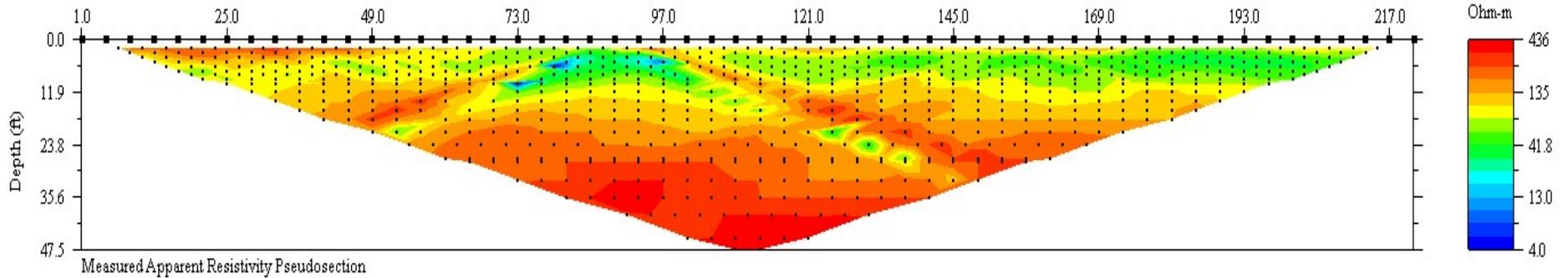
JAIL10_trial1.stg



A perfect cross section through the earth.

More Results

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Wrapping Up

A quick side note about the technology used at this site and others recently.

- There is no other county in the country that has its own geophysical equipment or that does the amount of geological exploration and research.
- When coupled with our new GPS technology, Greene County is able to perform geological and geographical investigations normally reserved for only universities and the USGS.
- Truly amazing that we are allowed to do such amazing work like this.