

Digger

Tutorial · 0.1.0

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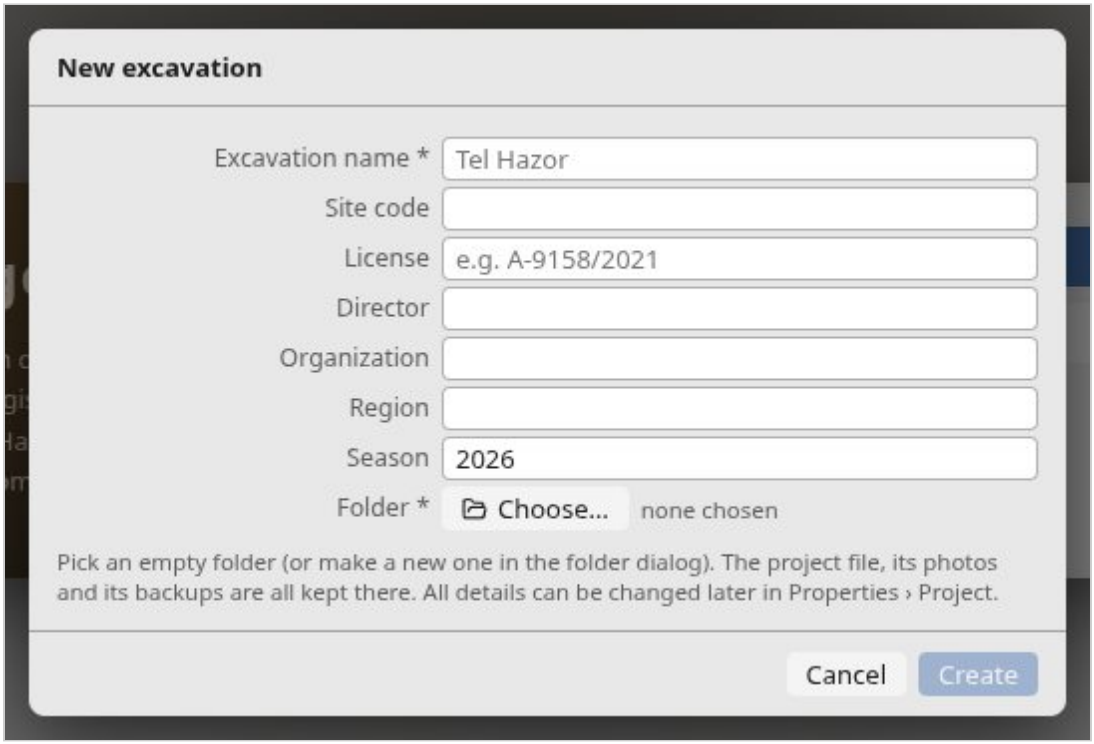
25. Settings, saving and backups

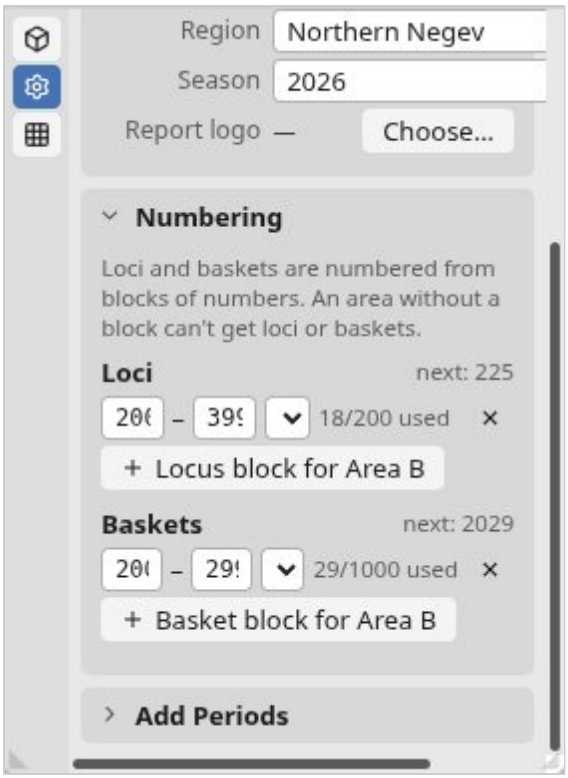
1. Start a project

Digger keeps each excavation in one project file, with its photos and backups in folders beside it. Everything is saved as you work: there is no Save button to remember.

1. Choose **File › New Project…**. Fill in the excavation's details (name, site code, licence, director, organisation, region, season) and pick an empty folder. The details can be changed later in **Project Settings**.
2. Choose the recording method: **Locus** (the site, area, square, locus and basket system) or **Context** (single-context recording, experimental). The method is fixed once the project exists. This tutorial describes the Locus method; a Context project has its own tutorial.
3. Give the first area a name when asked. Every locus, basket, photo and diary day belongs to an area, and each area works like a separate excavation inside the file.
4. Set the number blocks: open the gear tab in **Properties**, then **Numbering**. Add one block for loci and one for baskets, for example 100–199 and 1000–1999. New loci and baskets take the next free number from the working area's block, and Digger can't number new records until the area has one. When a block is used up, add another.
5. Set up the squares with **Edit › Site grid (squares)…**: square size, number of columns and rows, how they are labelled, and the south-west corner (the origin).

To open an existing excavation, use **File › Open Project…** or double-click its file. Each version of Digger opens only its own project files.





