

If you are looking at a 100 foot trench and a vacuum excavator (Vac-Ex or hydrovac) is on the table, you are already ahead of many people. You are thinking about utilities, safety, and cost of damage, not just how fast a bucket can move dirt.

The question everyone asks first is simple: how long will it take?

The honest answer is that a 100 foot trench can take anywhere from a couple of hours of active excavation to more than a full day on site, depending on depth, soil, access, and how disciplined the crew is with setup and spoil handling. I have seen 100 feet at 2 feet deep completed neatly before lunch, and I have seen the same distance at 5 feet deep across a congested urban street drag into a second day because of utilities, traffic control, and disposal delays.

To plan it properly, you need to understand what vacuum excavation can really do, what slows it down, and how the safety and regulatory side shapes your choices.

What vacuum excavation actually is

Vacuum excavation uses high airflow and suction to pull loose soil and debris into a holding tank. The soil is typically loosened with either high pressure water (hydro excavation) or compressed air (air excavation). Many people use “vac ex” loosely for any truck with a big vacuum, but there are meaningful differences.

Hydro excavation cuts with water. A high pressure water lance breaks down the soil ahead of the vacuum hose, and the slurry is pulled into the tank. It is fast in tight, cohesive soils, and it slices cleanly around roots and utilities. The tradeoff is that you end up with slurry, which is heavier and usually more expensive to dispose of. It can also be messy if you do not control your water and spoil.

Air vacuum excavation uses compressed air instead of water. The air lance disrupts and aerates the soil, and the vacuum removes the loosened material. It usually leaves you with relatively dry spoil that can sometimes be reused as backfill, and disposal is simpler. In very hard, dry, or frozen soil, it can be slower than hydro, and it may struggle if the ground is heavily compacted.

When people ask “What is the difference between hydro excavation and vacuum excavation?”, this is usually the key: hydro cuts faster in tough soils but creates slurry, air is cleaner and more reusable but can be slower. Many modern vacuum excavation trucks can switch tools and use either method, which is why you will hear operators talk about “hydrovac” even when they are doing air excavation.

How deep can vacuum excavation go?

Most vacuum excavation work for utilities and small civil jobs stays within the first 10 feet. The limiting factors are:

- hose length and efficiency
- pressure loss in the water or air line
- spoil tank capacity and cycle time

Technically, you can excavate deeper than 10 feet. I have worked on projects where we daylighted utilities at 15 to 20 feet using long hoses and staged spoil tanks. Productivity drops significantly beyond about 12 feet because of hose friction losses and the practicalities of moving hoses and handling spoil.

When people ask “How deep can vacuum excavation go?” or “How deep can you vacuum excavation?”, my rule of thumb is:

For planning, assume efficient production to about 8 or 10 feet. Treat anything deeper as a special case that needs detailed planning, possibly shoring, and lower production rates.

How long to dig a 100 ft trench with Vac-Ex?

Let us get to the core question and then unpack the pieces.

Assume a straightforward job:

- 100 feet long
- 2 feet wide
- 3 feet deep
- mixed urban soil with some clay
- one or two known utilities in the corridor

With a mid sized hydrovac truck and a competent crew, [Sacramento Vacuum Excavation](#) I typically plan 6 to 8 hours on site for excavation plus a bit of cushion. In perfect conditions, active digging might only be 3 to 4 hours. The rest is setup, traffic control, utility locating, spoil management, and housekeeping.

To translate that into volume, that 100 ft by 2 ft by 3 ft trench is about 600 cubic feet. Divide by 27 to convert to cubic yards, and you get roughly 22 cubic yards of in place soil. Vacuum excavation production on a trench like this commonly runs between 6 and 15 cubic yards per hour of actual excavation, depending on soil and crew skill. That is how you land in the 2 to 4 hour active dig window.

For planning, I usually tell clients:

If everything lines up, a 100 ft trench at 3 ft deep with vacuum excavation is a one day job from rolling onto site to rolling off, including restoration prep. Complex traffic or heavy utility congestion can stretch that.

