Ask three excavation contractors in Sacramento how much dirt you can move in an hour, and you will get three different answers. All of them can be right, depending on the machine, the operator, the soil, and especially the risk around existing utilities.

Comparing a conventional excavator to a vacuum excavation truck is not apples to apples. One is built for bulk earthmoving. The other is built for precision and safety. If you are trying to budget a project, decide how to dig a 100-foot trench, or price out excavating jobs in utility-dense neighborhoods, you need a realistic sense of production, costs, and limits for both.

This guide walks through what you can expect in Sacramento conditions, why the numbers vary so much, and when it actually makes sense to trade raw speed from an excavator for the controlled pace of a vacuum excavation unit.

What vacuum excavation really is (and what it is not)

Vacuum excavation is a non-mechanical way of digging using high-pressure air or water to loosen soil, then a powerful vacuum to remove it into a debris tank. On the street you will hear a few terms:

- Hydro excavation or hydrovac: water cuts and loosens the soil, then a large vacuum hose removes the slurry into a debris tank.
- Air vacuum excavation or air-vac: compressed air breaks up the soil, and the spoil is vacuumed up dry.

So when people ask, what is vacuum excavation or what is the difference between hydro excavation and vacuum excavation, in most field conversations “vacuum excavation” is the umbrella term, and hydrovac is the water-based version of it.

Vacuum excavation is common for:

- Potholing and daylighting utilities
- Exposing gas, fiber, or telecom in congested corridors
- Working near tree roots or structures where you want minimal disturbance
- Slot trenching for small diameter utilities

Compared to a steel bucket on a tracked excavator, vacuum excavation is slower at moving bulk soil, but far safer when you do not know exactly where that 4-inch gas main or 19-inch storm line actually is.

Hydrovac is not the same thing as a hospital “vacuum delivery” during childbirth. That is a medical procedure with its own risks and pain considerations. In construction, we mean a truck-mounted vacuum unit that cuts soil with water or air.

How much can an excavator excavate in one hour?

When someone asks how much does an excavator excavate in one hour, any honest operator will start with “it depends.” The theoretical production rates in manufacturer charts rarely match a real job in Sacramento traffic, with PG&E and SMUD lines crossing everywhere.

Here is how you should think about it.

Machine size and bucket capacity

Excavators are usually described by tonnage. For rough field purposes:

- A compact excavator (mini) in the 3 to 6 ton range will run a 0.1 to 0.25 cubic yard bucket.
- A mid-size machine around a Cat 320, which is indeed roughly a 20-ton excavator, will run a 0.8 to 1.2 cubic yard bucket.
- Large production machines in the 30 ton class and up can swing 2 cubic yard buckets or more, depending on the arm and material.

Productivity is bucket capacity multiplied by cycles per hour, then adjusted for swell, cleanup, and lost time.

A reasonably skilled operator on a 20 ton excavator, loading into trucks or building a trench, might average 3 to 5 full bucket cycles per minute in good conditions. That is 180 to 300 cycles per hour. Using a 1 cubic yard bucket, you can see the headline number: 180 to 300 loose cubic yards per hour.

In real Sacramento work, with utility spotting, traffic control, trucks moving in and out, and pauses for survey and checks, you rarely get that pure production. A more believable range for a mid-size excavator is:

- 60 to 120 in-place cubic yards per hour on open cuts with easy truck access.
- 30 to 60 cubic yards per hour in tighter easements or when heavy utility coordination is involved.

Those rates assume a competent operator, clear dig limits, and no major surprises underground.

Soil conditions and water content

Sacramento has a mix of sandy loams, silty clays, and cobbles. Whether it is better to dig when the ground is wet or dry comes up a lot.

Slightly moist soil often digs more cleanly and loads better. Saturated clays, on the other hand, stick to the bucket and slow production. Overly dry, hardpan soils can also slow you down because the bucket teeth have to work harder and you may need a ripper.

