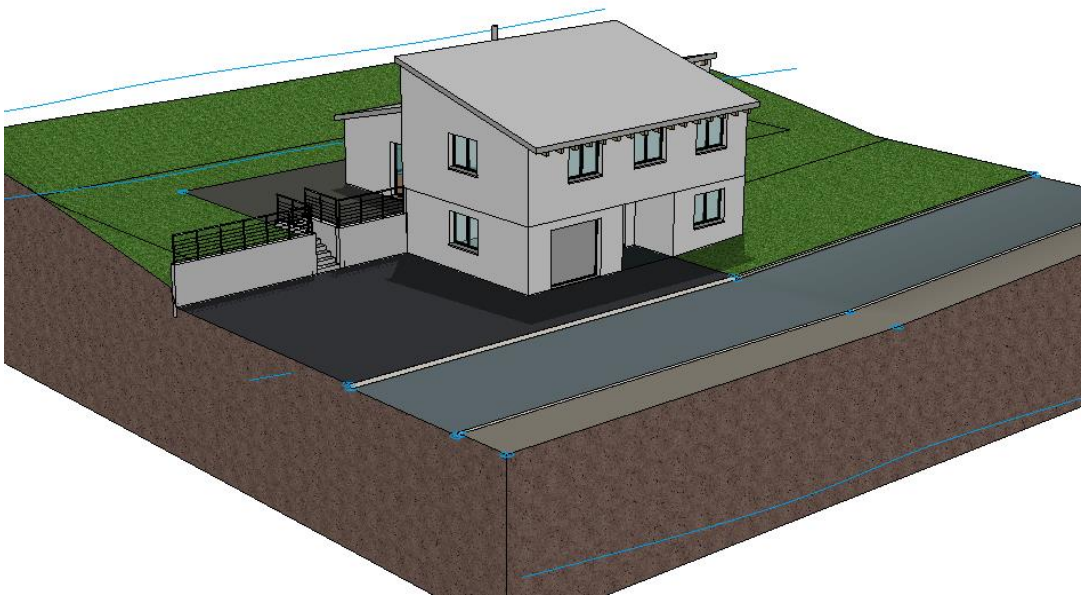


# COURSE UNIT



## Additional Module - Terrain

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# INTRODUCTION

Terrain is an additional module and requires its own codeword.

## How to use this course unit

This course unit is not a manual but a combination of theory and workshops with which to learn the programme on a 1-to-1 basis. Every mouse-click and every entry is described in detail, providing you with a teaching resource that lets you learn the basics of the programme by yourself. Each chapter provides explanations, information, and a workshop to practise the functions. To enable the workshops to be completed smoothly, the explanations should be read through very carefully. The order of chapters should not be changed because each workshop builds on the previous one. The programme DVD contains examples stored as an ELITECAD file, enabling problematic places to be reviewed.

## Conventions used in this course unit

The start and end of a workshop are marked as follows:

▼ ▼ ▼ ▼ **WORKSHOP**

---

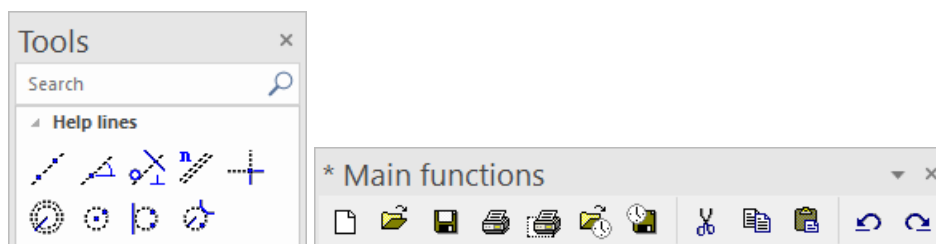
**WORKSHOP END**

Functions are written in block capitals. The corresponding icon also appears for new functions.

FUNCTIONS (BLOCK CAPITALS)



Functions can be accessed directly using icons (buttons). The functions are grouped together in toolbars or in the large tool management.



**[Enter]**

Function keys on the keyboard appear within square brackets.

**Input values (bold)**

Input values must be entered using the keyboard. When the text is entered in the input line, it must be confirmed with the [Enter] key.

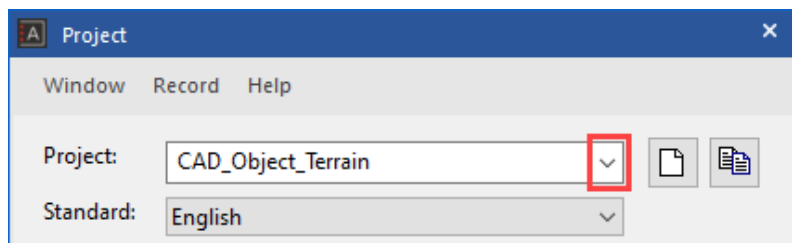
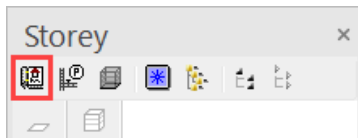
# PREPARATION

## ▼ ▼ ▼ ▼ WORKSHOP

---

In this course we start with the CAD\_Object\_Terrain.  
First, load the project.

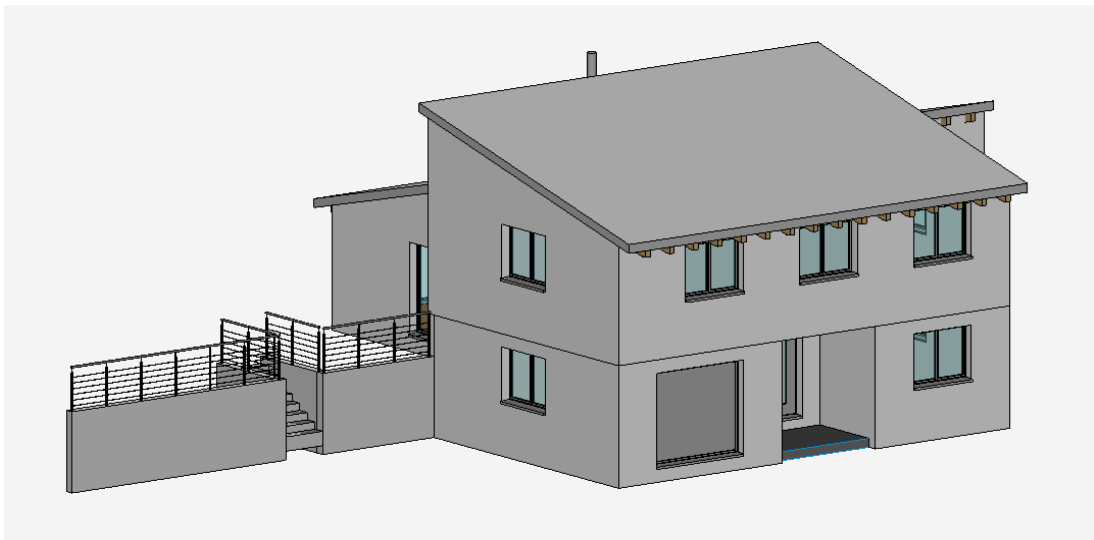
1. Open the project settings.



Select the project "CAD\_Object\_Terrain".