Core factors that control how long your 100 ft trench will take

Here are the big levers that move your schedule, in practical terms:

1. Soil conditions and moisture
2. Depth and width of the trench
3. Number and type of utilities
4. Disposal distance and rules
5. Crew experience and site setup

In loose sandy soil, hydrovac can chew through 20 cubic yards an hour with a good hand on the wand. In tight, dry clay or cobbles, I have seen production drop under 5 cubic yards per hour. If you are wondering whether it is better to dig a hole when the ground is wet or dry, the answer is nuanced. Slightly moist soil usually cuts better with hydro. Saturated, soupy material is a mess and slows everything. With air excavation, overly wet soil can clump and be harder to break up.

Depth matters because of both production and safety. A 1 foot deep trench for fiber can feel almost trivial; the same run at 5 feet deep multiplies the volume, increases safety requirements, and complicates spoil placement and access.

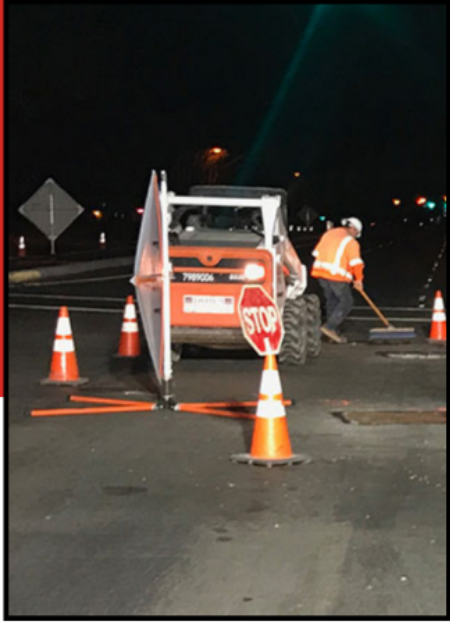
Utilities are the wild card. The entire reason many people choose vacuum excavation is to safely work around high risk utilities: gas, power, telecom. As soon as you are in a congested corridor, plan for stop and start digging,

constant potholing, and careful hand movement near lines. That can cut your linear feet per hour in half compared with clean ground.

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Spoil handling is often underestimated. If your dump site is 30 minutes away and your tank holds, say, 10 yards, you might need two or three disposal trips for a 100 foot trench. Each round trip can cost you an hour. On a short trench that can be the difference between finishing at 2 pm or chasing daylight.

How much can a Vac-Ex excavate in a day?

On a straightforward trenching job with no major surprises, a modern vacuum excavation truck with a two or three person crew might excavate anywhere from 30 to 80 cubic yards in a shift.

On pure volume, hydrovac in friendly soil can exceed 100 cubic yards per day, but most 100 foot trench jobs are constrained by layout, access, and utilities rather than raw production.

If you are pricing a job and wondering “How much does an excavator excavate in one hour?” versus “How much can a vac ex excavate in a day?”, remember that traditional excavators are far faster in open, greenfield conditions. A 20 ton excavator like a Cat 320 (yes, that is roughly a 20 ton class excavator) can move dozens of cubic yards per hour under good conditions. Vac-Ex shines when the risk of a utility strike, the need for precise trenching, or the site constraints make conventional digging a liability.

On a 100 foot trench in a city street, you may well get more real progress in a day with vac than with a tracked excavator, because the vac truck can slot into a narrow lane, spoil directly into its tank, and avoid the constant interruptions that come with hand digging around utilities or repairing accidental damage.

Safety rules that shape your trench plan

The time and method you choose for your 100 foot trench are not only about production. They are anchored in regulatory requirements, especially OSHA in the United States.

Some commonly cited rules and ideas come up often on site:

The “4 foot rule” in excavation refers to egress. If a trench is 4 feet deep or more, OSHA requires a safe way to get in and out, such as a ladder, within 25 feet of lateral travel. That means even on a 100 foot trench at 4 feet deep, you will need multiple access points.

