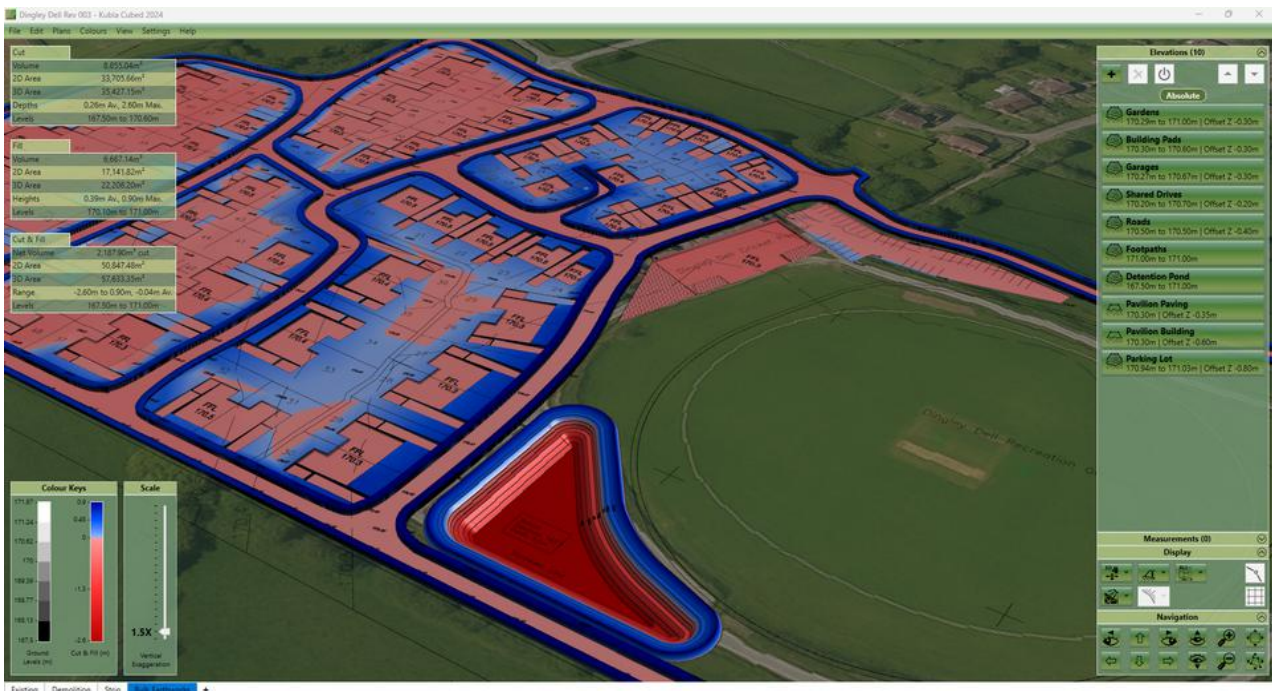




Getting Started

with Kubla Cubed 2024 (7.5)



Kubla Cubed calculates earthworks by comparing an existing ground surface with one or more proposed surfaces.

Create a project, import site plans, understand construction phases, model earthworks and generate volume calculations.

Table of contents

<u>INTRO</u>	01
<u>UNDERSTANDING THE WORKSPACE</u>	02
<u>SETTING UP YOUR PROJECT</u>	03
<u>IMPORTING SITE PLANS</u>	04
<u>CONSTRUCTION PHASES</u>	05
<u>CREATING EXISTING GROUND</u>	06
<u>FEATURE SURFACE OVERVIEW</u>	07
<u>SUGGESTED WORKFLOW</u>	08
<u>ADJUSTING TO SUBGRADE</u>	09
<u>VIEWING RESULTS</u>	10
<u>EXPORTING RESULTS</u>	11
<u>CHECKLIST</u>	12
<u>MISTAKES</u>	

1. Your First Project



Goal

In this guide you will learn how to:

- Import a site plan
- Define existing ground
- Create a proposed surface
- Calculate cut and fill volumes
- Export a report

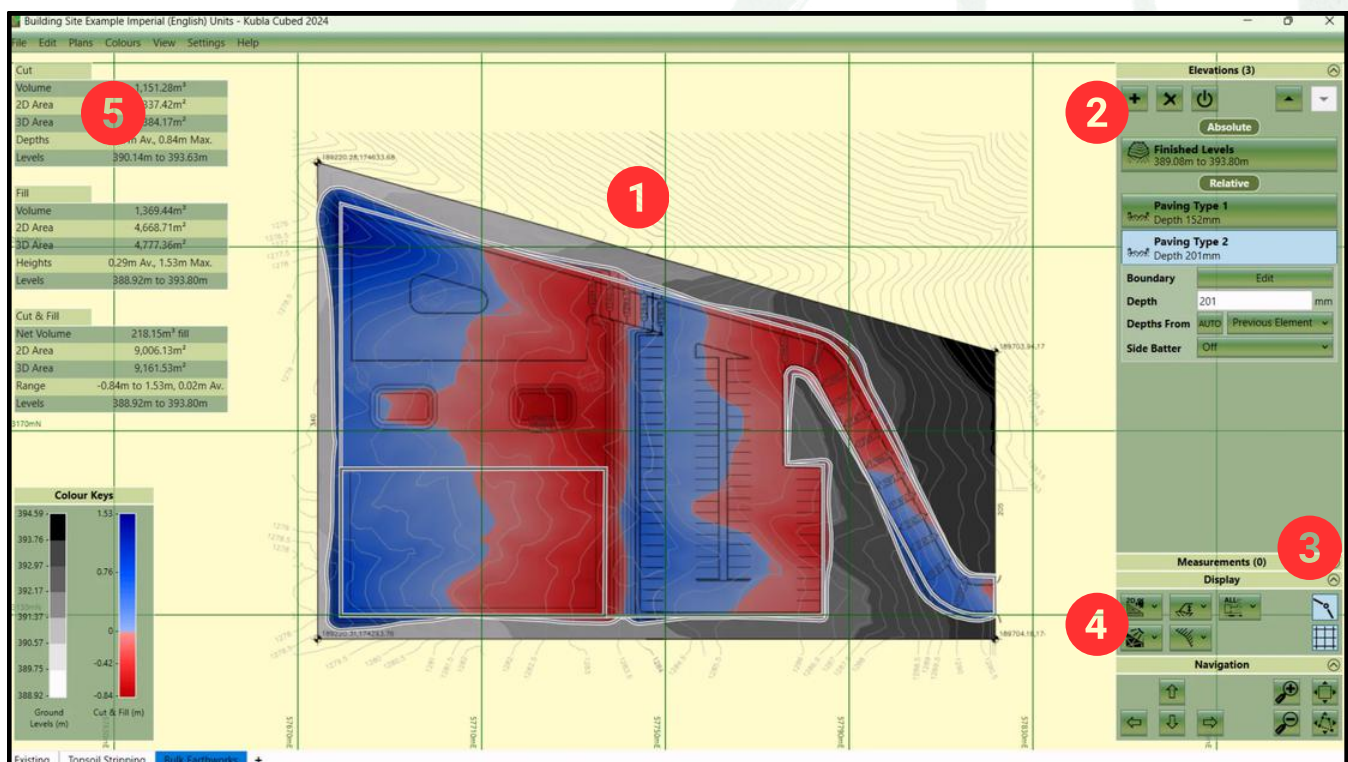
By the end, you'll have completed a basic earthworks estimate.

