

If you are planning to dig in Orange County, accuracy is not a luxury. It is what separates a smooth project from a gas leak, a fiber outage, or an emergency visit from the fire department. People are often surprised to learn that utility locating is not an exact science, even when done by seasoned professionals with good equipment. There is always a tolerance, and understanding that range is critical when you design, trench, or drill.

This guide walks through how utility locating works in practice, what you can reasonably expect in terms of accuracy, and how public 811 locates differ from private locating services in Orange County.

What utility locating actually is

Utility locating is the process of identifying and marking buried infrastructure before you dig. That includes obvious things like power and gas, but also less visible systems such as:

- Water and irrigation
- Sewer and storm drains
- Communications and fiber optic lines
- Private electrical feeds, propane lines, and site lighting

Utility locating does two basic jobs. First, it tells you what is in the ground and roughly where it runs. Second, it documents those findings for construction planning, permitting, and safety compliance. On a small residential project, it might just be some painted lines in the yard. On a commercial or municipal job, it might involve GPS mapping, CAD files, and formal subsurface utility engineering (SUE) reports.

When someone asks, "How accurate is utility locating?", they are really asking, "How close is that painted line to where I will actually hit the pipe or cable with my bucket or auger?" To answer that, you have to look at who is doing the locating, what tools they use, and how complex the site is.

What a utility locator actually does on site

A good utility locator is part technician, part detective. The work is far more than walking around with a wand that beeps.

On a typical job in Orange County, the process looks like this. First comes research: utility maps if available, as-built drawings, old survey plans, and anything the client or facility team can provide. Those records are often incomplete or wrong, but they give a starting framework and highlight obvious conflicts.

Next comes reconnaissance. The locator walks the site looking for visible clues: meter boxes, valve cans, manholes, transformer pads, risers, tracer wire terminations, and previous utility markings. You would be surprised how often a faded paint mark or a half-buried conduit stub gives away a line path.

Then the active locating begins. For conductive utilities like power, some communications lines, and metallic water or gas piping, the locator will use an electromagnetic (EM) transmitter and receiver. They either clamp onto the utility or connect indirectly, inject a signal, and then trace that signal at the surface.

For non-metallic utilities, or where no direct connect is possible, the locator switches to other methods: ground penetrating radar (GPR), sondes pushed through sewer laterals, transmitting tracer wires, or even acoustic listening for certain water leaks or flowing lines.

Finally, the locator marks the ground with paint and flags using the standard American Public Works Association color code. That is where most people encounter the work: colored lines and symbols on the ground. Behind those lines is a chain of judgment calls, equipment parameters, and site constraints that all influence accuracy.

Public 811 vs private utility locating in Orange County

One of the biggest misunderstandings I see is the belief that “I called 811, so everything underground is taken care of.” It is not.

California has a “call before you dig” law. In fact, California Government Code and regulations require excavators to notify the regional one call system before digging. In Orange County, you contact 811 (DigAlert) at least two working days and not more than 14 days before excavation. That call is the law for almost all non-emergency digging, whether you are a contractor or a homeowner with a rental auger.

Here is what happens after you call: the one call center notifies the public utility operators with facilities in your dig area. Those operators then send their own locators or contract locators to mark their public facilities. Public facilities typically mean lines they own and maintain up to the meter or service point.

That leads to several important limits.

First, 811 does not locate everything. It does not identify your private electrical runs from the meter to a detached garage, private fire lines on a campus, irrigation, pool lines, or privately owned sewer laterals beyond the public main tap. It also does not cover site lighting, landscape power, or private communications cables. Does 811 locate private lines? Generally no. There are rare exceptions where a “private” line is actually owned by a utility, but as a rule, private laterals and on-site systems are your responsibility.

Second, 811 locators are focused on marking presence, not providing survey-grade accuracy. Their mission is to satisfy legal requirements and keep excavators out of trouble for the immediate dig operation. They are not typically layering GPR grids, reconciling multiple mapping sources, or providing detailed subsurface utility engineering.

Private utility locating, by contrast, covers what 811 does not. A private utility locator works directly for the property owner, general contractor, or engineer. They can locate both public and private utilities in the work zone, and they can adjust their approach based on the project’s tolerance: hand digging and vacuum potholing where inches matter, building composite utility maps, and coordinating with survey teams.