2. Load the corresponding model file by clicking FILE > OPEN from the menu.  
Select the model "Starting Position".

The opened model should look as follows.



---

**WORKSHOP END**

# DEFINE HEIGHT LINE

## ▼ ▼ ▼ ▼ WORKSHOP

1. Start the terrain function.



2. For the sake of clarity, we recommend temporarily switching off the display of height lines and the slope.

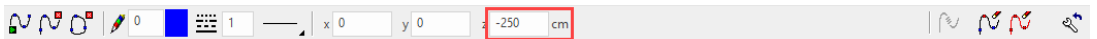


3. Select the function NEW HEIGHT LINE.

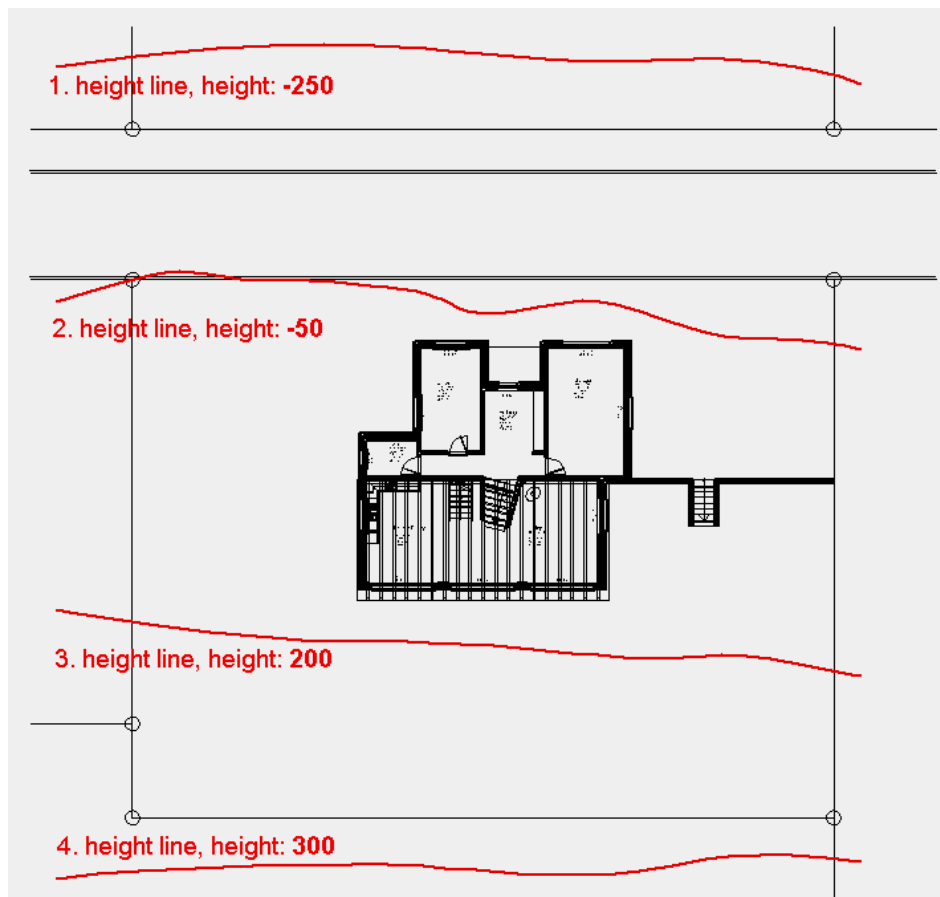


Create the height lines one after the other as shown in the sketch.

4. In the properties bar enter the value **-250** for the height (z). Watch for the adjusted units, because the unit for the terrain is configurable in the terrain parameters.



5. Draw the first height line by tracing the template (**line 1**). You do not need to set very many points because the curves are interpolated following termination.



6. To finish the height line, select the function NURBS END or the [Enter) key.



7. Start the second height line with NURBS BEGIN and enter the height **-50** for the Z value.



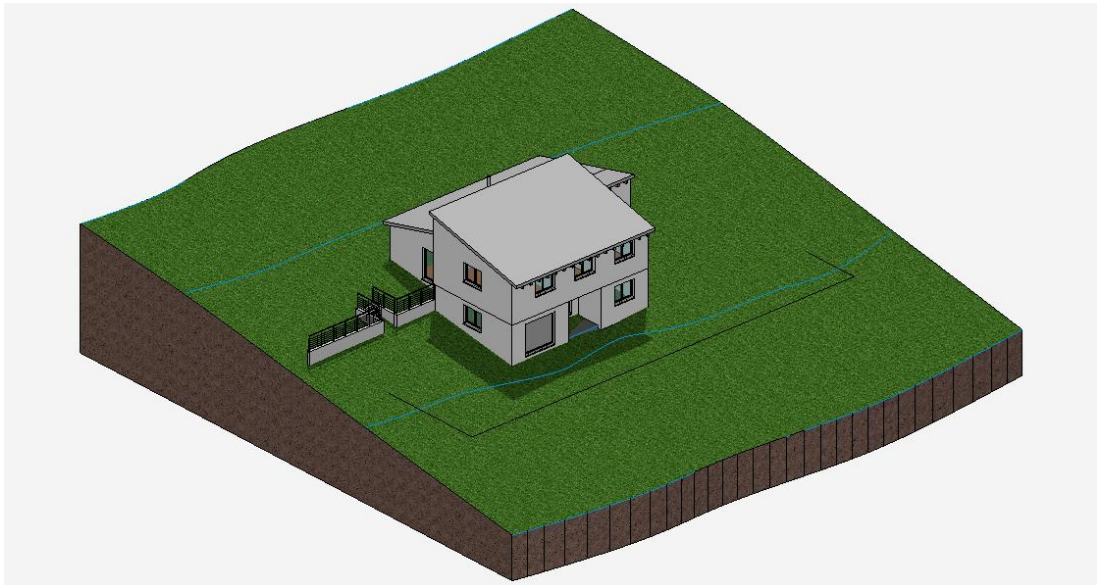
8. Draw the second height line by tracing the template (**line 2**).

9. End the second height line with the function NURBS END or the [Enter] key.



10. Next, draw the 3rd and 4th height line in exactly the same way as you drew the first two. Ensure that you enter the correct heights.

11. Now switch to the solid model [Ctrl]+[D] and check your entries.



12. Cancel function [Esc], save work copy [Ctrl]+[W]

### TIP

To change the height of a height line later on, click on the nurbs curve to open the properties bar. There you can change the value of the height or you can remove a height line using the function DELETE CURVE.



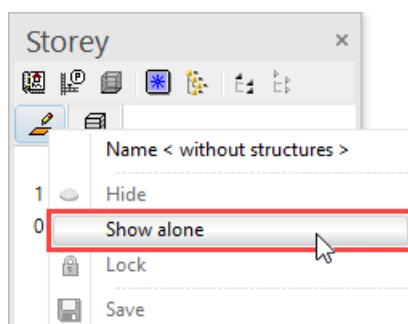
WORKSHOP END

## OUTER CONTOUR

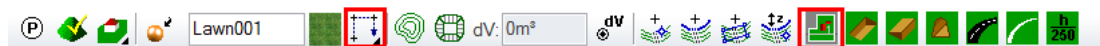
The outer contour generally marks the limits of the piece of land. It is required so that the excavations, landfill/dispersals, etc. can be created. The 3D model is cut, however the height curves and height points that lie outside are always included in the calculation.

