

groundWorks

Player guide / 0.15.0

Dig with vanilla tools. Plan a full footprint. Frame and secure underground spaces.

Mod ID: groundWorks

Declared game minimum: 42.20.3

Required dependencies: none

10 construction presets / 4 directions

Optional equipment integration APIs

Lua alone or optional enhanced visibility

All gameplay works through Lua alone. The optional FJL companion adds local cutaways and keeps the nearby surface visible while underground. Requires FJL 0.3.4+ and PZ 42.20.4 for enhanced rendering. Foreground structures, lighting and extreme depth can still affect visibility.

groundWorks is a standalone Project Zomboid Build 42 excavation and construction mod using vanilla tools and materials. Mod ID: groundWorks. The Lua mod declares 42.20.3 or later. No other mod is required. CAT Construction is optional.

Two rendering modes

Lua alone: all digging, preset construction, framing, collapse, deeper floors, backfill, routes and equipment APIs remain available. Vanilla visibility applies: upper levels hide while underground, and small openings can conceal occupants from above.

Optional FJL: the included client companion adds a local cutaway around GroundWorks excavations, reveals lower contents and retains the nearby surface view while underground. Real ground and collision remain intact outside the excavated footprint. No ZombieBuddy or PeekAView dependency is added.

Use Faded's Java Loader **0.3.4 or newer**, enable GroundWorks and restart the game. The companion currently targets **PZ 42.20.4 / Java 25**. FJL discovers the included JAR automatically. On a completely new profile, run the game once so it writes its version file, then restart. Unsupported versions or missing hooks fall back to vanilla rendering.

The GroundWorks sandbox setting **Enhanced excavation visibility (optional FJL)** turns the enhancement off or on. Without FJL it has no effect. The server still runs the Lua gameplay; the Java companion is client-only. Removing the companion does not remove excavations or alter the save format.

This is a terrain cutaway. Foreground structures, railings, trees, covered rooms, darkness and very deep camera framing can still affect visibility. Covered basements need a light source. Full two-client multiplayer gameplay remains untested.

Start a trench or basement

1. Carry a usable shovel, pickaxe, hand shovel or suitable hoe. Tool speed varies. A normal shovel supplies half the work needed to excavate one initial level per action.
2. Right-click a clear ground-floor tile and choose the groundWorks excavation option. Choose trench, moat, grave, open pit, basement, burn pit or foundation.
3. Basements support natural ground outdoors and a clear ground-floor access tile inside an existing house. Dig that first opening, enter it, then use a basement preset to expand below the house. Additional indoor columns preserve the house's original floor and objects above them. Existing underground rooms, occupied excavation spaces and unrelated underground objects remain protected.
4. Use the climb-into/climb-out context actions to enter and leave. A clear landing is required. The preset system does not automatically add a walk-in ramp, ladder or permanent stairs.
5. Use **Dig deeper** to extend an empty column. Floor and perimeter geometry is generated as excavation proceeds downward. A player-built cover is preserved; use your stairs or an uncovered access opening afterward.

Build and secure a preset

Stand inside an unfilled groundWorks trench, moat or basement. Right-click and choose **groundWorks Construction** to open this mod's construction panel.

Choose a recipe and north, east, south or west. Your occupied underground tile is the anchor. **Preview footprint** displays the complete floor area and its bare wooden framing; blue marks the anchor. The normal building-rotation key changes direction. Left-click confirms the preview, and right-click or Escape cancels it. Remain at the anchor while the work action runs.

The action excavates missing columns to the builder's current depth and frames the perimeter at every excavated level. Existing columns must match the recipe's type and depth. An already excavated footprint requires less digging time. Existing intact perimeter frames reduce the new materials needed. Missing tools/materials are shown in the panel and prevent completion.

Recipe	Directions	New planks / loose nails per level, with no existing frames
Trench 1 x 3	N, E, S, W	16 / 16
Trench 1 x 5	N, E, S, W	24 / 24
Trench 1 x 7	N, E, S, W	32 / 32
Moat 2 x 3	N, E, S, W	20 / 20
Moat 2 x 5	N, E, S, W	28 / 28
Moat 2 x 7	N, E, S, W	36 / 36
Basement 3 x 3	N, E, S, W	24 / 24
Basement 3 x 5	N, E, S, W	32 / 32
Basement 5 x 5	N, E, S, W	40 / 40
Basement 7 x 7	N, E, S, W	56 / 56

Each new perimeter edge consumes **two planks and two loose nails**. Multiply the table by depth when no supports already exist. Carry a digging tool and usable hammer. Materials can come from carried inventory/containers or loose planks and nails on the ground within a **3 x 3 area around the builder at the same underground level**. Stockpile on an already excavated floor, including your anchor, before a large build. Unpack nails boxes. Unrelated placed objects and occupied/new excavation space remain protected.

Finished walls use vanilla bare carpentry frame sprites. They secure the excavation while the complete required frame set remains intact. They are not finished house walls, waterproofing, furnished rooms or guaranteed native indoor-room metadata. Dismantle an old frame before an expansion would turn it into an internal obstruction.

