

If you are planning a project anywhere in the Sacramento region and someone on the design team has suggested “let’s use vacuum excavation,” they are usually trying to keep you out of trouble.

Whether you manage public works, commercial sites, utility upgrades, or a subdivision, you are dealing with one basic problem: the ground here is full of things you do not want to hit. Fiber, gas, old clay sewer laterals, abandoned services no one has mapped correctly, and in some areas, shallow groundwater. Traditional digging will always have a place, but on many jobs vacuum excavation is becoming the default tool, not the exotic one.

This guide walks through what vacuum excavation actually is, what it costs, how deep it can go, and how to think about productivity and safety rules when you are planning a job in the Sacramento area.

What vacuum excavation really is (in plain terms)

At its core, vacuum excavation is simply using air or water to loosen soil, then using a powerful vacuum to suck that soil into a debris tank. The truck parks near the work area, a crew runs a hose to the dig point, and they “pothole” or trench without using metal teeth underground.

Two main methods are used:

- Hydro excavation (water plus vacuum)
- Air excavation, often called “air knife” or “air vac”

Both are still “vacuum excavation,” but they behave differently enough that choosing the right one will affect cost, speed, and how messy your site gets.

In Sacramento, the majority of work we see in urban streets and around live utilities is hydro excavation, especially for deeper work or in compacted native soil. Air excavation comes in when disposal costs are high or when the project wants to reuse the dry spoil as backfill.

If you have ever seen a crew standing around a small hole with steam or mist rising, watching a hose as if they are cleaning instead of digging, that was almost certainly hydro vacuum excavation in action.

Hydro excavation vs vacuum excavation: clearing up the terms

A lot of planners ask, “What is the difference between hydro excavation and vacuum excavation?” From a contractor’s standpoint, hydro excavation is a type of vacuum excavation that uses high pressure water to cut the soil. Air excavation is the other primary type, using compressed air.

Hydro excavation:

- Uses water to break up the soil, the vacuum pulls out the muddy slurry.
- Faster in hard clays, compacted fill, and winter-wet soils.
- The spoil is a slurry, so you have to haul it and dispose of it, usually at an approved facility.
- Excellent around congested utilities because water is gentle on pipes and cables when operated correctly.

Air vacuum excavation:

- Uses compressed air to fracture the soil, the vacuum removes the dry spoil.
- Slower in hardpan or highly compacted fill.
- Spoil stays relatively dry, which means you can often reuse it on site for backfill.

- Good if you are trying to minimize disposal costs or keep the work area cleaner.

Most people who say “vacuum excavation truck” or ask “How much is a vacuum excavation truck?” are thinking of a hydro-vac truck, but the same chassis can often be set up for both modes. Purchase prices vary widely, but to ground your expectations: a new full-size hydrovac truck that can support serious commercial work commonly runs from the high \$400,000s to well over \$600,000 depending on options. That price tag is part of why the hourly rates sound high to first-time buyers.

Where vacuum excavation shines on Sacramento projects

On paper, vacuum excavation looks “expensive” compared to throwing a laborer and a mini excavator in the hole. In practice, it often saves money by avoiding damages, delays, and safety incidents.

For a Sacramento planner, vacuum excavation earns its keep in several recurring scenarios:

1. Locating existing utilities before major excavation

Potholing to expose PG&E gas lines, SMUD duct banks, city water mains, or old telecom bundles before you trench with large equipment.

2. Working in older neighborhoods

Central and East Sacramento, parts of Oak Park, and older county pockets have unpredictable, shallow, or undocumented utility runs. A vacuum truck lets you confirm what is really there.

3. Tight urban sites and traffic control constraints

Around light rail, downtown streets, or busy arterials, you often need to minimize open trench and spoil stockpiles. Vacuum excavation keeps the footprint small.

4. Sensitive facilities

Hospital campuses, data centers, refineries, and treatment plants push hard for “soft dig” methods to protect operations. Vacuum excavation is usually written into their standards.