“How deep can you dig without shoring?” or “How deep can you excavate without shoring?” is another frequent question. OSHA generally requires a protective system (sloping, benching, shoring, or shielding) at 5 feet deep and deeper, unless the excavation is entirely in stable rock. That is why larger vacuum excavations and deeper trenches need more than just a clean cut; you need either a compliant slope or a trench box or engineered system.



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The “19 inch rule” is related to ladder rungs and steps. OSHA does not allow vertical distance between ladder rungs or steps greater than 12 inches in most cases, and platforms or breaks in ladders cannot be spaced more than 30 feet apart. In excavation training, people sometimes use “19 inches” informally about maximum step height or similar, but it is best to go back to the actual OSHA ladder regulations for the exact dimension that applies.

The “5 4 3 2 1 rule for excavation” and “3/4/5 rule for excavation” are not formal OSHA rules. They are mnemonics some trainers use to remember common requirements, like:

- 5 feet - need for protective system
- 4 feet - need for egress
- 3 feet - spoil setback

- and so on

Since these memory aids are not universal, I always tell crews to refer to the current OSHA excavation standard (29 CFR 1926 Subpart P) rather than rely on a slogan. When people mention “rule 1413 for excavation”, that is likely a reference to a local or corporate standard, not a section in OSHA’s excavation rules.

Vacuum excavation helps with safety because you are less likely to undermine trench walls aggressively, and you can daylight utilities with less risk. That does not remove the need for protective systems or safe egress. The soil does not know you used a wand instead of a bucket.

When people ask “How deep can you dig without shoring?” in the specific context of vacuum excavation, my advice is: do not treat vac as a magic exemption. Apply the same depth and soil considerations for protective systems. If you end up with people entering a cut deeper than 5 feet, bring in proper shoring or shielding.

OSHA’s three most cited violations fluctuate year to year, but fall protection, hazard communication, and ladders routinely top the charts. Trenching and excavation violations also feature heavily because collapses kill quickly. If your trench plan ignores access, spoil placement, and sloping or shielding, it does not matter how neat your vac work looks.

Training, certifications, and truck requirements

Vacuum excavation sits at the intersection of trucking, construction, and sometimes environmental work. That has implications for staffing and planning.

For the truck itself, “Is a CDL required for hydrovac jobs?” is usually answered yes. Most hydrovac or vacuum excavation trucks exceed 26,001 pounds gross vehicle weight rating, which means a commercial driver’s license is required. The exact class of CDL can vary with size and combination.

“Do you need a tanker endorsement for a hydrovac truck?” is a nuanced one. In the U.S., a tanker endorsement is required when you are transporting liquid or gaseous materials in permanently mounted or portable tanks of certain capacities. Some hydrovac operations meet that definition, especially when they carry significant volumes of slurry. Many operators do carry a tanker endorsement to stay on the safe side and meet employer or insurer requirements.

“What kind of training is required for vacuum excavation?” Typically you see:

- CDL training and licensing for the driver
- confined space, trenching and excavation safety training
- task specific training on the hydrovac or vac ex unit (manufacturer and employer led)
- utility locating and safe digging practices, including “call before you dig” processes

Formal “What certifications do you need to run an excavator?” type requirements depend on jurisdiction. OSHA in the U.S. Requires that employers ensure operators are competent through training and evaluation. Some cities, unions, or large clients require third party operator cards or internal certifications.

From a career perspective, “Is 50 too old to become a heavy equipment operator?” Not inherently. I have seen people start in their 40s and 50s and do well, particularly if they bring prior construction or trucking experience. Hydrovac and vac ex work can be physically demanding, so fitness and willingness to learn matter more than the date on a birth certificate.

“The highest salary for an excavator operator” varies widely by region and sector. Union hydrovac operators on industrial sites in high cost regions can clear six figures with overtime. Municipal or small contractor operators

might see much more modest ranges. Specialized skills and clean safety records are what move you to the higher end.