Water content also affects swell: the difference between in-place volume and loose volume in the truck. When you calibrate how much to excavate 200 cubic yards, you have to remember that 200 in-place yards often turns into 220 to 260 loose yards once disturbed, depending on the material.

That “divide by 27 for cubic yards” rule that everyone references simply converts cubic feet to cubic yards: 27 cubic feet per yard.

Trenching example: How long to dig a 100 ft trench?

Let us make it practical. You need to dig a 100 foot trench, 2 feet wide, 4 feet deep, along a residential street in Sacramento.

Volume:

100 ft × 2 ft × 4 ft = 800 cubic feet. 800 ÷ 27 ≈ 30 cubic yards in place.

A 20 ton excavator working in an open right-of-way, with spoil being sidecast and no major utilities to tiptoe around, can often dig that in well under an hour of pure digging, even accounting for minor positioning.

On a real project, you will add time for:

- Utility locating and hand digging around marked lines
- Traffic control moves

- Checking line and grade
- Staging or loading out spoil

On a fairly clean city block, you might see that 100 ft trench take 2 to 4 hours total machine time from first bite to final trimming, depending on how congested the corridor is.

If you are asking how long does it take to dig a 100 ft trench in a backyard where access is tight, maybe with a 3.5 ton mini excavator and every bucket going into a small dump trailer, double or triple that time is not unusual.

How deep can you excavate without shoring?

Once trenches get deeper, productivity is only part of the story. Safety and compliance drive your choices.

In Sacramento, OSHA standards apply just like anywhere else in the United States. There are a few numbers contractors toss around:

- The “4 foot rule” in excavation: at 4 feet of depth OSHA requires a safe way to get in and out of the trench, like a ladder.
- The “5 foot rule”: once a trench is 5 feet deep or more, it usually must be sloped, benched, or shored unless the soil is proven to be stable rock.
- The “3/4/5 rule for excavation” or “5 4 3 2 1 rule” that you sometimes hear in training are internal mnemonics companies use for ladder spacing, setback distances, or inspection intervals, not official code language.

So how deep can you dig without shoring? In practice, small trenches under 5 feet in stable soils may be allowed without formal shoring, provided side slopes are safe and a competent person has inspected the excavation. Once you go deeper, or if there is any doubt about stability, shoring, shields, or proper sloping are not optional.

Vacuum excavation does not bypass OSHA rules. If a worker enters the hole, the same trench safety standards apply. That said, vac excavation allows you to expose utilities from the surface without a worker climbing down, so many daylighting tasks never turn into an actual “trench” under OSHA.

How much can a vacuum excavation unit excavate in one hour?

Now to the other half of the question: how much can a vac ex excavate in a day, or in an hour, compared to *Sacramento Vacuum Excavation* that 20 ton excavator?

Production from a vacuum excavation truck depends heavily on:

- Whether it is hydro or air excavation
- Water pressure and flow rate
- Vacuum power and hose diameter
- Soil type and presence of cobbles or debris
- Travel distances to dump slurry or replace water

In typical Sacramento utility work with a hydrovac truck:

- Potholing and spot exposures often run 1 to 2 cubic yards per hour.
- Slot trenching in softer soils at shallow depth might reach 3 to 6 cubic yards per hour.
- In very hard clays or heavy gravels, production can drop below 1 cubic yard per hour.

Over a full shift, once you count drive time to the site, traffic setups, moving the truck, dumping, refilling water, and breaks, a realistic “per day” number might look like 10 to 40 cubic yards of excavation.

On straight trenching, with a good crew and favorable soil, some operators do better, especially when the trench is shallow and narrow. I have seen hydrovac units in loose river soils push 60 to 80 cubic yards in a long day. That is still a fraction of what a tracked excavator can move.

How deep can vacuum excavation go?