### ▼ ▼ ▼ ▼ WORKSHOP

1. Make only the "without structure" storey visible. In the list of storeys, right-click on "without structure" and select the option "Show alone" or double-click on the Storey icon.



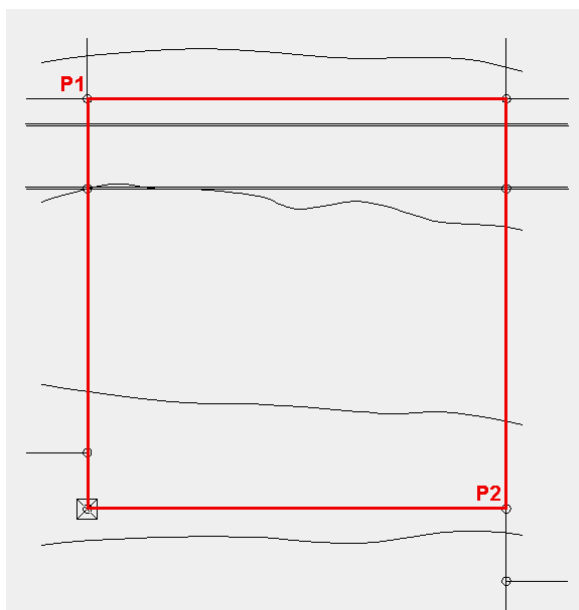
2. Start the Terrain function and then the BORDER CONTOUR. Ensure that the type of entry is set to "Contour entry".



3. The drawing functions appear in the Input Assistant. Switch to the drawing function RECTANGLE.



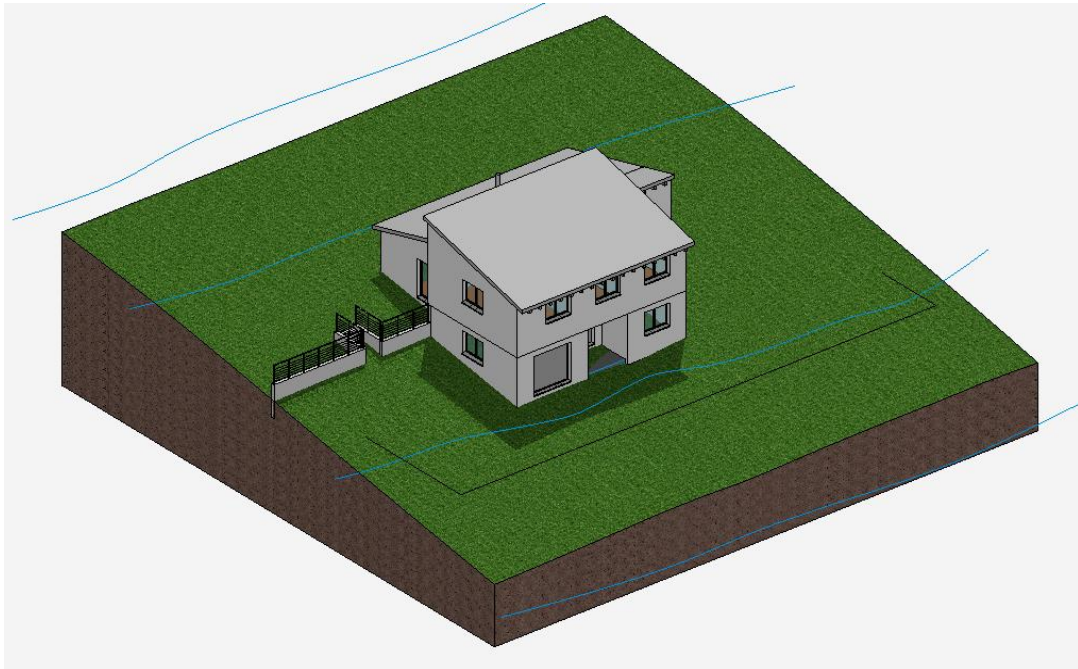
4. Now draw the following rectangle through **P1** and **P2**.



5. Show



6. When you switch to the solid model [Ctrl]+[D], you will see that the terrain of the outer contour has adjusted itself.



7. Cancel function [Esc]

---

**WORKSHOP END**



## SAVE REFERENCE TERRAIN

The reference terrain is the terrain that has increased in size. If it was saved, ELITECAD can display the difference volumes for the finished terrain.

Before you determine the reference terrain, you should save the entire model since this action cannot be reversed.

### ▼ ▼ ▼ ▼ WORKSHOP

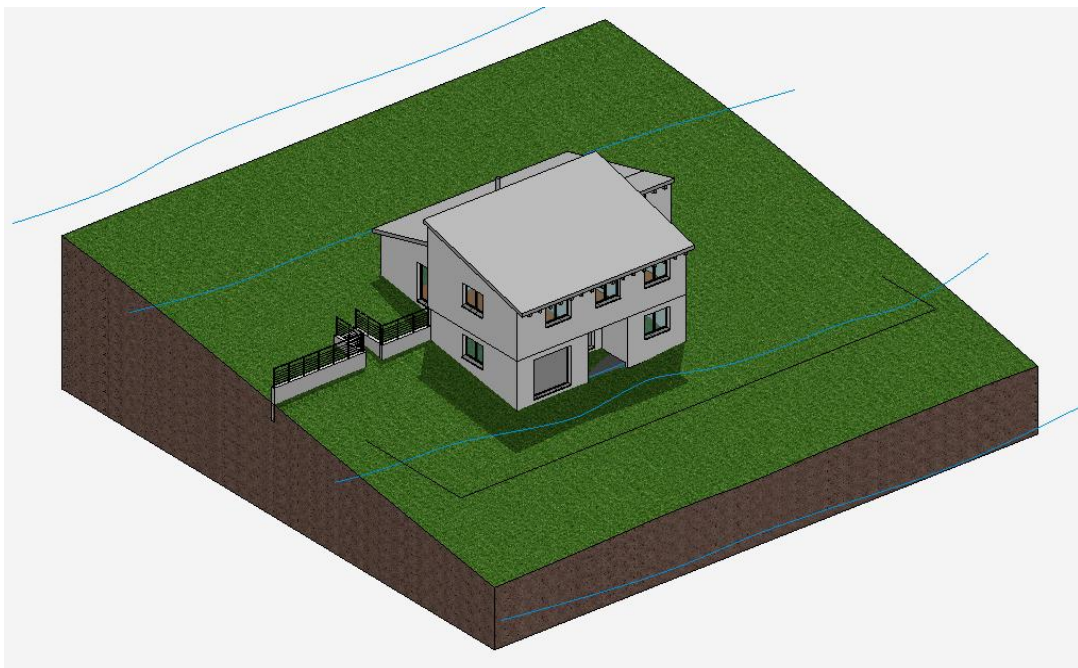
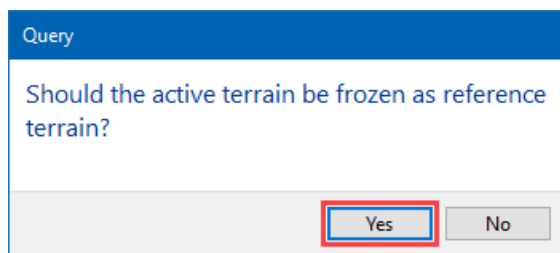
1. Start the terrain function.



