

When a GC calls and asks, "How deep can vacuum excavation go on this Sacramento project?" What they really want to know is not just a number. They want to know where safety, soil, equipment, and budget intersect, and whether vacuum excavation is the right tool for their specific hole, trench, or daylighting work.

After years around hydrovac and air-vac trucks on Central Valley and Sacramento jobs, I can tell you the theoretical maximum depth is a very different thing from the depth you can hit productively and safely on a live site with traffic control, inspectors, and a schedule breathing down your neck.

This article walks through practical depth limits, the factors that really govern them, and how that plays into cost, production rates, and project planning in the Sacramento area.

## What is vacuum excavation, really?

Vacuum excavation uses high-pressure water or compressed air to break up soil, then a powerful vacuum to suck the spoils into a debris tank. It is designed to expose utilities and excavate in congested corridors without the tooth-and-bucket damage risk of mechanical digging.

Hydro excavation uses high-pressure water to cut and liquefy the soil, while air excavation (sometimes called air-vac or dry vac) uses compressed air to fracture the ground without adding water. Both fall under the general umbrella term "vacuum excavation."

On a typical Sacramento streetscape or utility job, you will see vacuum excavation used to:

- Daylight existing utilities prior to mechanical trenching
- Pothole for design verification and as-built checks
- Install small-diameter utility crossings in congested corridors
- Excavate in sensitive areas, such as near gas lines, fiber, or tree roots

The trucks that perform this work are often called hydrovac trucks or vac ex trucks. Modern units mount a debris tank, high-pressure pump or [Sacramento Vacuum Excavation Bess Utility Solutions Sacramento](#) compressor, boom, and blower or vacuum system on a heavy truck chassis.

That naturally leads to related questions clients often ask: Is a CDL required for hydrovac jobs? Usually yes, because most hydrovac trucks operate above 26,000 pounds GVWR, so the operator typically needs a CDL. Do you need a tanker endorsement for a hydrovac truck? Often you do, because you are hauling water to the site and liquid spoils away from it in a tank. That depends on local DMV interpretations and the actual tank configuration, so it is something to confirm by jurisdiction.

## Hydro excavation vs vacuum excavation: is there a difference?

People will phrase this a few different ways: What is the difference between hydro excavation and vacuum excavation? What are the limitations of vacuum excavation with water versus air?

The terms get used loosely, but in practice on Sacramento projects they usually break out like this:

### 1. Hydro excavation

Water at 2,000 to 3,000 psi (sometimes higher for stiff clays) is used to cut and liquefy soil. A large positive displacement blower and boom suck the slurry into the tank. Hydrovac cuts faster in compacted soils, but you

now have wet spoils to dispose of. In tight environmental windows or on projects with limited disposal options, that matters.

## 2. Air (dry) vacuum excavation

Compressed air breaks and fluffs the soil, which is vacuumed in a much drier state. It can be slower in hard or saturated soils, but you end up with dry spoils that can often be reused as backfill or stockpiled more easily. On certain utility specifications, air-vac is required right over the facility.

In casual conversation, "vacuum excavation" may mean either method, so you will hear people ask, "How much can a vac ex excavate in a day?" Or "How deep can you vacuum excavation?" Without specifying water or air. For depth and productivity, the distinction matters a lot.

## Sacramento soil and groundwater: the local reality

Depth potential is always local. "How deep can vacuum excavation go?" In Denver or Houston is not the same question as it is in Sacramento.

Around Sacramento, you commonly encounter:

- Loose fill and pavement sections in streets and parking lots
- Silty and sandy clays, sometimes fairly stiff with depth
- Occasional cobbles and buried debris in older neighborhoods
- Seasonal high groundwater, especially near levees, canals, and low-lying areas

In dry months, hydro excavation handles these soils well. In the wet season or after storms, saturated silts can turn to soup the moment water hits them. That immediately affects how deep you can go without the excavation wall sloughing or your hole flooding.

Groundwater makes air-vac less effective beyond moderate depths because the air tool struggles to move truly saturated soils, and the column of wet material in the hose gets heavier and harder to lift.

So while a brochure might tell you a hydrovac truck can excavate 30 feet or more, actual Sacramento job sites often run into practical limits at 12 to 18 feet for vertical holes, unless significant shoring, dewatering, and planning are in place.