5. Regulatory and safety driven work

Projects with strict safety oversight, or following best practices from PHMSA and utilities, often require vacuum potholing any time you are within a stated distance of a known pipe or cable.

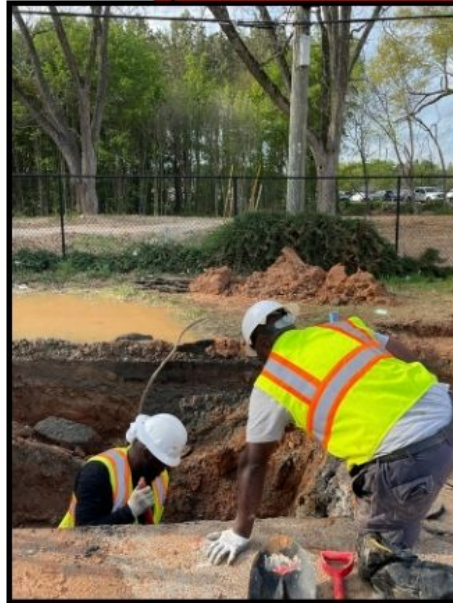
If you are being asked “Can I dig a trench with a pressure washer?” what you are really hearing is someone trying to reinvent hydro excavation with consumer tools. The safe answer for commercial work is no. True hydrovac systems carefully balance water pressure, flow, and vacuum power, have trained operators, and include debris tanks and filtration. A pressure washer and a shop vac is not a substitute and invites damage and safety problems.

Depth limits: how deep can vacuum excavation go?

“How deep can you vacuum excavation?” is usually the first technical question from designers. The short answer: a lot deeper than you will likely need for [Sacramento Vacuum Excavation bessutility.com](https://www.bessutility.com) utility work, but with some productivity penalties as you go down.



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In practical Sacramento jobs:

- Routine potholing runs 4 to 8 feet deep.
- Service laterals and small structure excavations often go 8 to 12 feet.
- It is quite feasible to go 15 to 20 feet or more with the right truck and hose setup.

The limiting factors are:

- Vacuum lift performance, especially as hose length and bends increase.
- Soil type and moisture content.
- Groundwater level, which in Sacramento can be fairly shallow in some corridors.
- Site access: how close you can park the truck to the dig point.

On deeper excavations, the production rate drops, but depth itself is less of a technical limit than safe shoring and site logistics.

Safety rules: shoring, OSHA, and the “4 foot” questions

At planning level, you do not need to memorize every excavation standard, but you should be fluent in the broad safety triggers. In the United States, OSHA sets the baseline. California, through Cal/OSHA, adds its own detail, but the logic is similar.

Two questions come up constantly:

“How deep can you dig without shoring?”

On most commercial projects, any trench or excavation 5 feet deep or more must have a protective system such as sloping, benching, shoring, or shielding, unless the excavation is entirely in stable rock. Even shallower cuts can require protection if there is a risk of cave-in. A more conservative planning approach is to treat 4 feet as the point where you start asking your “competent person” to evaluate trench protection explicitly.

“What is the 4 foot rule in excavation?”

4 feet is often treated as the depth where certain additional precautions kick in, like providing safe access and egress (ladders or ramps) so workers do not climb up dirt faces. Ladders are typically required within a set maximum horizontal distance for workers in a trench, which is why details like ladder rung spacing, commonly in the 12 inches neighborhood with specific rules such as not exceeding roughly 19 inches between rungs, matter for compliance and safety.

When vacuum excavation is used only for potholing narrow vertical holes that no one enters, shoring requirements do not apply in the same way, [Sacramento Vacuum Excavation](#) because no one is in the excavation. Once a person is entering the hole, even a vacuum excavated one, trench safety rules apply.

OSHA’s three most cited violations year after year are usually:

- Fall protection in construction.
- Hazard communication.
- Scaffolding or ladder related violations.

Excavation and trenching violations are not always in the top three nationwide, but every serious contractor treats them as top tier risk. As a planner, your role is to make sure your scopes, bid documents, and schedules allow contractors to follow the rules without blowing the budget.