2. Select the function SAVE REFERENCE TERRAIN.



Confirm the prompt with YES.



3. Cancel function [Esc].

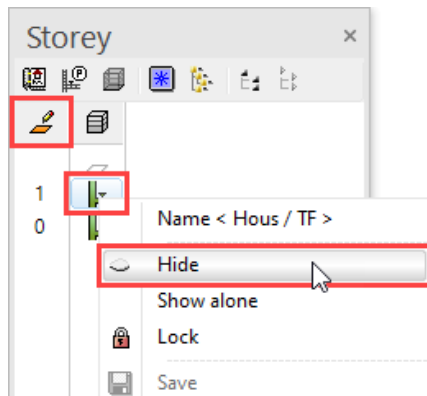
WORKSHOP END


# EXCAVATION

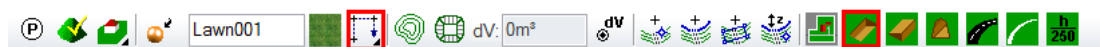
The excavation is defined via a contour. Several excavations can be defined in the same project.

## WORKSHOP

1. Switch the "without structure" storey to *current* and the top floor to *hide*.



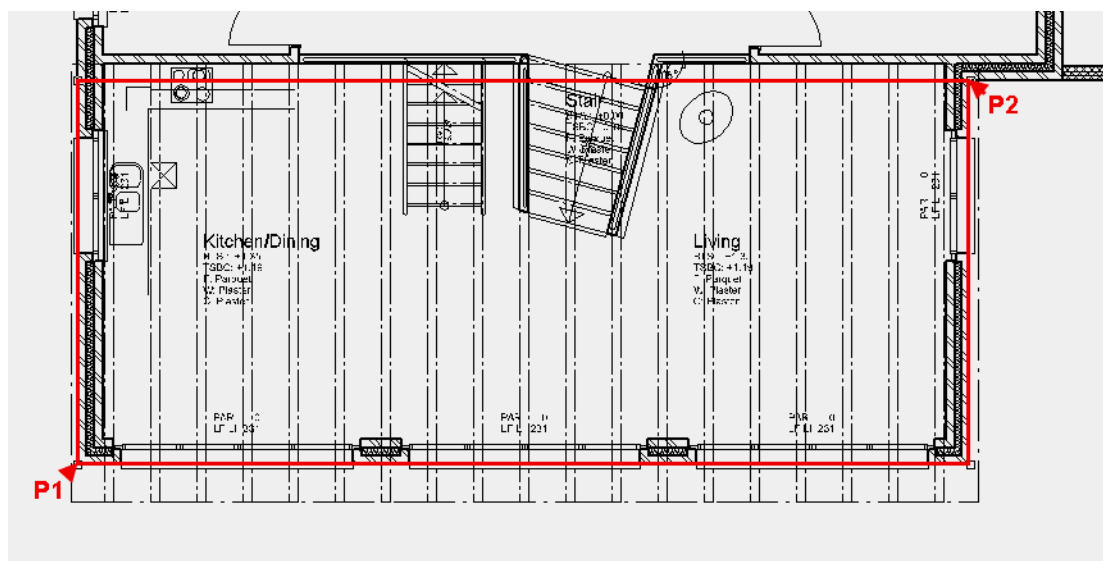
2. Start the TERRAIN function  and then the EXCAVATION function. Ensure that the type of entry is set to "Contour entry".



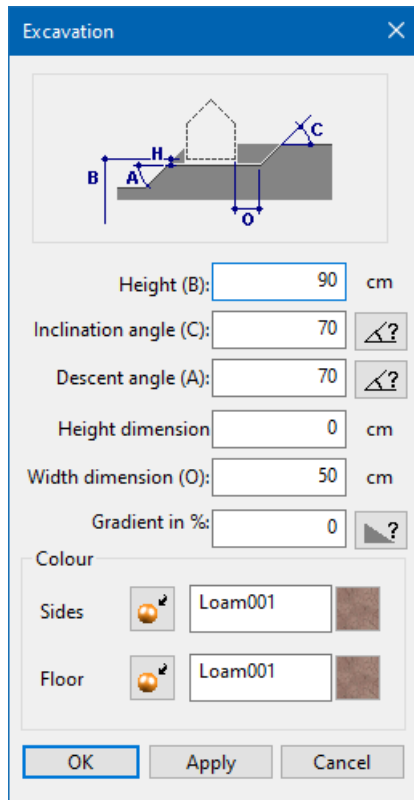
3. The drawing functions appear in the Input Assistant. Switch to the drawing function RECTANGLE.



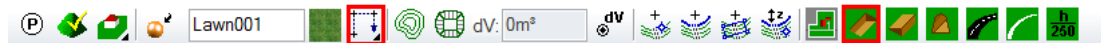
4. Draw the rectangle using the two points **P1** and **P2**.



5. Add the values in the excavation screen and confirm with OK.



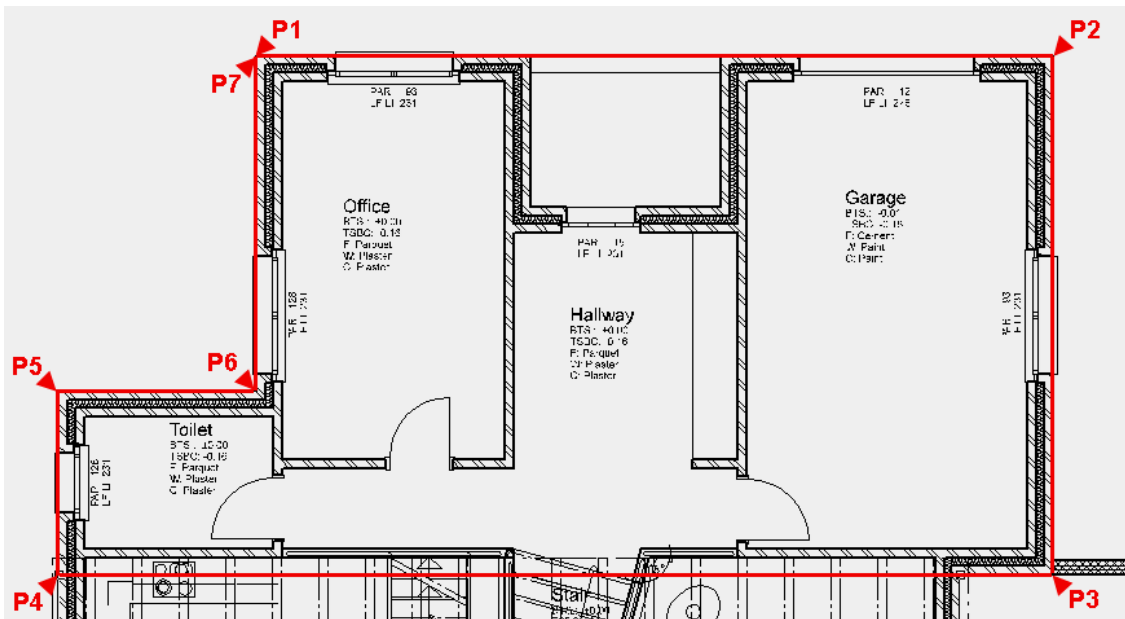
6. Start the terrain function and then the EXCAVATION function. Ensure that the type of entry is set to "Contour entry".