Equipment cost: buying and operating a vac ex

If you are wondering “How much is a vacuum excavation truck?” or “How much is a vac ex to buy?”, recent market ranges (which fluctuate with specs and region) look roughly like this:

- smaller trailer or skid units can run in the tens of thousands of dollars
- full size hydrovac trucks with large spoil tanks and robust pumps usually land somewhere in the low to mid six figures, often between 300,000 and 600,000 USD, and sometimes more for top of the line builds

Operating costs are significant. You are running a large diesel engine, high pressure pumps or compressors, and heavy duty blowers. That means high fuel consumption, meaningful maintenance, and disposal fees on top of labor. That is why “How much does vacuum excavation cost?” or “What does excavation cost per hour?” usually has a higher sticker price than a conventional excavator and dump truck, but that cost needs to be viewed against the risk of utility damage and the productivity in sensitive areas.

For a hydrovac truck with a competent crew, hourly rates in many North American markets range from around 200 to 400 USD per hour or more, depending on region, scope, and any included traffic control or disposal. Some firms price by the day, some by the hour, and others by the cubic yard.

When someone asks “How much to excavate 200 cubic yards?” using vacuum excavation, a quick ballpark method is:

- estimate production at, say, 20 to 40 cubic yards per day for a congested utility corridor, or 60 to 100 yards per day in favorable conditions
- translate that into crew days
- multiply by your blended daily cost or market day rate
- add disposal, traffic control, and restoration as separate lines

That is how seasoned estimators approach “How to price out excavating jobs” with vac ex: by volume, adjusted for risk and productivity, not by a simplistic linear foot rate.

How much does it cost for a vac excavation on a 100 ft trench?

For a 100 foot trench, vacuum excavation cost will generally reflect minimum mobilization and daily rates more than volume. You might only remove 20 to 30 cubic yards of material, but you still need to bring a 6 figure truck, a crew, and possibly traffic control.

On a real job, for planning purposes, I tend to think in ranges:

- a straightforward 100 ft trench in accessible ground with modest depth might come in at the low end of a one day hydrovac rate, especially if combined with other work on the site
- a tricky 100 ft run across a busy street, with full traffic control, multiple utilities, and off site disposal at a premium facility can cost several times that

“What is the cost of 1000 sq ft?” in excavation terms is another way people try to simplify estimates. For trenching, square footage is less helpful than cubic yards and context. A 1000 square foot shallow scrape is not equivalent in cost or risk to a 1000 square foot deep cut alongside a gas main.

If you want to compare vac ex with a conventional excavator plus hand digging, you have to include the cost of utility locates, hand exposure, slower progress near services, and the potential delay and liability of a strike. When you factor those in, vacuum excavation often looks less like a luxury and more like insurance.

Practical limits and when vac ex is not ideal

Vacuum excavation is not always the right tool. It has real limitations.

In remote greenfield sites where there are few buried utilities, a traditional excavator is faster and cheaper for mass excavation. If you ask "What's stronger than a bulldozer?" in terms of pure earthmoving, think large excavators, scrapers, and off road trucks. Vac ex simply cannot compete on bulk.

On rocky ground with large cobbles or boulders, air excavation can be painfully slow. Hydro can help, but there comes a point where you are just washing rocks and spending money.

On very long runs, such as asking "How much would it cost to excavate 10 acres of land?" with vac ex, the answer is almost always, do not. Use loaders, dozers, excavators, and scrapers. Vacuum excavation belongs where risk, access, or required precision outweigh sheer volume.



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You also run into disposal issues. Slurry from hydro excavation is heavy and sometimes requires solidification or special handling. If your nearest disposal site is far away or has strict rules, that can dominate your cost and schedule.

Finally, vacuum excavation still requires good planning and safe practices. Some people treat a vac truck as a magic wand. They skip basic trench rules, ignore soil classification, pile spoil right at the edge, or let people climb in and out without proper egress. The soil does not care that you used a fancy truck. It will still collapse if you push your luck.