Collapse

Collapse applies to unsecured trenches, moats and basements. Both collapse and fatal collapse are enabled by default. Default base risk is 0.01 per game hour, multiplied by **column depth**. The authority checks loaded columns once per game minute; unloaded time does not accumulate catch-up risk.

Intact required framing prevents collapse. Breaking/removing a required frame reintroduces risk. A frame outside the loaded world is not treated as destroyed. Existing unframed excavations from an older version have no support protection.

An overhead house floor or player-built cover does not replace framing. The floor or cover and objects above it stay intact during collapse.

A collapse seals the affected column at the original surface. With **CollapseKills** enabled, players in that column are killed. With it disabled, players move to a clear surface landing; if no safe landing is available, collapse is deferred. Items, corpses and unrelated underground objects remain underneath the cap. A collapse is recorded once and cannot repeatedly kill new occupants. No player recovery/re-excavation action for a collapsed column is currently supplied.

Other excavation types and contents

Type	Maximum depth	Supported fill / contents
Trench	4	People, items, soil, water
Moat	4	People, items, soil, water
Grave	4	People, items, bodies, soil, concrete
Open pit	8	People, items, bodies, soil, concrete
Basement	8	People, items, bodies, soil, concrete
Burn pit	4	People, items, bodies, soil, petrol and ignition
Foundation	8	Soil or concrete fill

- **Backfill:** use loose excavated soil with a digging tool, or dirt from a vanilla dirt bag. A completed level can fill an empty sack you carry, deducting soil from the loose supply. Clear occupants, items, corpses and placed objects before normal backfill. Closing an indoor column restores its original ground-floor sprite.
- **Concrete:** use `Base.BucketConcreteFull`; each pour consumes one use. Powder/plaster are rejected. Completed solid-fill levels raise the floor; full fill closes the surface.
- **Water:** trenches/moats accept pure water from vanilla fluid containers, up to one litre per action. Water is an appearance and content ledger. There is no automatic river-fed/rain filling, flowing water, swimming, drowning or drinking from the excavation.
- **Burn pits:** add pure petrol, then use a lighter or matches. Ignition uses native fire. Extended fire spread and corpse burning are not accepted by the current review.
- **Items and bodies:** supported open cavities move dropped contents to the cavity floor and update their ledger on removal. Covered cavities do not pull objects through a player-built floor.

A partly filled column cannot be deepened or included in framing work. No hand action currently drains water or removes cured concrete.

Paths, roads and surface wear

The groundWorks context menu supports **Start gravel path**, **Start concrete road**, **Supply route material** and **Build route** on suitable clear ground-floor tiles. Supply materials and perform work until the route completes.

- Gravel path: two gravel-bag uses and 100 work units per tile.
- Concrete road: four gravel-bag uses, four full-concrete-bucket uses and 250 work units per tile.

These are material uses, not necessarily whole bags/buckets. Vehicles are optional for built-in hand routes. Surface wear tracks players, animals, occupied vehicles and unoccupied vehicles, with configurable recovery.

Optional construction mods

CAT Construction is optional. Load groundWorks before `CATConstruction`. Existing provider registrations remain, and new server APIs let equipment mods excavate preset footprints without framing them. Players must enter and secure machine-dug spaces afterward.

The desktop CAT build has not been wired into the new preset construction menu. Equipment mods must call the new APIs from their own vehicle controls, timing and fuel logic. Exposed APIs do not mean a new CAT preset button or complete

machine gameplay is included.

Optional adapters exist for weatherWorks precipitation exposure, itjustWorks heavy-object capability inspection and CAT/experienceWorks vehicle manuals. They remain inactive when their owning mods are absent; none is required for normal digging/framing.

Sandbox and installation

Setting	Default
EnableFJLVisibility	true; only active with the optional companion
EnableHandExcavation	true
EnableCollapse	true
CollapseKills	true
CollapseChancePerHour	0.01
EnableAnimalTraffic	true
EnablePlayerFootTraffic	true
EnableVehicleTraffic	true
EnableUnoccupiedVehicleTraffic	true
WearRecoveryPerDay	0.05
EnableLiveOpenPit	false; separate admin/development convenience

For local installation, put the package's Contents\mods\groundWorks folder under %UserProfile%\Zomboid\mods\groundWorks, then enable groundWorks.

```
Mods=groundWorks
WorkshopItems=YOUR_GROUNDWORKS_WORKSHOP_ID
```

With CAT, use Mods=groundWorks;CATConstruction and the corresponding published Workshop IDs. Replace placeholders only when actual IDs exist. A staged folder/ZIP is not a Workshop ID.

Verification scope

See REVIEW.md and native-acceptance.json for the exact tested modes, saved-world checks and visual limits. Earlier Lua tests cover the construction and collapse systems; the hybrid adds its own native rendering and fallback checks. Java availability does not imply a new CAT preset-menu integration.

Optional FJL view in the game

Looking into an open basement from the surface.



Standing inside the basement, with the nearby surface still visible.



Native PZ 42.20.4 examples. Foreground structures and extreme depth can still affect the view; covered basements need light.