A GEOLOGIC TOUR OF MARKERS IN PARSONS CEMETERY

This tour highlights the types of materials that grave markers in Parsons Cemetery are made of.

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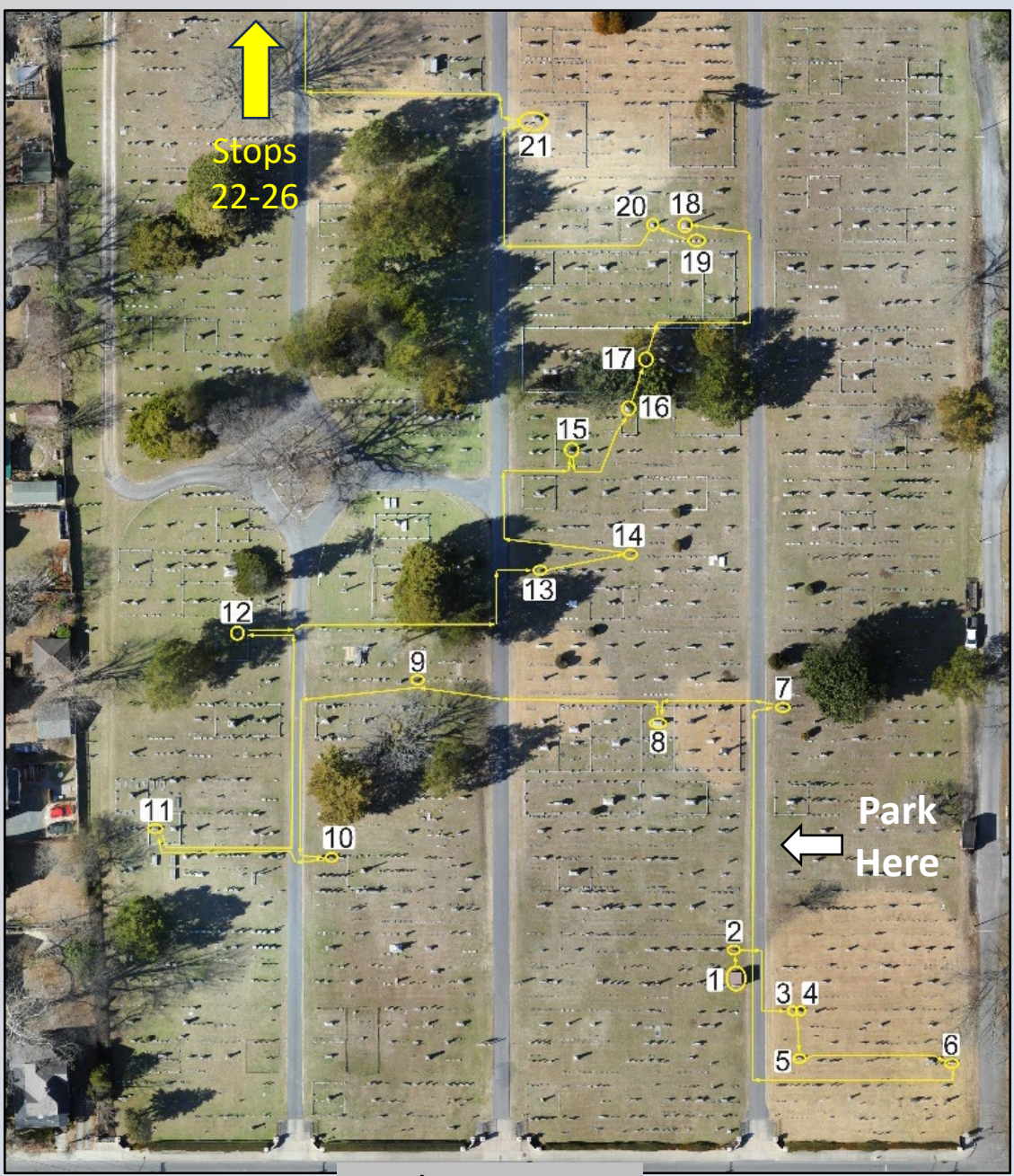
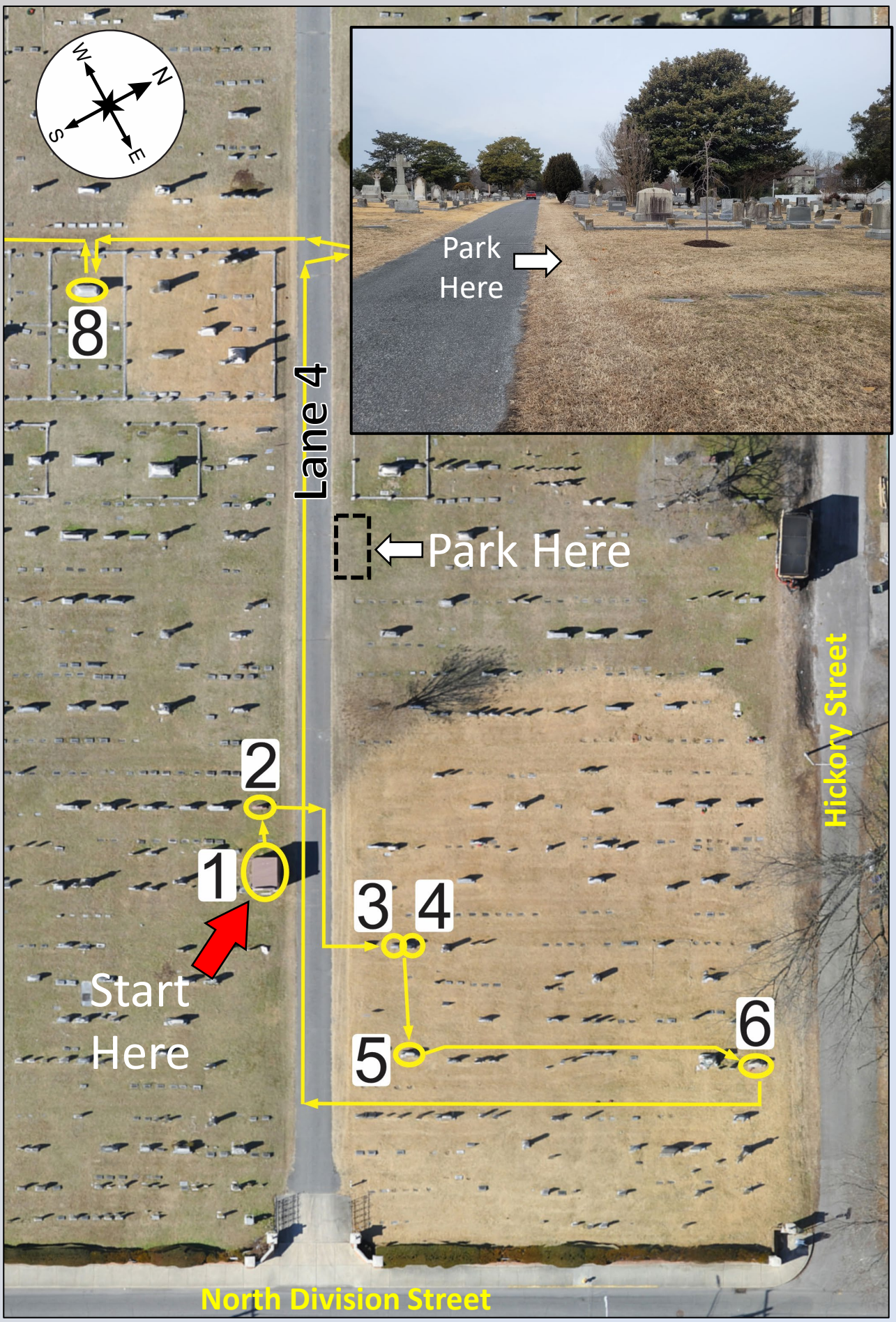
This tour is designed to be viewed on a standard cell phone held vertically.

The tour covers a distance of approximately 3/4 of a mile and will take 1-1.5 hours to complete.

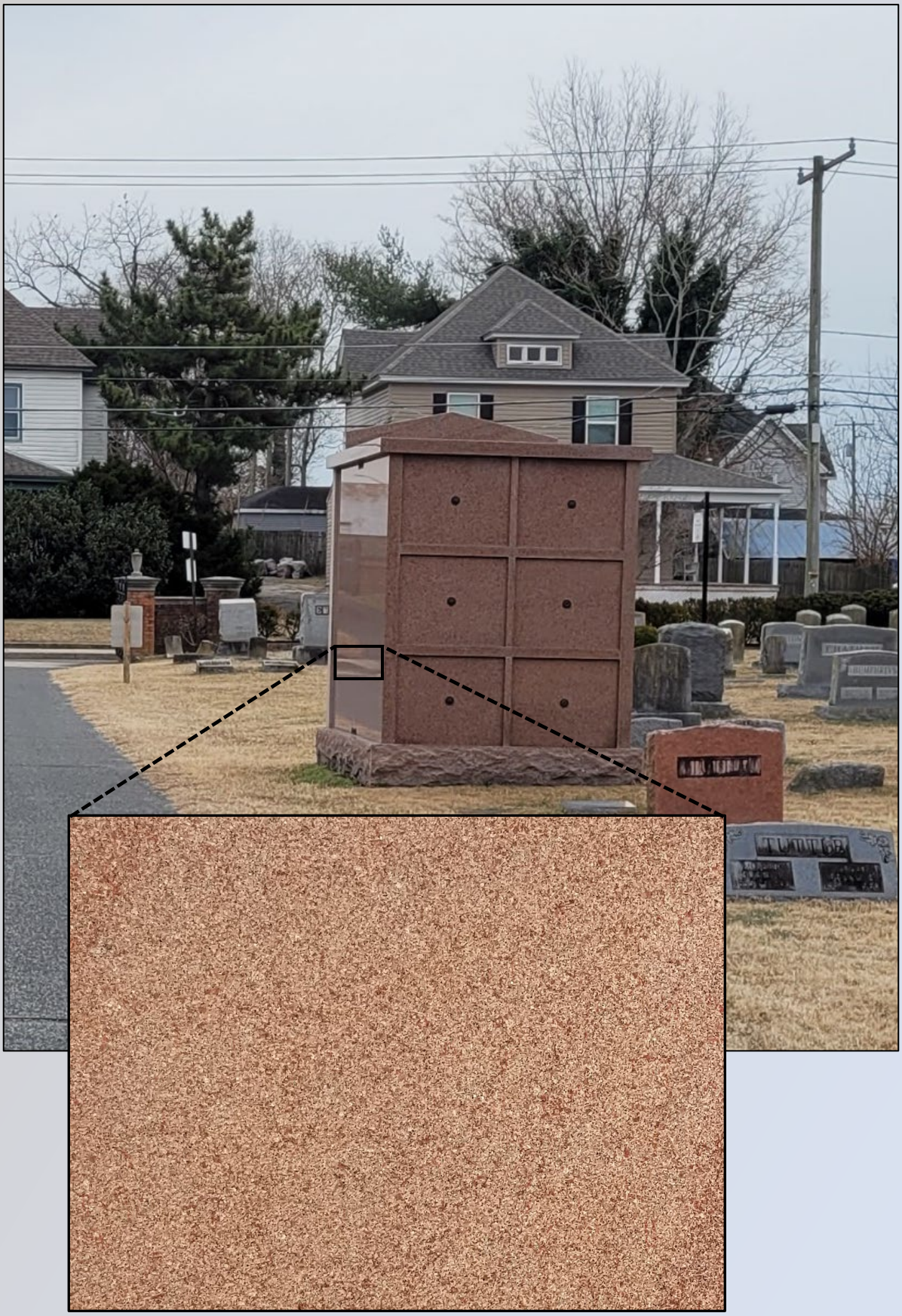


It is recommended you park just off Lane 4 at the space indicated below.

Once parked, look for the large Brown mausoleum to the east.



Stop 1: Brown mausoleum



We start our geologic tour at the largest and most obvious mausoleum in the cemetery. Virtually all the markers in Parsons Cemetery are made of rock.

So, what is a rock? A **rock** is a naturally-occurring substance made up of one or more different **minerals**.

Stop 1: Brown mausoleum

So, what is a mineral? A **mineral** is a naturally-occurring inorganic solid that possesses a definite chemical structure (also known as a *crystal lattice*), giving it a unique set of properties. One of the most obvious properties is color, and you will see minerals of all sorts of different colors on this tour.

If you look closely at the rock which the Brown mausoleum is made of, you will see it has several different distinct types of minerals.

Because most of the minerals are pink to red in color, the overall appearance of this rock is pinkish-red.

Stop 1: Igneous Rocks

So how do rocks form? Well, that depends on the type of rock. Most of the rocks which make up the Earth's crust are formed by the cooling of molten rock called magma or lava. When the molten rock is found *inside* the Earth, it's called **magma**, but when the molten rock flows out *on* the Earth's surface during an eruption, it's called **lava**.

In either case, the molten rock will cool, and minerals will form through a process called **crystallization**. That's how the rock at Stop 1 formed. These types of rocks are called **igneous rocks**, and the majority of the markers in Parsons are made of igneous rocks.

Stop 2: Harden/Tuttle

Here is another example of an igneous rock. This one has a darker red color, and that's because it is dominantly composed of a pink mineral called **feldspar**. In fact, all of the igneous rocks in Parsons are composed of some combination of eight basic types of minerals known as the **rock-forming minerals**.

Stop 2: The Common Rock-forming Minerals

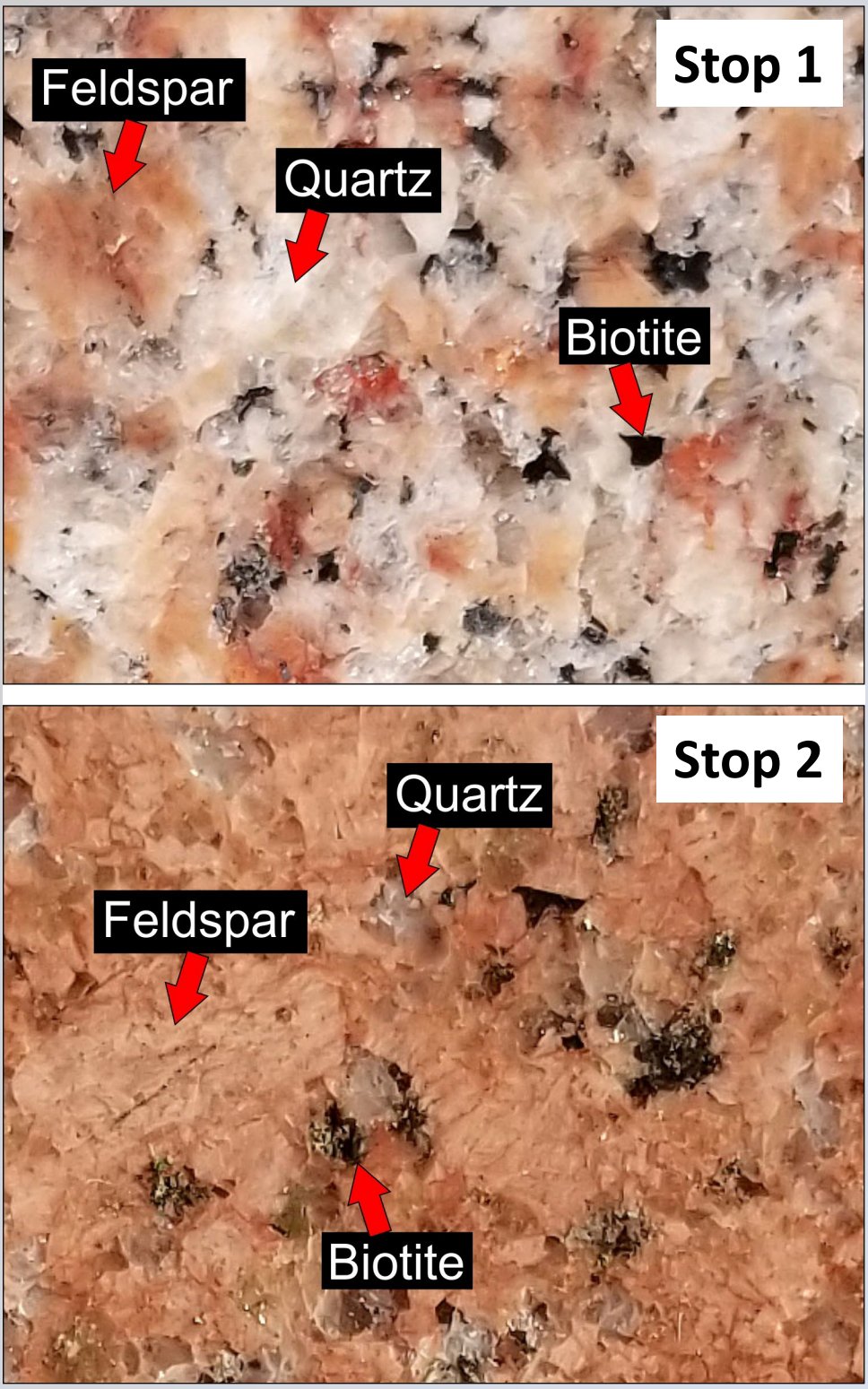
Although there are over 4,000 unique minerals found around the world, there are only a few that are very common, including the **rock-forming minerals**. The overall color an igneous rock displays is a direct reflection of which of these common minerals the rock is made of.

Common rock-forming minerals

It's important to note that some of the minerals above come in a range of colors. For example, Feldspar is typically pink, but it can also be white. Anorthite can be light to dark grey in color, while Albite can be white to light grey in color. Quartz comes in a range of colors including milky white, grey, orange, pink and it can also be colorless and transparent.

You will see examples of all these minerals on this tour *except for olivine and muscovite*. Rocks which contain those two minerals don't make good markers because the rocks are susceptible to weathering and rapid degradation.