2. Find your way around

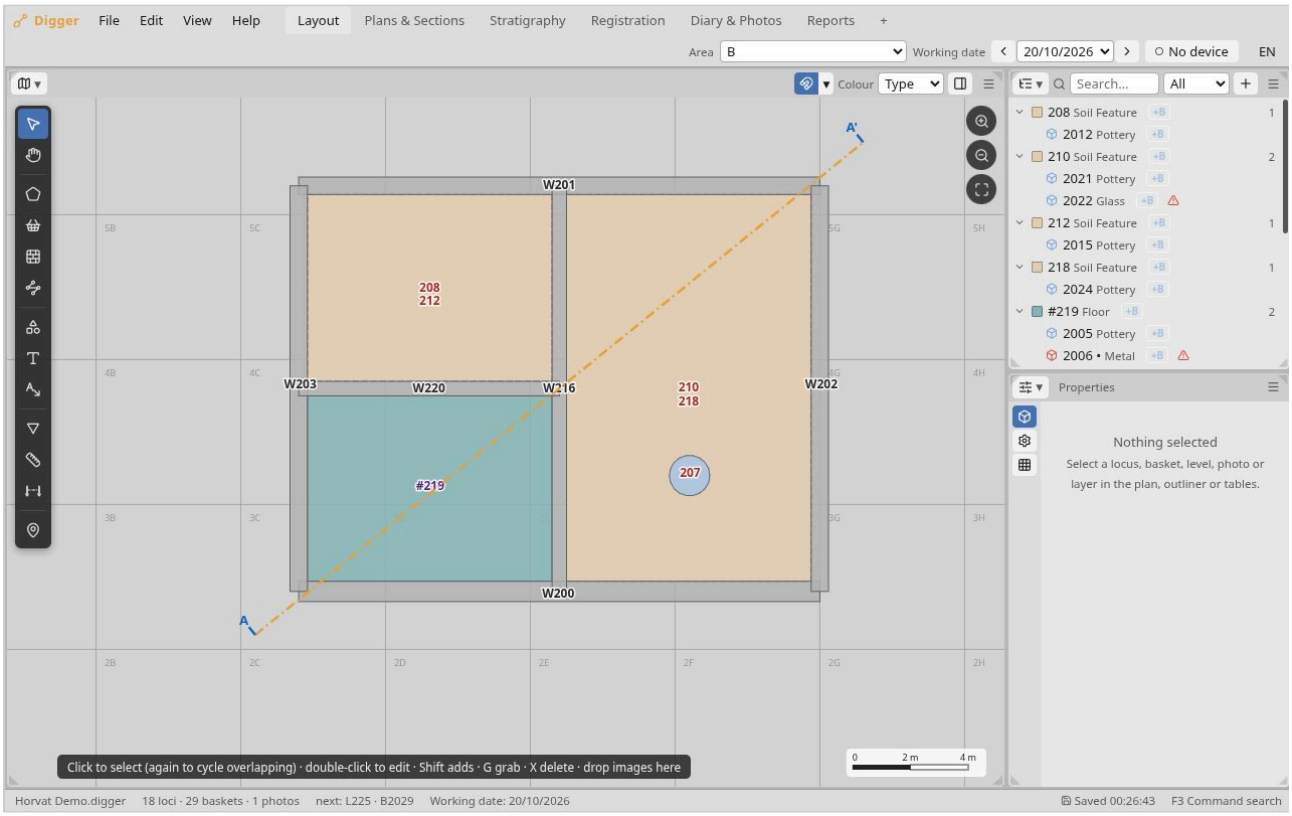
The tabs along the top are ready-made workspaces: **Layout**, **Plans & Sections**, **Stratigraphy**, **Registration**, **Diary & Photos** and **Reports**. Each workspace is a window split into areas, and every area can show any panel.

- **Change what an area shows:** click the menu at the top-left of the area and choose another panel.
- **Resize:** drag the border between two areas.
- **Split or join:** drag an area's corner inwards to split it, or outwards over a neighbour to join them. While dragging a border, press S to split there instead.
- **Area menu:** ☰ at the top-right of an area (or right-click its header) splits, swaps, maximizes or closes it.
- **Maximize:** Ctrl+Space fills the window with the area under the mouse; press it again to go back.
- **Workspaces:** Ctrl+PgUp and Ctrl+PgDn move between tabs. **View › New workspace (copy of current)** adds your own, and **View › Reset Layouts** brings back the standard ones.

The bar at the top also holds:

- **Area:** the working area. Everything you see and record belongs to it. The list also creates a new area, imports one from another file, or opens the area's details.
- **Working date:** the day you are recording (see the next chapter).
- **Devices:** the phone link and surveying instruments.

The status bar at the bottom shows the file, how many loci, baskets and photos the area has, the next free numbers, and the last message. Press F3 (or Ctrl+K) to search every command by name.



3. Keyboard shortcuts

Digger has a key for almost everything. **Help › Keyboard shortcuts** shows the full list at any time.

- **F3 or Ctrl+K:** search every command.
- **Ctrl+Z / Ctrl+Shift+Z:** undo / redo.
- **Ctrl+S:** save (saving is automatic anyway).
- **Alt+← / Alt+→:** previous / next excavation day.
- **Ctrl+B:** new basket in the selected locus, with the locus's outline.
- **Ctrl+Space:** maximize the area under the mouse.
- **Ctrl+PgUp / Ctrl+PgDn:** previous / next workspace.
- **Ctrl+,:** settings.

On the plan:

- **Q** select, **D** draw locus, **B** draw basket, **W** wall, **E** or **Tab** edit vertices, **K** knife, **P** stone or polygon, **T** text, **L** move labels, **H** heights, **M** measure, **S** section.
- **D again** switches between outline, round locus and fill; **B again** between outline, round basket and coin.
- **Shift+B:** a basket tracing its parent locus.

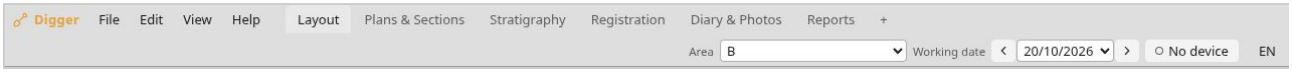
- **G:** grab and move the selection (click to place, Esc to cancel). **X** or **Delete:** delete the selection.
- **A:** select all loci shown. **Home:** frame everything. **.** (full stop): frame the selection. **N:** the plan's sidebar.
- **Enter, right-click or double-click:** finish a drawing. **Backspace** or **Ctrl+Z** while drawing: remove the last point. **Esc:** cancel.
- **Shift+Tab:** snapping on or off. **Ctrl** while drawing: invert snapping for that point.
- **Wheel:** zoom. **Middle button or Alt+drag:** pan.

4. Work through the days

Each day of digging is an excavation day. The working date matters everywhere: new loci, baskets and heights get it, and the plan shows the loci that are open on it.

1. To start a new day, open the date list in the top bar and choose **+ Add day…** at the top. Pick the date on the calendar, or type it and press Enter.
2. Move between days with the arrows beside the list, or Alt+← and Alt+→. The list holds every day that has records, plus the days you added.
3. A day added by mistake, with nothing recorded on it, can be removed with **Edit › Remove this excavation day (nothing recorded on it)**.

Going back to an earlier day shows the excavation as it was then: loci opened later are not drawn yet, and loci closed earlier have gone. A closed locus leaves the plan after its closing date. To keep one that is still in the ground, such as a wall or floor, press **Always show** in its properties.



5. The plan

The plan is where most recording happens. The tools are on the shelf at its left edge, one button each. The bar above the plan shows the options of the tool in use, and the round buttons at the top-right zoom in, zoom out and frame everything.

Move around with the mouse wheel (zoom) and the middle button or Alt+drag (pan). Home frames the whole excavation and **.** (full stop) frames the selection. Double-clicking a locus, basket or section in the **Outliner** centres the plan on it.

The **Colour** list above the plan colours loci by **Type**, **Phase** or **Period**. Colouring by phase or period shows a legend at the top right; click a colour in it to choose your own.

Select (Q)

Click anything on the plan to select it and see it in **Properties**. Where items overlap, click again to cycle through them, lowest number first. Shift+click adds to the selection, and A selects every locus shown.

- **G** moves the selection: move the mouse, click to place it, or Esc to cancel.