## How deep can vacuum excavation go in theory?

On paper, depth is mostly governed by:

- Suction power and air velocity
- Hose diameter and internal friction
- Density and behavior of spoils in the hose
- Boom reach and articulation

Modern hydrovac trucks can lift spoils 25 to 30 feet vertically with reasonable production, and some specialized systems can go deeper by using booster systems or staging.

However, once you push past about 20 feet of vertical lift, production drops, clogs become more common, and every extra foot adds time and risk. You can technically vacuum from deeper excavations by running additional hose down into a shored shaft, but now you are in a combined operation: excavation plus pit construction, not a simple pothole.

For most contractors, the practical single-pass working range for vertical hydro vac holes is about:

- 6 to 10 feet deep for fast potholing and utility daylighting
- 10 to 15 feet deep for routine structural or utility excavations, with some shoring or benching thought involved
- Up to around 20 feet if you are prepared for slower production, more careful wall management, and heavier spoils columns in the hose

Air-vac operations tend to tap out earlier in Sacramento, often in the 8 to 12 foot range in anything but dry, well-graded soils.

## Safety rules that quietly limit depth

When a foreman asks, "How deep can you dig without shoring?" Or mentions the "4 foot rule in excavation," they are pointing at OSHA regulations that matter far more than the vacuum truck spec sheet.



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Under OSHA Subpart P, a few key thresholds change how you are allowed to dig:

- At 4 feet deep, OSHA begins to require a safe means of egress like a ladder within 25 feet of lateral travel. This is often referred to on site as the 4 foot rule in excavation.
- At 5 feet deep, a protective system (sloping, benching, shoring, or shielding) is generally required unless a competent person determines there is no potential for cave-in, which is rare in real practice. This threshold is one place people reference ideas like the 5 4 3 2 1 rule for excavation or the 3/4/5 rule for excavation, though those mnemonics vary and are often misunderstood.

- At 20 feet and deeper, protective systems usually have to be designed by a registered professional engineer or be based on tabulated data approved by one.

So the pragmatic answer to "How deep can you excavate without shoring?" In typical Sacramento soils is, rarely beyond 5 feet, and often less if the soil is loose, wet, or previously disturbed. Vacuum excavation does reduce the risk of a worker causing collapse with a bucket or pick, but the soil does not magically become safer just because a vacuum is involved.

If you are sending a worker into the hole for any reason, those OSHA rules apply, whether you are using a backhoe, an excavator, or a vac truck wand.

It is worth remembering that OSHA's 3 most cited violations in construction almost always involve some combination of fall protection, scaffolding, and ladders, but excavation hazards have a long, grim history on their own. A crew that fixes trench access and protective systems early in the planning phase avoids accidents and project shutdowns later.

## **Practical depth limits on Sacramento job sites**

Taking local soil, groundwater, and OSHA into account, a realistic depth picture for vacuum excavation around Sacramento looks like this:

- Utility potholing and daylighting

Most work stays in the 3 to 8 foot range. That is enough to confirm line depth and alignment for gas, water, sewer, or comms. At these depths, vacuum excavation is quick, precise, and typically does not require complex shoring, though you still follow ladder and access rules once a worker enters the hole.

- Service and lateral work

You might see hydrovac used to cut narrow trenches or pits in the 8 to 12 foot range for tie-ins, manhole connections, or valve vaults. Shoring or shields start to appear frequently, and production slows.

- Deep features

Going 12 to 20 feet deep with a vac truck is possible, for example tying into a deep sewer main or installing a deep pump station. At that point you are nearly always dealing with some protective system, possibly dewatering, and slower excavation. The vac truck spends more time moving heavier, wetter spoils, and every refill of the debris tank is a meaningful interruption.

Beyond 20 feet, vacuum excavation tends to shift from being the primary excavation method to being a supplemental one. A common pattern is to use hydrovac to safely daylight and expose utilities in the upper portion of the dig, then bring in an excavator or backhoe for bulk removal once conflicts are clearly seen and protected.

## **How much can a vac ex excavate in a day?**

The honest answer: it depends heavily on soil, depth, and what the inspector will accept.