What you'll need

- Kubla Cubed on your desktop and scroll mouse
- A site plan in PDF, CAD or image format
- Existing ground information, such as contours, points or a TIN
- Proposed levels/design information

2. Understanding the Workspace

Before creating a project, become familiar with the main areas of the screen:



- 1 **Design Area** = where you edit and view your model
- 2 **Elevations Panel** = where you add, remove and edit elements that build the surface
- 3 **Measurement Panel** = where you add, remove and edit measurements
- 4 **Display Panel** = controls how the model is displayed
- 5 **Results Panel** = shows the calculated quantities for the current phase.

Elevations Panel

Use this panel to create the surfaces that Cubed will calculate volumes from. You can add the following elements:

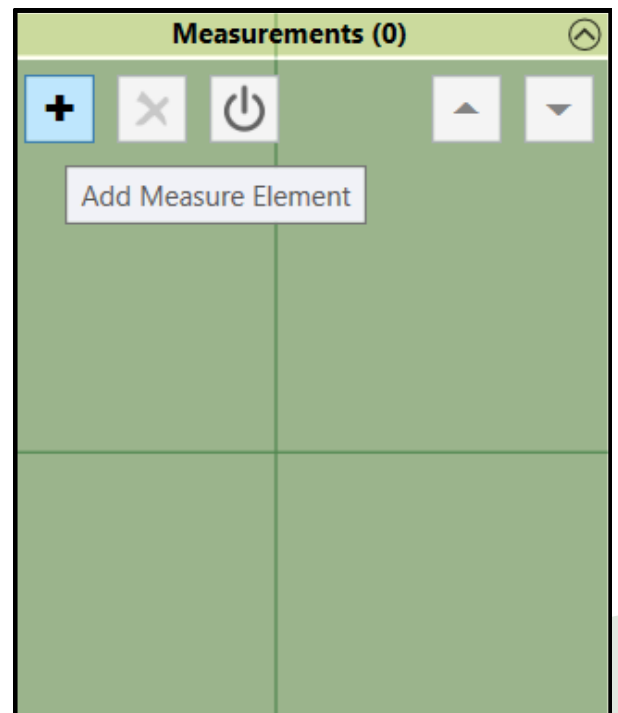
- Platforms
- Slopes
- Paths
- Feature Surfaces
- Reduce and Raise elements



Measurements Panel

Use this panel to create measurements and validate your calculations. Here you can create:

- Areas
- Lengths
- Volumes
- Cross sections



Add element



Delete element



Disable element



Move up in list



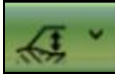
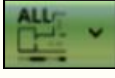
Move down in list

Display Panel

Use this panel to change the display options within the software. You can control:

- **Camera controls:** switch between 2D/3D views
- **Shading modes:** adjust shading to represent different data i.e. cut/fill, elevation map, element colours.
- **Site plan visibility:** dictate site plan visibility across different views.
- **Lighting options:** switch between Hard Lighting, Soft Lighting or No Lighting.
- **Line visibility:** switch between Incline Lines, Outlines Only or No Lines.



-  Camera controls
-  Shading options
-  Site plan visibility
-  Lighting options
-  Line visibility

Results Panel

Shows cut, fill and other project totals for the current phase. You can produce a more detailed analysis in a report or spreadsheet.

Cut	
Volume	1,151.28m ³
2D Area	4,337.42m ²
3D Area	4,384.17m ²
Depths	0.27m Av., 0.84m Max.
Levels	390.14m to 393.63m
Fill	
Volume	1,369.44m ³
2D Area	4,668.71m ²
3D Area	4,777.36m ²
Heights	0.29m Av., 1.53m Max.
Levels	388.92m to 393.80m
Cut & Fill	
Net Volume	218.15m ³ fill
2D Area	9,006.13m ²
3D Area	9,161.53m ²
Range	-0.84m to 1.53m, 0.02m Av.
Levels	388.92m to 393.80m

3. Setting up your project

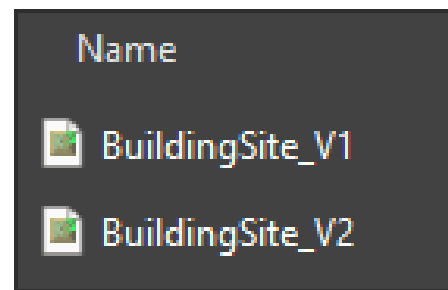
Step 1 – Create a New Project

File → New Project

Step 2 – Save Project

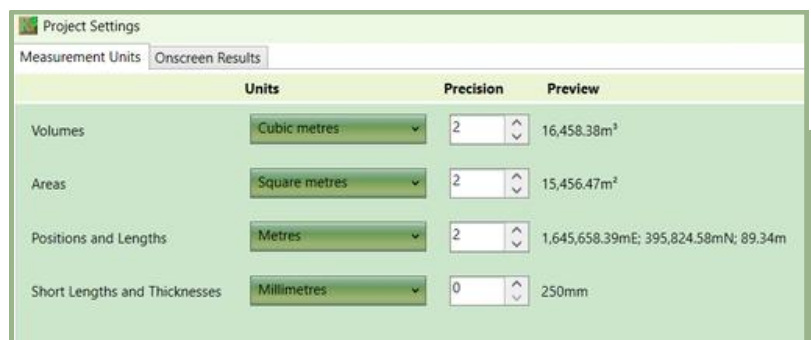
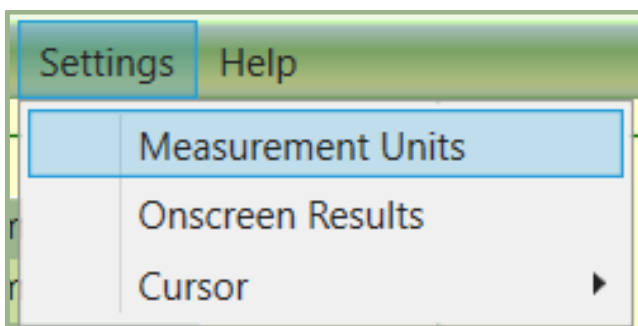
Save the project immediately –
Recommended naming convention:

ProjectName_Version



Step 3 – Set Units

Important: Make sure your project units match the units used by your drawings before scaling or entering elevations.