The limiting factors on depth for vacuum excavation are:

- Length of the excavation hose
- Suction lift capability of the blower or fan
- Practical reach of the boom and operator visibility

On most modern hydrovac trucks, digging down 15 to 20 feet is routine. With staged hoses and specialty setups, 30 feet or more is technically possible, but production drops as depth increases.

So when you ask how deep can vacuum excavation go, the practical answer for common field work is roughly 15 feet efficiently, 20 to 25 feet with planning, and deeper only for special cases with custom rigs.

Productivity comparison: Excavator vs vacuum excavation

In an open field with no buried utilities to worry about, there is no contest. A reasonably sized excavator out-digs a vacuum truck by at least an order of magnitude.

Here is a rough comparison in Sacramento-type soils, assuming competent operators and normal jobsite delays:

| Task type | 20 ton excavator (per hour) | Hydrovac truck (per hour) | |----------|----------|----------| | Bulk cut in open area | 60 to 120 cu yd | 5 to 10 cu yd* | | Utility trench in easement | 30 to 60 cu yd | 3 to 6 cu yd | | Precision potholing around lines | 10 to 20 cu yd equivalent | 1 to 3 cu yd |

*Most hydro units are not used for pure bulk cuts, but this shows scale.

The more congested your site and the higher the risk of line strikes, the more competitive vacuum excavation becomes. When a gas hit can shut down a block in Midtown or downtown and trigger fines, slower but safer starts to win the math.

What does excavation cost per hour in Sacramento?

Rates change with fuel prices, labor market, and insurance, but for planning:

- A 20 ton excavator with an experienced operator in the Sacramento area is often billed in the range of a few hundred dollars per hour, depending on contract structure, attachments, and whether it is a short-term or long-term engagement.
- A hydrovac or vacuum excavation truck with a two-person crew can run roughly double or more on an hourly basis, again depending on size, disposal arrangements, and travel.

Those higher hourly rates are what drive questions like how much does vacuum excavation cost, or how much does it cost for a vac excavation in Sacramento. For a small daylighting job, a half-day minimum is common, so it pays to stack your potholes together.

Hydrovac cost also ties to disposal. Slurry from hydro excavation is heavier and more expensive to dump than dry spoil from a bucket. Air-vac excavation leaves spoil dry and easier to reuse, which can bring the effective cost per cubic yard down on some jobs.

If you are asking how much to excavate 200 cubic yards, using rough numbers:

- Bulk cut with excavator, open site: that might be a small fraction of a day with one machine and one operator, plus trucks. Your cost per cubic yard stays low.
- Vacuum excavation: 200 cubic yards of hydrovac is several days of work even in good soils, with a higher hourly rate and higher disposal cost, so the per-yard cost is many times higher.

On urban projects, it is rare to do all 200 cubic yards with hydrovac. More often, you use vacuum excavation to expose utilities and tight spots, then finish the rest with conventional iron.

How much is a vacuum excavation truck or vac ex to buy?

For contractors weighing whether to own or hire, sticker shock is real.

- A new large hydrovac truck can easily cost as much as a small house, sometimes more, depending on tank size, blower type, and options.
- A used unit in good condition can still be a major capital purchase, often comparable to or above a mid-size excavator.
- A compact air-vac trailer unit costs less, but it also has lower production and capacity.

Likewise, how much is a vac ex to buy compared to a standard excavator? A new 20 ton excavator is typically significantly cheaper than a full-blown hydrovac truck. You can often own several mid-size excavators for the price of one large vacuum excavation truck.

That is why even large firms in Sacramento often sub out hydrovac work instead of owning a fleet, unless they have steady, high-volume utility work.

Training, certifications, and licensing

Operating a modern excavator or hydrovac truck is not just a matter of climbing in and pulling levers. The regulatory and training landscape matters when you are budgeting labor and schedule.