Stop 2: The Eight Common Rock-forming Minerals



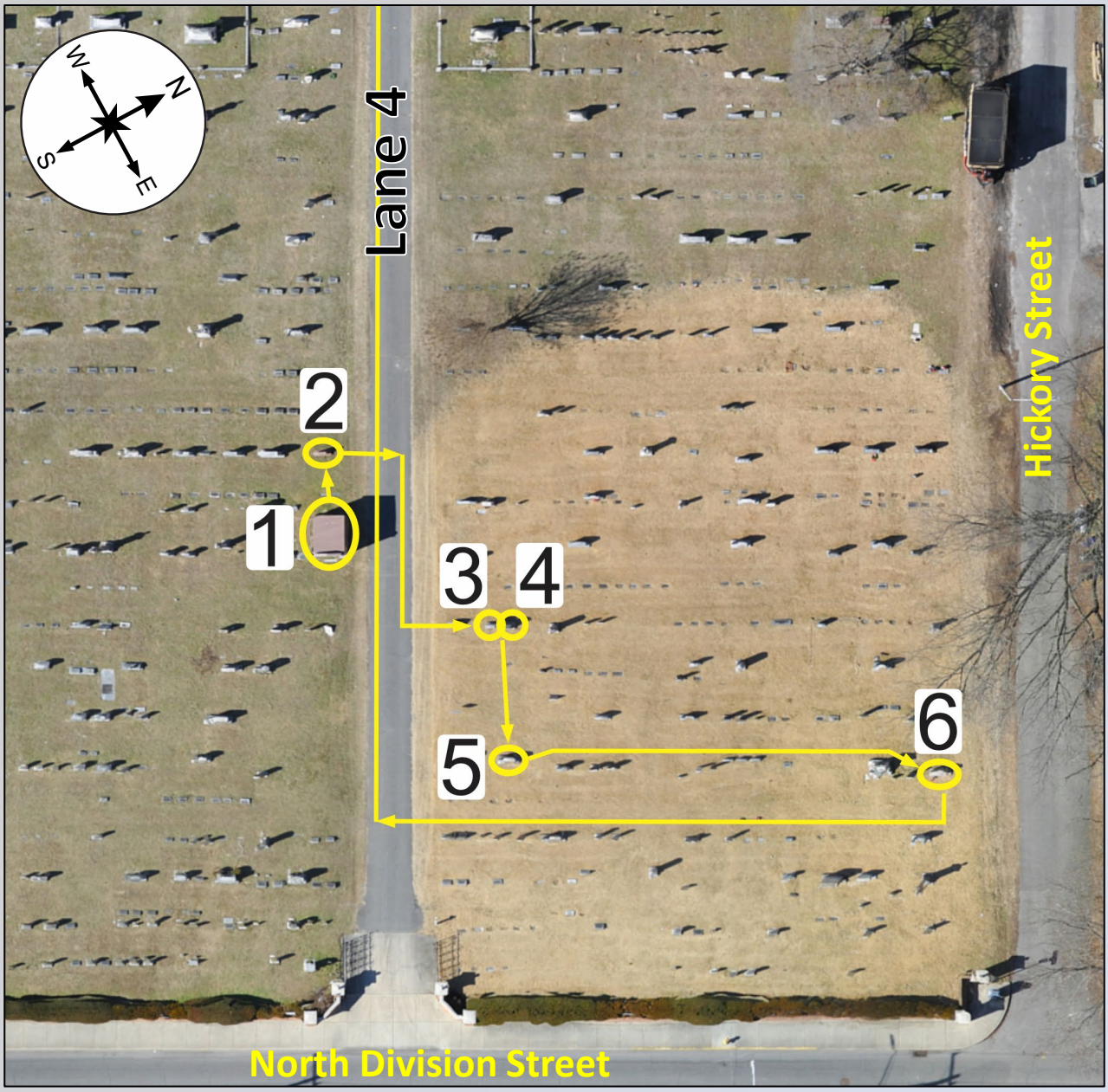
Although the rocks at Stops 1 and 2 are made of the same types of minerals, the rock at Stop 1 has more white quartz than the rock Stop 2, so its overall color is lighter.

In general, igneous rocks fall in one of four categories in terms of their composition: ***felsic***, ***intermediate***, ***mafic*** or ***ultramafic***. Ultramafic rocks are rare, and not used as cemetery markers, so we won't discuss them further.

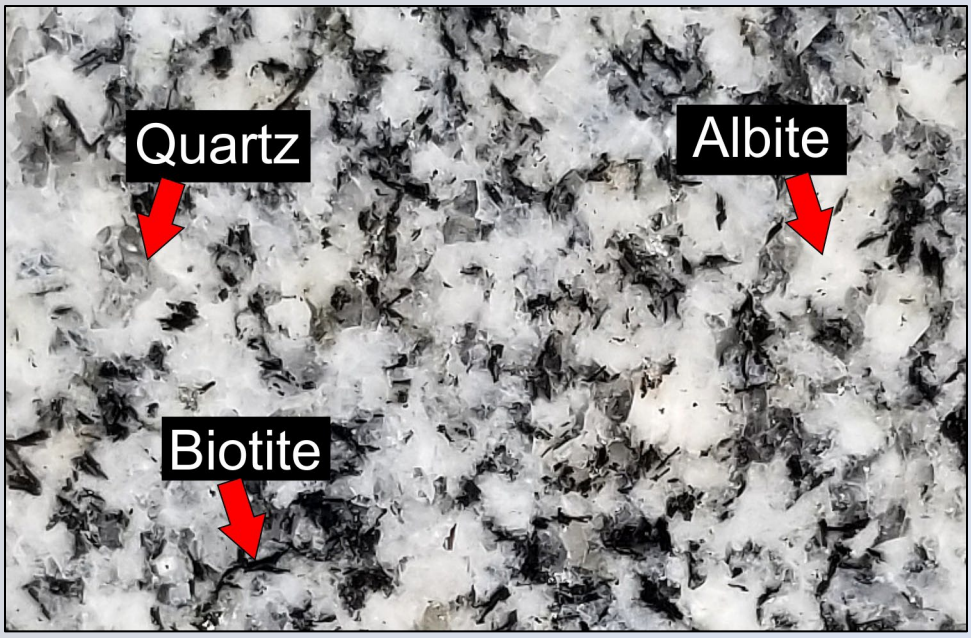
Stop 2: Harden/Tuttle

Before we move on to the next stop, take a moment to look at the top of the Harden/Tuttle marker. Unlike the sides, the top has not been cut and polished. As a result, it is harder to pick out the individual minerals. When you polish a rock, the individual minerals become more visible, and the colors are more vibrant.

Return to lane 4 and walk a couple rows to the east to reach stops 3-5.



Stop 3: Adkins



Although the red and pink markers are very pretty, you will find that most of the markers in Parsons are grey, like this one here. The key difference is the absence of the pink feldspar minerals. This rock is made exclusively of white, grey and black minerals. This rock would be classified as **felsic**.

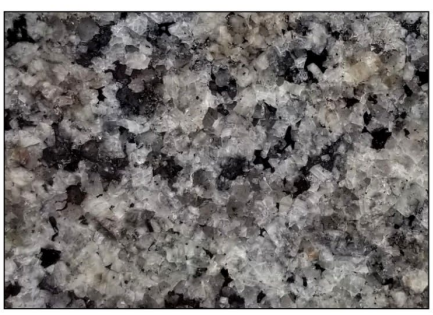
Stop 3: Basic types of Igneous Rocks

The most common igneous rocks
used for cemetery monuments in Parsons

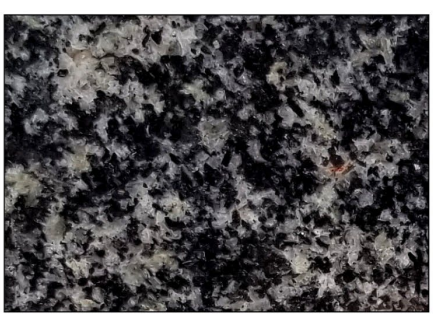
Granite
(*felsic*)

Granodiorite
(*felsic*)

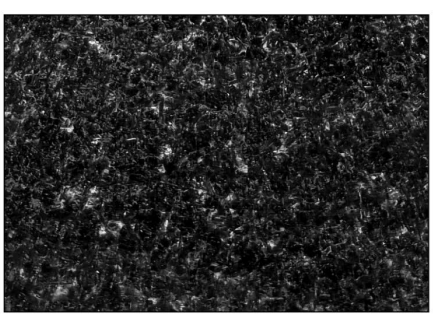
Syenite
(*intermediate*)



Monzonite
(*intermediate*)



Diorite
(*intermediate*)

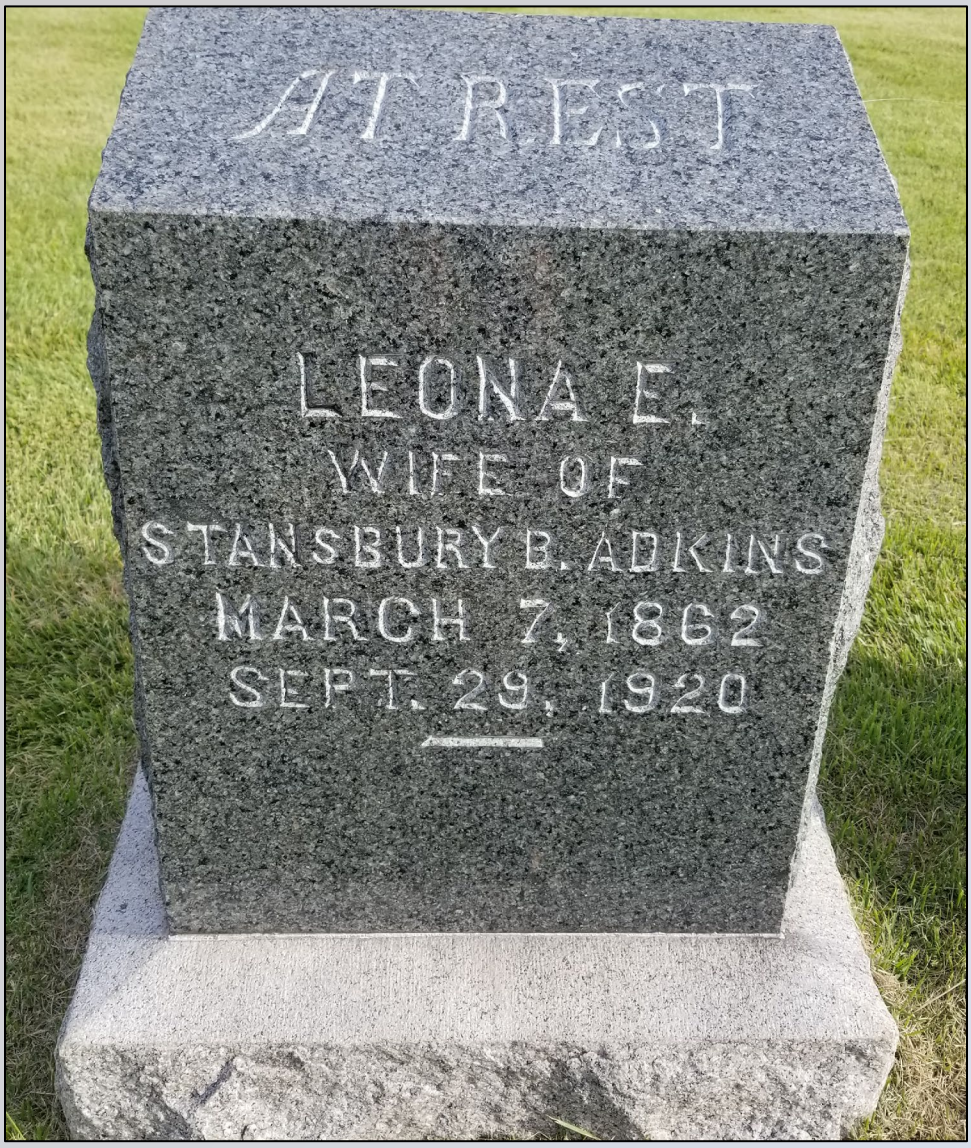


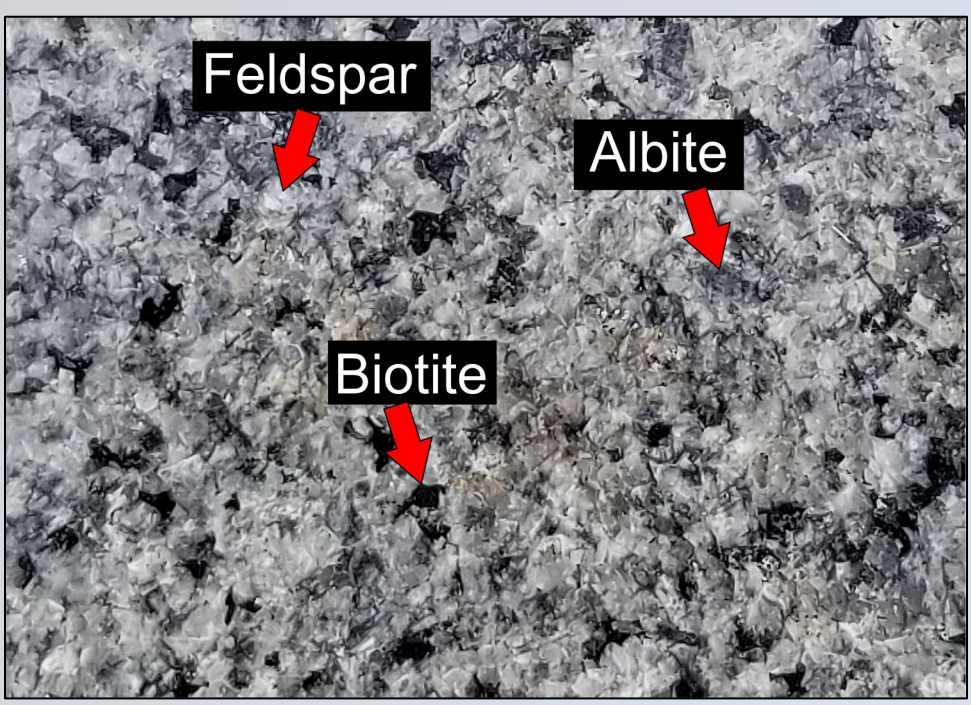
Gabbro
(mafic)

Most of the “igneous” markers in Parsons are one of the six types of igneous rock shown above. The terms geologists use to classify different types of igneous rocks are based on the relative proportion of the different minerals they contain. For example, granite or granodiorite will have a large amount of quartz, syenite or monzonite will have very little quartz, and diorite or gabbro will have no quartz at all.

The marker at Stop 1 would be classified as a **granite**, the marker at Stop 2 would be classified as a **syenite**, and the marker at Stop 3 is a **granodiorite**.

Stop 4: Leona E. Adkins





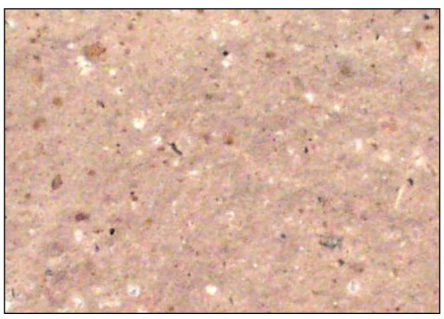
This rock is classified as a **monzonite**, which has a darker gray color than the marker at Stop 3. But there is another key difference between this marker and the previous one. They have different sized crystals. *Some igneous rocks have bigger crystals than others*.

Stop 4: Igneous Rock Textures

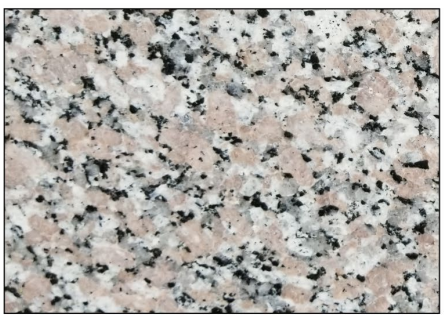
How big the crystals grow in an igneous rock is a function of how fast the magma cools.

If the magma cools quickly, the crystals will be small in size. If the magma cools slowly, the crystals will be large in size.

The most common igneous rock textures



Aphanitic



Phaneritic

Pegmatitic

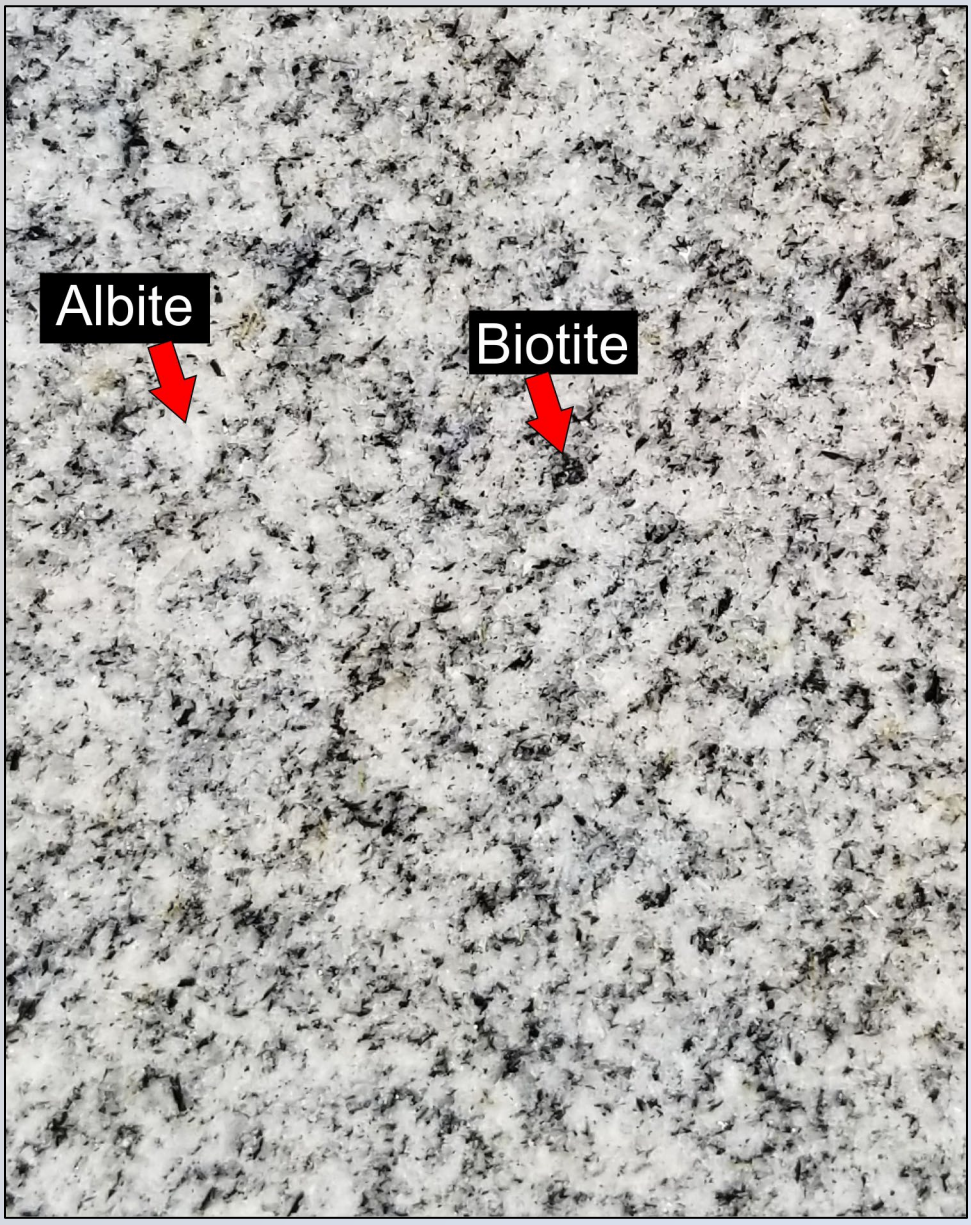
Porphyritic

Geologists use different terms to describe the general size of the crystals in an igneous rock.