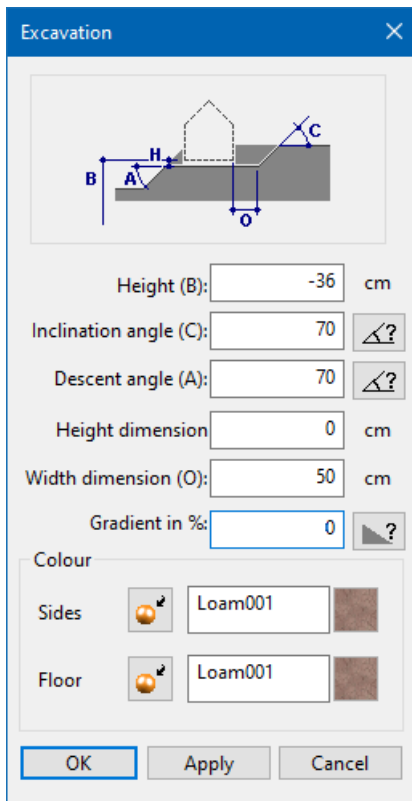
7. The drawing functions appear in the Input Assistant. Switch to the drawing function POLYGON.



8. Draw a contour from point P1 – P7.



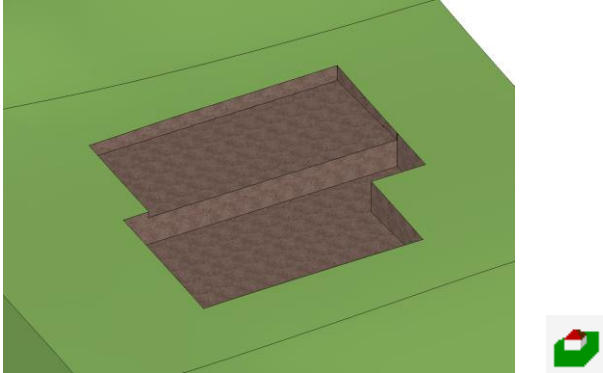
9. Add the values for the second excavation and confirm with OK.



**TIP**

There are 3 different display methods for the terrain.

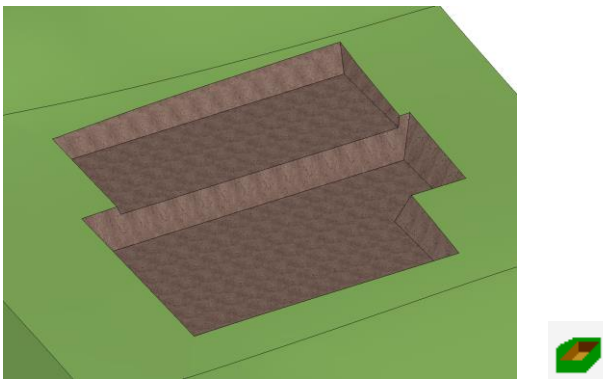
- TERRAIN MODE - WITH STRUCTURES



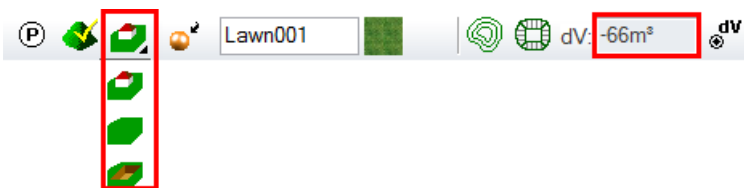
- TERRAIN MODE - WITHOUT EXCAVATION (REFERENCE TERRAIN)



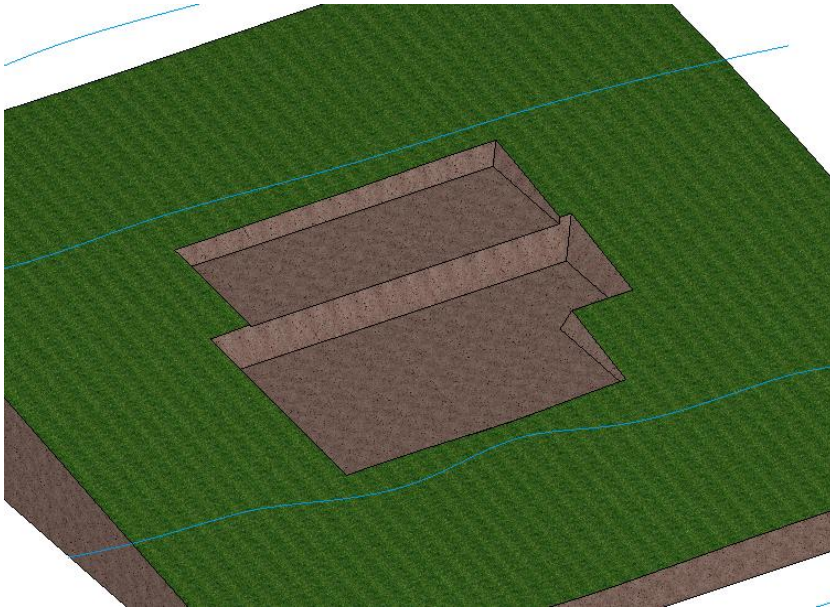
- TERRAIN MODE WITH EXCAVATION



The difference between the reference terrain and the current interface is displayed as volume in the properties bar .




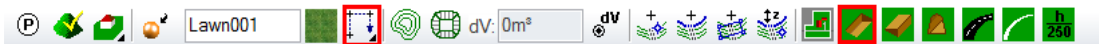
Your terrain should then look as follows:



For the internal staircase an additional excavation must be defined.

10. Display the "GF" storey manually by double-clicking on the storey icon.

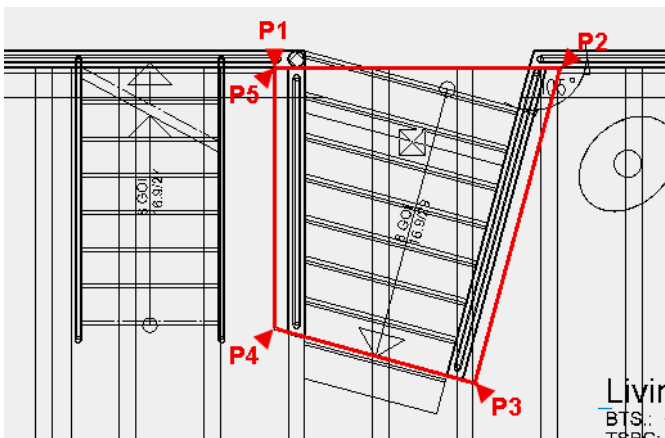
11. Start the TERRAIN  function and then the EXCAVATION function. Ensure that the type of entry is set to "Contour entry".