- Open Settings → Measurement Units
- Choose Metric or Imperial units

Step 4 – Enable Auto-Recovery

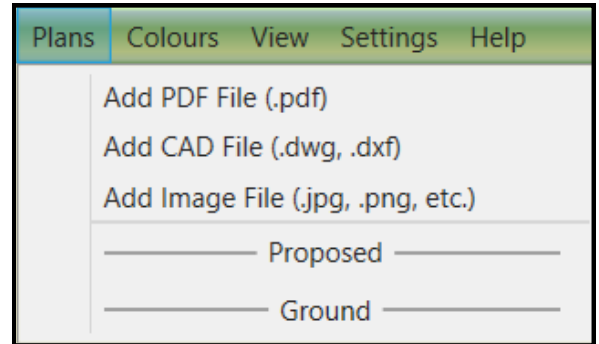
Step 5 – Import Plans

4. Importing Site Plans

Step 1 – Add a Drawing

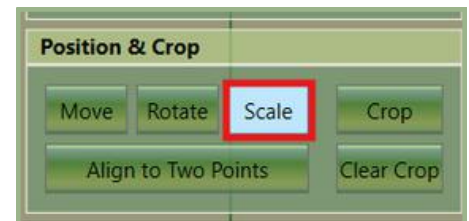
From **Plans**, add a file from one of the following formats:

- PDF
- CAD
- Image



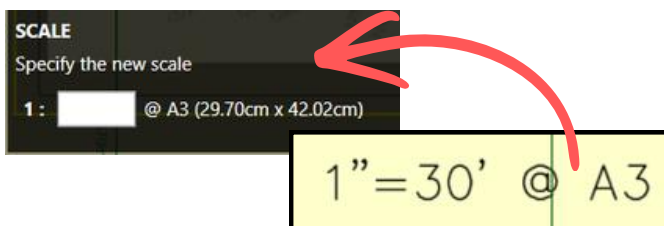
Step 2 – Scale the Plans

Under '**Position and Crop**', scale your plans:



By ratio:

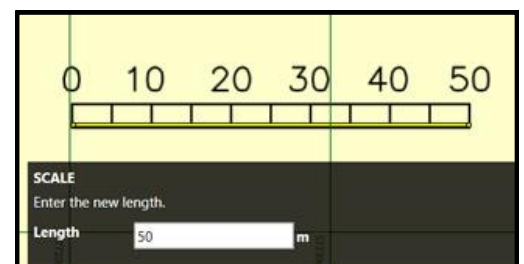
- Identify the plan ratio if provided.
- Type the new scale (i.e. 1:100 or 1"=25').
- Click OK to complete.



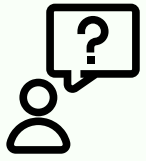
- We recommend this method where available.

By length:

- Draw a line along a known dimension
- Enter the real-world length
- Click OK to complete



- We recommend this method if no ratio is provided.



Which scaling method should I use?

Scale by ratio

Use when the drawing gives a reliable drawing scale.

Scale by known length

Use when the drawing contains a known dimension.

Align to Two Points

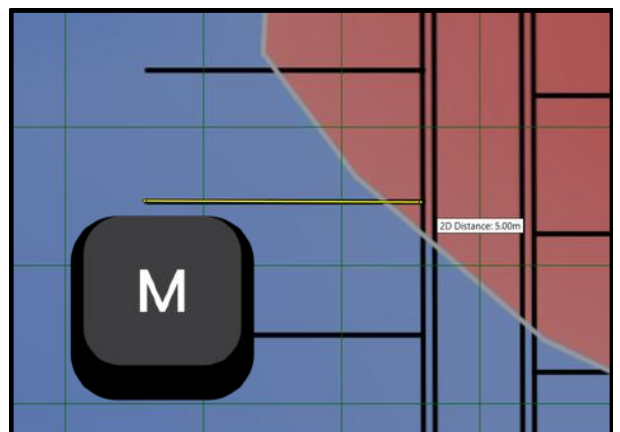
Use when you have two known coordinates or need to align a drawing with another drawing.

Step 3 – Verify Scale



Always verify the scale before continuing. Measure a known distance on the drawing and check that the result matches the real-world dimension.

- Press and hold the **M** key on your keyboard.
- Drag your cursor along a known distance.
- If the value on cursor matches the drawing, scaling is correct.



Step 4 – Rotate and Crop

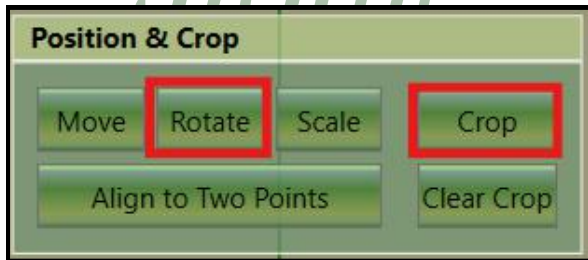
Use:

Rotate

To align the plan to the correct orientation.

Crop

To remove title blocks, notes, and other unnecessary areas.



Step 5 – Position the Plan

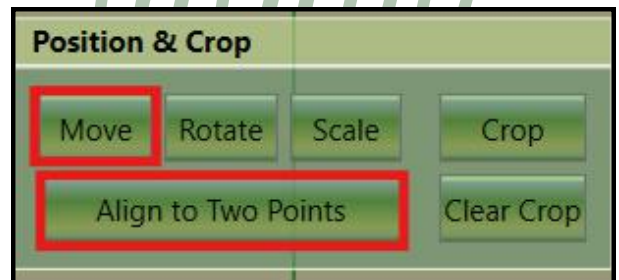
Use:

Move

For plans with one known coordinate (if known), or when stitching multiple plans together.

Align to Two Points

For plans with two known coordinates (if known), or when overlaying multiple plans. This option automatically moves, rotates and scales the drawing.



5. Understanding Construction Phases

Construction phases are one of **the most important** concepts in Kubla Cubed – think of them as separate stages of work.