Aphanitic rocks have very small crystals, so small that they are not visible to the naked eye (although you might pick out one occasionally). *Aphanitic rocks are not commonly used as cemetery markers because they aren't very durable*.

Most of the igneous rocks in Parsons Cemetery are **phaneritic**, meaning the crystals can be seen with the naked eye. **Pegmatitic** rocks have crystals which are larger than a dime, while **porphyritic** rocks have two groups of distinctly different-sized crystals.

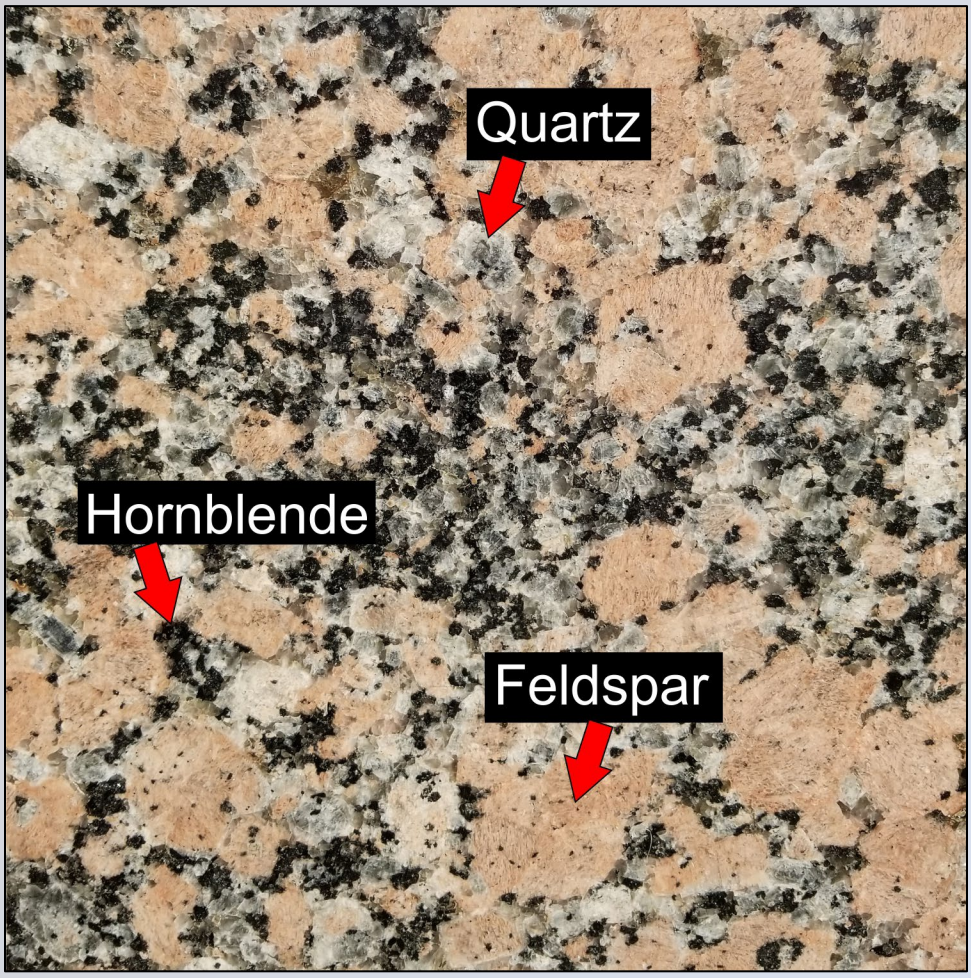
Stop 5: Kelley



This rock is **phaneritic** in texture, but the crystals are smaller in size as compared to the last stop. It is also a **granodiorite** based on its composition.

Now walk north from stop 5 to reach stop 6.
It is near the large “Richmond” marker

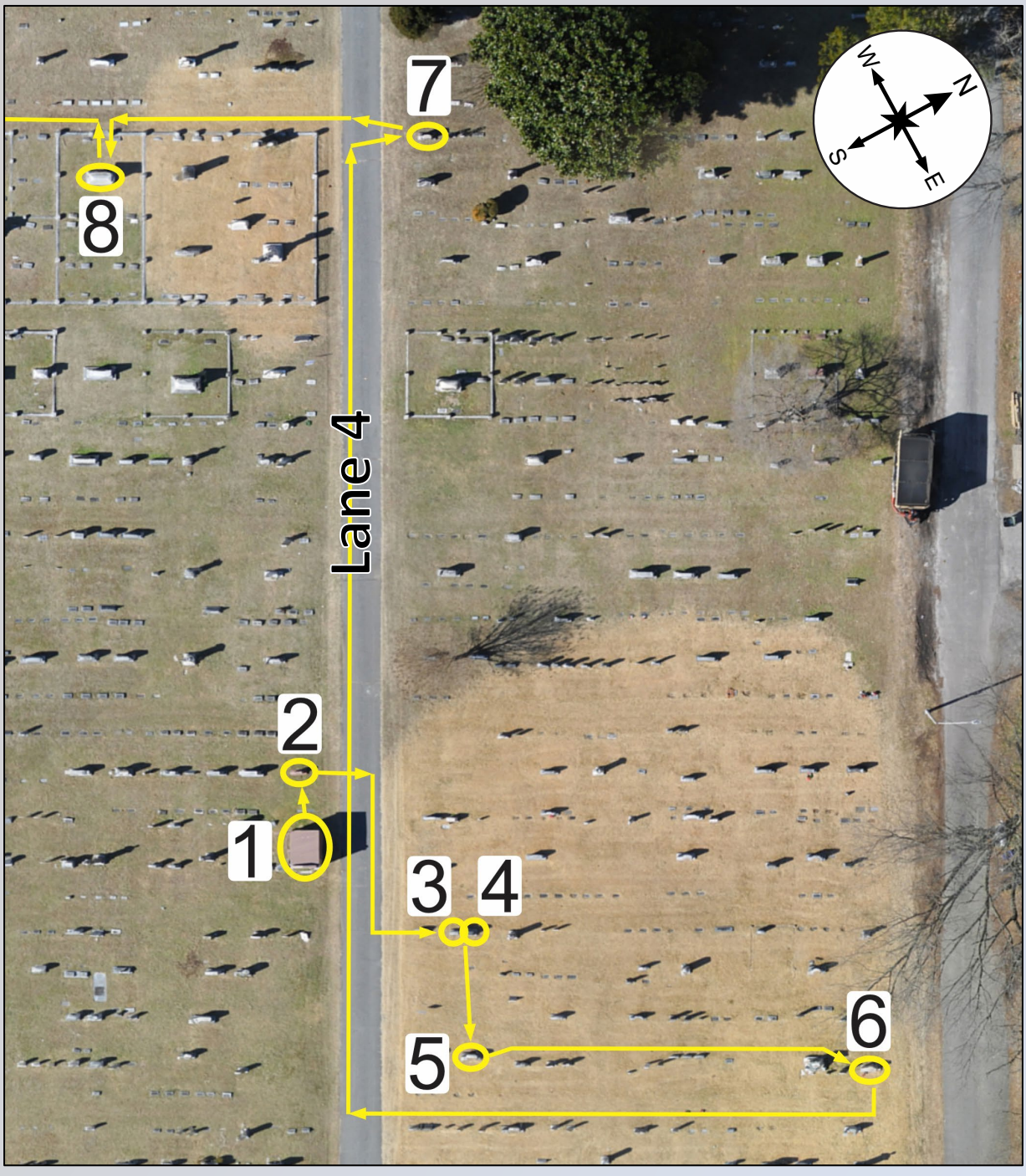
Stop 6: Robertson

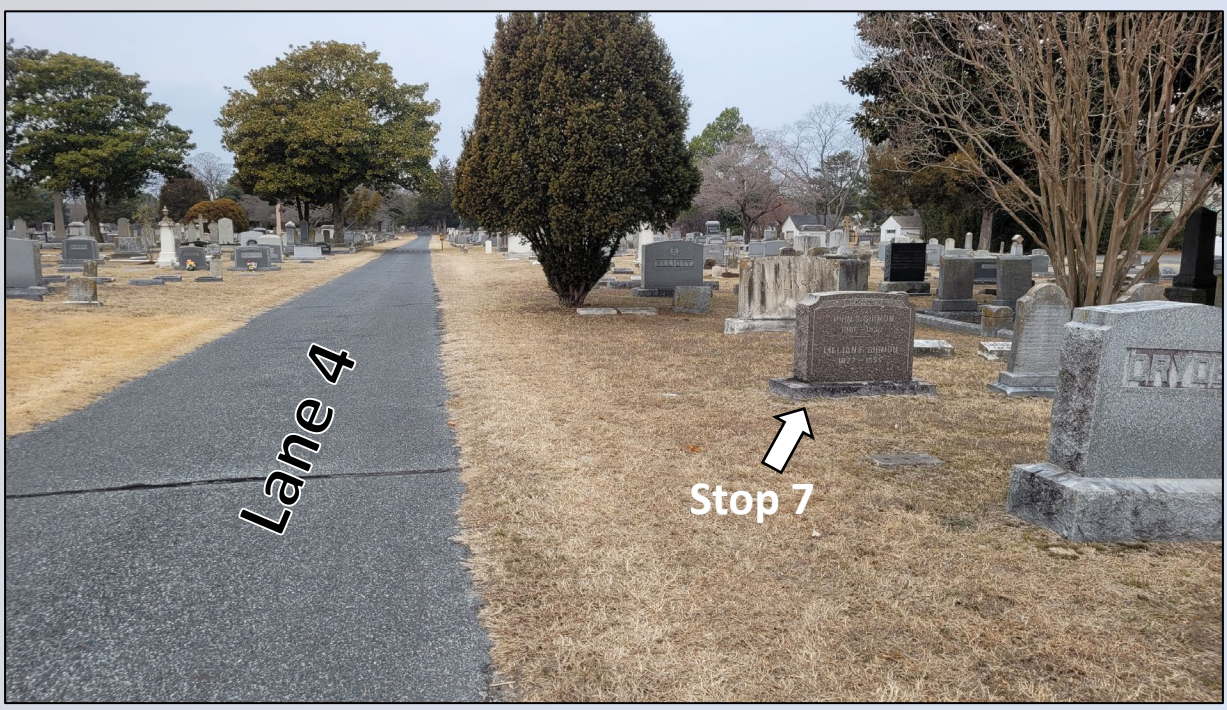


This rock is an excellent example of a **pegmatitic** igneous rock, because many of the crystals are bigger than a dime.

In terms of composition, this rock is classified as a **granite.** The pink feldspar crystals in this marker are quite large. The black minerals are called **hornblende**.

Now walk south to return to Lane 4.
Walk west on Lane 4 to Stop 7.

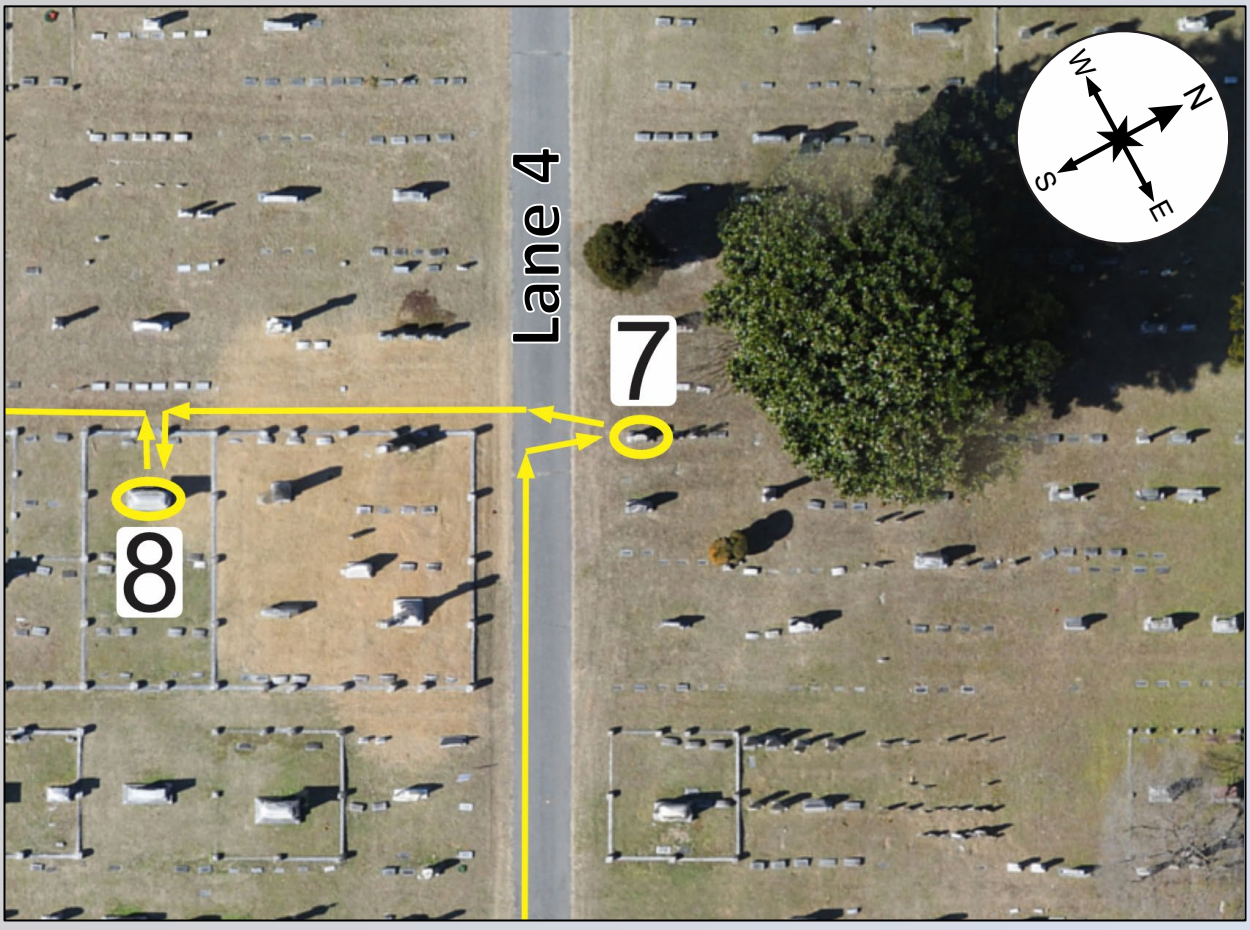




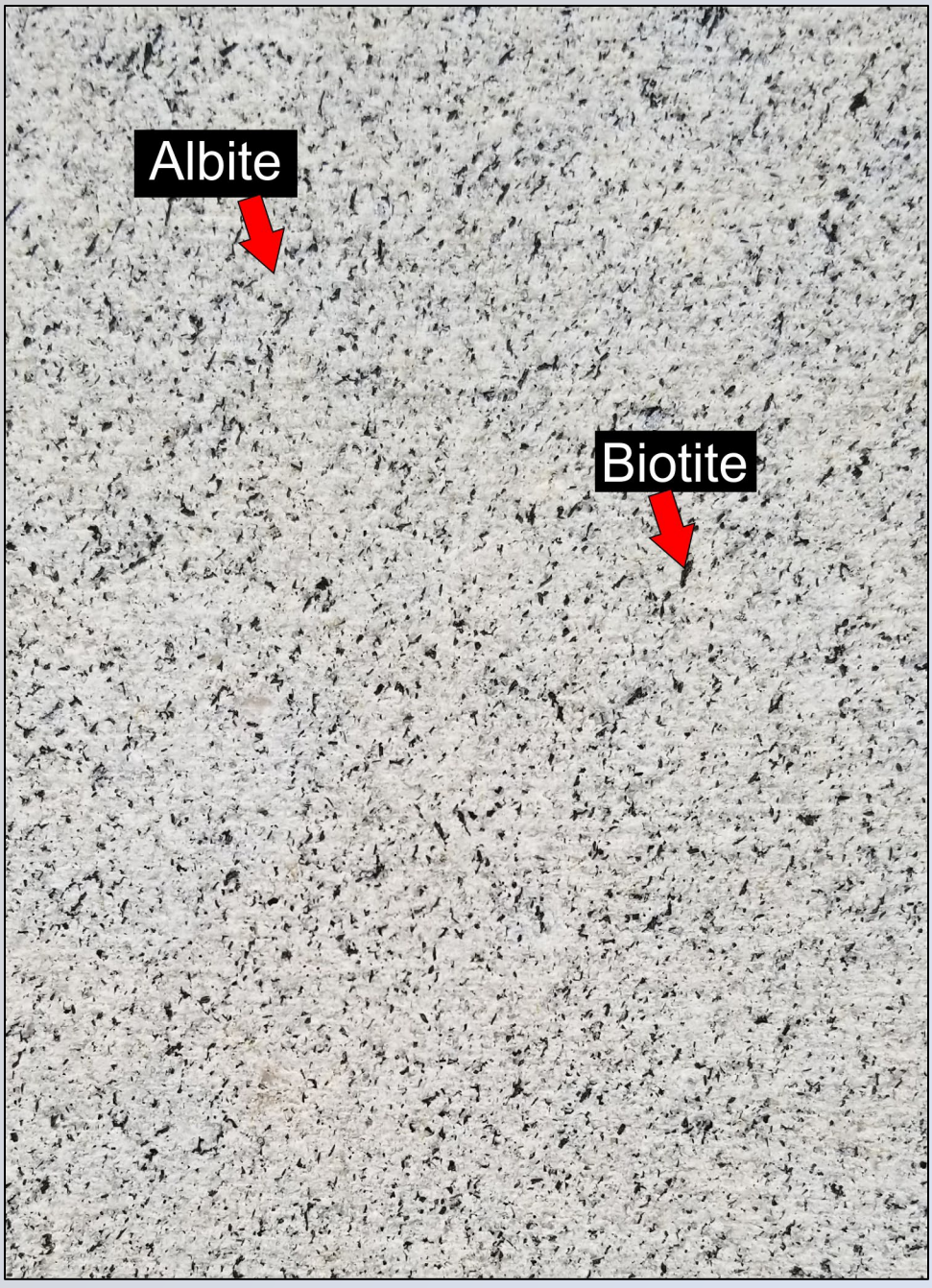
Stop 7: Sirmon

This rock is an excellent example of a rock with a **porphyritic** texture, one of the only ones in Parsons. It has very large albite crystals, while the other minerals are considerably smaller. This rock would be called a **porphyritic monzonite**.