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On relatively shallow potholing in cooperative soils, a good hydrovac crew around Sacramento can often achieve:

- 20 to 40 standard potholes per day, 1 foot by 1 foot by 4 to 6 feet deep
- Or the equivalent of roughly 10 to 25 cubic yards of spoil removed and hauled, depending on setup time and site congestion

Once you start chasing depth and larger volumes, production changes quickly. Digging a 100 foot trench 2 feet wide and 4 feet deep is about 30 cubic yards. If you ask, "How long does it take to dig a 100 ft trench with a vac truck?" You might hear anywhere from half a day to two days, depending on:

- How many utility crossings you have
- Whether you are allowed to dispose of wet spoils locally
- How far you must move the truck between setups
- Traffic control and lane closure constraints

For deeper work, it is not uncommon for a hydrovac crew to average only 5 to 10 cubic yards per hour, with that number dropping if the hose repeatedly plugs or if the hole needs frequent maintenance due to sloughing.

## How much to excavate 200 cubic yards with vacuum excavation?

Contractors often phrase this as, "How much to excavate 200 cubic yards?" Hoping for a quick budget number. That is a fair question, but the context matters.

On a vacuum excavation job, pricing commonly appears as:

- Hourly rate for truck and crew

- Disposal fees per load for spoils
- Travel or mobilization
- Possibly a per-hole or per-foot rate for unit-priced work

Hydrovac truck rates in California often fall somewhere in the \$300 to \$450 per hour range, sometimes more, depending on truck size, crew experience, and union or non-union status. So when someone asks, "How much does vacuum excavation cost?" Or "What does excavation cost per hour?" These are the sorts of figures they will hear.

On moderate-depth work, a rough planning figure for 200 cubic yards with hydrovac might look like 2 to 4 full working days of production, assuming 50 to 100 cubic yards per day, depending on conditions. That could put bare excavation costs in the \$5,000 to \$12,000 range before you add flagging, engineering, traffic control, or restoration. Production in saturated or very deep conditions can be half that, which doubles duration and cost.

A side question people raise is, "Why do you divide by 27 for cubic yards?" When you are doing quick field math for trench volume, you convert cubic feet to cubic yards by dividing by 27, because a cubic yard is 3 feet by 3 feet by 3 feet:  $3 \times 3 \times 3$  equals 27 cubic feet. So that 100 foot by 2 foot by 4 foot trench:  $100 \times 2 \times 4$  equals 800 cubic feet. Divide by 27, and you are just under 30 cubic yards.

## How to price out excavating jobs with vac trucks

Rigid price sheets rarely survive contact with a real site. When I walk a project to help price vacuum excavation, I pay closer attention to constraints than to the raw volume.

A simple way to structure your thought process is:

### 1. Identify the scope in units that matter

Is it 75 potholes at roughly 1 yard each? A 300 foot trench? One deep pit around a manhole? Once you have realistic dimensions, you can estimate cubic yards and compare them to typical vac ex production rates.

### 2. Classify soil and groundwater expectations

Is it compacted road base, native clay, imported fill full of junk, or saturated fine material? Is it better to dig when the ground is wet or dry? Vacuum excavation often performs better on slightly moist to firm soils than on bone-dry dust or pure slop. In Sacramento, I prefer shoulder seasons when the surface is not baked solid and you are not fighting standing water.

### 3. Factor safety and shoring needs

As soon as you get near or past the 5 foot depth threshold, you have to consider shoring, shields, or sloping. That adds labor and sometimes equipment rentals. The more time you spend making the hole safe for a worker, the fewer yards per hour the vac truck moves.

### 4. Check access and trucking

Is the vac truck parking in the street with a 20 foot hose run, or 150 feet away in a staging area? How long is the haul for spoils disposal? Can you get multiple loads out per day?

### 5. Align contract structure

Decide whether to bid hourly, per hole, per foot, or a hybrid. For uncertain utilities, hourly is usually safer. When the path is clear and repetitive, per-foot or per-hole pricing can reward efficiency.

Those same steps help a GC understand why one vac ex quote comes in higher than another. It is rarely just about the hourly rate. It is about how the contractor has mentally priced risk and production constraints.

## Depth vs equipment: when vacuum is not enough

There is a reason general contractors still love their excavators and backhoes. A good operator on a 20 ton excavator can move soil faster and more cheaply than any vacuum truck when the excavation is straightforward and clear of conflicts.