- **X** or **Delete** deletes it, after asking. Deleting a locus keeps its baskets.
- **Double-click** a drawing to edit its corners; double-click a text label to change its text.
- **Right-click** opens a menu for what is under the mouse (see "The plan's right-click menu").

Pan

The hand moves the plan with the left button, for when no middle button is at hand. Every other tool also pans with the middle button or Alt+drag.

Draw locus (D)

Press D, then click around the locus, one click per corner. Press Enter, right-click or double-click to finish; Backspace removes the last corner. The bar above the plan offers three ways to draw, and pressing D again switches between them:

- **Outline:** click the corners.
- **Round:** click the centre, then click or drag for the radius. The wheel or + and − set the number of corners (6–64), also shown in **Corners**. Good for pits, tabuns and silos.
- **Fill:** click an empty space enclosed by loci (or embankments) and the new locus takes its exact shape.

The **New** list sets the type of the next locus. **Trace locus** makes a new locus with the outline of another one you pick. With a locus selected, **Duplicate down** starts the next locus below it with the same outline.

Draw basket (B)

Select a locus, press B and draw the basket's own outline; it belongs to that locus. Pressing B again switches between:

- **Outline:** click the corners, as for a locus.
- **Round:** a round basket, centre then radius.
- **Coin:** one click places a small yellow coin basket, 5 cm across, for a single find.

Trace parent locus (Shift+B) gives the basket the outline of its locus at once. The **Type** list sets the type of the next basket.

Draw wall (W)

Click along the wall's centre-line and Digger draws it at its width, giving it a wall number. Change the width with + and −, or Ctrl+wheel, in 5 cm steps; the default width is in Settings. A long click or Shift+click starts a new wall at that corner, so a whole structure can be drawn in one go, and clicking the first point closes it.

Edit vertices (E / Tab)

Select a drawing and press E or Tab (or double-click it) to edit its outline.

- Drag a corner to move it. Shift+drag moves it straight up, down, left or right, still lining up with other corners.
- Drag the small point in the middle of an edge to add a corner there.

- Backspace over a corner, or right-click it, deletes it.
- Press Tab or Esc when done.

Knife (K)

Cuts a locus, basket or stone in two. Select it, press K and click a line across it, starting and ending inside; the ends are carried to the outline. Press Enter, then click the part that continues the original: it keeps its number, relations and baskets, and the other part becomes a new locus that copies its fields and adjoins it. The **Neither** button closes the original on the working date and makes both parts new loci below it. Clicking back on the first point cuts a piece out, leaving a hole.

Stone / polygon (P)

Draws a plan element that is not a locus: a stone, an installation detail or any other shape. Elements have a label, a layer and a colour in **Properties**, and can be tied to a locus.

Text label (T)

Click where the text goes and type it. The bar above the plan sets its size and colour. Double-click a label to change its text.

Move locus label (L)

Drag a locus number to where it reads best, for example out of a crowded corner. Double-click it to put it back in the middle.

Heights (H)

Click a locus or wall to record its upper or lower level. A dialog works out the elevation from a levelling reading: benchmark + instrument height − staff reading. The benchmark and instrument height are kept until you change them, and you can also type the elevation directly. For a basket, select it first so its outline shows, then click inside it to record its opening or closing level.

Measure (M)

Click two points to see the distance between them. The plan's coordinates are in metres.

Section line (S)

Click the two ends of a section line, in any direction; the section appears in its own panel (see "Sections").

Georeference

Ties the plan to real-world coordinates for GIS. Click a point whose real coordinates you know, such as a grid corner, and type them in; with two or more points the whole excavation is placed. The plan itself never changes.

Snapping and smart guides

The magnet button above the plan turns snapping on and off (Shift+Tab); the small arrow beside it chooses what to snap to: corners, edges, the grid, and smart guides that line a point up with other corners and edge extensions. Hold Ctrl while clicking to invert snapping for that point.

The plan's sidebar (N)

The sidebar button (or N) opens a panel with what the plan shows: loci, baskets, levels, sections, labels, the grid and square labels, plan elements, loci closed earlier as outlines, text size and fill opacity. It also lists the base layers (images, DXF, GeoJSON) with their order, opacity and lock.

The plan's right-click menu

Right-clicking the plan offers what fits the spot: grab, edit vertices, delete, frame the selection or everything, a new locus here, fill this space with a new locus, **Trace locus…**, put a label back in the middle, set the grid origin here, extend the grid to here, the grid settings, and copying the coordinates.

Images on the plan

Drop an aerial photo or scanned plan onto the plan, or import one from **File › Import**. Drag it to move it, drag its corners to resize and its round handle to rotate, then lock it in the sidebar so it can't move.

6. Record a locus

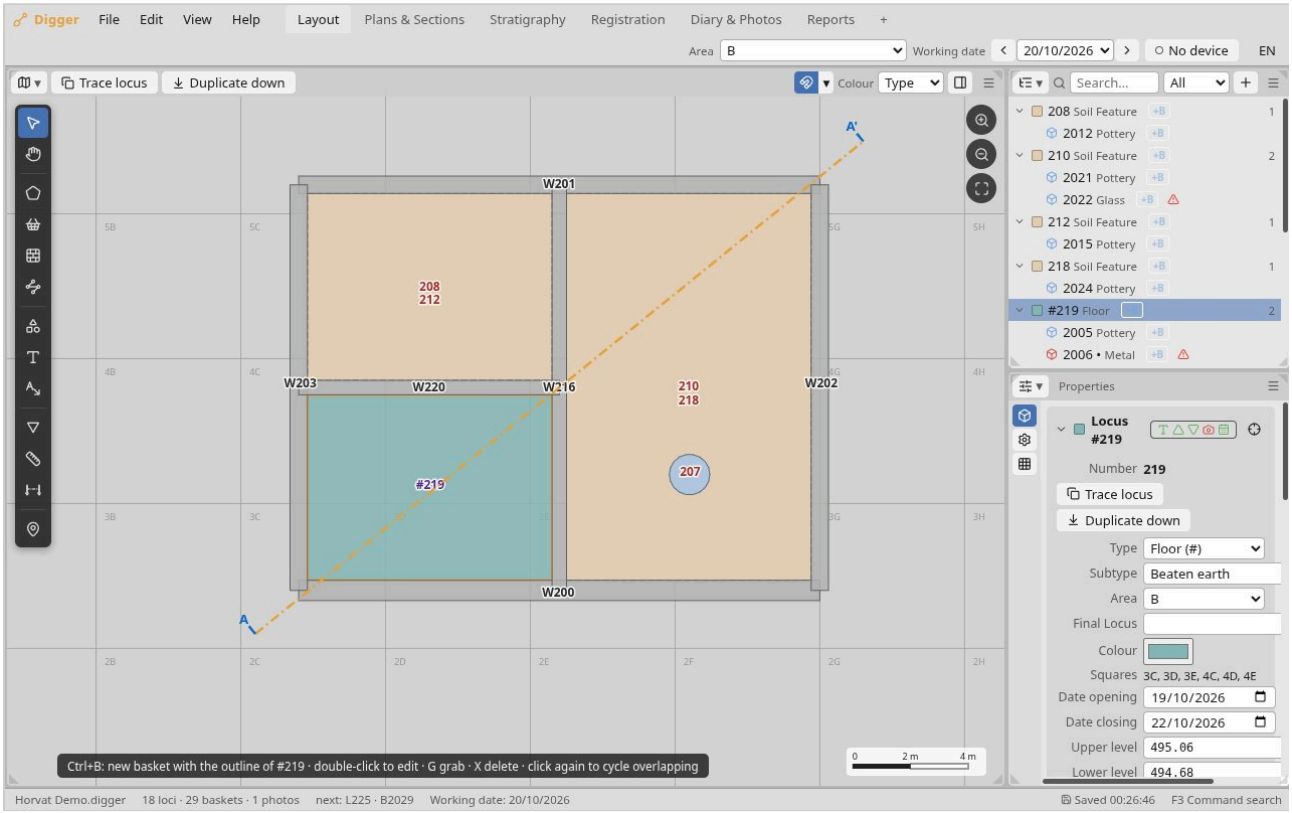
Draw the locus on the plan (or add one without a drawing from the **Outliner**'s + menu), then fill in its **Properties**:

- **Number:** given automatically from the area's block and never changed. Use **Final Locus** to record a renumbering.
- **Type** and **Subtype:** soil feature, wall, floor, installation and so on, each with its subtypes. Your own types and subtypes can be added.
- **Area:** the area it was recorded in. A locus never moves to another area.
- **Colour:** its own colour on plans, sections and the matrix; **Use type colour** goes back.
- **Squares:** worked out from its outline.
- **Date opening** and **Date closing.**
- **Upper level** and **Lower level:** type them, take them from a levelling reading with +, or import one from another locus or basket.
- **Description.**

Below these: **Stratigraphy** (its relations), your own fields, a **Wall** panel for walls (length, width, height, direction, rows, courses), **Chronology & phasing**, **Baskets**, **Photos** and **Geometry**.

Two buttons at the top save drawing: **Trace locus** and **Duplicate down**. **Auto heights** takes the upper and lower levels from the highest and lowest basket levels.

The small icons beside the locus number, and the **Status** column in the **Registration** sheet, show what the record has (green) and still lacks (red): description, upper level, lower level, a photo it is tagged in, and opening and closing dates. Once complete, **Lock** protects it and its baskets from changes; **Unlock** opens it again.



7. Close a locus

A locus is closed by giving it a closing date. From that day on it leaves the plan, and it takes no new baskets. There are several ways:

- **Close** beside **Date closing** in its properties closes it on the working date.
- **Auto close** in its properties sets the closing date to the last day a basket of the locus was opened.
- In the **Outliner**, right-click the locus and choose **Close on working date**.
- With several loci selected, **Close on** in **Properties** closes them all on one date.
- In the **Registration** sheet, type the date in its **Closing Date** cell, or press **Auto close** above the sheet to close every listed locus on its last basket day.
- Type or pick the date in **Date closing** yourself.

A locus can't close before the day of its last basket. To reopen it, clear the date, or right-click it in the **Outliner** and choose **Reopen**. A locked locus has to be unlocked first. A closed locus that is still in the ground, such as a wall or floor, stays on the plan with **Always show**.

8. Record baskets

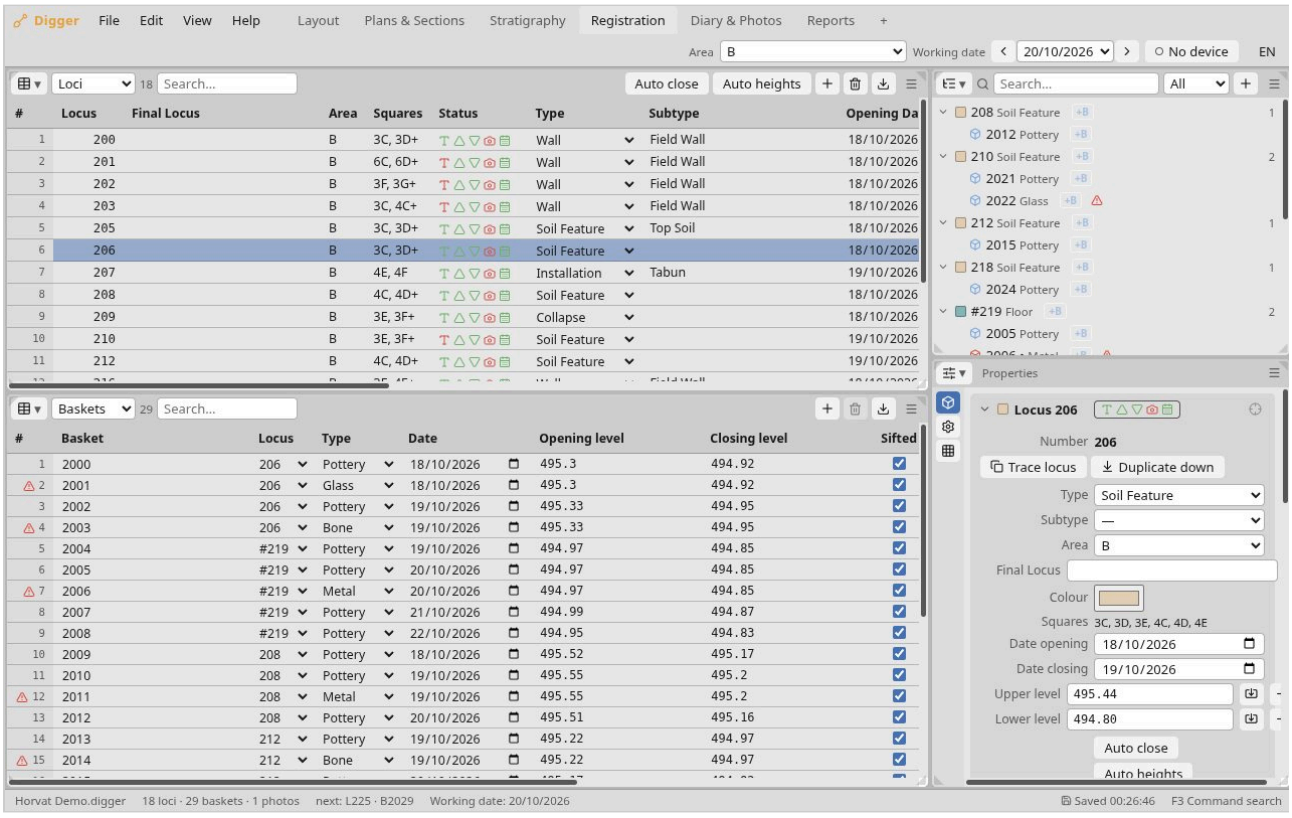
Every basket belongs to a locus. Select the locus, then use any of these:

- **Ctrl+B:** a basket with the locus's outline.
- **+B** beside the locus in the **Outliner**.
- **B** on the plan, to draw the basket's own outline, round basket or coin (see "The plan").
- **Shift+B** or **Trace parent locus:** a basket with the outline of its locus.
- The **+** in the **Baskets** panel of the locus's properties, or the right-click menu of the locus in the **Outliner**.
- **+** in the baskets sheet of **Registration**.