Now walk south from stop 7 across Lane 4 to reach stop 8.



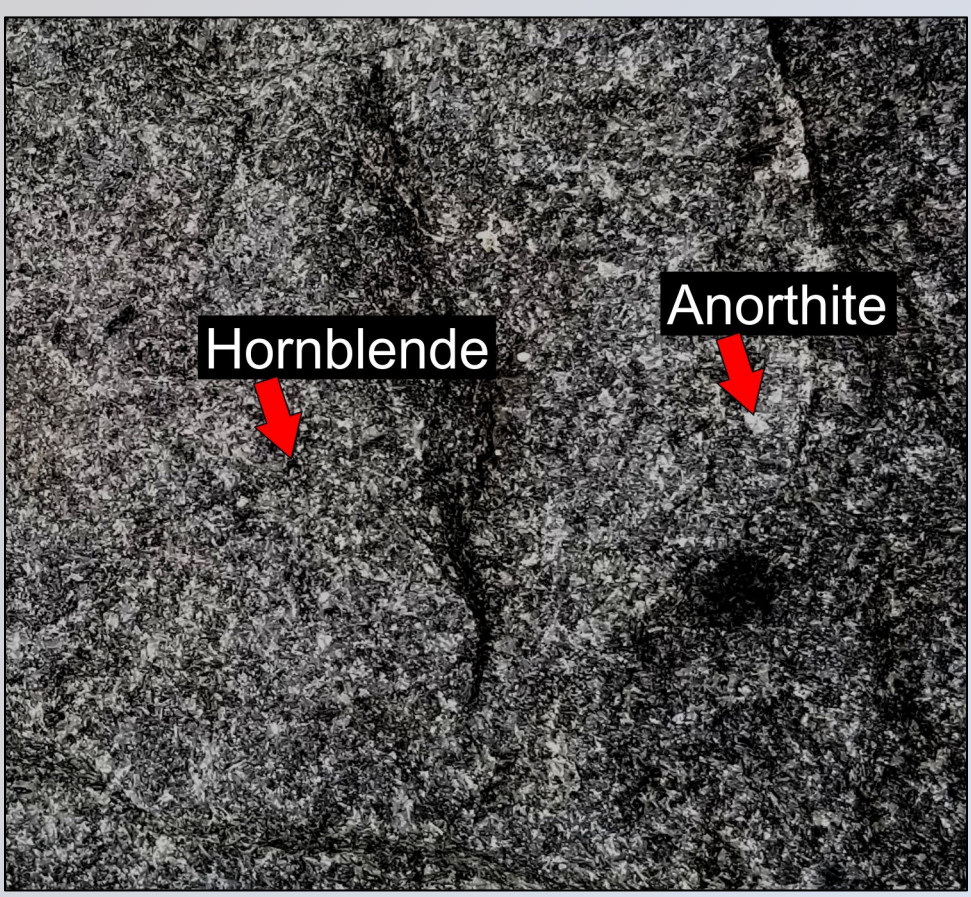
Stop 8: Smith



This rock has very small crystals but would still be called **phaneritic**. It is one of the lightest-colored markers in the cemetery. It also has not been polished. Compositionally, it is a **granodiorite**.

Continue south across the grass to reach Lane 3. Cross Lane 3 to reach stop 9.

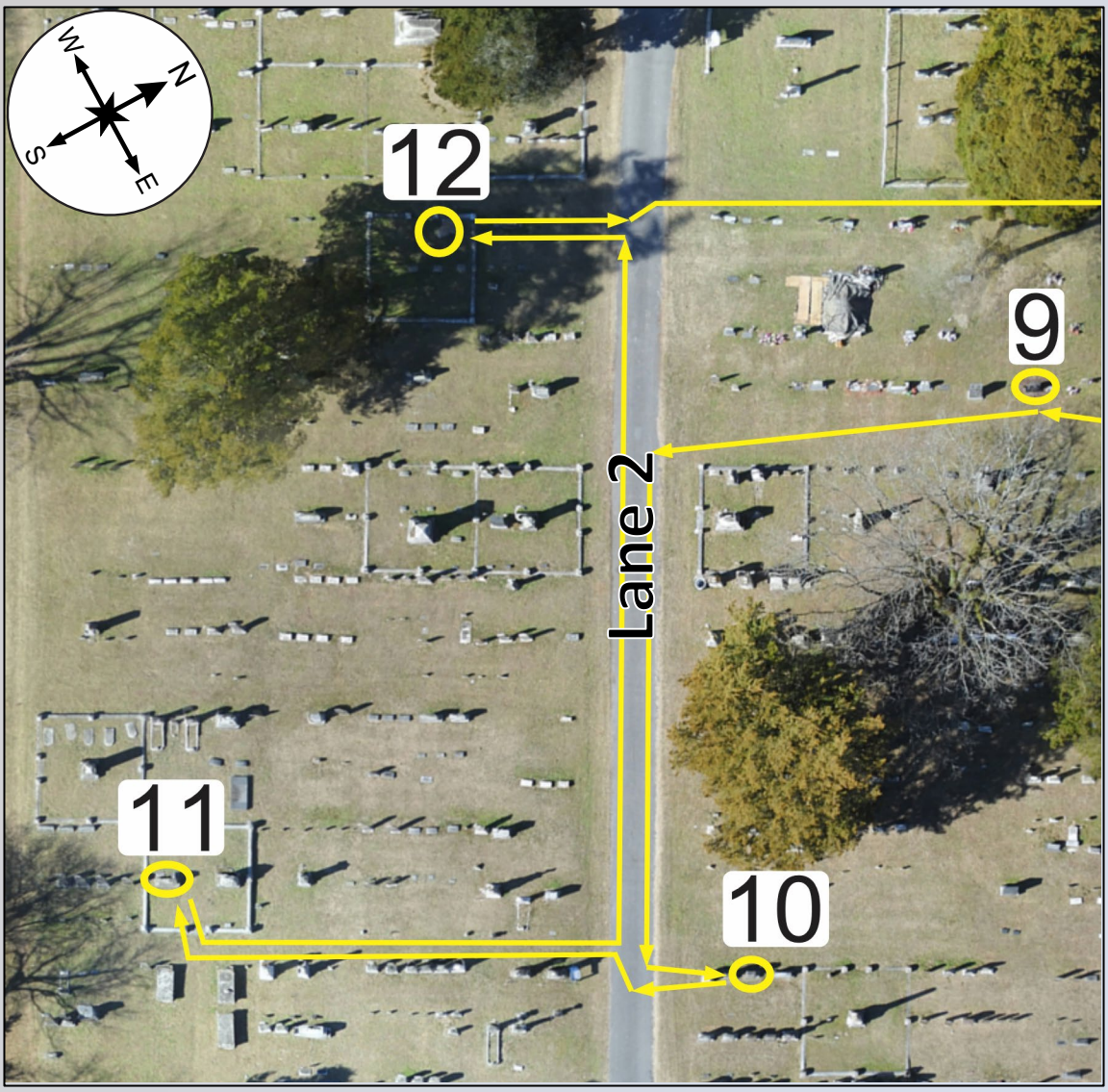
Stop 9: Purnell



Now for something new. In contrast to the lighter-colored igneous rocks you have seen so far, this one is very dark in color. This is a good example of a **gabbro.** If you look closely, you can see the individual crystals, which means it is **phaneritic** too.

When it is polished, it looks black, but it is actually composed of predominantly dark grey **anorthite** minerals along with black **hornblende** minerals.

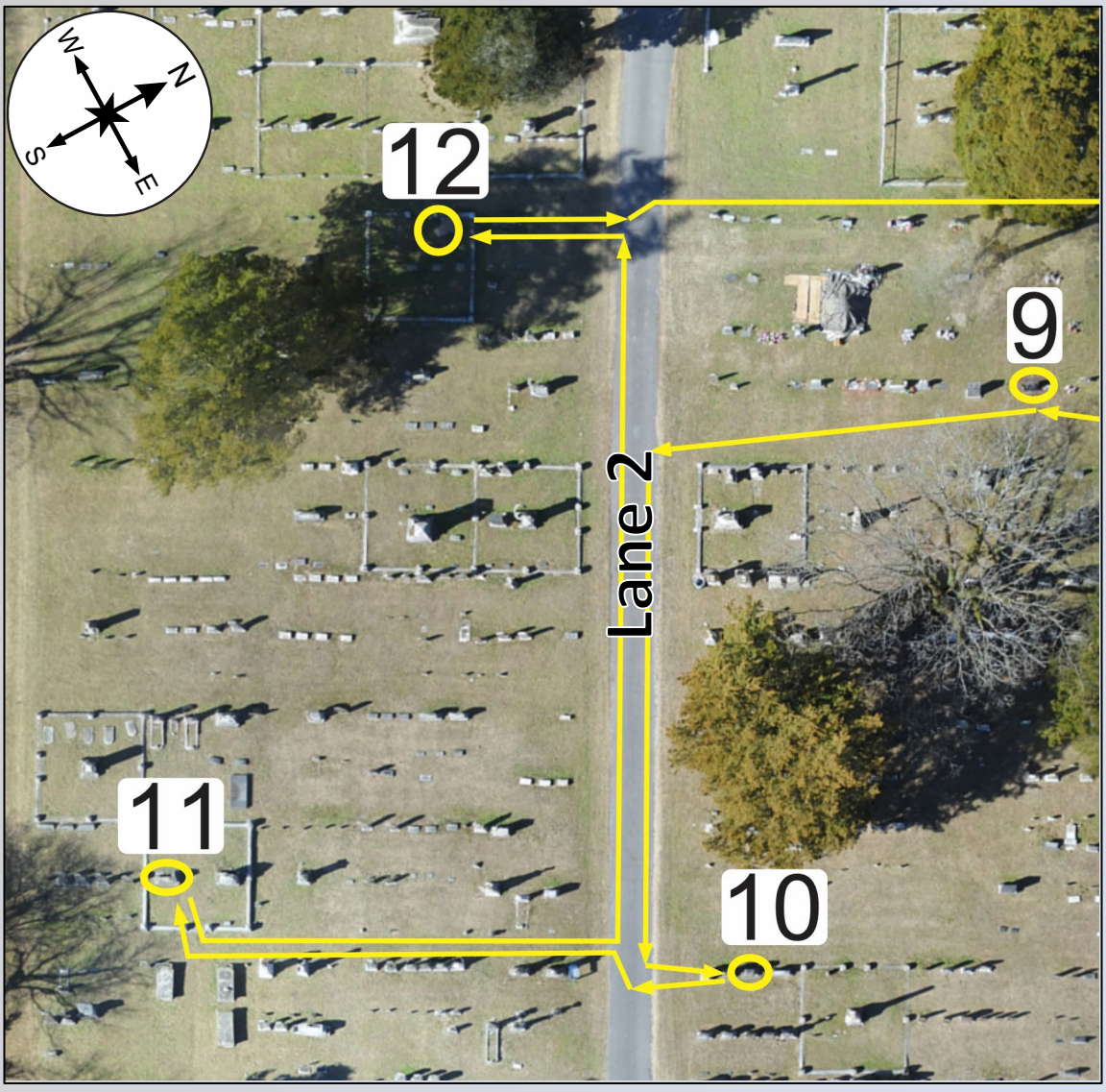
Continue south across the grass to reach Lane 2. Follow Lane 2 eastward to reach stop 10.



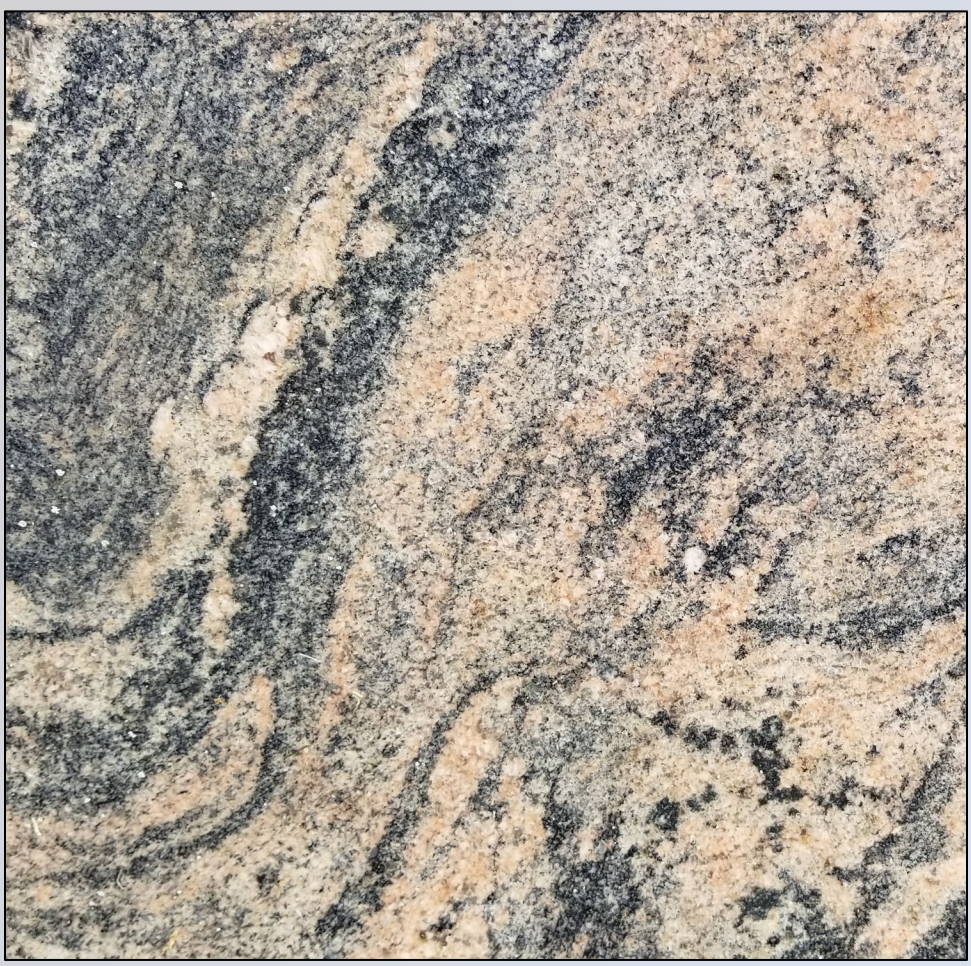
Stop 10: Parker

This marker has small crystals and is called a **diorite**. You can see it has a mixture of dark **hornblende** minerals and light **albite** minerals.

Continue south across Lane 2 and through the grass to reach stop 11.