Example:

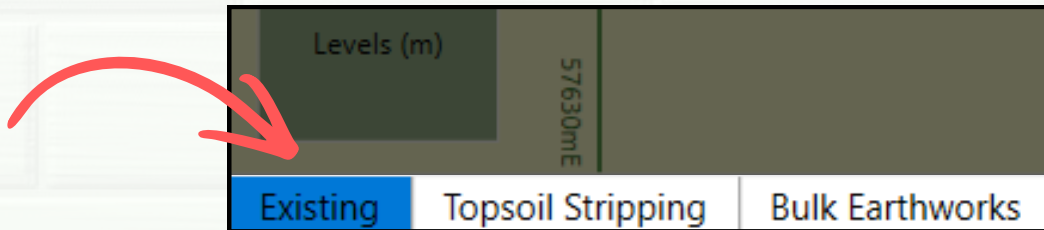
Phase:	Work:
Existing	Existing surface
Phase 1	Topsoil strip
Phase 2	Bulk earthworks

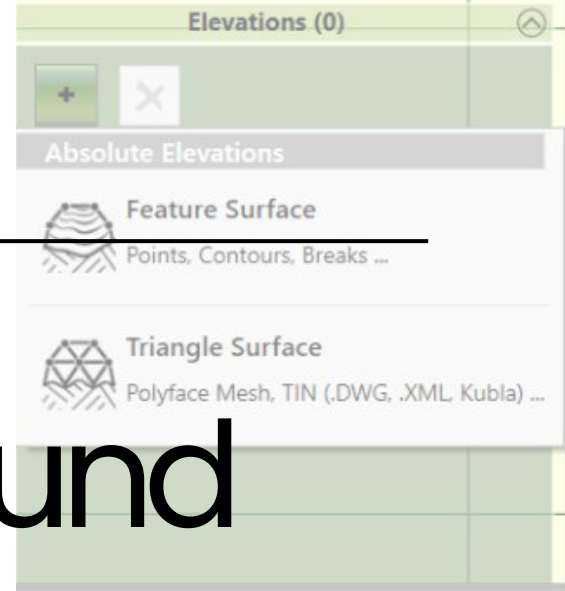
A phase represents a stage of construction. The result of one phase becomes the starting ground for the next phase.



Don't create a separate phase for every area on the site. Only create a new phase when the work changes the ground surface that the next stage will be calculated from.

The phases panel is found at the bottom of the Cubed window, where you can create, delete and tab through the different phases of your project. Rename your phases as you go to stay organised.





6. Creating Existing Ground

Before you can calculate earthworks, Cubed needs an existing surface.

In your '**Existing**' phase, add either a **Feature Surface** or **Triangle Surface**



Feature Surface vs Triangle Surface

Use Feature Surface when:

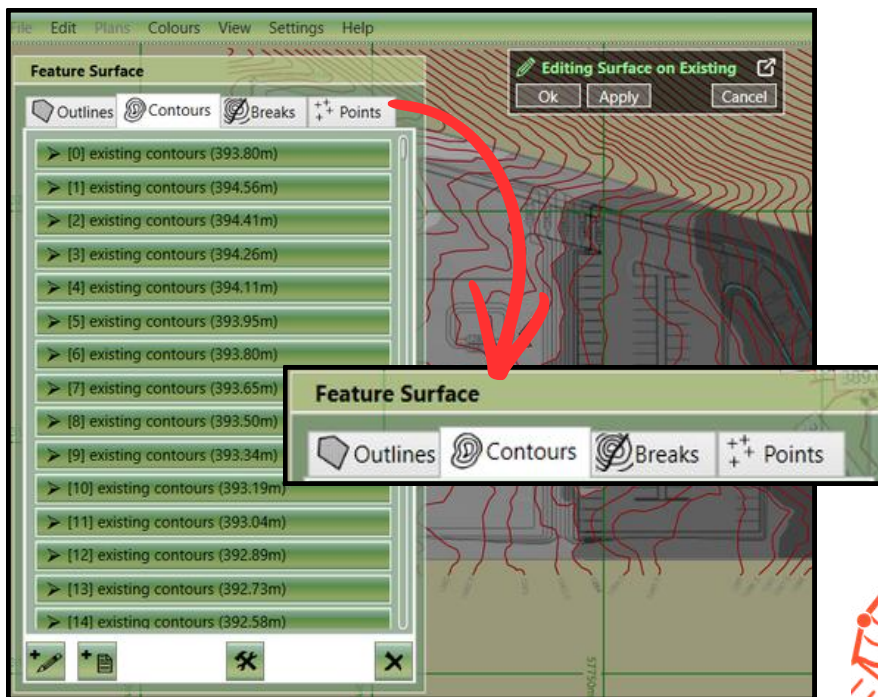
- You are building a surface from contours, points and breaklines.
- Your survey information is contained in PDF/CAD drawings.

Use Triangle Surface when:

- You already have a TIN/survey mesh.

If you're working from a typical PDF or CAD topographical survey, you will start with a Feature Surface.

7. Feature Surface Overview



How to build a reliable Feature Surface

1. Add contours (where needed)
2. Add spot levels/points (where needed)
3. Add breaklines (where needed)
4. Add an outline
5. Check the resulting surface in 2D and 3D views

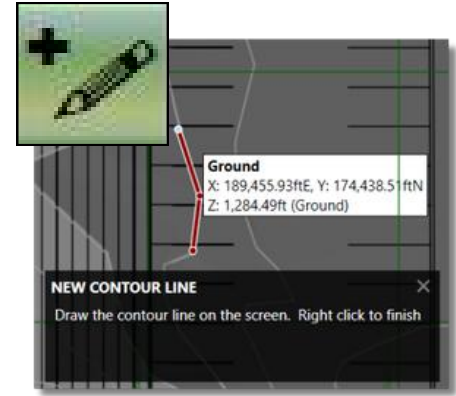
Roles:

- **Contours** describe changes in elevation.
- **Points** provide individual elevation information.
- **Breaklines** create hard edges in the triangulation.
- **Outline** defines the area of the surface.

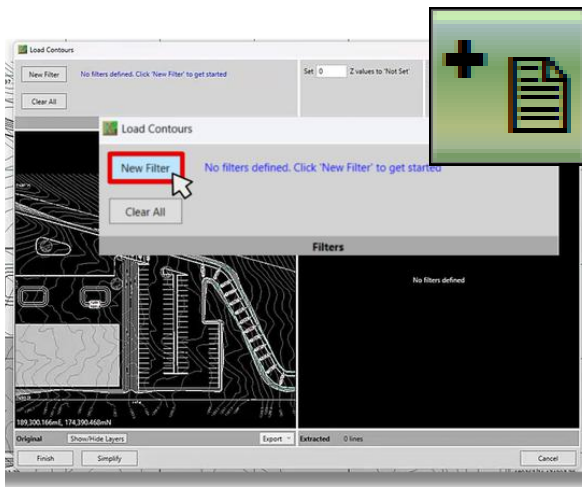
Adding Elements to a Feature Surface

Tracing

All elements can be traced from a site plan by clicking on the pencil icon. Define an element using your cursor, then input its elevation data. Right click to finish.