The practical difference is scope and accuracy. If you are hand digging a small planting hole, public marks may be adequate. If you are pushing a 24 inch auger or drilling piers near a fiber route, you probably need a private utility locator as well.

Is utility locating free in California, and who pays?

The 811 service itself is free in California for excavators. You do not pay DigAlert to process your ticket, and public utility locators do not bill you directly for standard responses. The cost is built into utility rates and system overhead.

Private utility locating, on the other hand, is a contracted service. In Orange County, the cost for private locating typically ranges as follows:

For residential or small commercial sites, many firms have a minimum mobilization fee, commonly in the range of \$350 to \$750, which may include up to a few hours of work on site. Larger commercial, industrial, or campus work

may be billed hourly, often somewhere between \$150 and \$300 per hour per crew, depending on equipment used (for example, adding GPR) and reporting requirements.

"How much does private utility locating cost" and "How much does utility locating cost in Orange County" both depend heavily on scope. A quick "trace the electrical to the pool equipment" visit costs far less than a SUE quality B utility survey across a multi-acre site with GPS mapping and CAD deliverables.

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Who pays for utility locating? Typically the party performing or directing the excavation. On construction projects, that might be the general contractor passing the cost through to the owner. On a homeowner project, the property owner or the contractor they hire usually pays any private locator fees. Public 811 locating remains free.

How utility locating works, technically

Two broad classes of tools dominate: electromagnetic locators and ground penetrating radar. Each has strengths and weaknesses that directly affect accuracy.

Electromagnetic (EM) locating involves using a transmitter to induce a signal on a conductive line, then tracing that signal with a receiver. It works well on metallic pipes and cables with continuous conductors. It is the workhorse of utility locating, but it assumes that the line is continuous, well bonded, and reasonably isolated from other metallic paths. In dense utility corridors, signals can bleed onto adjacent utilities, leading to ghost lines or skewed paths.

Ground penetrating radar sends short radio pulses into the ground and measures energy reflected by changes in material properties. It does not need a conductive line and can detect plastic pipes, concrete structures, and voids. In Orange County's mixed soils, GPR performance ranges from excellent in dry granular soils to poor in clayey, saturated, or highly conductive ground. Reinforcing steel, debris, and buried junk can also obscure signals.

So when someone asks, "How deep can utility locators detect?" the honest answer is: it depends. In typical Orange County soils, EM equipment can often trace power and communications lines down to depths of 10 to 15 feet if the line carries a clean signal. GPR might reliably show utilities from just below the surface to about 8 or 10 feet in good conditions, and sometimes deeper, but with decreasing resolution and confidence.

Manual tools still matter. Experienced locators will probe with rods, listen for acoustic cues, or even coordinate with vacuum excavation crews to daylight key points. On critical lines, no one who has been burned once will rely solely on surface marks.

How accurate is utility locating, realistically?

Accuracy in utility locating is usually expressed as lateral tolerance from the mark to the actual utility centerline, plus some uncertainty in depth. Most statutes and best practices do not guarantee a specific tolerance, but in practice, in Orange County you might see these common ranges:

On straightforward sites with clean, conductive lines and good access, EM locates often fall within 6 to 18 inches horizontally of the actual line. Depth estimates on EM are less reliable, often within 10 to 30 percent of the actual depth, and they can be thrown off entirely by complex geometry.

With GPR in favorable soils, reflections can often place utilities within roughly a foot or two horizontally, but interpretation plays a big role. Two technicians can read the same GPR data slightly differently, especially around multiple overlapping targets.

Older, congested corridors or sites with undocumented modifications can inflate tolerances dramatically. It is not unusual to see 2 to 3 feet of variance or more, particularly with abandoned lines, cross bonding, or utilities that loop or serpentine around obstacles.

That is why the tolerance zone concept exists. When you see colored paint on the ground, the safe assumption is not that the utility lies exactly beneath the center of the line. The safe assumption is that a variable corridor around that line contains the utility, and you must use hand tools, potholing, or vacuum excavation within that zone.

For critical work, private locators will often recommend daylighting utilities at conflict points. That means exposing the utility physically to confirm location and depth. In many ways, that is the only way to achieve true "zero tolerance" for a conflict.

How accurate is ground penetrating radar on utilities?

Ground penetrating radar has a reputation as a magic x-ray for the ground. The reality is more nuanced.