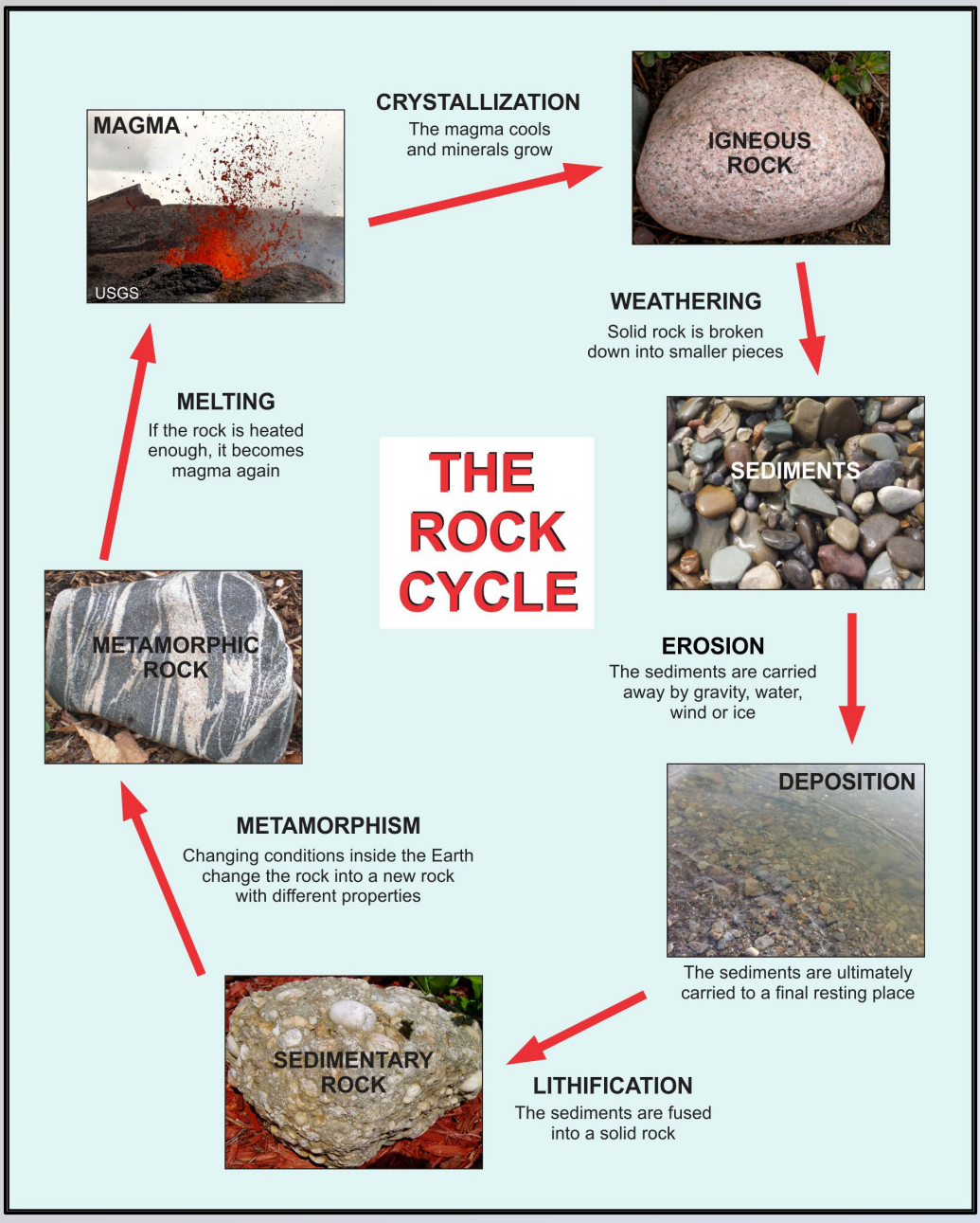
Stop 11: Brenizer



Here we have a marker which is very different from anything you've already seen on the tour to this point. This is a new type of rock called a **metamorphic rock**. Metamorphic rocks are commonly used for cemetery markers as well as kitchen countertops and floor tiles.

This marker is made from a metamorphic rock called **gneiss** (pronounced "nice").

Stop 11: The Rock Cycle

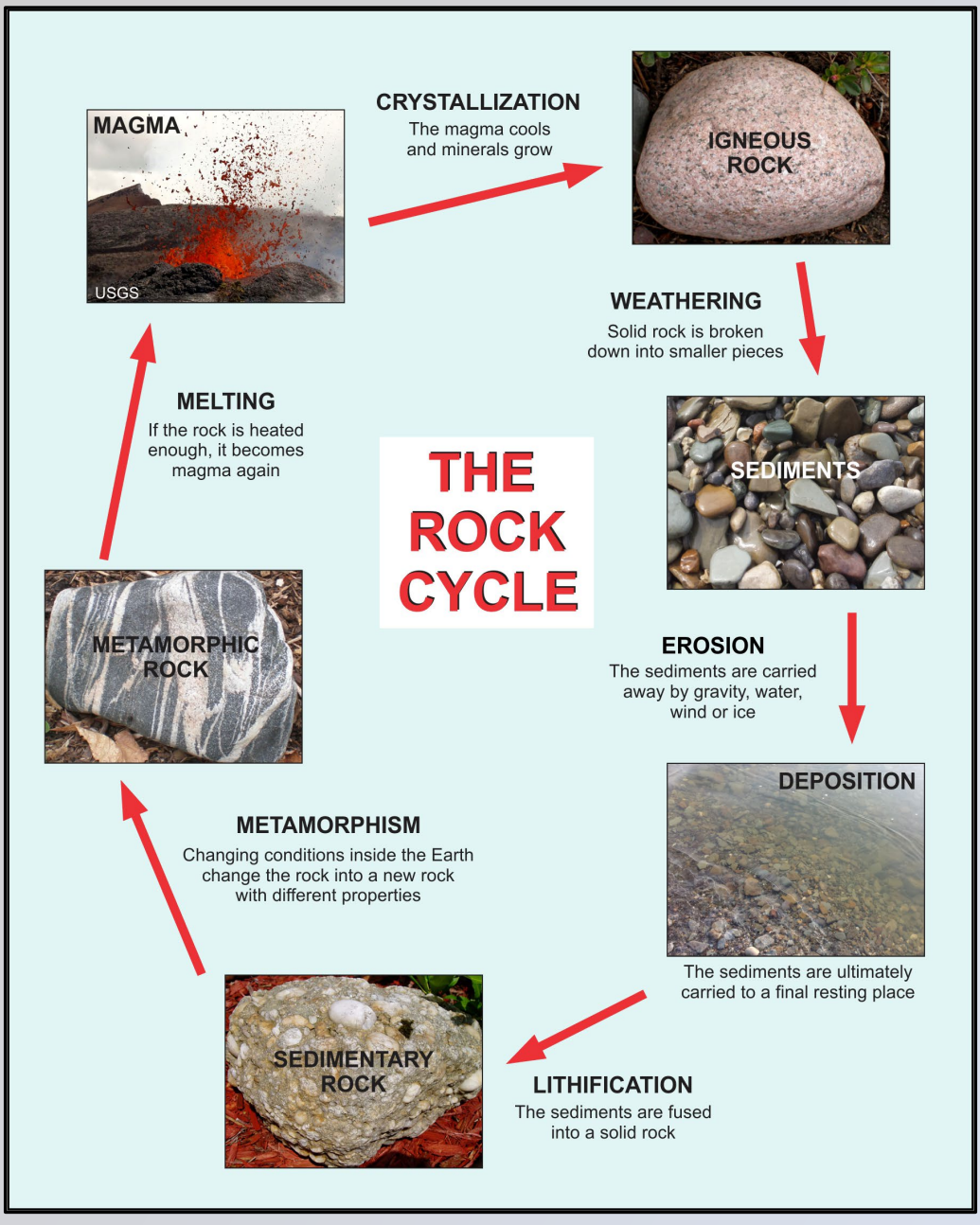


To understand how a metamorphic rock forms, we need to discuss the rock cycle. The **rock cycle** explains how different types of rocks form and change over time. When rocks are exposed at the Earth's surface, they are broken down into **sediments** by the process of **weathering**.

These sediments are commonly carried away by the process of **erosion** and **deposited** somewhere else, usually in a body of water like the ocean.

As these layers of sediment pile up, they become cemented together through the process of **lithification**, forming a **sedimentary rock**.

Stop 11: The Rock Cycle

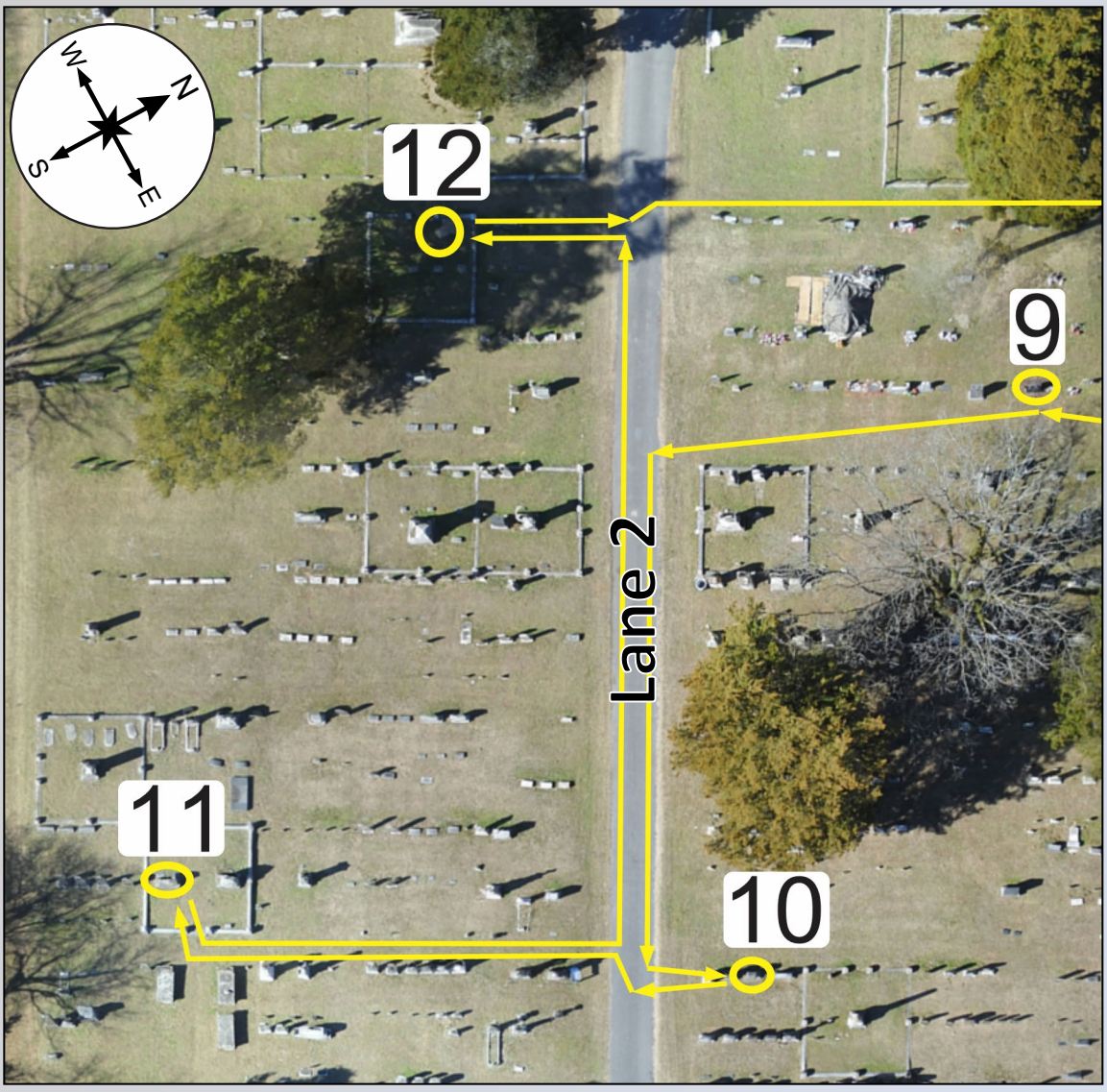


Most sedimentary rocks are generally not suitable for use as grave markers, because they are either weak or hard to carve cleanly.

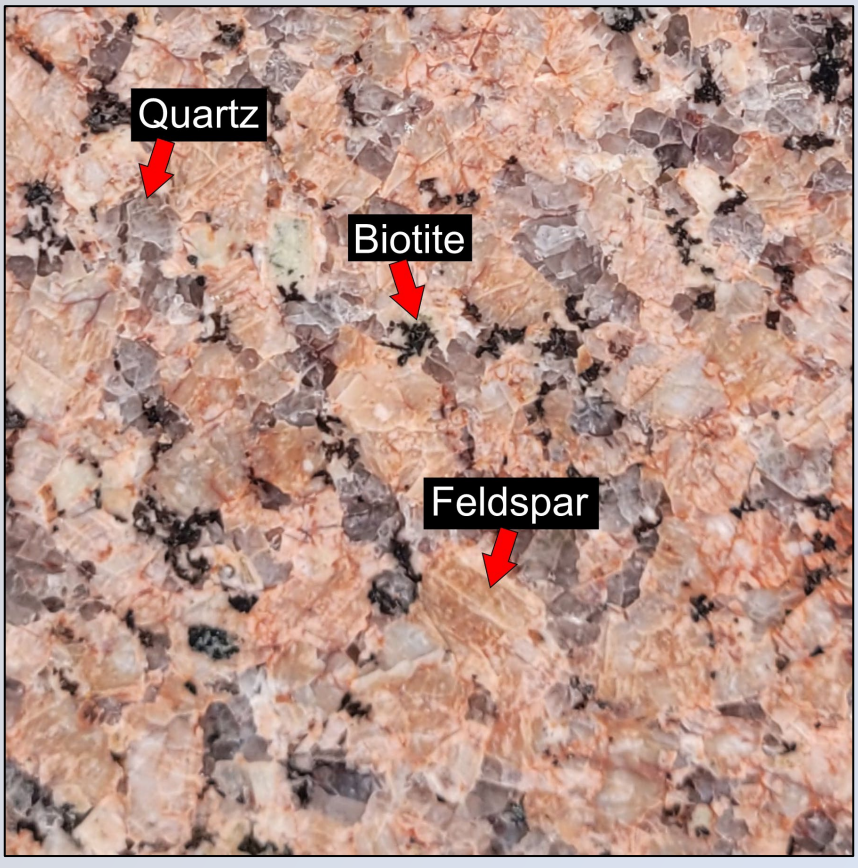
However, if a rock gets buried deep in the Earth, it can undergo a transformation called **metamorphism**. Metamorphism takes one type of rock and slowly changes it into a new rock with different properties. Commonly, these new metamorphic rocks are both denser and stronger than the original rock. This makes metamorphic rocks suitable for cemetery monuments.

Although they aren't common in Parsons, some of the prettiest markers are made of gneiss, which you will see later in the tour.

Return north across the grass to reach Lane 2. Follow Lane 2 westward to reach stop 12, which will be on your left



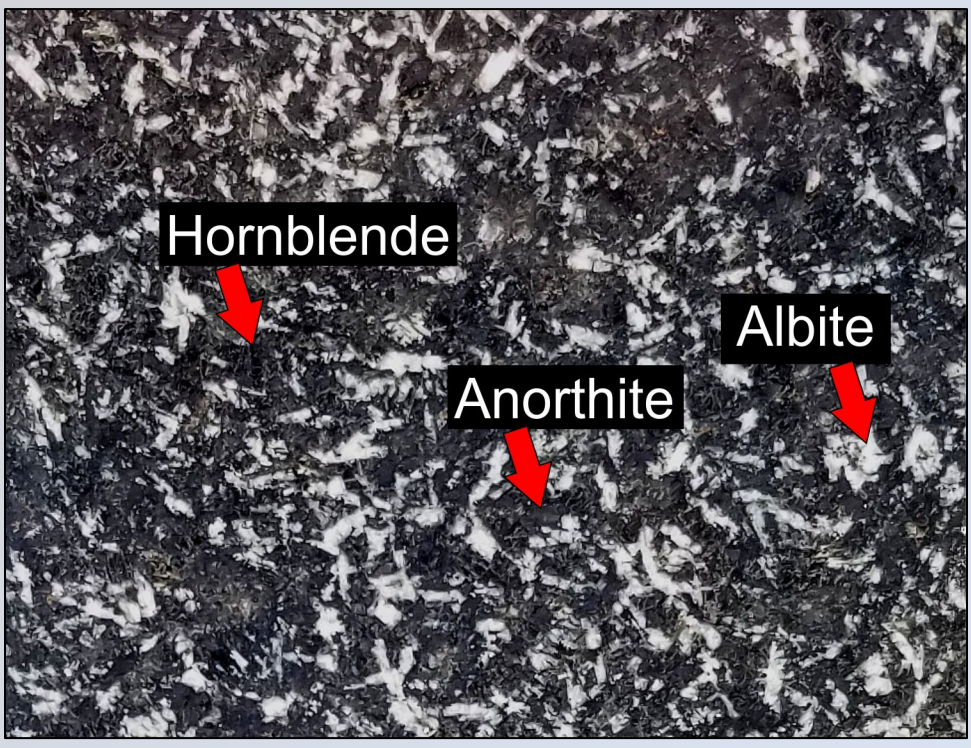
Stop 12: Jackson



This is another example of a **granite**, and this granite has a light pink color which is not very common in Parsons.