Trace when: The information cannot be extracted or you need to manually define geometry.



Extracting

Click on the file icon. Choose the relevant site plan and it will open in the Importer Window.

Here, select 'New Filter' and make a small selection around the geometry you want to import i.e. a contour line. The software will identify all geometry with the same characteristics. Adjust as you need to, then simply import and assign elevation values (where needed).

Tip: Use the 'Set Multiple Elevations' tool to quickly assign contour line elevations.

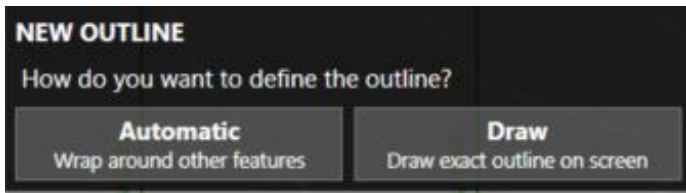
Extract when:

The information already exists as usable CAD/PDF geometry.

Extraction is usually faster and more accurate than manually tracing large numbers of features.

Outlines

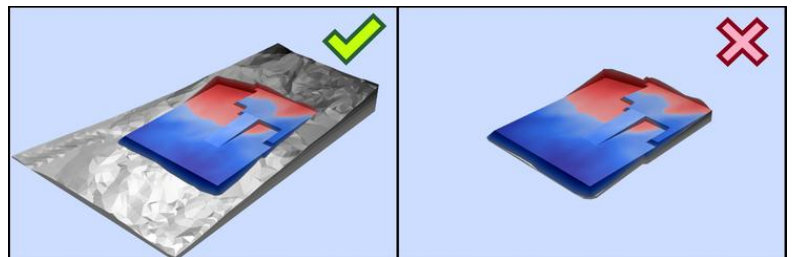
A Feature Surface needs an outline to define the extent of the surface. Only data within the outline will be included in the calculations.



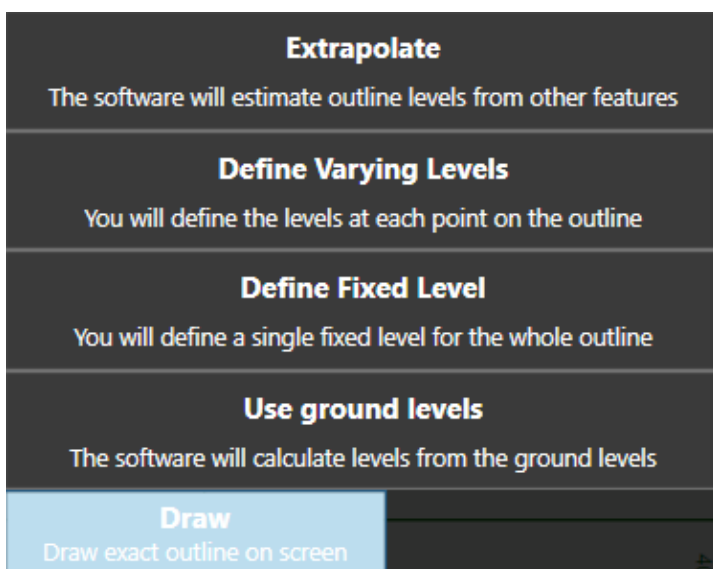
Tips: Extend the Existing outline so that it exceeds the proposed disturbance area. Draw proposed outlines only around areas where levels change.



As with other elements, you can **draw** an outline manually, extract it, or you can generate an **automatic** outline that will shrink-wrap around your existing features.



Outline Types



Use:

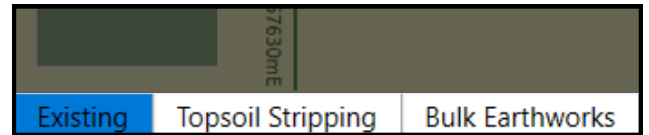
Extrapolate for Existing

Ground Levels for Finished Floor Feature Surface to create a match line.

The other two are used less often and by experienced users.

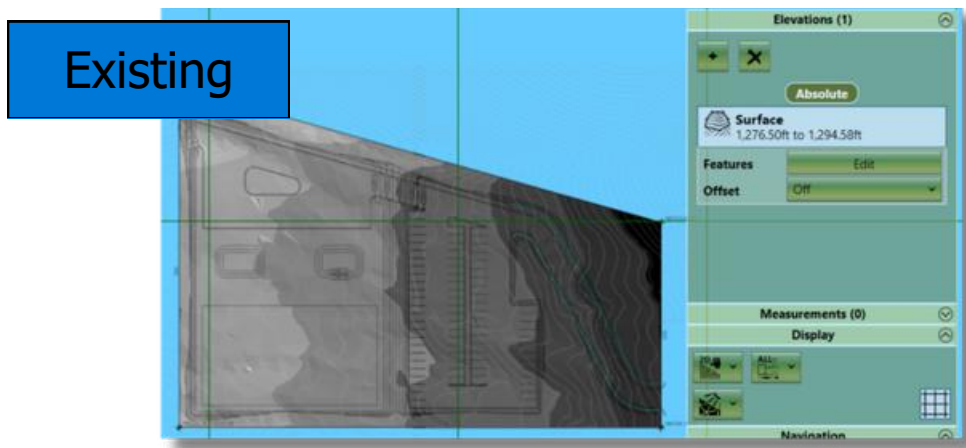
8. Suggested Workflow

The following is a recommended, basic workflow within Kubla Cubed:



Step 1 – Existing Ground

Create your existing surface using a **Feature Surface** with contours, breaks, points and outlines.



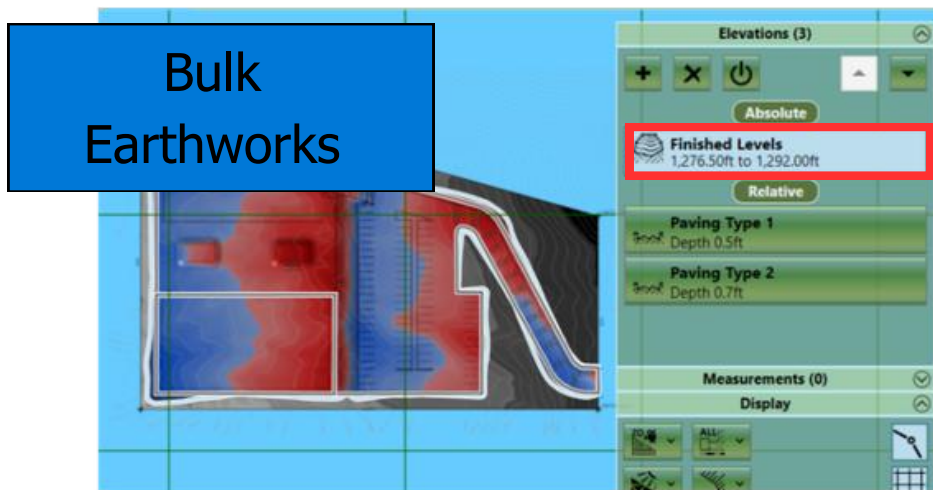
Step 2 – Strip Topsoil

If required, in phase 2 use a **Reduce** element to remove the specified depth for the site strip.