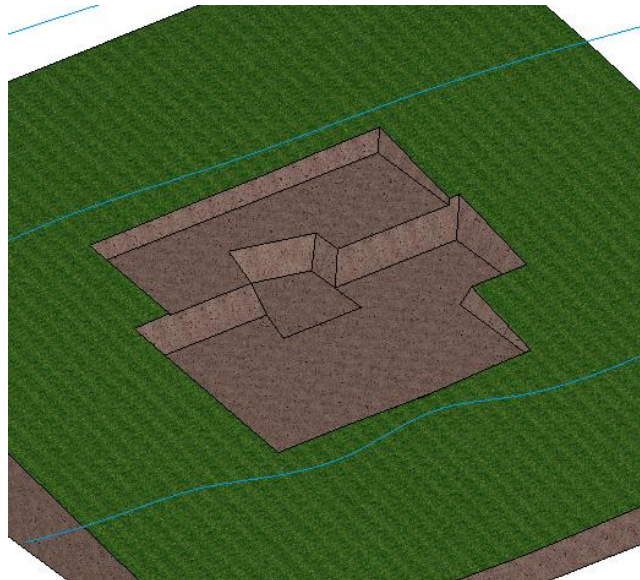
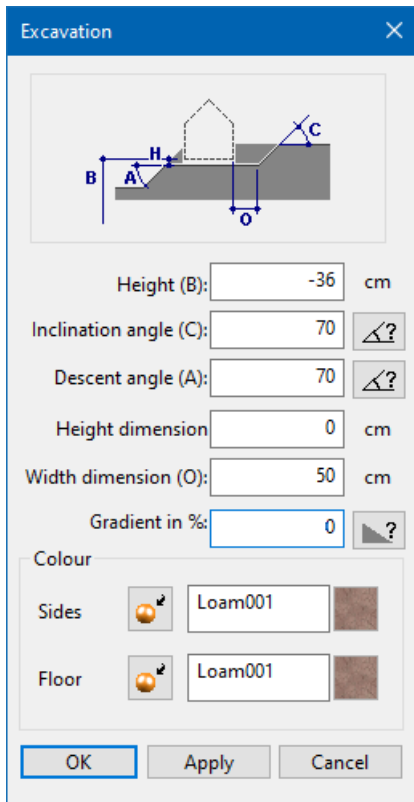
12. The drawing functions appear in the Input Assistant. Switch to the drawing function POLYGON.



13. Draw the polygon along the red contour.



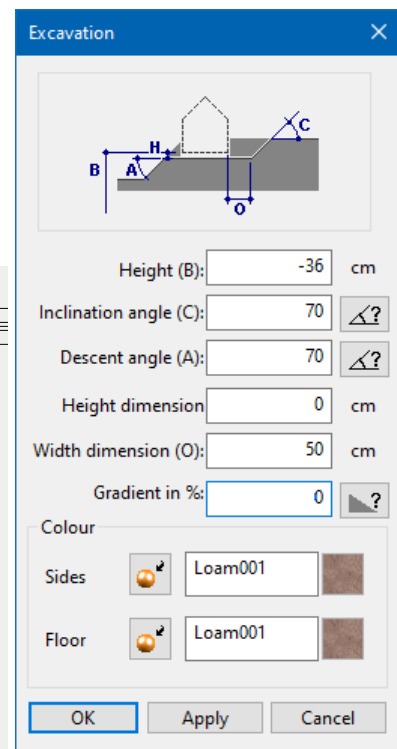
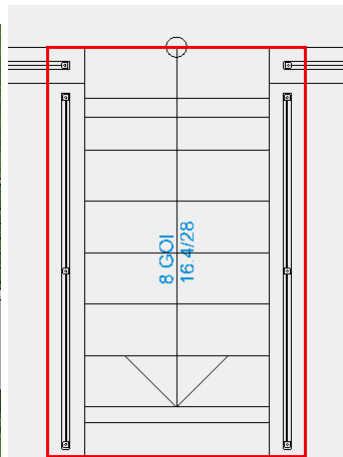
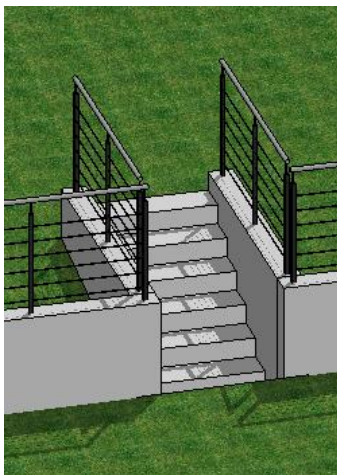
14. Add the values in the excavation screen.

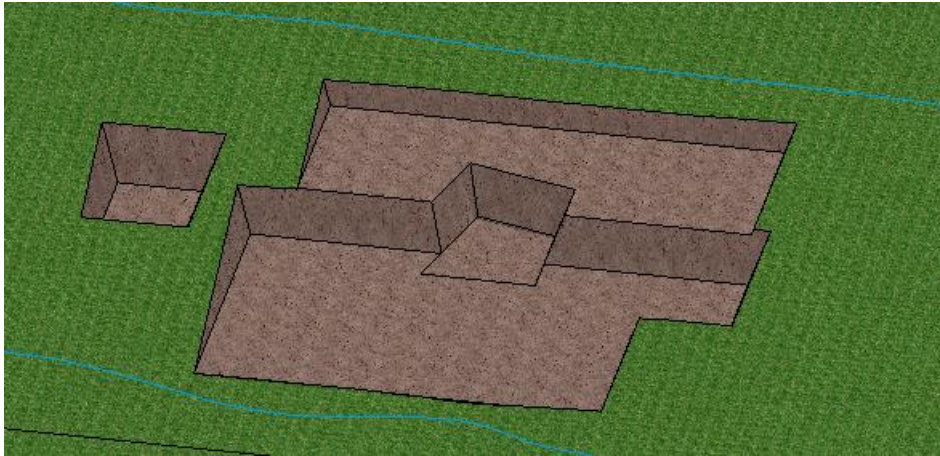


15. Create the storey "without structure" manually by double-clicking on the storey icon.

The excavation for the stairs was created.

16. Now try to create the excavation for the external staircase.





---

**WORKSHOP END****TIP**

The settings for the excavation can be edited and changed if necessary. In the wire model, either select the excavation contour or, in the solid model, a plane of the excavation and click in the properties bar on **TERRAIN OPTIONS**. The excavation screen opens and the values can be changed.

**TIP**

Before continuing, save the current status of the terrain so that you always have this excavation state available.

If you create the terrain only, in the menu select **FILE > SAVE AS** and save the terrain (visible selection) under a separate name.



# TERRAIN SURFACES

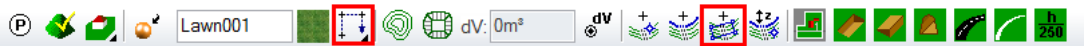
## ▼ ▼ ▼ ▼ WORKSHOP

The terrain will now be adapted to the house.