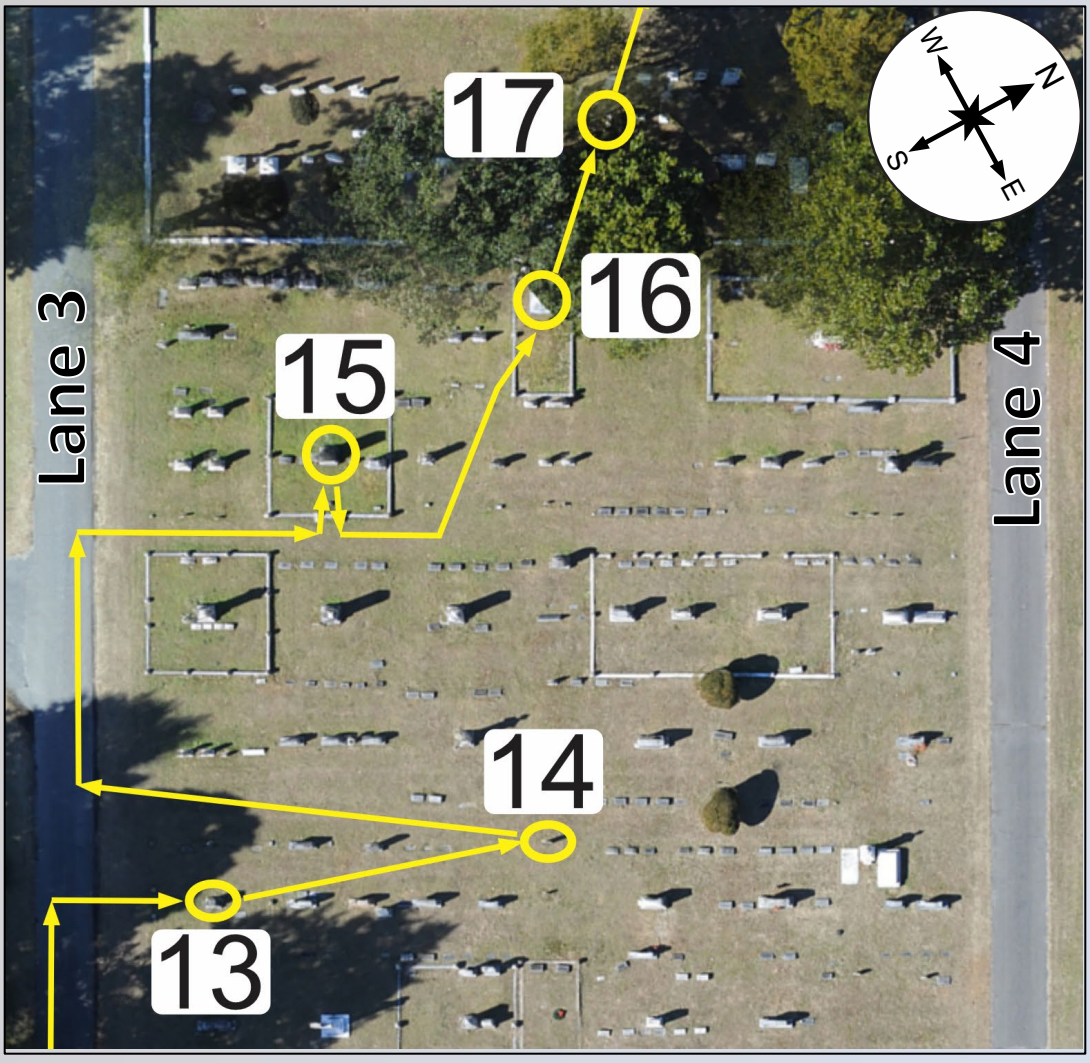
Travel north across the grass to reach Lane 3 and Stop 13.

Stop 13: Booth



This marker is a **diorite,** and it is similar in composition to the rock at stop 10. What makes this marker different are the long, slender albite white crystals.

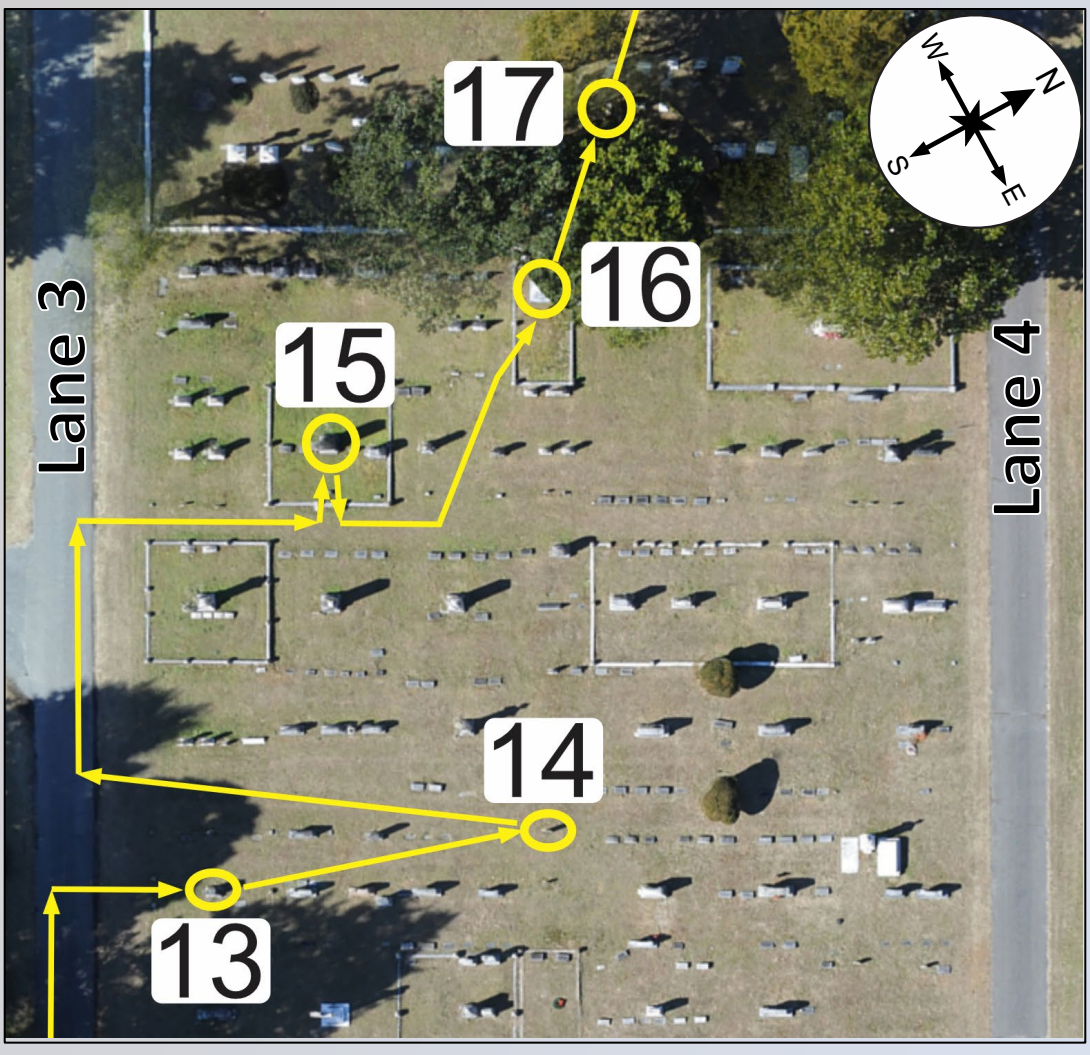
Travel north across the grass to reach Stop 14.



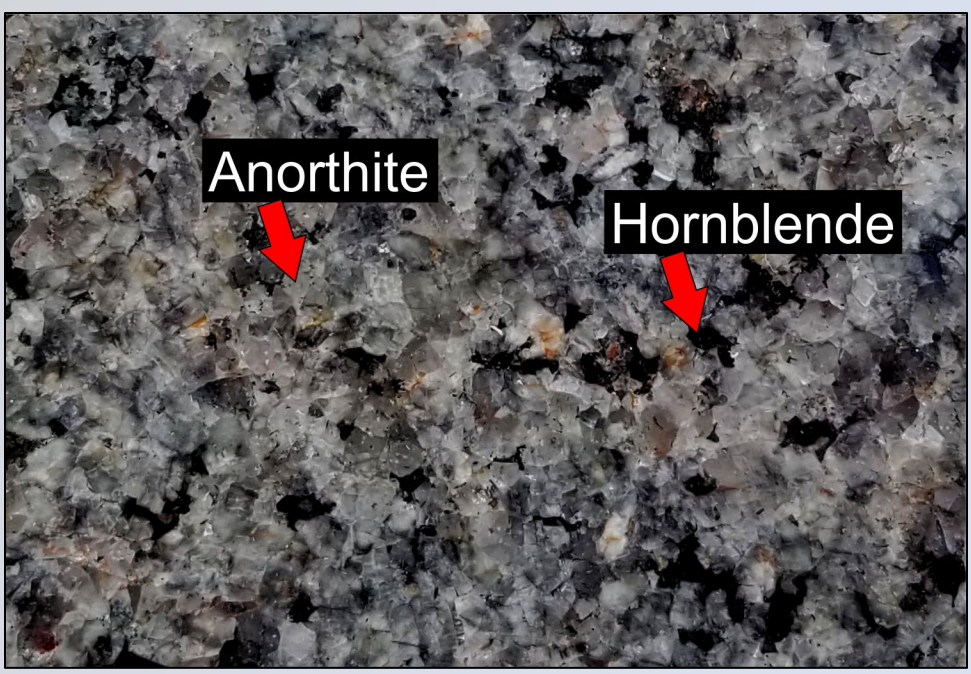
Stop 14: Murtle Baker

In comparison to 99% of the other markers in the cemetery, this marker is made of concrete. The appeal of concrete is easy to see – it's cheap and simple to make. However, it is not a very durable material and it quickly weathers once installed. Below is another example of a concrete marker.

Travel south across the grass back to Lane 3. Then travel west a few rows to reach Stop 15. Then walk west to reach Stop 16.



Stop 15: Ball

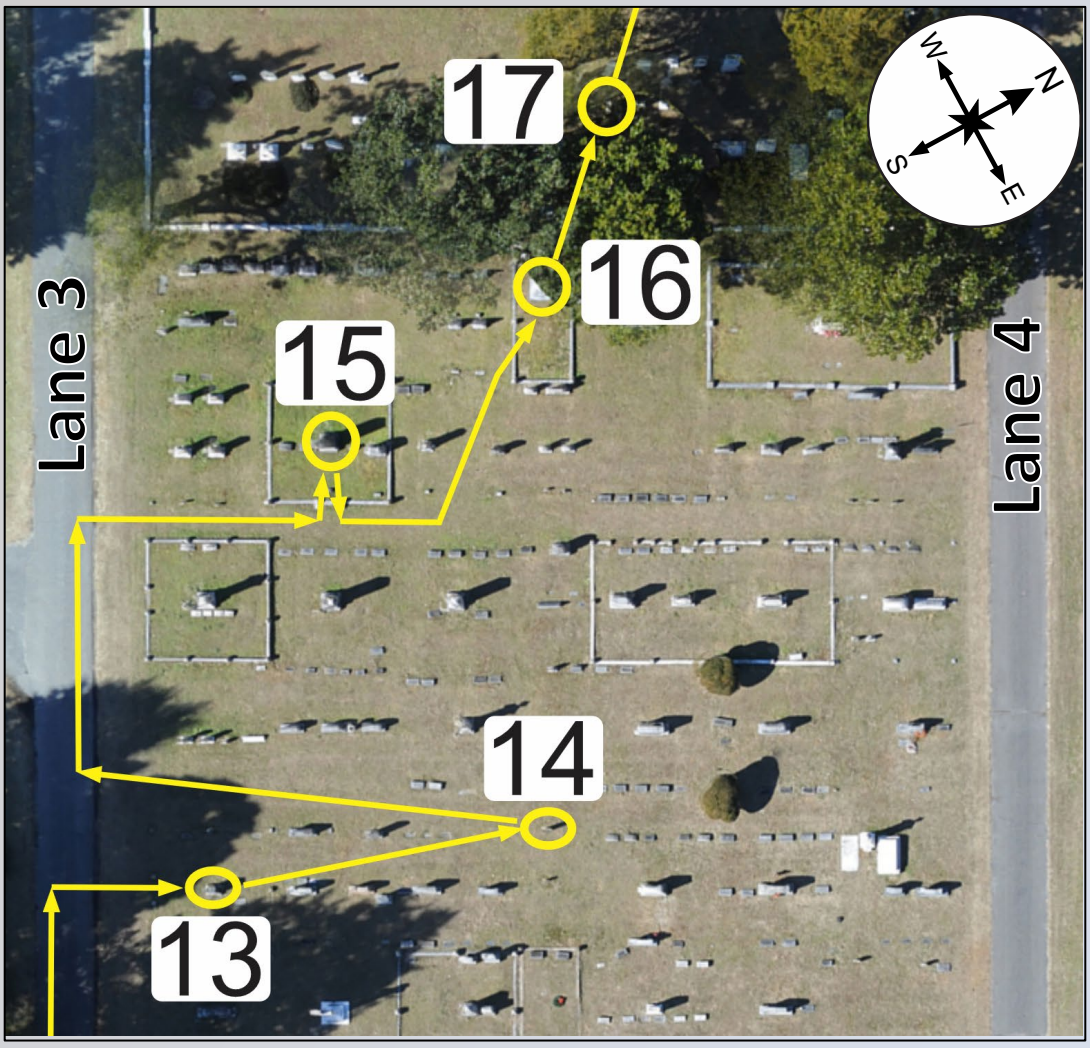


This marker is good example of a **monzonite**. Many of the dark grey markers in Parsons are monzonites.

Stop 16: Booth

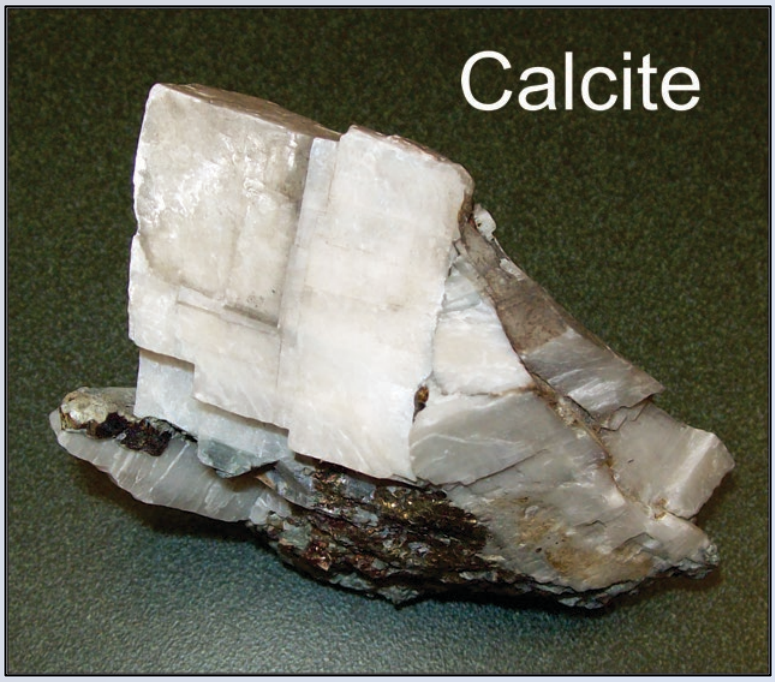
This is one of the most unusual markers in Parsons. It is not made of stone, but instead, it is made of **zinc**. The pieces were formed in a mold and then welded together. Zinc is cheaper than monuments made of stone, and resistant to algae and moss growth.

Travel northwest into the Governor Jackson lot to Stop 17.

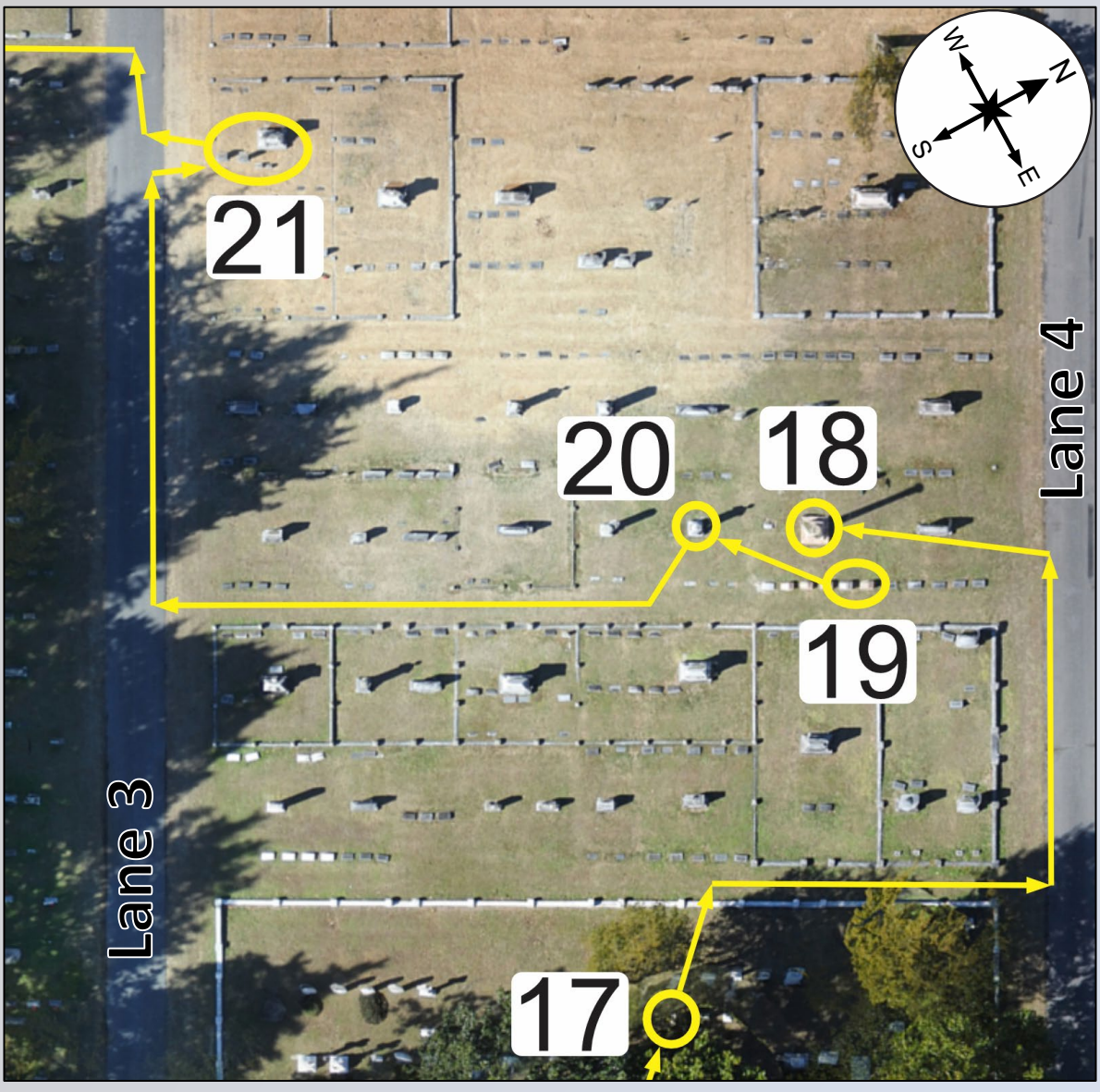


Stop 17: Rider

This marker is made a metamorphic rock called **marble**. Many of the markers in Parsons, <u>especially the older markers</u>, are made of marble. Marble is made of a mineral called **calcite**. Calcite is the same mineral that clams and snails use to make their shells.