When someone asks, "What are the three types of excavators?" Or "What are the four types of excavation?" They are usually stepping back to think more broadly about choosing tools. On many Sacramento sites, you might see:

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- A standard crawler excavator for bulk digging in open areas
- A compact excavator for work in tight urban streets or backyards
- A hydrovac or air-vac truck for potholing and conflict zones

Mechanical excavation still dominates bulk work. A model like a Cat 320 is considered a roughly 20 ton [Sacramento Vacuum Excavation](#) excavator and is among the most used excavator sizes on commercial sites. If the question is, "How much does an excavator excavate in one hour?" The answer can easily be 100 to 200 cubic yards in soft, open ground, far beyond vac truck production.

Vacuum excavation shines where you have risk: gas mains under pressure, fiber bundles worth more than the house next door, unknown abandoned lines, or strict damage prevention requirements. Once those are exposed and protected, an excavator or backhoe can often take over for depth and volume.

So the true vacuum excavation depth limit on many Sacramento projects is set not by physics, but by where it stops making economic sense to keep the hydrovac as the primary tool.

## **Training, certifications, and crew skill**

Someone will occasionally ask, "What certifications do you need to run an excavator?" Or "What kind of training is required for vacuum excavation?" From a regulatory standpoint in the U.S., there is no single universal excavator or hydrovac operator license, but there are several layers:

- A CDL for driving the truck, often with a tanker endorsement if required
- Employer-provided training on the specific hydrovac or vac ex equipment
- OSHA-required training for excavation safety and competent person duties
- Sometimes union apprenticeship or local training programs

The safety and productivity of a vac crew depend heavily on the operator's feel for the wand, pump, and soil. A good operator in Sacramento learns to read the ground, adjust pressure for different soils, and manage the spoil column in the hose so you do not plug the line every 10 minutes.

Age questions come up more often than you might think. "Is 50 too old to become a heavy equipment operator?" Not necessarily. If you have the physical ability for climbing, hose handling, and long days, you can still learn the work. Hydrovac operations in particular reward patience and judgment more than brute strength.

On the pay side, people talk about "What is the highest salary for an excavator operator?" In busy markets, top operators with broad skills can sometimes earn well into the high five figures or low six figures annually, especially with overtime. Hydrovac operators with CDL and strong safety records sit in the upper tier of equipment operator pay scales.

## **Cost of owning and hiring vacuum excavation trucks**

The price tag of the equipment itself shapes the local market. When someone asks, "How much is a vacuum excavation truck?" Or "How much is a vac ex to buy?" They are ready for a gulp moment.

A new hydrovac truck with modern features often sits in the \$400,000 to \$700,000 range or more, depending on tank size, pump, blower, and chassis. That is why even larger contractors often rent or subcontract hydrovac work rather than buying outright. Ownership means heavy capital cost, maintenance, and the need to keep the truck busy enough that it does not just sit as an expensive billboard in the yard.

For project owners, the upside is that hiring a vac truck by the hour spreads that cost out. Instead of carrying the asset, you pay for the expertise and equipment only when you need it.

## **Depth planning checklist for Sacramento projects**

When you sit down with a set of plans and wonder how deep you can go with vacuum excavation on that Sacramento job, a short checklist keeps the conversation grounded:

1. Confirm expected utility depths and conflicts from records and locates.
2. Classify soil types and likely groundwater level along the alignment.
3. Decide where vacuum excavation is mandatory for safety or spec compliance, and where mechanical excavation can take over.
4. Map locations that will need shoring or shielding based on depth and soil conditions.

5. Estimate volumes in cubic yards and match them to realistic daily vac ex production rates.

Those five steps will usually answer your own question about maximum practical depth before you even call the hydrovac subcontractor. When you do make that call, you can have a much more precise conversation about how deep you are going, what protection you are planning, and how to phase the work.

## **Final thoughts on "How deep can you go?"**

Vacuum excavation is one of the safest and most precise ways to dig around live utilities in crowded Sacramento corridors. Under ideal conditions, a capable hydrovac truck can technically excavate 20 feet or more. In the real world, most meaningful work stays in the 4 to 15 foot range, with anything deeper requiring additional shoring, dewatering, and coordination.

If you treat vacuum excavation as a scalpel instead of a bulldozer, and you respect OSHA depth thresholds, you will find it an invaluable tool for de-risking your trenching and structure work. When you know how deep you can safely and economically go, choosing between vacuum and mechanical excavation on each segment of a project becomes a straightforward judgment call instead of a guessing game.