A basket can also hold baby baskets: right-click a basket in the **Outliner** for a new basket inside it, in the same locus.

Then fill in its properties: **Type**, **Date**, **Opening level**, **Closing level**, **Sifted**, **Registered** (a special find, marked • in lists), **Count**, **Weight**, **Storage**, the pottery **Reading** and the **Description**. **Previous basket** copies the outline of the locus's previous basket. To see all the baskets of a locus, select it and open the **Baskets** panel in its **Properties**.

A closed locus refuses new baskets: reopen it first, or record them in the locus that continues it.



9. Finish a basket

A basket is finished when its closing level is recorded. Any of these does it:

- Press H, select the basket, and click inside its outline; choose its closing level in the dialog.

- Type the **Closing level** in its properties or in the baskets sheet.
- Use the import button beside the level to copy a height from another locus or basket.
- Record it in the **Levelling (experimental)** panel with the basket selected.

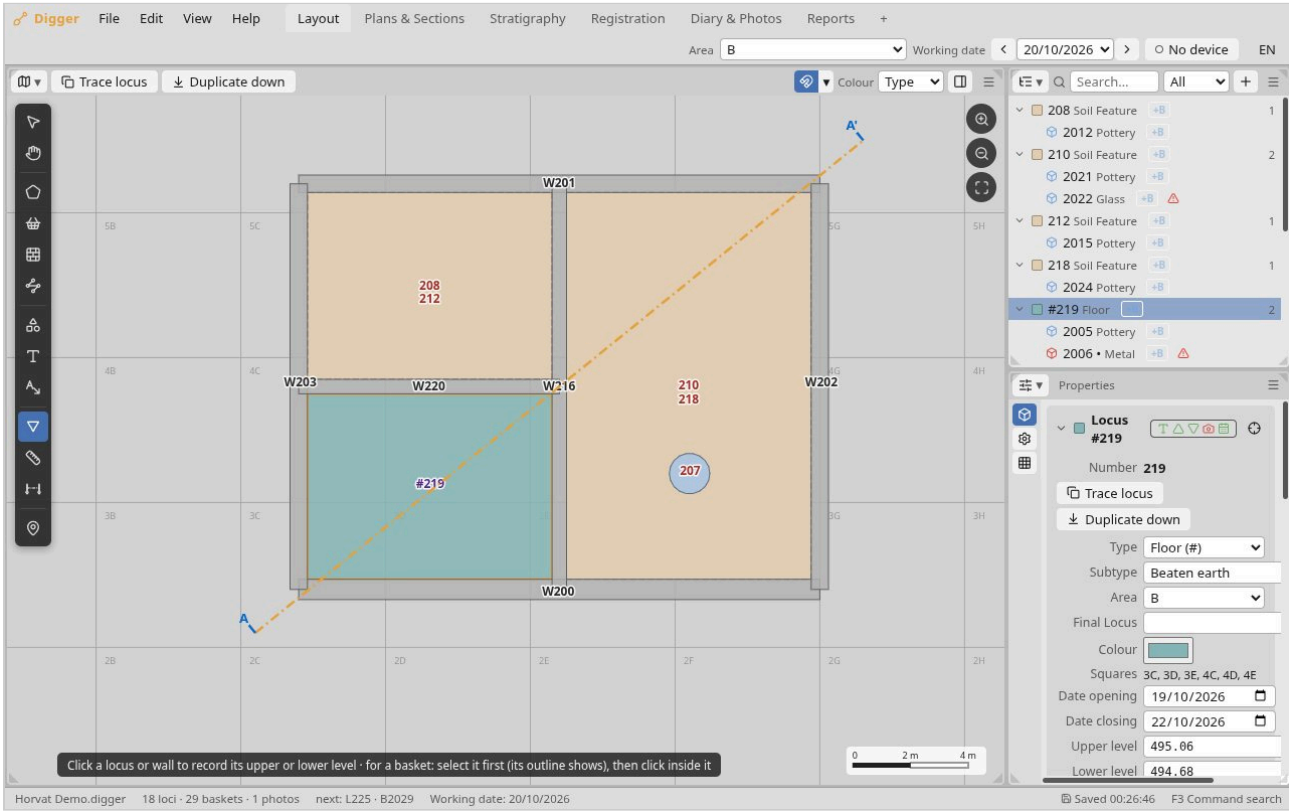
When the locus is done, **Auto heights** takes its levels from its baskets and **Auto close** its closing date.

10. Record heights

Heights can be recorded in three ways:

- **On the plan:** press H and click a locus, wall or basket. The dialog takes a benchmark, the instrument height and the staff reading, and works out the elevation; you can also type the elevation.
- **In the record:** the + beside each level field in **Properties** opens the same dialog.
- **In the levelling panel:** select a locus or basket and type readings one after another (experimental).

Add benchmarks from the dialog with **+ New benchmark…**; each belongs to one area. Digger warns when a height looks wrong, for example a lower level above the upper one.



11. Periods, phases and units

Period, **Stratum**, **Phase** and **Unit** are in the **Chronology & phasing** panel of a locus. Each is picked from a list, never typed freely, so the same phase is always spelt the same way.

- The bottom of each list has a box for adding a new value.

- Every value you added has a pen beside it, to rename or delete it. Renaming changes every locus that uses it. Deleting asks first, and leaves those loci blank in that field. Ctrl+Z undoes either.
- The built-in periods can't be renamed or deleted.
- Periods and strata are for the whole site; phases and units belong to one area.

Colour the plan by **Phase** or **Period** to see them, and the plans report adds a plan for each.

12. The Outliner

The **Outliner** lists the loci of the working area with their baskets under them.

- Click a row to select it; double-click it to centre the plan on it.
- **+B** beside a locus adds a basket to it.
- The + at the top adds a locus (with or without drawing it) or a basket.
- The search box finds loci and baskets by number or text; the list beside it chooses what is shown.
- Right-click a locus to zoom to it, redraw its outline, add baskets, close it on the working date or reopen it, or delete it (its baskets are kept).
- Warning triangles mark records that are not drawn on the plan, and baskets whose locus was deleted.