A brief digression: “vacuum delivery” and other confusing phrases

Occasionally, especially in general search analytics, terms like “Is vacuum delivery painful?” and “How risky is vacuum delivery?” crop up alongside vacuum excavation queries. That is because “vacuum delivery” also refers to assisted childbirth using a vacuum device to help deliver a baby. That medical topic is entirely different from hydrovac or vac ex work, and the risks and pain questions there belong with obstetric professionals.

Similarly, “What is the rarest hour to be born?” and the “5 3 1 rule for labor” relate to childbirth, not excavation. They sometimes appear near excavation topics because of broad keyword scraping, but they have nothing to do with trenching.

Treat those as noise if you are focused on planning a trench.

Related excavation questions that come up on trench jobs

On site, discussions often wander to broader excavation topics.

“What are the three types of excavators?” is one way people classify equipment: usually tracked excavators, wheeled excavators, and mini or compact excavators. Others classify by function instead: standard, long reach, and specialty machines.

“What are the four types of excavation?” is another common categorization: earth excavation, rock excavation, muck excavation, and unclassified excavation. For trench planning, you mostly care whether your material is easy earth, reinforced rock, or some messy mix like saturated muck.

“What is the most used excavator?” depends heavily on region and sector. Globally, 20 ton class tracked excavators are the workhorses of construction. On urban utility jobs, you see more mini excavators and vac ex units because of access and utility congestion.

“Is it illegal to dig a hole in your backyard?” usually has a simple answer: you are generally allowed to dig on your property, but local bylaws, easements, and one call requirements still apply. You can be held liable if you damage utilities or violate local codes, even on your **Sacramento Vacuum Excavation** own land.

“Can I dig a trench with a pressure washer?” comes up surprisingly often. A standard consumer pressure washer does not have the flow, pressure, or safety systems to be used as a hydrovac lance. You might blast some soil loose, but you will not get controlled, efficient excavation, and you could injure yourself or damage property. Proper hydrovac uses industrial pumps designed for that purpose, with trained operators and integrated vacuum systems.

The “35 foot rule” sometimes gets mentioned around overhead lines: maintain minimum clearance from energized conductors, which varies with voltage. Exact distances are specified in electrical safety standards. For trench work, especially with boom trucks or excavators, you need to know those clearances. Vacuum trucks can also run afoul of overhead lines when positioning booms, so do not ignore them.

The “7 3 rule in trucking” refers to a split sleeper berth arrangement under U.S. Hours of service regulations. Drivers can split their off duty time into 7 and 3 hour blocks under certain conditions. If your vac ex crew is also doing long haul driving, those rules matter for how long they can legally operate the truck on a given day.

Quick planning checklist for your 100 ft vac ex trench

To bring this back to your immediate goal of a 100 foot trench, here is a concise checklist that lines up with real world planning:

1. Define trench size: length, width, and depth, and convert to cubic yards (divide cubic feet by 27)
2. Identify utilities and constraints: one call tickets, as built drawings, likely congestion, overhead lines
3. Choose method: hydro versus air, or a combination, based on soil and disposal options
4. Confirm safety controls: shoring or shielding needs, spoil setback, egress every 25 feet if depth $\geq$ 4 ft
5. Lock in logistics: vac truck capacity, disposal site, traffic control, crew skill, and realistic production rate

If you run through those five points honestly, you can estimate how long your 100 ft trench will take within a reasonable margin and choose whether vacuum excavation is the right tool.

For many urban and industrial trenches, especially around critical utilities, the answer is yes. You may pay more per hour, but you often gain a safer site, a cleaner cut, and fewer expensive surprises. For wide open fields and deep, long cuts with no utilities, you will likely lean on conventional excavators, dozers, or even scrapers instead.

Either way, the 100 ft number is just the start. The real story is in depth, soil, utilities, and how seriously you take safety and planning.