How much does vacuum excavation cost?

Now to the part everyone actually cares about: what does it cost for a vac excavation, and how should you budget it?

Because each market is a bit different, use these as ballpark Sacramento-area ranges, not quotes:

- Daily or hourly rates: most full-size hydrovac trucks with a two-person crew run somewhere in the range of \$275 to \$450 per hour, or \$2,200 to \$3,600 for a full 8 hour shift, depending on depth, conditions, standby time, and traffic control needs.
- Small day-minimum “pothole only” crews sometimes quote you a package: for example, half day minimum plus travel, including a stated number of potholes up to a certain depth.

So when someone asks “How much does vacuum excavation cost?” it is usually safest to answer with a range per hour, then translate that to cost per cubic yard or per pothole once you know production.

Productivity: how much can a vac ex excavate in a day?

Productivity is where planning lives or dies. A vac truck is not a backhoe; it excels at precise holes, not moving massive quantities of dirt.

On a realistic Sacramento street job in mixed fill and native soil:

- Shallow test holes up to 5 feet where records are good and traffic control is simple: you might see 15 to 30 potholes in a day.

- Deeper work down to 10 to 12 feet, with careful utility locating and some congestion: often 6 to 15 potholes per day.
- Continuous trenching with vacuum excavation rather than machinery is slower, and rarely how we design a project, unless damage risk is extreme.

In cubic yard terms, a full-size hydrovac might remove something like 10 to 20 cubic yards of material in a day while potholing, more if the soil is loose and access is excellent. If you hear someone claim 100 cubic yards in a normal urban day, look closely at soil type and whether they are counting time in a way a scheduler would accept.

“How much does an excavator excavate in one hour?” is a different question. A 20 ton class excavator can move tens of cubic yards per hour in an open cut, but cannot safely dig blind across a bundle of gas, water, and fiber without prior potholing. Vacuum excavation is the scouting tool; conventional machines do the bulk earthwork once the underground is mapped with real eyes.

Example: how long to dig a 100 foot trench?

Planners often ask: “How long does it take to dig a 100 ft trench?” The honest answer is, it depends what is in front of you.

If you tried to vacuum excavate the entire 100 foot trench for a shallow electrical conduit, you might be talking 1 to 2 days or more, depending on width and soil conditions. That would be an odd design choice unless you were inside an extremely dense corridor.

On a more typical project, you might:

- Use vacuum excavation to pothole across the trench alignment every 10 to 20 feet, and at each mapped utility crossing.
- Use a mini excavator or backhoe to open the trench once conflicts and depths are known.
- Use hand digging or more vacuum work at each live utility crossing for added protection.

On that hybrid approach, a 100 foot run might indeed be completed in a normal work day, including vacuum work, digging, and pipe or conduit install, provided crews are well coordinated and soils are not terrible.

How much to excavate 200 cubic yards?

Occasionally someone phrases the question this way: “How much to excavate 200 cubic yards?” If the intent is 200 cubic yards of bulk earthwork for a pad or detention basin, vacuum excavation is the wrong tool, both technically and financially.

For rough pricing:

- Bulk excavation by dozer, scraper, or excavator and trucks is usually priced per cubic yard, and can land in the ballpark of \$4 to \$15 per cubic yard in many California markets, depending heavily on haul distance, export or import needs, and site constraints.
- Vacuum excavation is rarely priced strictly per cubic yard, because it is slow for volume and you are paying for safety and precision.

A better way to think about vacuum excavation is as a line item for “utility potholing and daylighting,” budgeted as a number of crew days or hours. For example, on a several-million-dollar utility upgrade, you might carry \$20,000 to \$60,000 or more specifically for vacuum excavation, based on the number of expected test holes and site complexity.

How deep can you excavate without shoring when using vac ex?

Another frequent confusion point: “How deep can you excavate without shoring if you are using a vacuum truck?”