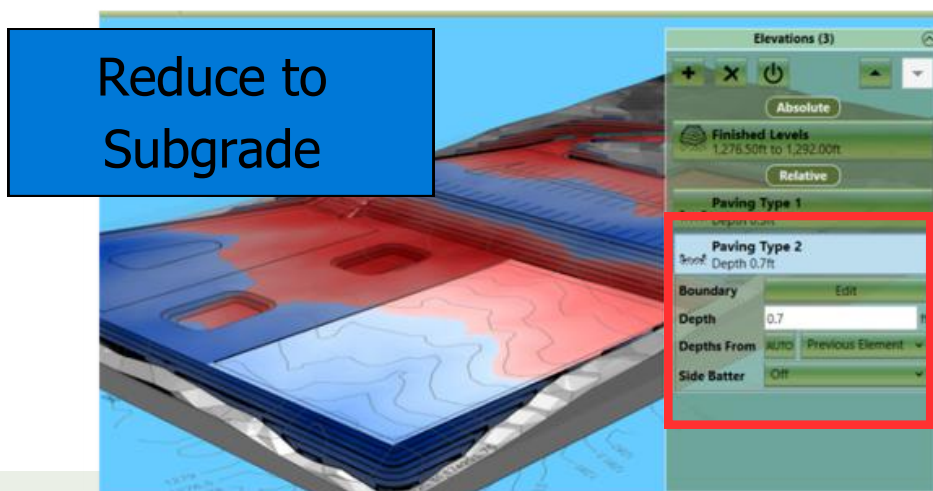
Step 3 – Model Bulk Earthworks

Add a new phase (you now have 3 phases) for earthworks, and start building your proposed surface using Cubed's Feature Surface element and define all contours, breaks and points that are on your proposed terrain drawing.



Step 4 – Adjust to Subgrade

In the same phase as your bulk earthworks, if the design requires adjust to subgrade/formation level using one of the methods explained below.

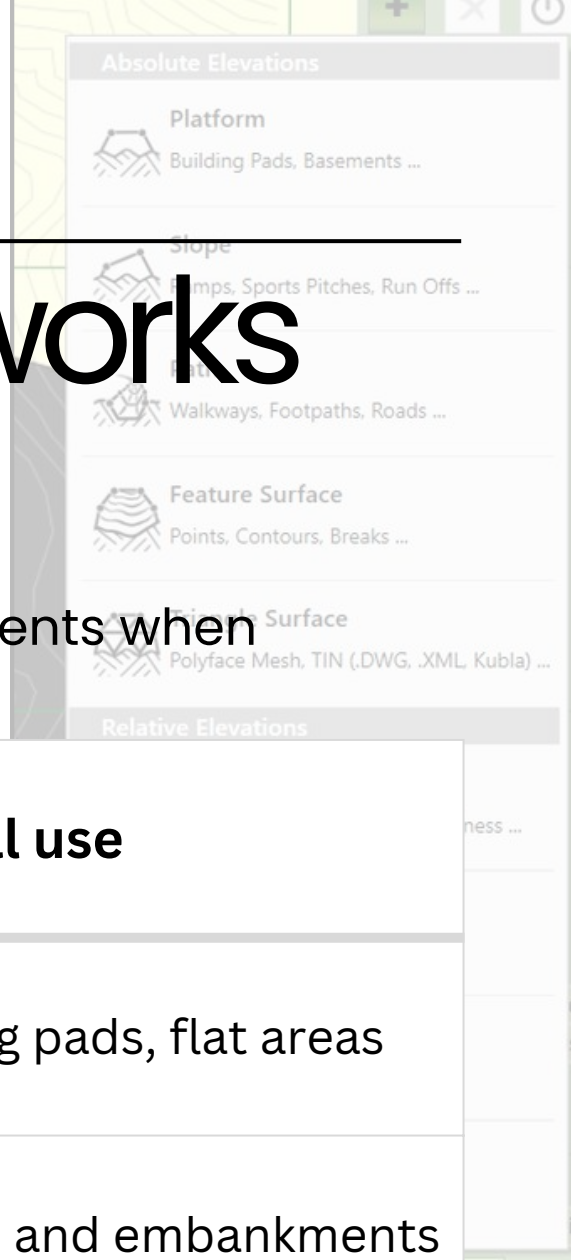


Step 5: Final Check

Review the resulting surface and cut/fill quantities

9. Bulk Earthworks Elements

You can utilise the following elements when creating your proposed surface:



Element

Platform

Typical use

Building pads, flat areas



Slope

Batters and embankments



Path

Roads, tracks and linear areas



Feature Surface

Complex proposed terrain



Reduce

Lower an area by a specified amount



Raise

Raise an area by a specified amount

10. Adjusting to Subgrade

There are 2 options to adjust to subgrade (formation level) For the above workflow, Reduce is the recommended method.

Option 1: Reduce

Use the Reduce Method when different parts of the same surface require different reductions.

Example:

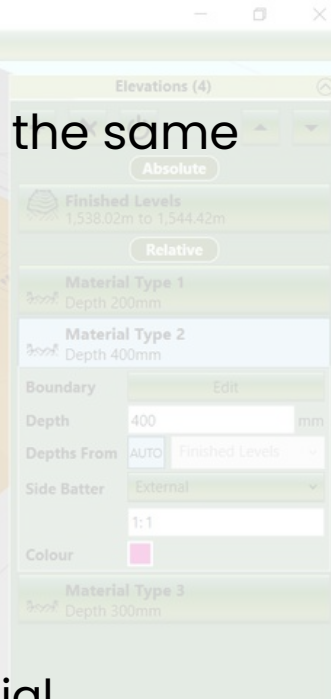
- Finished ground = 100.00 m
- Subgrade depth = 0.20 m
- Subgrade = 99.80 m

1. Create the proposed surface at FFL.
2. Add Reduce elements over the areas that need adjustment.
3. Set each Reduce element to the required material thickness.