13. Properties

Properties shows the record you selected, wherever you selected it: the plan, the **Outliner**, a sheet or the matrix. With several records selected, it edits them together. Its three tabs, on the left:

- **Selection:** the selected locus, basket, height point, photo, element or section.
- **Project:** the excavation's details and logo, **Numbering** (the number blocks of each area), and the recording method.
- **Grid & coordinates:** the site grid, the coordinate system and the georeference.

Panels open and close with a click on their title, and Digger remembers which ones you keep open.

14. Site grid and embankments

Edit › Site grid (squares)... sets the squares: their size, how many columns (east) and rows (north), how columns and rows are labelled and in which order (D6 or 6D), and the south-west corner. The compass buttons move the whole grid one square at a time, and + and − add or remove a row or column on that side; square names and the loci's squares follow. **Lock grid** stops any change once the grid is right.

Edit › Generate embankments... draws embankments of a chosen width along the square edges, up to 1 m. Loci snap to them, and the fill tool fills the space between them.

15. Registration sheets

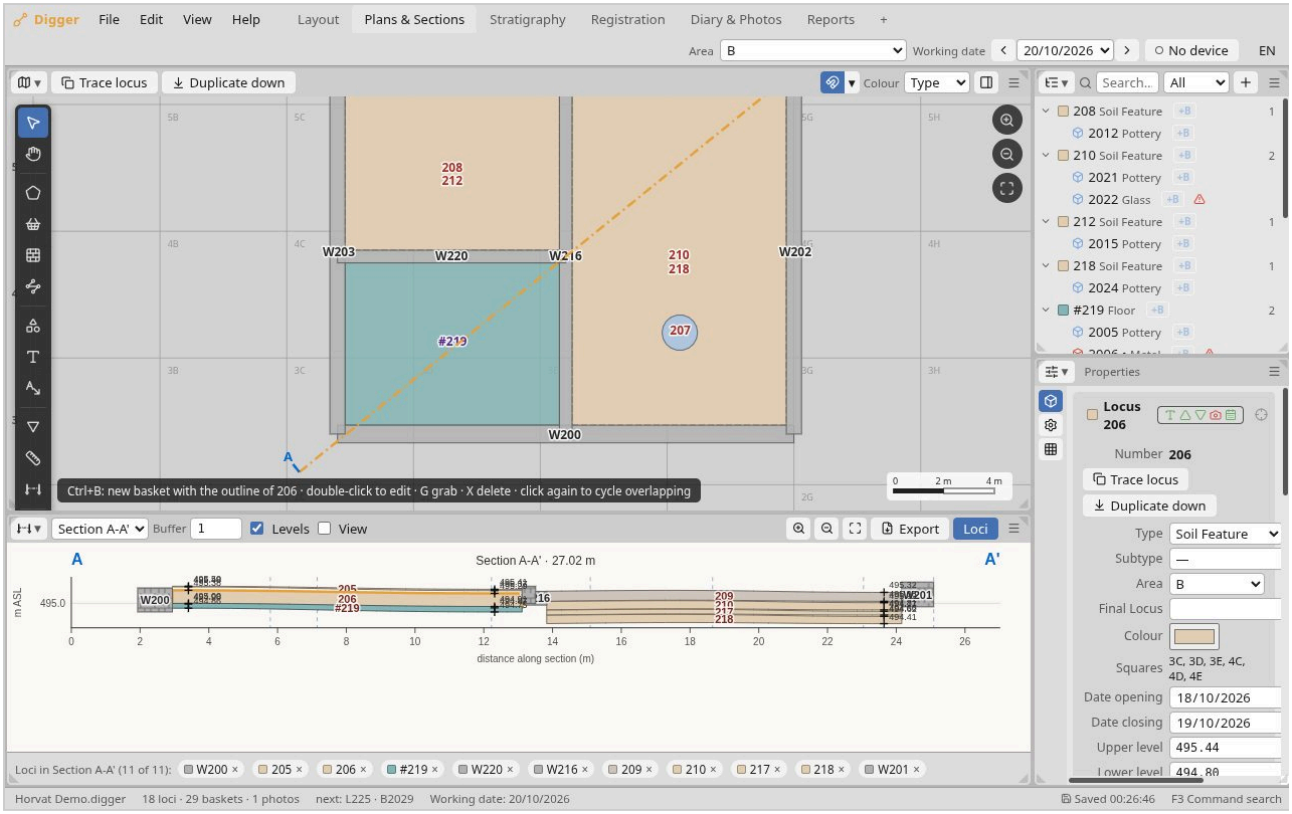
The **Registration** workspace has a spreadsheet for each kind of record: loci, baskets, height points, photos, areas and relations. Choose the table from the panel's top bar.

- Click a cell to edit it; dates, types and lists edit in place. Read-only columns, such as squares and levels worked out from baskets, are shown but not edited.
- The search box searches every column. L and a number, such as L101, finds exactly that locus and the loci merged into it.
- Click a column heading to sort by it; drag its edge to change its width.
- **+** adds a row; **Export CSV** saves the table.
- **Auto close** and **Auto heights** work on every locus listed.
- **Add** adds your own field to loci or baskets: a tick box, a number or text. Right-click its heading to rename or remove it.

16. Sections

1. Press S and click the two ends of the line on the plan, in any direction. Diagonal lines are fine.
2. To turn it, select the line and drag its round handle (hold Shift for 15° steps), or use **Bearing (°)** and **Rotate 90°** in **Properties**.
3. The section appears in its own panel in **Plans & Sections**, drawn from the loci's outlines and levels.

In the section panel, the wheel zooms and dragging pans; double-click or Home shows it all. Tick **View** to see the section as it stood on the working date, with loci beyond the line drawn paler, in the direction you are looking. **Buffer** sets how far from the line loci are included, and **Levels** shows the height points near it. The list of loci shows those drawn: × removes one and + brings it back. **Export** saves it as a PNG, SVG or PDF.