The method of soil removal does not change the safety rules once someone could be exposed to a cave-in. A vacuum excavated shaft has vertical sides just like a trenched one. The same limits apply:

- If no one will enter the hole, and it is properly barricaded, you can cut quite deep without shoring from a regulatory perspective, though you still need to manage surface stability and adjacent structures.
- Once workers enter, you must follow the same trench protection standards: competent person assessment, protection systems at required depths, safe entry and exit, and so on.

Some internal training tools in the industry refer loosely to “3/4/5” or “5 4 3 2 1” rules for excavation as memory aids, such as 5 feet for protection systems, 4 feet for access and atmospheric testing in certain confined spaces, 3 feet for material set-back from the edge. Treat these as teaching devices, not legal codes. The legal reference is always OSHA and, in California, Title 8 standards.

Training and certifications: who can run these trucks?

Unlike a simple skid steer, hydrovac and air-vac trucks blend high pressure systems, large vacuum blowers, and heavy commercial vehicles. That combination drives several questions.

“What kind of training is required for vacuum excavation?”

Most competent contractors use a layered approach:

- Formal equipment training by the manufacturer or dealer.
- Internal operating and safety procedures, including utility damage prevention practices.
- OSHA-required safety training on excavation, confined spaces where applicable, PPE, and hazard communication.
- Ongoing field mentoring by experienced operators.

“What certifications do you need to run an excavator?”

For general excavator operation, OSHA does not have a specific “license,” but requires employers to ensure operators are competent through training and assessment. Many contractors and agencies now prefer or require third-party operator qualification cards or unions provide formal apprenticeship paths.

“Is a CDL required for hydrovac jobs?”

In practice, yes. Hydrovac trucks fall well into commercial vehicle territory. To drive them on public roads you generally need a Class A or B CDL, and often an air brake endorsement at minimum. “Do you need a tanker endorsement for a hydrovac truck?” depends on state interpretation and truck configuration. Some fleets obtain tanker endorsements because the water and slurry tanks meet certain volume and design thresholds. This is something your fleet manager or safety department should verify against current DMV definitions.

“Is 50 too old to become a heavy equipment operator?”

Not if you are realistic about the physical demands and have good coordination and health. Many operators come from other trades in their 40s and 50s and do well. Hydrovac work involves climbing, hose handling, and periods of awkward posture, so it is not a desk job, but age alone is not a barrier.

As for “What is the highest salary for an excavator operator?” that varies by union status, overtime, and specialty work. In California, experienced operators in specialty roles such as deep foundation work, refineries, or remote projects can earn into the high five figures or low six figures annually when overtime is steady.

Equipment choices: excavators, bulldozers, and the ever-present Cat 320

Vacuum excavation does not replace excavators or bulldozers; it sits alongside them.

“What are the three types of excavators?”

There are more than three types in reality, but most planners only need to think in broad categories:

1. Standard crawler excavators for general digging and trenching.
2. Compact or mini excavators for tight sites and utility work.
3. Specialized units such as long reach, wheeled, or zero tail swing machines for particular constraints.

“What is the most used excavator?”

In utility and site work around Sacramento, the workhorse class is often the 20 ton excavator. The Cat 320 is a common reference point. “Is a Cat 320 a 20 ton excavator?” Roughly yes. It is in that size class, which balances reach, lifting ability, and mobility for trenching and general dig work.

“What’s stronger than a bulldozer?” is almost a barroom question, but if you mean earthmoving power, a large dozer is built for pushing, while big excavators and scrapers move material differently. For planners, focus less on “stronger” and more on matching the machine type to the task: dozers for spreading and pushing, excavators for trenching and structures, scrapers and loaders for high volume haul.

Vacuum excavation is the precision partner that lets those heavy machines work faster and safer because the underground has been exposed and confirmed.

Site conditions: wet vs dry soil, backyards, and legal constraints

“Is it better to dig a hole when the ground is wet or dry?”