Excavator operator qualifications

There is no single nationwide “excavator license,” but employers and insurers expect:

- Proof of equipment training on that class of machine
- OSHA awareness training for excavation and trenching
- Site specific safety orientations

So when someone asks what certifications do you need to run an excavator, the practical answer in Sacramento is: employer documented training, OSHA training appropriate to the work, and sometimes union or apprenticeship credentials for public projects.

The highest salary for an excavator operator in busy markets can climb into six figures with overtime, specialized work, and strong experience. In more typical cases around Sacramento, a skilled operator earns a solid middle class wage with benefits, especially in union shops.

Is 50 too old to become a heavy equipment operator? Not necessarily. If you are fit, willing to learn modern safety practices and technology, and can pass the physical requirements, many companies value the maturity and caution that often come with age.

Hydrovac and trucking rules

Vacuum excavation trucks are heavy commercial vehicles, often with large water and debris tanks. That pulls in trucking regulations.

Is a CDL required for hydrovac jobs? Almost always yes, because hydrovac trucks typically exceed the 26,001 pound gross vehicle weight rating threshold. The driver needs a commercial driver’s license appropriate to the truck.

Do you need a tanker endorsement for a hydrovac truck? In many cases you do, because the water and slurry tanks can meet the regulatory definition of a tank vehicle, especially when carrying large volumes of liquid or semi-liquid loads. Local enforcement practices can vary, so Sacramento contractors usually err on the side of caution and require the endorsement.

The “7 3 rule in trucking” is a shorthand some drivers use for certain hours-of-service rest and break patterns, and those rules indirectly affect hydrovac productivity. If your driver has been on duty for most of the day before even reaching your site, your effective working window is shorter.

For vacuum excavation itself, what kind of training is required? At minimum:

- Manufacturer or vendor training on the specific unit
- Confined space and trench safety awareness
- Utility damage prevention practices, including 811 ticket processes

Many utility owners in Sacramento now require documentation that vac crews have completed specific locator and damage prevention training before working near their facilities.

Safety, OSHA, and excavation rules that actually matter

Contractors throw numbers around, but only some come directly from OSHA. When clients ask what are the 5 OSHA requirements for excavation, or what is OSHA's 3 most cited violation, they are usually trying to understand risk, not memorize rule numbers.

For excavation and trenching, the recurring themes in real citations include:

- Lack of protective systems (no shoring, shielding, or proper sloping in deeper trenches).
- Unsafe access and egress (no ladders within required spacing, or workers climbing on trench walls).
- Failure to provide a competent person to inspect the trench and soil conditions.

You will sometimes hear references to “rule 1413 for excavation” or a “35 foot rule” in training materials. Those usually come from either older standards, internal corporate rules, or from specific local ordinances. In practice, what matters is that a competent person on site understands current OSHA subpart P and any Sacramento or California specific requirements.

For both excavators and vacuum units, depth, soil, and water all matter. How deep can you dig without shoring or how deep can you excavate without shoring are not just productivity questions. On a wet winter day in loose fill, a 4 foot trench with steep vertical cuts can be more dangerous than a 7 foot trench in Sacramento Vacuum Excavation solid undisturbed clay that is properly sloped.

When to choose excavator vs vacuum excavation

If you ignore safety and utility damage risk, a tracked excavator looks unbeatable. Factor in the cost of a single gas strike in a busy Sacramento neighborhood, and the picture changes.

Here is a simple way many project managers in the region decide which tool gets priority:

1. Use vacuum excavation to daylight and verify all critical utility crossings in your alignment, including gas, electric, telecom, and water.
2. Once those are physically exposed and protected, use a conventional excavator to complete the majority of the trench or cut, slowing down only as you pass each known utility.
3. In extremely congested areas, near critical gas or electrical infrastructure, or where space is so tight that a bucket risks contact, complete entire sections with vac excavation even if the per-yard cost is high.
4. For large open areas, grading of pads, or mass balance work on a 10 acre site, use conventional heavy iron exclusively and bring in a vac unit only where you must.
5. Where environmental or tree protection requirements limit root disturbance, vac excavation often wins even when slower, because it can surgically remove soil while preserving roots.