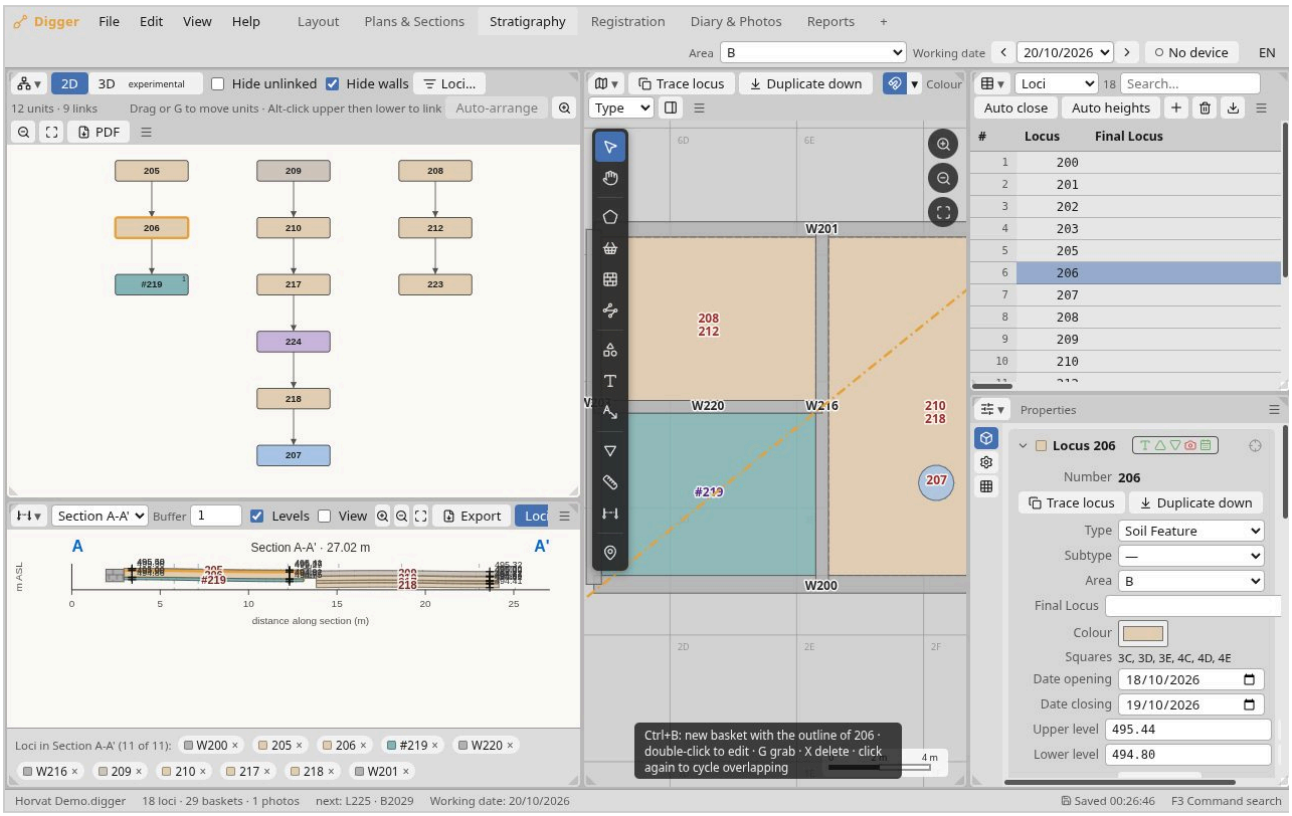


17. The Harris matrix

Open **Stratigraphy**. The matrix builds itself from the relations of the loci.

- **Add relations** in the **Stratigraphy** panel of a locus's properties (is above, cuts into, fills, abuts, adjoins, is bonded with, is same as, is contemporary with), or Alt+click the upper unit and then the lower one in the matrix.
- **Arrange:** drag units, or select them and press G. **Auto-arrange** forgets the hand placement.
- **Choose what it shows: Choose loci…** leaves loci out (the sequence still runs through them), **Hide walls** leaves walls and their relations out, and **Hide unlinked** hides loci with no relations.
- **Right-angle links** draws the links with right-angle turns.
- **3D (experimental):** the matrix in 3D, schematic or placed where the loci are on the plan. Drag to orbit, Shift+drag to pan.

Loci that conflict, such as one below a later unit, are marked, and cycles are listed so they can be fixed.



18. Merge loci with a final locus

When loci turn out to be one, enter the number they belong to as their **Final Locus**. For example, give 127 and 128 the final locus 126. Then:

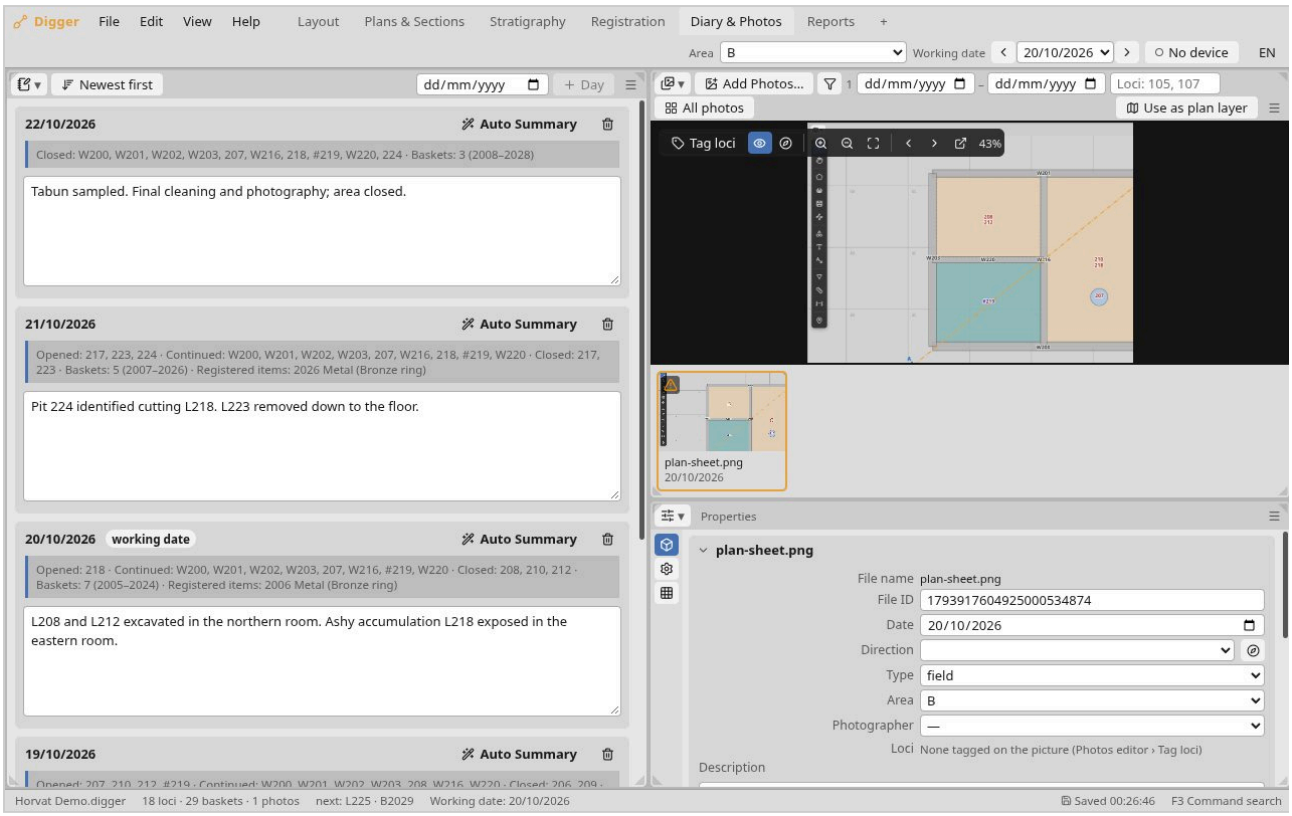
- The matrix draws them as one box, with all their relations.
- Locus 126 shows their relations and baskets in **Properties** and on its card.
- Searching **L126** in the baskets sheet finds exactly its baskets and theirs.