Best for: Contour or point-based surfaces where splitting the model into separate elements would be difficult.

Important rules:

- 
- Reduce elements must be in the same phase as the finished level surface.
 - Reduce elements must be below the finished level elements in the Elements list (calculation order).
 - Use a steep side batter (for example, 0.01).
 - Leave 'Depths From' set to 'Auto'.



Option 2: Offset Method

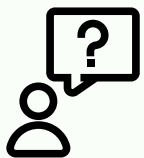
Use the **Z Offset** setting to lower an element by the required surface build-up depth.

This method works best when different areas are modelled as separate elements, such as:

- Building pads (Platforms)

For example, if the surface build-up is 600 mm, apply a -600 mm Z Offset to calculate the subgrade level.

Best for: Projects where each area has a consistent material thickness.



Which Method Should I Use?

Reduce Method: Useful when a single surface contains areas with different material thicknesses.

Offset Method: Simple and recommended for most projects.

For a walkthrough of both methods, watch the [Adjusting to Subgrade / Formation Level](#) video.

11. View and Check Your Results

The Results Panel gives you the calculated quantities. The display modes help you understand where those quantities occur.

Before you export your reports we recommend you:

- View cut/fill shading
- Use 3D view
- Check suspicious areas
- Check elevations
- Use cross sections

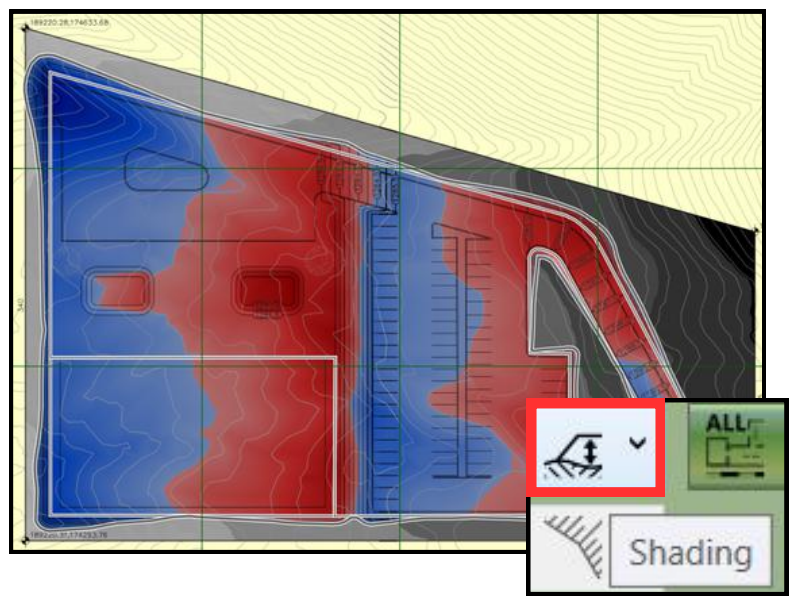
Cut/Fill Shading

Cut/Fill is the default visualisation mode and will display volumes like so:

Red = cut
Blue = fill

The darker the colour, the greater the volume difference.

You can change shading mode in the 'Display' panel.

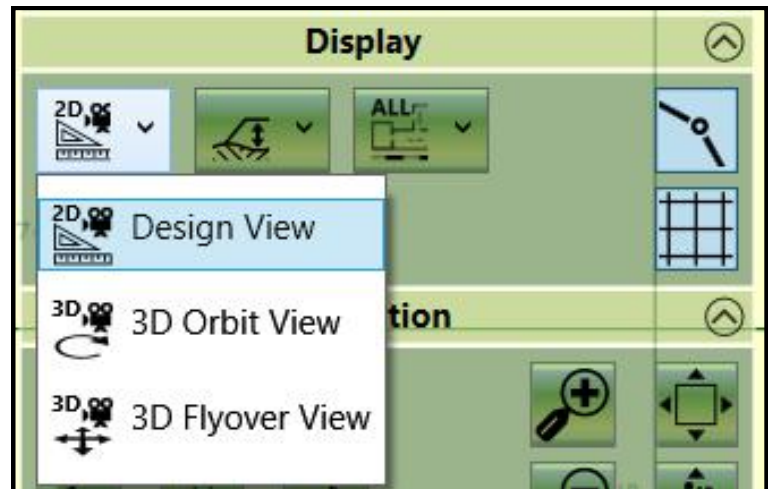


View Types

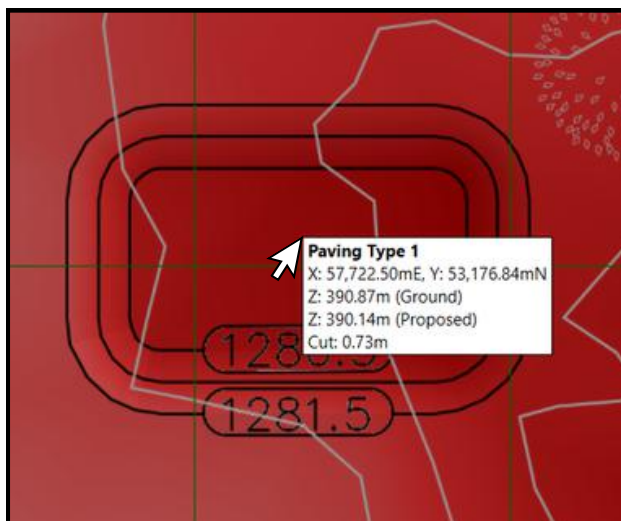
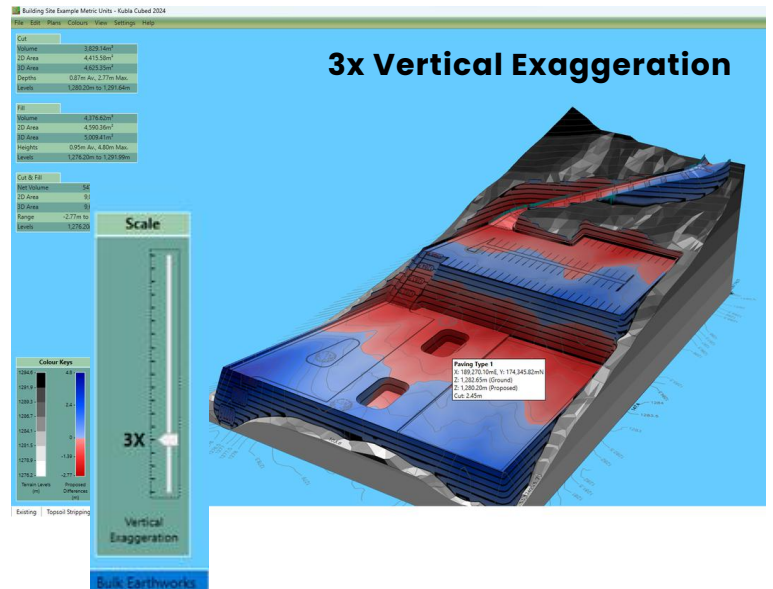
Switch between:

- Design View
- 3D Orbit
- 3D Flyover

to validate your model visually



Tip: Use the 'Vertical Exaggeration' slider to magnify elevations and visually validate your model.