That hybrid approach tends to keep both schedule and risk in balance.

Pricing and planning: getting realistic with numbers

Owners often frame questions in square feet instead of cubic yards. They ask what is the cost of 1000 sq ft of excavation or how much would it cost to excavate 10 acres of land. For production planning, you always need depth to convert area to volume.

A 1000 square foot footprint at 3 feet deep is 3000 cubic feet, or about 111 cubic yards. A rough rule of thumb with a 20 ton excavator on an easy site might be that you can knock that out well within a shift, often much faster, depending on loading and hauling constraints.

On 10 acres, the numbers explode. One acre is 43,560 square feet. Ten acres is 435,600 square feet. Even at a shallow 1 foot cut, that is over 16,000 cubic yards. Excavators and scrapers can handle that kind of volume. Vacuum excavation cannot. You would only bring vac rigs into a 10 acre job for specific utilities, not for the mass earthwork.

If you are trying to figure out how to price out excavating jobs in Sacramento, spend time on:

- Accurate volume takeoffs in cubic yards, not just square footage.
- Separation of “bulk move” yards (excavator work) from “high risk, utility dense” yards (vacuum and hand work).
- Mobilization and trucking realities, including how far you have to haul spoil and bring water for hydrovac.

The simplest starting point for many small contractors is to estimate your excavator work at a lower cost per yard and your vacuum excavation at a premium per yard or per hour, then explain clearly to the owner why the split exists.

A few edge questions and misconceptions

A lot of stray questions come up around excavation that are worth clearing up briefly.

What are the three types of excavators or four types of excavation? Textbooks sometimes slice and dice categories differently. In the field, operators talk more about machine size (mini, mid, large) and attachments than textbook types. For excavation work itself, people more often distinguish trenching, basement or pit excavation, mass grading, and specialty work like underpinning.

What is the most used excavator in general construction? In California light civil and utility work, mid-size tracked excavators in the 18 to 24 ton range dominate, because they are big enough for real production but small enough to move legally and get into most sites.

What is OSHA’s 3 most cited violation overall? Those change year to year and are often unrelated to excavation, so quoting a precise ranked list requires current OSHA data. For excavation, lack of protective systems and unsafe access to trenches are repeatedly high on the list.

Is it illegal to dig a hole in your backyard in Sacramento? Not inherently, but calling 811 before you dig deeper than a trivial depth is a good idea, and local ordinances or HOAs may restrict structures, retaining walls, or drainage changes. If you are near known utilities, failing to locate them can create legal and financial trouble.

Can I dig a trench with a pressure washer? People occasionally try to improvise hydro excavation with a pressure washer. It is messy, inefficient, and unsafe around utilities. Professional hydrovac units are engineered with specific nozzles, pressures, and flow rates, plus debris tanks and filtration. A hardware store pressure washer is not a substitute for either an excavator or a vac truck.

What is the 5 3 1 rule for labor, the rarest hour to be born, or how risky is vacuum delivery? Those belong in obstetrics, not on a Sacramento construction site. The only real overlap is vocabulary: both medical and construction worlds use the word “vacuum,” but the tools, risks, and rules could not be more different.

The bottom line for Sacramento projects

If you want a single sentence answer to how much does an excavator excavate in one hour versus a vacuum excavation unit:

- A mid-size excavator in good conditions can often move 30 to 100 in-place cubic yards per hour on real jobs.
- A hydrovac truck will more typically move 1 to 6 cubic yards per hour, trading speed for precision and safety.

Neither tool is “better” on its own. In Sacramento’s crowded underground environment, the best projects use both: vacuum excavation where a bucket is risky, and excavators everywhere else.

Understanding those production ranges, along with OSHA rules, truck licensing, and local soil behavior, lets you plan more realistic schedules, avoid utility hits, and choose the right iron for each part of the job.