1. Set everything up and switch to the terrain mode "with structure".



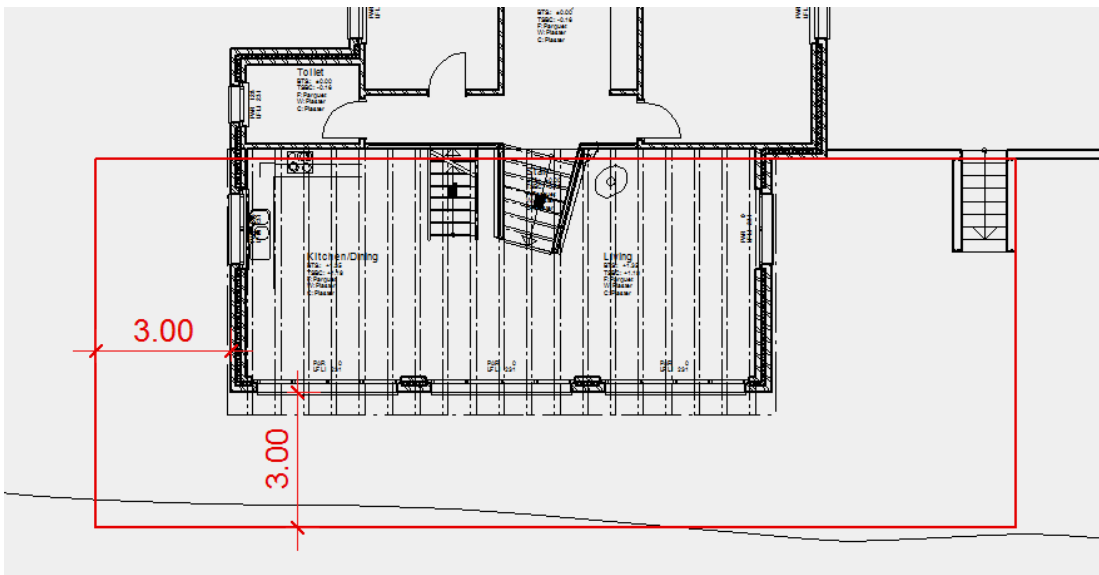
2. Start the TERRAIN function and then the function NEW TERRAIN EDGE/AREA. Ensure that the "type of entry" is set to contour entry.



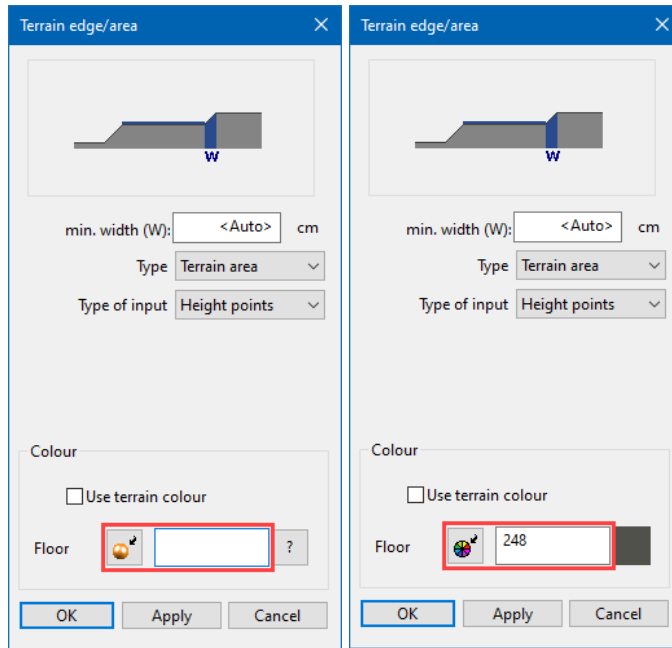
3. The drawing functions appear in the Input Assistant. Switch to the drawing function RECTANGLE.



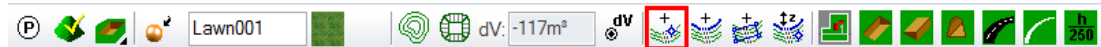
4. Draw the contour shown in red.



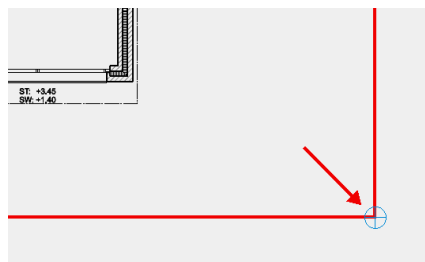
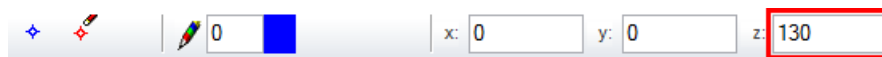
5. For the ground colour delete any material name present, switch to colour mode, and enter the following values in the screen.



6. For the terrain surface to take effect a height point must be added to it. Start the function NEW DEFINITION POINT.



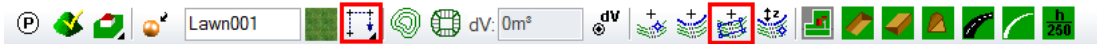
7. For the z coordinate specify the height **130**, place the point at the bottom right onto the corner of the terrain surface and confirm with [Enter].



The terrain now looks as follows:



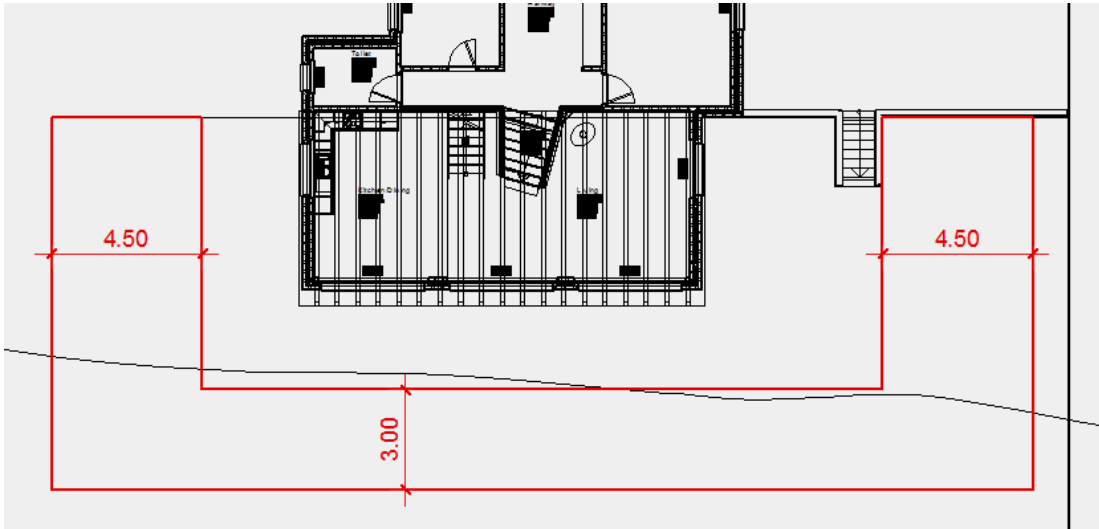
8. Restart the function TERRAIN and then the function TERRAIN EDGE/AREA.