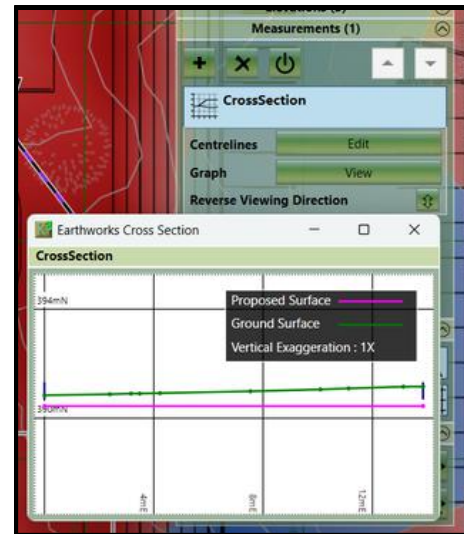
Verify Levels

Hover the cursor to check ground level, proposed level and Cut/Fill values.

Use Cross Sections

To compare the existing and proposed surfaces along a selected line.

This is a useful way to check levels, batter slopes, and cut/fill depths before finalising your estimate.



Cross sections can be made from the 'Measurements' panel



Re-order elements using the arrows at the top of the Elevations panel

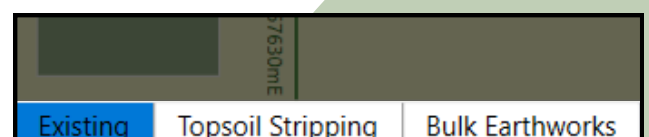
Review Element Order

Intersecting elements can produce different results depending on calculation order.

Elements lower in the list will take priority over those above it

Review Phase Order

Confirm work is in the correct phase.



12. Exporting Results

Once satisfied:

Export Reports

Generate:

- Volume reports
- Quantity summaries

Export Spreadsheets

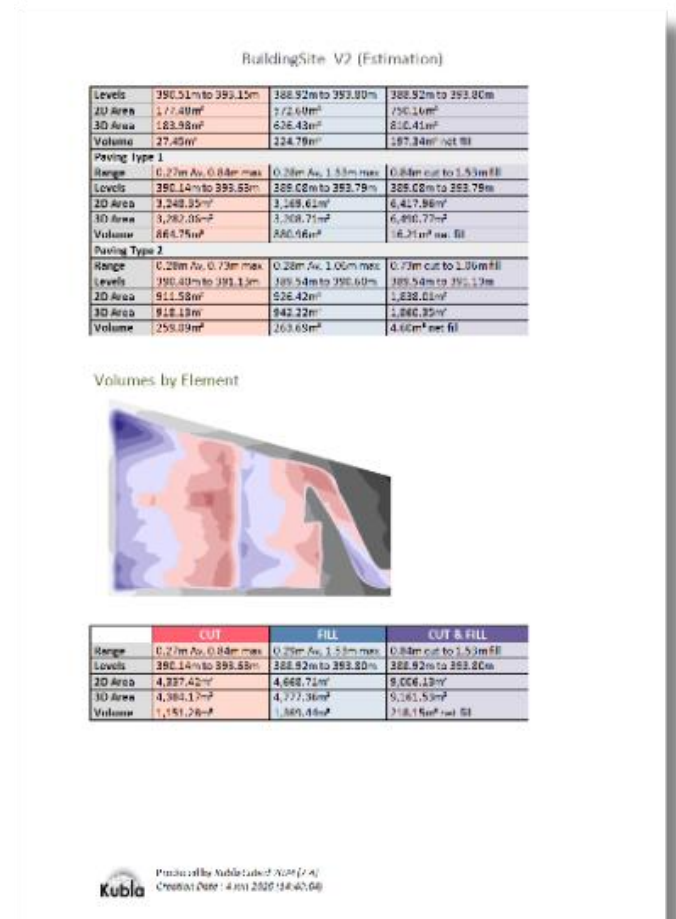
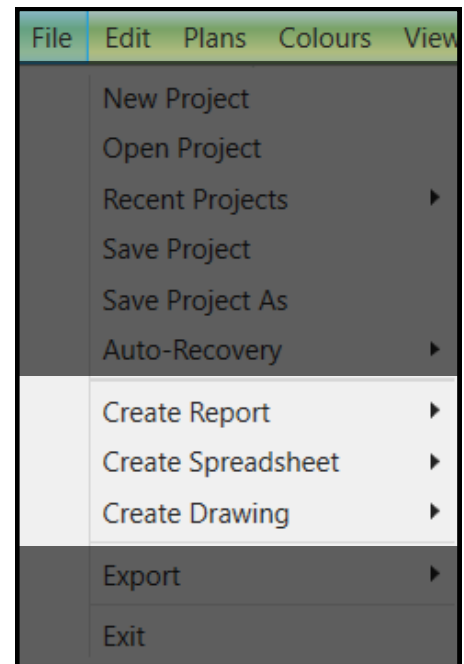
Generate:

- Detailed quantity schedules
- Breakdown reports

Export Drawings

Create:

- Images
- CAD exports
- LandXML files





Quick Start Checklist

Before calculating

- ☐ Units are correct
- ☐ Drawing is correctly scaled
- ☐ Existing ground is complete
- ☐ Surface outline is correct

Before exporting

- ☐ Proposed levels have been checked
- ☐ Subgrade/formation depth is correct
- ☐ Element order has been checked
- ☐ Construction phases are correct
- ☐ Cut/fill has been visually reviewed
- ☐ Cross sections have been checked where appropriate
- ☐ Results are reasonable

Common Beginner Mistakes

Wrong scale

Always measure a known distance after importing a drawing.

Wrong units

Check project units before entering dimensions or elevations.

Incorrect phase

Remember that each phase starts from the previous phase's proposed surface.

Incorrect element order

Elements lower in the Elevations Panel take priority where elements overlap.

Incorrect subgrade method

Use Reduce when the subgrade should follow the finished surface at a constant depth. Use a platform when a constant level is required.

Need help?

[Troubleshooting guide](#)

[Video tutorials](#)

Contact support: support@kublasoftware.com