Accuracy depends on antenna frequency, soil conditions, depth, and target contrast. In Orange County, sandy and decomposed granite soils on hillsides often yield very good GPR results. High clay content, fill areas, and saturated zones near the coast can scatter and absorb the radar signal.

For shallow utilities, say within 4 to 6 feet of the surface, GPR can often detect and outline features with 6 to 12 inch lateral accuracy if interpreted correctly. Deeper utilities might be visible but fuzzier, and depth estimation becomes more of a range than a crisp line. GPR is especially useful for non-metallic pipes, concrete encased ducts, and tanks that EM cannot see.

What is GPR used for beyond locating? On larger projects, it helps identify unknown structures, verify slab thickness, locate voids, and complement EM locates in building sites where everything is heavily reinforced. But no

competent locator in Orange County will claim GPR is infallible. It is a powerful tool layered into a broader locating strategy, not a guarantee of 100 percent detection.

Color codes and what the marks actually mean

Those colored lines and flags around your property are not random. They follow a standard color code so crews can quickly identify what they are working around.

Here is a simple reference many of us keep in our heads on site:

1. Red means electric power lines, cables, conduit, and lighting.
2. Orange indicates communications, alarms, signal lines, and fiber optic cable.
3. Yellow marks gas, oil, steam, petroleum, or other gaseous materials.
4. Blue is for potable water.
5. Green identifies sewers and drain lines.

There are also pink marks for temporary survey, purple for reclaimed water or irrigation in some cases, and white paint for proposed excavation limits. When you see white paint on the ground in Orange County, someone has likely outlined the work area as required before the utilities respond to an 811 ticket. That white outline helps locators focus their time where digging will actually occur.

The paint line itself often includes letters or abbreviations (for example, "E" for electric, "GAS," "TEL," "FO" for fiber optic). Arrows, dashes, and offsets may be written to show direction or distance to the utility when it cannot be marked directly above.

If you notice orange utility flags along a street setback, that implies communications or fiber routes. That is an area where striking a line can be extremely expensive, as fiber outages can affect multiple businesses and the repair cost, not counting downtime, can be very high.

Can locators find plastic pipes and non-metallic lines?

Yes, but not as easily as metal, and not every time.

Plastic water lines, sewer laterals, and irrigation piping can be detected by several methods. If there is a tracer wire along the pipe, EM equipment can follow that wire. For sewers, a sonde can be pushed from a cleanout down the pipe, transmitting a signal that the locator traces from the surface.

GPR is the go-to for buried non-metallic pipes without tracer wire. The radar detects changes in dielectric properties, which show up as hyperbolic reflections on the screen. In practice, success depends heavily on pipe size, depth, soil conditions, and nearby clutter.

Small plastic irrigation lines at 18 inches depth in a landscaped yard are often difficult to pick out with GPR among roots and small buried debris. A 10 inch PVC water main at 5 feet in clean native soil is usually obvious.

A locator should be candid with you about what they can and cannot reliably detect. If you ask, "Can you locate a septic tank?" or "How do you locate a sewer line?", the answer may involve a combination of GPR, tracing from a cleanout, probing, and sometimes exploratory digging if the system is old and undocumented.

How long does utility locating take?

Time on site depends on area, complexity, and deliverables.

A straightforward residential call in Orange County, where a client wants to “find a buried electrical line” to the back shed and “locate a buried water line” to a hose bib, might take 1 to 2 hours after setup and walk-through. Add GPR to search for a “maybe there is a septic tank” situation, and that can extend another hour or two.

Commercial sites and street row work scale quickly. Locating both public and private utilities along a 300 foot trench alignment beside a busy street could take half a day to a full day, depending on traffic control and the need to coordinate with 811 marks.

Subsurface utility engineering at quality level B, where a locator systematically scans corridors, reconciles records, and works with survey crews to capture coordinates, can stretch across days or weeks for large campuses or road projects.

From a schedule perspective, plan ahead. How far in advance do you need to call before digging? In Orange County, calling 811 at least two working days before digging is the minimum. For private locating, many companies can respond within 1 to 3 days for small jobs, but prime construction season fills calendars. For deep, complex work like directional drilling near key utilities, it is wiser to engage a private locator during design, not the day before mobilization.

Legal and liability considerations in California

Is calling 811 the law in California? Yes, for most excavations. The state’s Dig Safe requirements expect you to notify 811, respect the marks, use appropriate excavation methods in the vicinity of buried utilities, and report any damage.