After Stop 17, navigate back to Lane 4 and travel west to reach Stops 18-20.



Stop 18: Doody

This distinctive marker is made of a pink marble. Marble comes in a range of colors including white, grey, blueish-grey and tan. Most of the marble markers in Parsons are white and/or grey.

Stop 19: Taylor-Doody

Being able to tell the difference between a marble and an igneous rock like granite can sometimes be challenging. Lucky for us, we have examples of each sitting side-by-side at Stop 19 for comparison.

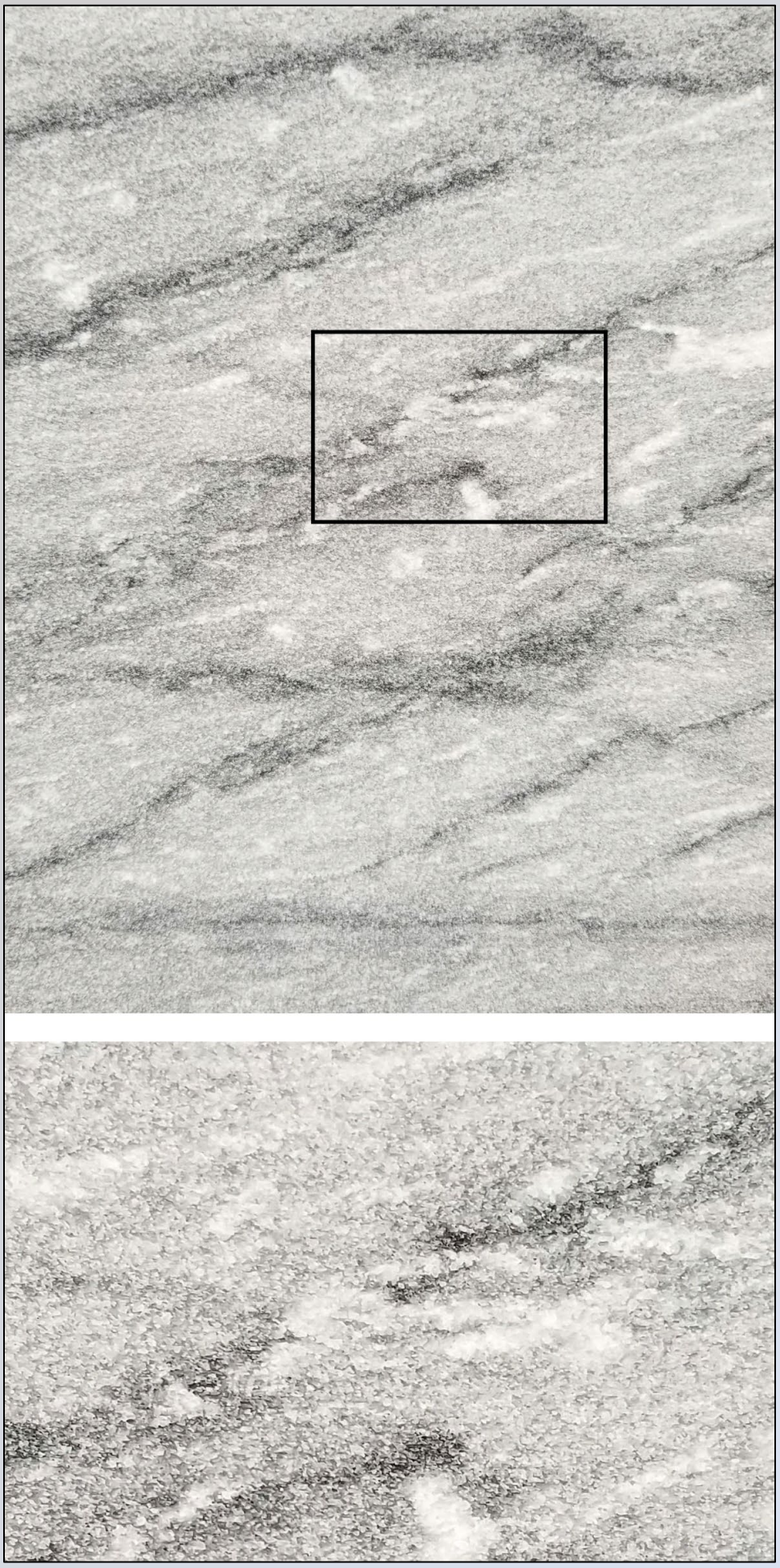
The marker on the left is made of pink marble, while the marker on the right is made of pink granite. They are both made of crystals of about the same size. The key difference is that the granite is made of several different types of minerals, whereas the marble is only made of calcite. The dark streaks are caused by impurities in the rock. Many marbles have these dark streaks running through them.

Stop 20: Bozman

This is another example of a marble. This marble also has the dark streaks running through it.

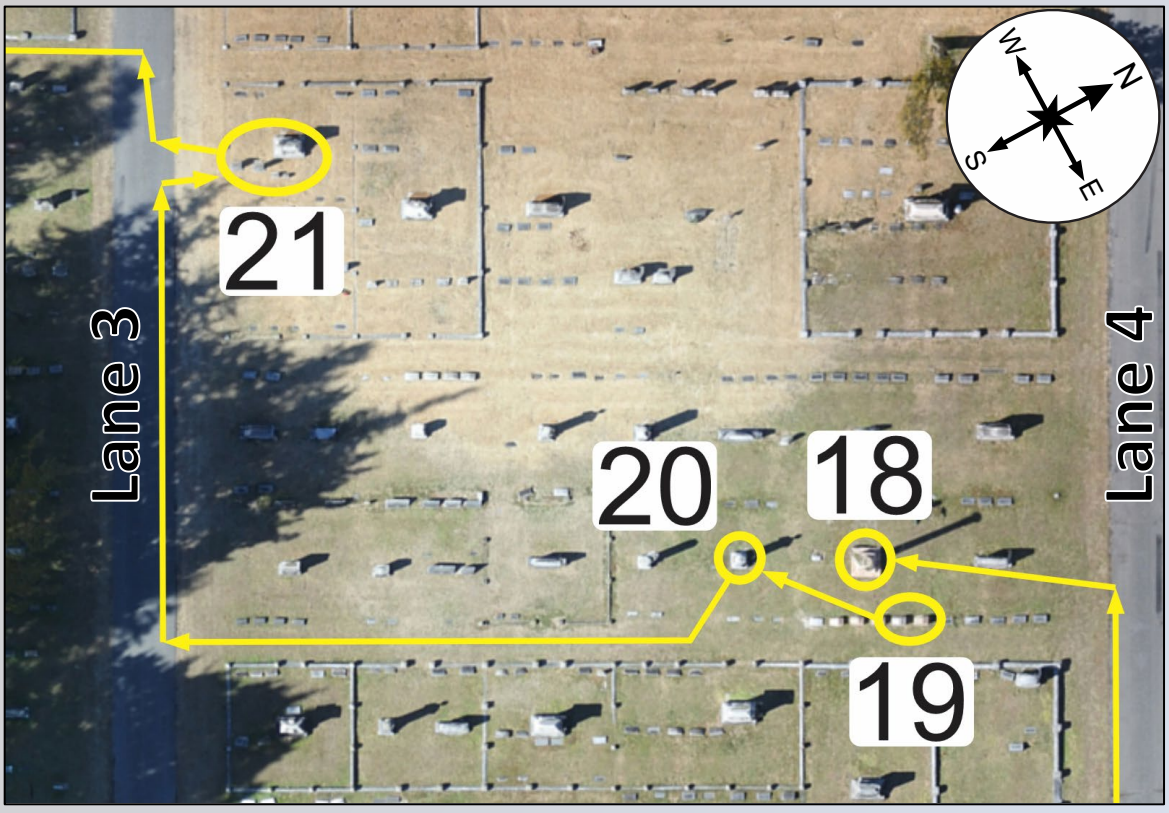
Marble starts out its life as a sedimentary rock called **limestone**. Limestone, which is also made of calcite crystals, commonly forms in warm, shallow tropical seas. There is a large marble quarry north of Baltimore which is still active today.

Stop 20: Bozman



If you look at this marker closely, you can see the individual calcite crystals. They are smaller than the crystals in the pink marble at Stop 18. You can also feel them if you run your hand across the marker face.

After Stop 20, walk across the grass to Lane 3 and travel west a few rows to reach Stop 21 (Kelly).



Stop 21: Kelly

Although marble is a very attractive stone which can be easily carved into different-shaped markers, it has one major problem.

Calcite is a mineral which readily dissolves in the presence of acidic water. Unfortunately, rainwater is slightly acidic. As a result, many of the older markers in the cemetery are becoming harder to read as the marble dissolves away. Eventually, they will be completely unreadable. For this reason, marble is not commonly used for markers anymore.

In the 19th and early 20th century, marble was commonly used because it was a cheaper. But igneous rocks are much more durable, and they are not as expensive as they used to be, so now igneous rocks are almost always used for markers in Parsons Cemetery.

Stop 21: Kelly

That doesn’t mean igneous rocks aren’t susceptible to weathering over time.

The family marker at this stop is made of granodiorite, but you can see the weathering process has stained it and moss is growing on it. Mosses and lichens can break rocks down over time. Eventually, the sharpness of the lettering on a granite marker will become rounded and less distinct.

Still, most igneous rocks weather much more slowly than marble.

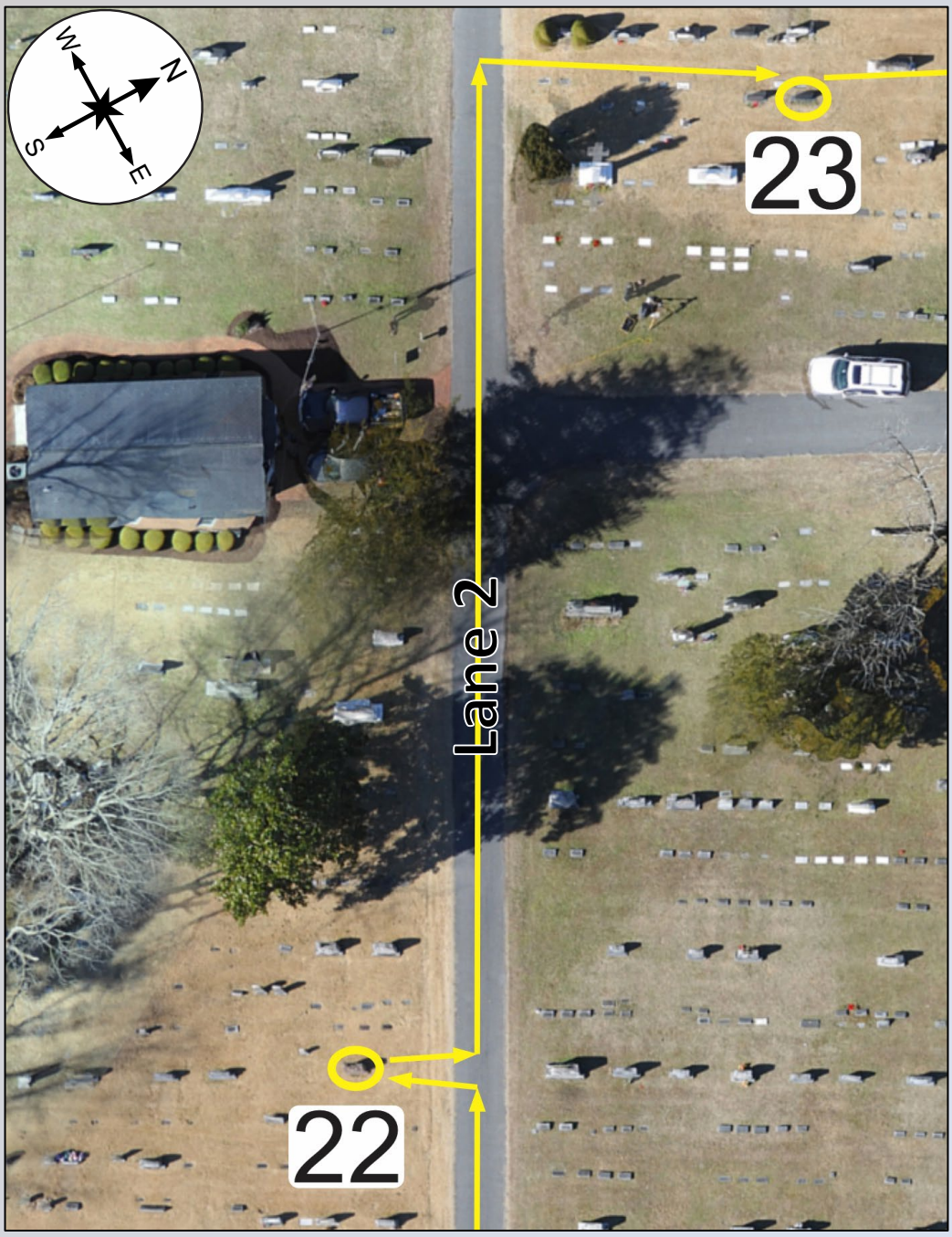
After Stop 21, walk across the grass to Lane 2 and travel west down Lane 2 to reach Stop 22.

Stop 22: Chatham

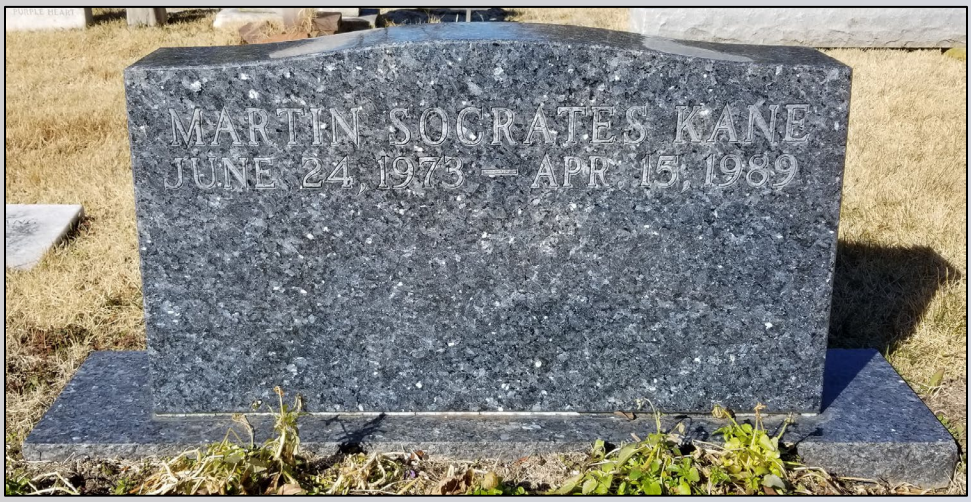
At first, this marker may look like it is an igneous rock, but in fact this is another example of a **gneiss**. You can tell it is a gneiss because the minerals are lined up in large bands.

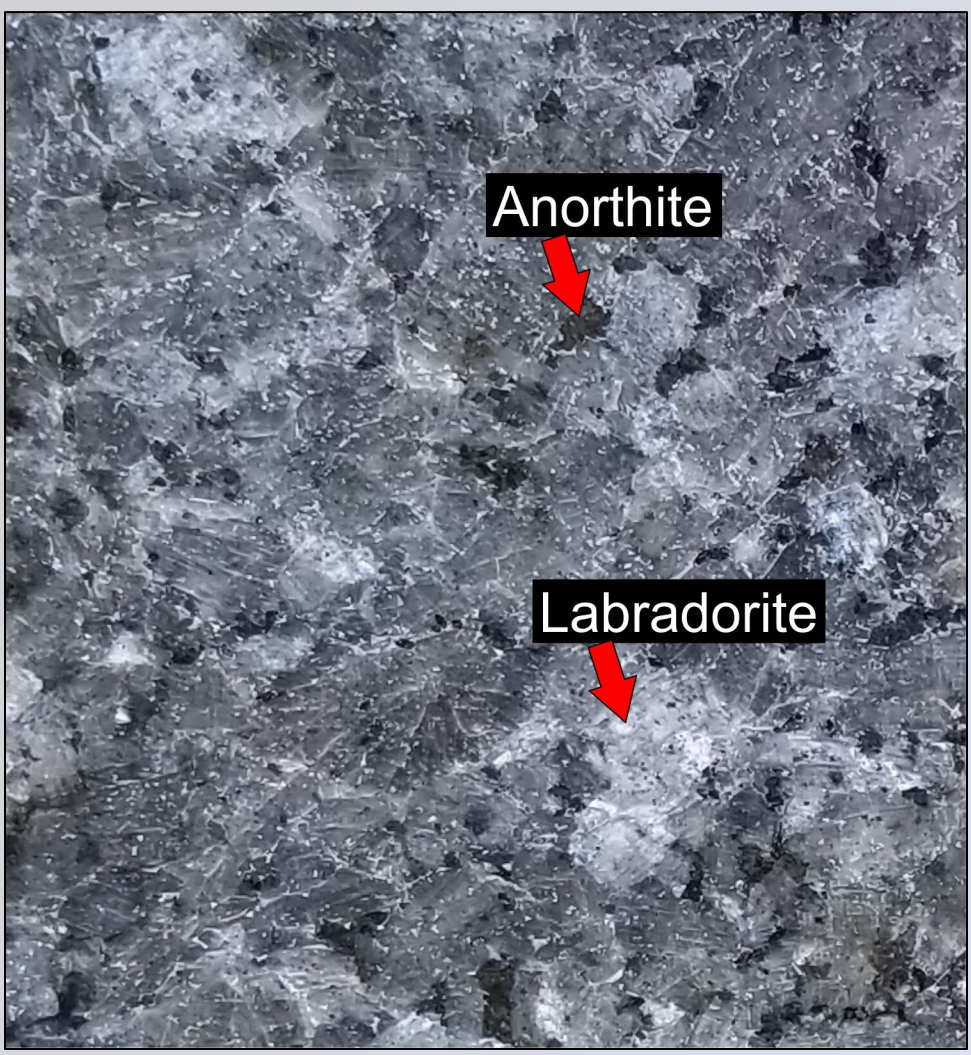
In general, if you see a rock which is made of different colored minerals which appear as large, flowing bands it is most likely a gneiss.