Vacuum excavation behaves differently in each. Slightly moist soil is often ideal: it holds shape but breaks cleanly. Fully saturated soils can cave and create slurry management problems. Very dry, loose soils may actually be easier for air excavation but produce more dust. In Sacramento’s clay-heavy areas, water helps cut the soil when using hydro excavation, but you must watch for instability as you get deeper.

“Is it illegal to dig a hole in your backyard?”

On private property, small homeowner digging is generally lawful, but you must call 811 for utility locating before significant digging, and you are still liable for damages. For commercial and public work, ignoring locate rules is asking for trouble both legally and financially. Vacuum excavation is often used to verify 811 marks before mechanized digging.

“Is the 35 foot rule” or “rule 1413 for excavation” binding on your project? Various agencies and standards have internal rules or references along those lines, often related to egress spacing, support systems, or distance from structures. The safe planning approach is to specify compliance with OSHA and relevant state and local codes, and to require a competent person to review excavation plans. Rely on your safety professionals and geotechnical engineer to interpret which detailed rules apply.

Cost planning: pricing out excavating jobs with vac ex in the mix

“How to price out excavating jobs” that include vacuum work is where many new planners stumble. The trick is to separate precision work from bulk work, then combine them in a schedule and budget that reflects reality.

A practical approach often looks like this:

1. Use design drawings and utility records to estimate how many potholes you will need along each alignment, at each crossing, and near critical tie-ins. Add contingency for unexpected utilities.
2. Consult with a vacuum excavation contractor to translate that pothole count and depth range into an estimate of crew days. Adjust for site access and traffic control.
3. Carry a line item for vacuum excavation based on those crew days, with a realistic hourly or daily cost range.
4. Price bulk earthwork, structural excavation, and grading separately, usually by cubic yard or as lump-sum, using conventional machines.
5. Remember to include costs for disposal of hydrovac spoils where they cannot be spread on site.

“Why do you divide by 27 for cubic yards?” comes up surprisingly often when planners check the math on volumes. One cubic yard is 27 cubic feet, because 3 feet by 3 feet by 3 feet equals 27. So if you have a trench that is 2 feet wide, 4 feet deep, and 100 feet long, that is 800 cubic feet. Dividing 800 by 27 gives you roughly 29.6 cubic yards.

When someone asks “What does excavation cost per hour?” they may be rolling different costs into one. Distinguish between:

- Equipment plus operator rates (for excavators, dozers, or vac trucks).
- Labor rates for additional crew.
- Ancillary costs such as traffic control, disposal, and standby.

In Sacramento bidding, an excavator with operator might be billed in the \$140 to \$250 per hour range depending on size and union status, while a vacuum truck with crew will usually be higher as discussed earlier.

Checklist: when vacuum excavation belongs in your Sacramento project

Here is a short planning checklist you can run through in predesign or early design. If you answer “yes” to several, vacuum excavation should probably appear in your scope.

1. Will you be working within a few feet of known high value utilities like transmission gas lines, fiber bundles, or major power conduits?
2. Are your as-built records old, inconsistent, or missing for key areas of the site?
3. Is your work in a dense urban corridor with limited room for open trench or spoil stockpiles?
4. Does the owner have strict risk tolerances, such as hospitals, refineries, airports, or data centers?
5. Are there regulatory or internal standards calling for “soft dig” methods within a certain distance of existing utilities?

If several of these fit your project, bring in a local vacuum excavation contractor early. Let them comment on access, staging, and sequence. It is almost always cheaper to plan for vac ex up front than to scramble a truck after you have already hit something.

Final thoughts for Sacramento project planners

Vacuum excavation is not a magic tool, and it will not replace every excavator or laborer on your site. What it gives you is control. It lets you see what you are about to cut into, verify depths, and uncover the surprises that do not appear on any drawing.

For a project planner responsible for both budget and risk, the right question is rarely "Can we afford vacuum excavation?" It is "Where can we not afford to skip it?" If you design your work so that vac trucks handle the high risk, high consequence digs and conventional equipment handles the volume, you will generally spend less overall and sleep better while the work is underway.