What happens if you dig without calling 811? You expose yourself to liability if you hit a line, including repair costs, potential fines, and increased civil exposure if someone is injured or service is interrupted. Is it illegal to dig without calling 811 in California? For covered excavation work, failing to notify 811 can be cited, and evidence of non-compliance can weigh heavily in any subsequent legal action.

If you strike a utility, who is liable? In many cases, the excavator bears responsibility, unless it can be shown that the utility was not properly marked, was outside the tolerance guidelines, or that maps and records were grossly inaccurate. That is not a simple determination. It usually involves damage reports, photos of markings, and sometimes expert testimony.

The cost to repair a damaged utility line varies wildly. A shallow residential gas service strike might involve a few thousand dollars, plus a utility crew shutdown. A cut fiber optic cable serving businesses could run into tens of thousands in direct repair and service disruption costs. Major power hits can be even worse, both financially and from a safety standpoint.

When accuracy matters, do not hesitate to ask your locator how they determined the path, what tools they used, and where their confidence is lower. If you are pushing the edge of a locator’s tolerance with, say, a bore path near a gas main, consider potholing and coordinate with the utility owner.

When you should hire a private utility locator in Orange County

For some work, homeowners and small contractors ask, “Can I locate my own underground utilities?” and sometimes try metal detectors, rental locators, or basic probing. On very simple, shallow tasks away from known utility corridors, that might be adequate. But there are clear scenarios where bringing in a private locator is simply good risk management.

Typical situations where you should strongly consider hiring a private utility locator include:

1. Any mechanical excavation or drilling deeper than a foot or two in areas with known or suspected utilities beyond what 811 will mark.
2. Projects near critical infrastructure, such as fiber optic routes, larger gas mains, or electrical duct banks.
3. Sites with extensive private infrastructure, such as HOA communities, school campuses, hospitals, refineries, data centers, or large retail complexes.
4. Older properties with uncertain histories, where records are missing and visible evidence conflicts with maps.
5. Projects that require as-built documentation, CAD utility layers, or SUE-level confidence rather than basic safety marks.

Should homeowners hire a utility locator? If you plan to install deep footings, cut in a new pool, add a detached ADU, or run new utilities across your yard, the answer is usually yes, especially if the existing infrastructure is not clearly documented. The relatively modest cost of locating compares favorably to even one serious hit.

Permits, design, and subsurface utility engineering

Do you need a permit to dig in Orange County? For most substantial work, yes. The exact requirements depend on the jurisdiction (city, county, Caltrans) and the nature of the work. Utility locating intersects with permitting in two important ways.

First, plan reviewers increasingly expect to see that underground utilities have been considered in design, especially for public row work. Vague statements like “contractor to verify utilities prior to construction” are not sufficient when a bore path crosses known gas and fiber corridors.

Second, subsurface utility engineering provides a structured framework for utility investigation. SUE classifies data quality from level D (records only) up to level A (utilities exposed and surveyed). Quality level B is common on roadway and site projects [Orange County vacuum excavation](#) where utility paths must be known with reasonable accuracy before final design. That work blends EM locating, GPR, records research, and surveying to deliver utility maps with stated confidence.

Asking for SUE when you design, rather than reacting to unknowns in the field, reduces surprises and change orders. It also forces everyone to deal with the limitations of locating early, rather than assuming perfect accuracy.

Managing expectations and working with tolerances

Utility locating, whether through 811 or private services, gives you a better picture of the subsurface, not an absolute truth. Treat the marks and maps as informed approximations within a tolerance zone.

Expect that:

You will not see every small conduit, abandoned line, or poorly installed lateral. Even the best locator will miss some features in complex or noisy environments.

Depth readings, especially from EM, are estimates. Do not set the teeth of your bucket to 18 inches below the “depth” shown on a locator’s display and assume safety.

Painted lines have width, and utilities may not be perfectly centered under them. Give yourself a buffer, especially for large equipment.

The safest approach is to integrate locating into your risk management: call 811, engage private locators where needed, daylight critical conflicts, use hand tools near marks, and keep field crews informed about what those colors and flags mean.

Accuracy in Orange County is often quite good when the site is straightforward and equipment is used well. But even at its best, utility locating works within bands, not millimeters. If you design, plan, and dig with that reality in mind, you significantly reduce the odds of your project being the one that shuts down the street or the business park because a line you “thought” was somewhere else turned out to be exactly where you were digging.

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