After Stop 22, continue west on Lane 2 past the cemetery office. They cut across the grass to reach Stop 23.



Stop 23: Kane





This marker is a one-of-a-kind in Parsons. The blueish color is from a mineral called **labradorite**. Labradorite is a mineral which has a pretty, iridescent blue color when viewed from the right angle. This is what gives this igneous rock its blueish hue. Although it is not very dark in color, this rock is a type of **gabbro**.

On a sunny day, if you find the right angle, you might be able to see the blue “pop” out of some of the crystals.

After Stop 23, walk across the grass to Lane 3 and travel west down Lane 3 to reach Stop 24. It is the large Bailey mausoleum on your right.

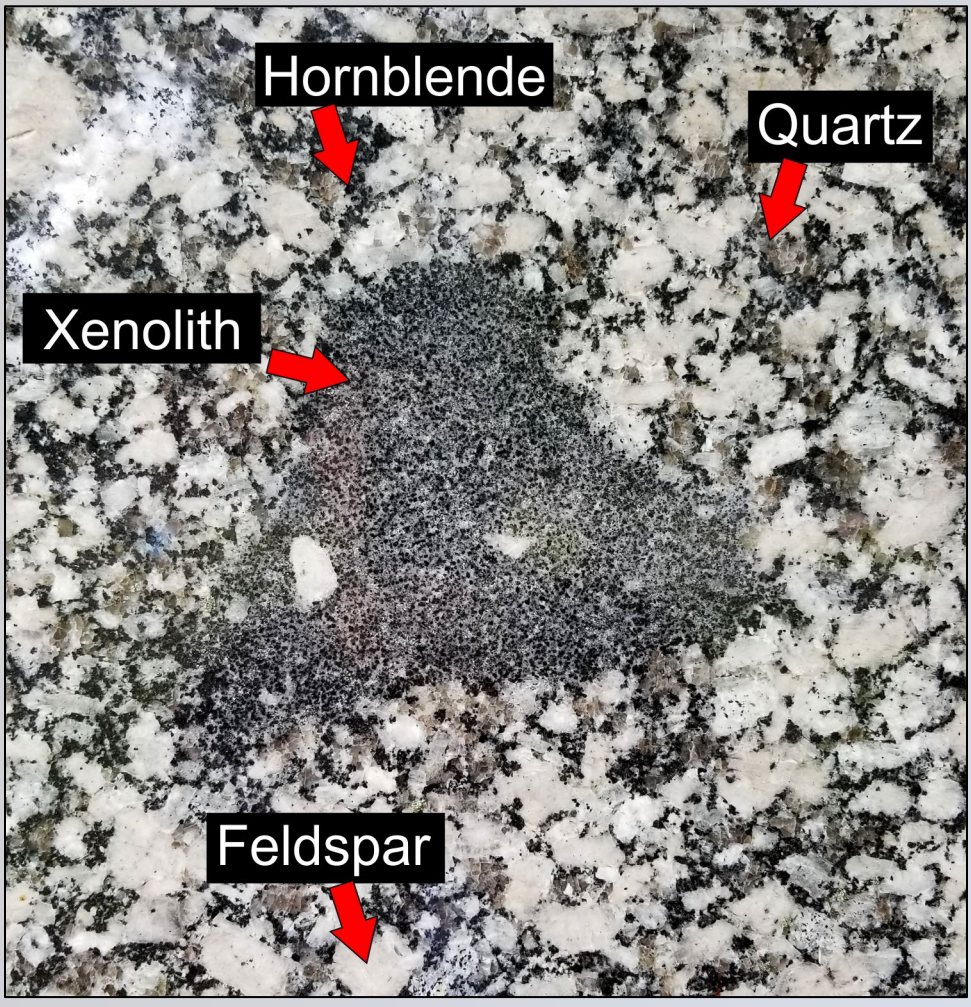
Stop 24: Bailey mausoleum

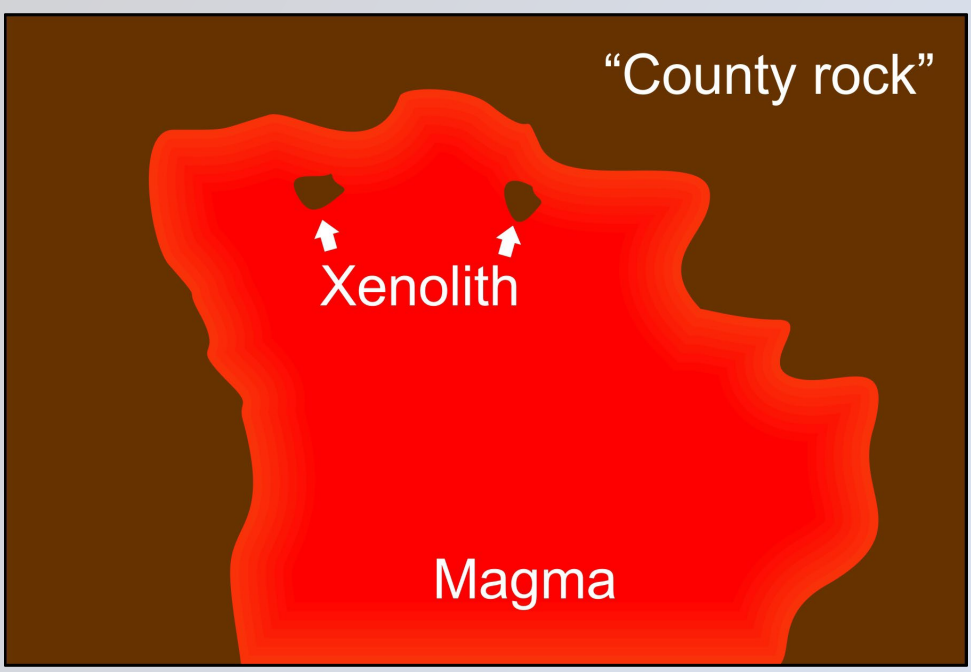
This mausoleum is made of granite, but it has a unique feature that makes it different from the other granite markers in Parsons.

To see what I mean, look at the west-facing side of the mausoleum and look for the large dark mass as shown above.

This large, dark mass is called a **xenolith** (pronounced “zee-no-lith”). There are several dark xenoliths of different sizes in this slab of granite, but this is the largest.

Stop 24: Xenoliths

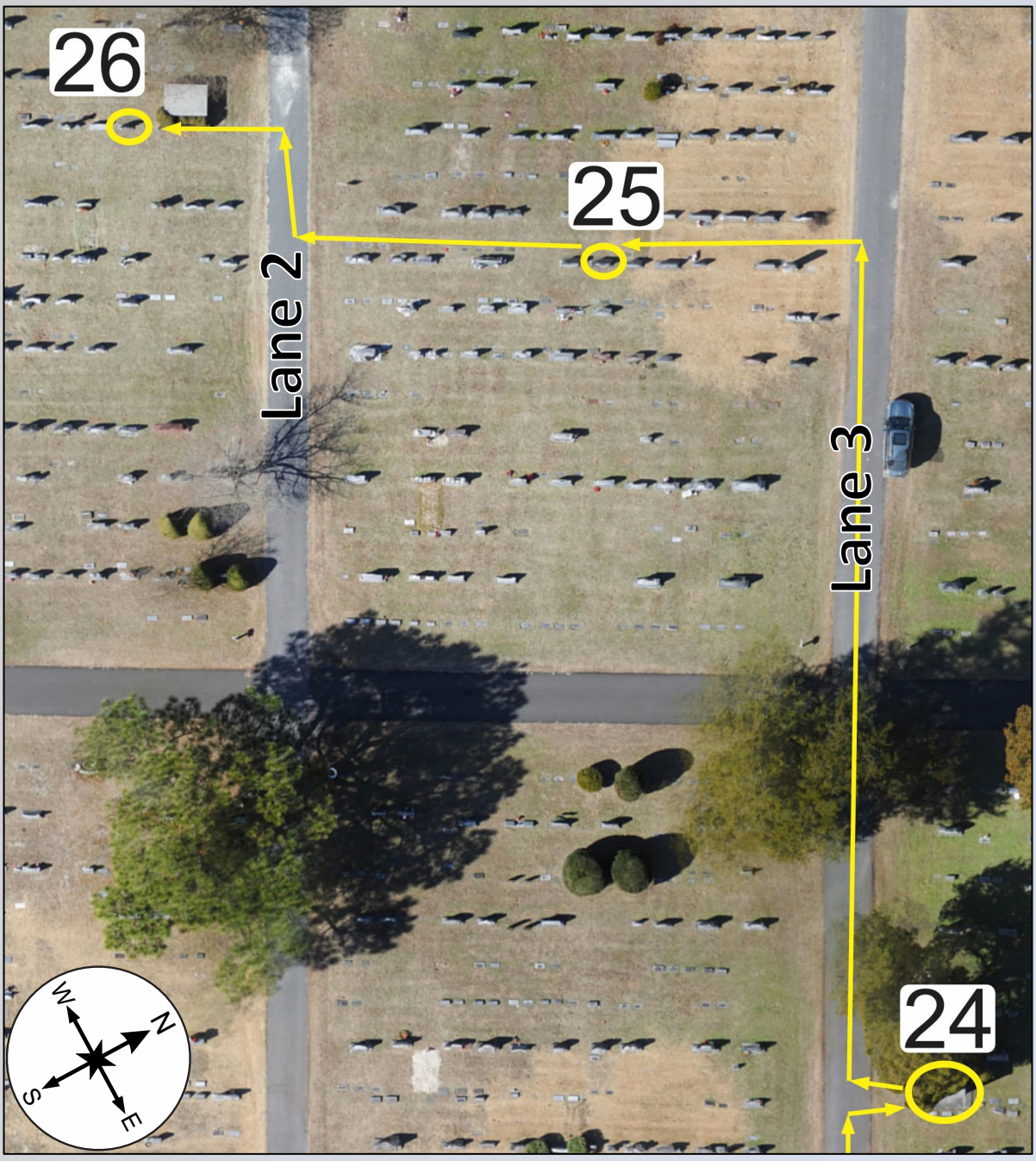




Xenoliths form when magma rises up from the Earth’s interior and pushes its way into the rocks in the Earth’s crust. Sometimes, pieces of the “country rock” fall into the magma.

The pieces of rock don’t necessarily melt, but instead, they get incorporated into the newly-forming igneous rock. In this case, there are xenoliths of diorite within the granite.

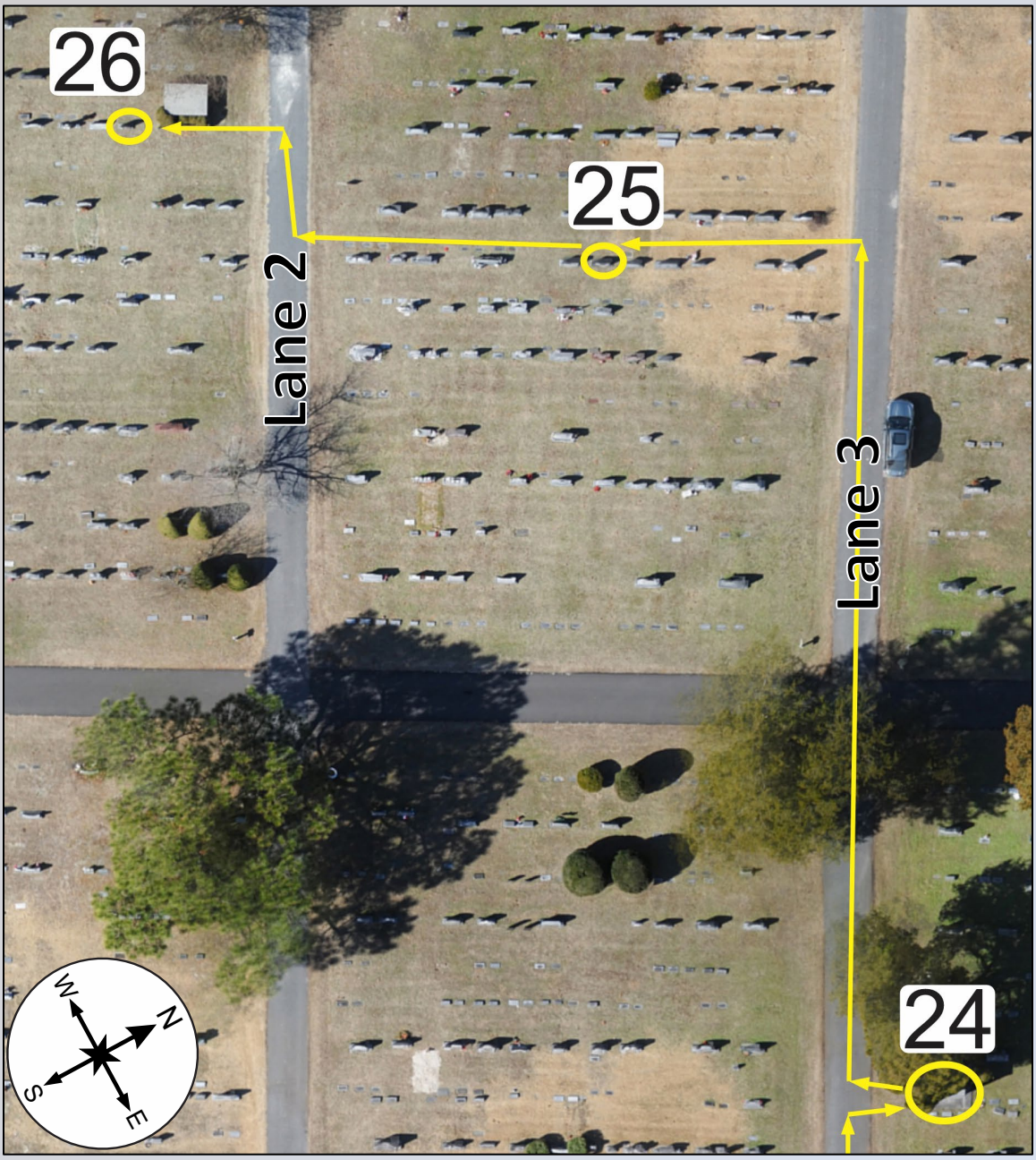
After Stop 24, continue west on Lane 3 for several rows, the cut across the grass to reach Stop 25.



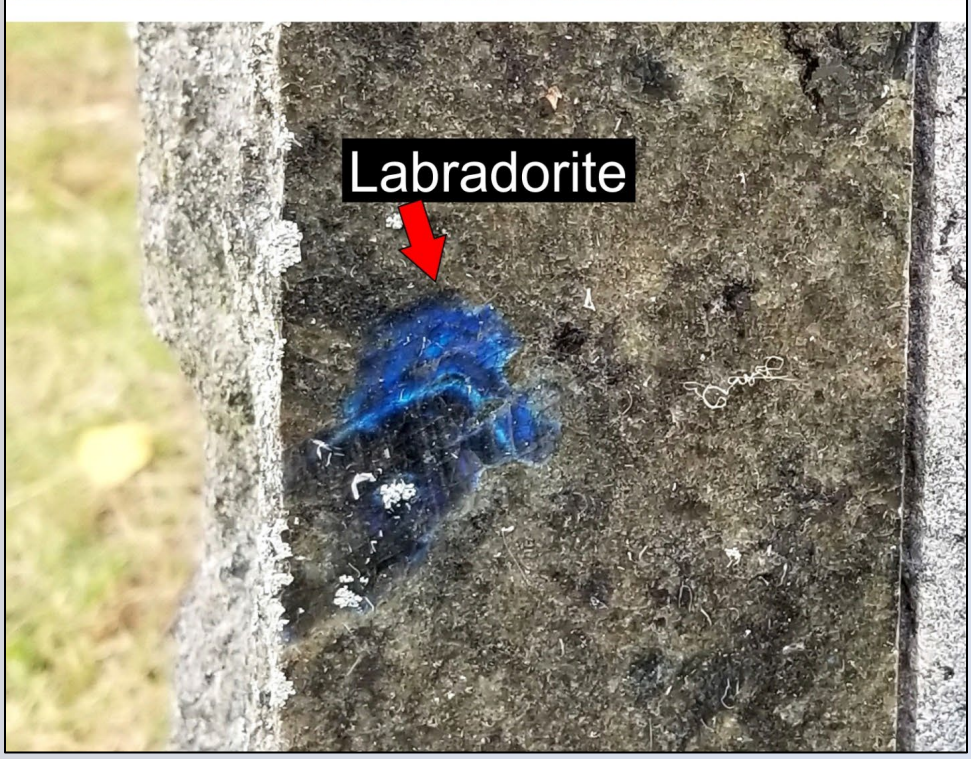
Stop 25: Nelson

This is another example of a **gneiss**. You can tell it is a gneiss because the minerals are lined up in bands.

After Stop 25, walk across the grass to Lane 2 and travel west down Lane 2 to reach Stop 26. It is right behind the small Wolf mausoleum on the left.



Stop 26: May



Although this marker isn't the most colorful, it has a most unusual feature. Just like at Stop 23, this marker also has labradorite minerals in it. As it so happens, one crystal is orientated in just the right way such that the bright blue iridescent labradorite "pops" out prominently.

There are several markers in this part of Parsons which are made of this type of rock (**monzonite**), but this is the only marker with this unusual mineral feature.

Tour Summary

We hope you have enjoyed this geologic tour and that you have gained a deeper appreciation for the markers in Parsons Cemetery and the variety of rocks they are made of. Below is a summary of the concepts we covered on this tour:

What is a rock?
What is a mineral?
What are igneous rocks?
How do igneous rocks form?
What are the common minerals that igneous rocks are made of?
What are the different types of igneous rock textures?
What is the rock cycle?
What are metamorphic rocks?
What is marble and how does it form?
What is a xenolith?
What are other materials are markers made of?

All of the images and diagrams in this tour were created by Dr. Brent Zaprowski unless otherwise noted.