19. Photos

Add pictures with **File › Import › Photos…**, by dropping them on the **Photos** panel, or with **Add Photos…**. A PDF becomes one photo for each page, and dates are read from the camera.

- Click a thumbnail to view it large; ← and → move between photos, the wheel zooms and Home fits.
- **Tag loci** (A), then click on the photo where the locus is, to label it. Drag a label to move it and click it to edit. The photo is then linked to that locus.
- Set the camera's **Direction** on the compass, the photographer, the type and a description in **Properties**. Photos missing any of these are marked.
- Filter the thumbnails by date, by loci, or to the selected locus.
- **Use as plan layer** places a drone photo or scanned plan on the plan to be georeferenced.

Photos can also arrive straight from a phone through the Devices window.



20. The diary

The **Diary** has one entry for each excavation day of the working area. Write what was done, why, and what was found. **Auto Summary** inserts the day's summary from the records: loci opened, continued and closed, baskets and registered items. The days can be listed newest or oldest first.

21. Info: checks and log

The **Info** panel lists problems Digger finds in the record: cycles in the stratigraphy, levels or dates that contradict the relations, a lower level above the upper one, a locus that closes before it opens, numbers used twice, loci without an area, heights or a drawing, and drawings far outside the site grid. Double-click a line to show the record on the plan. The **Log** keeps every message of the session.

22. Levelling panel (experimental)

The **Levelling (experimental)** panel records many heights quickly. Choose the benchmark, enter the instrument height and the backsight, select a locus or basket, and type each staff reading; **Record** (Enter) saves it and moves on. Check the heights it records against your field sheet.

23. Devices (experimental)

The Devices button in the top bar connects to the field:

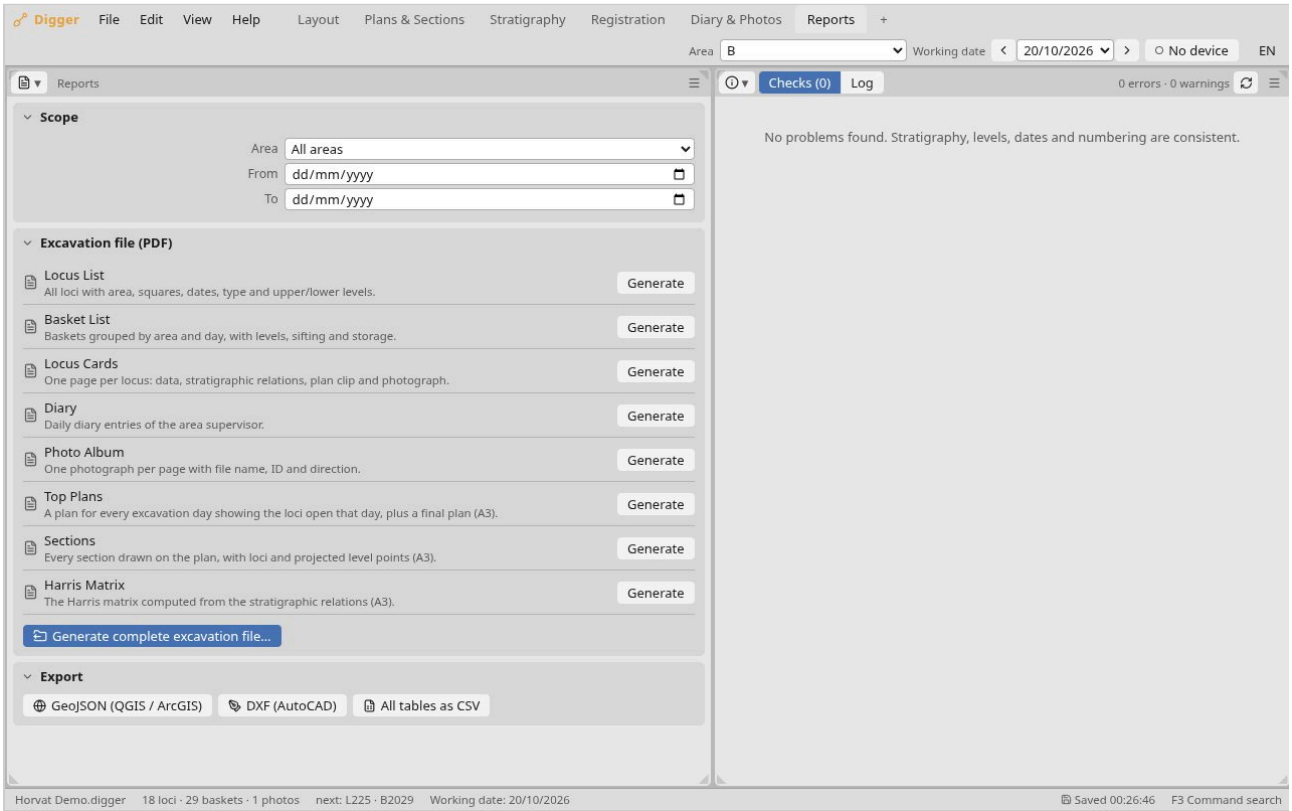
- **Phone:** start the phone link, put the phone on the same Wi-Fi as the computer and scan the code. Photos taken on the phone appear in the working area, with the locus and camera direction chosen on the phone. No app and no internet are needed.
- **Instruments:** digital levels and total stations (Leica GSI) and GNSS receivers, by cable or Bluetooth. **Take point** records the current position.

These links are new: check what arrives. Importing survey points from CSV (**File › Import**) is the established route.

24. Reports and exports

Every report is in **File › Reports** and in the **Reports** workspace: the locus and basket lists, **Locus Cards**, the diary, the photo album, **Top Plans** (one for each day, a final plan, and plans by period and phase), sections, the matrix, and **Complete excavation file…**. In the workspace, choose the area and the dates first. Reports follow the interface language and carry the excavation's name on every page.

File › Export gives GeoJSON for QGIS and ArcGIS, DXF for AutoCAD and every table as CSV. **File › Import** brings in survey points, DXF, GeoJSON, Shapefiles, images, photos and areas from other excavation files.



25. Settings, saving and backups

File › Settings… (Ctrl+,) holds your own choices, for every project: theme and interface size, language, locus type colours, plan text size, the default wall width, snapping, how many steps Ctrl+Z can undo, start-up tips, and backups. **Save template…** keeps all of these in a file to load on another computer or for the next excavation.

Digger saves every change as you make it. Ctrl+Z undoes your last steps. Backups go into the project's Backups folder every few hours and when you close the project; **Back up now** makes one at once.