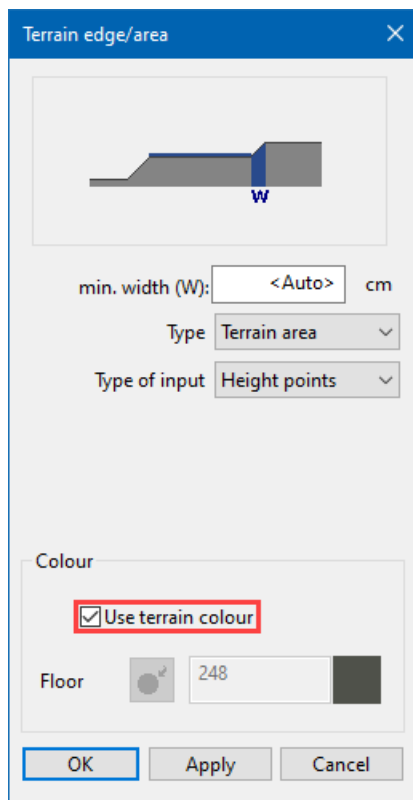
9. The drawing functions appear in the Input Assistant. Switch to the drawing function POLYGON.



10. Draw the contour shown in red.




11. Activate the option "Use terrain colour" and confirm with OK.



A height need not be assigned to this terrain surface because the definition point previously set applies to both areas.

The terrain now looks as follows:



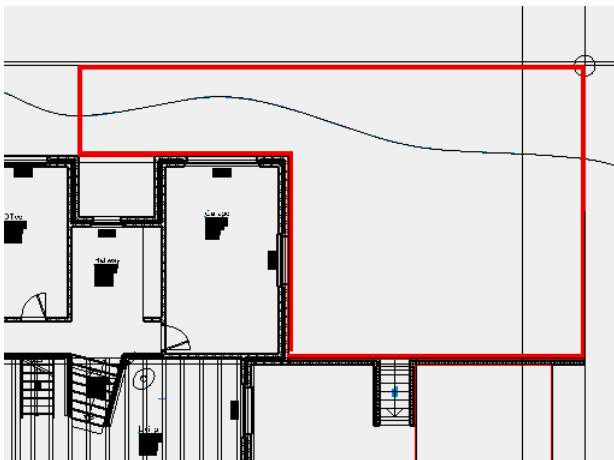
12. Restart the function TERRAIN  and then the function TERRAIN EDGE/AREA.



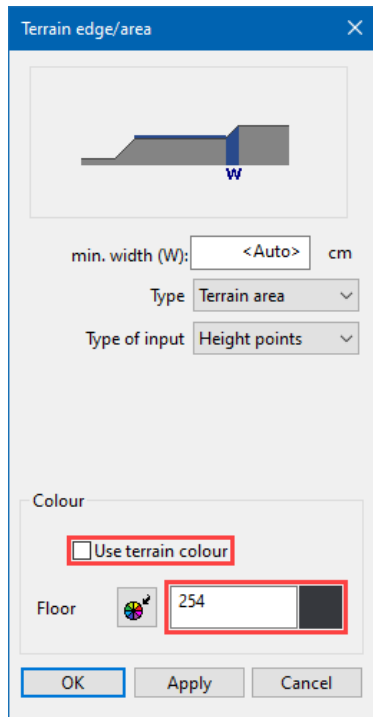
13. The drawing functions appear in the Input Assistant. Switch to the drawing function POLYGON.



14. Draw the contour shown in red.



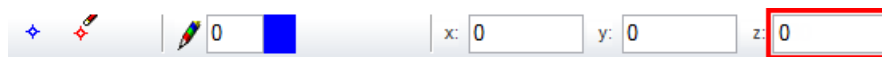
15. Enter the following values in the screen and confirm with OK.



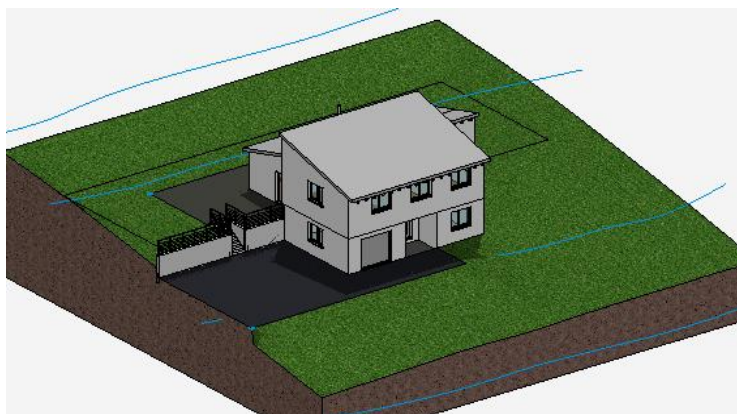
16. A height must be assigned to the terrain surface. Start the function NEW DEFINITION POINT.



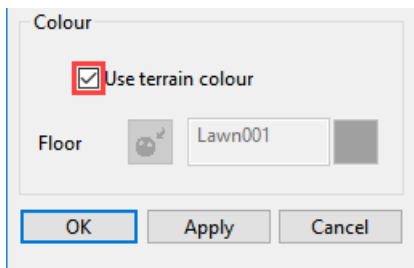
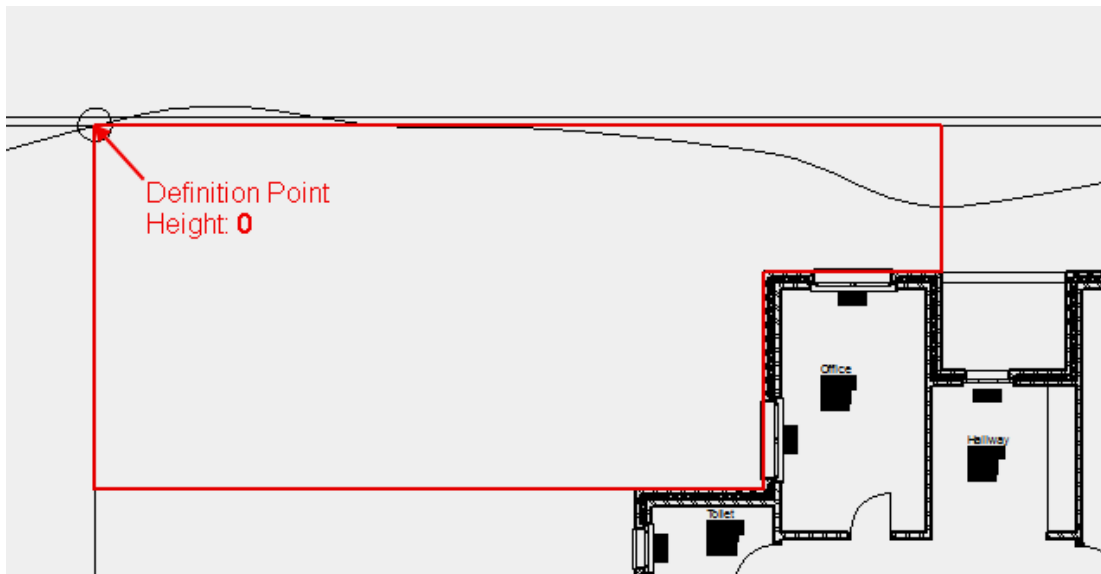
17. For the z coordinate specify the height 0, place the point at the top right onto the corner of the terrain surface and confirm with [Enter].



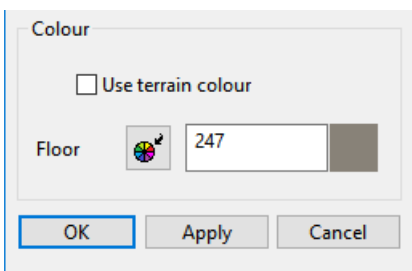
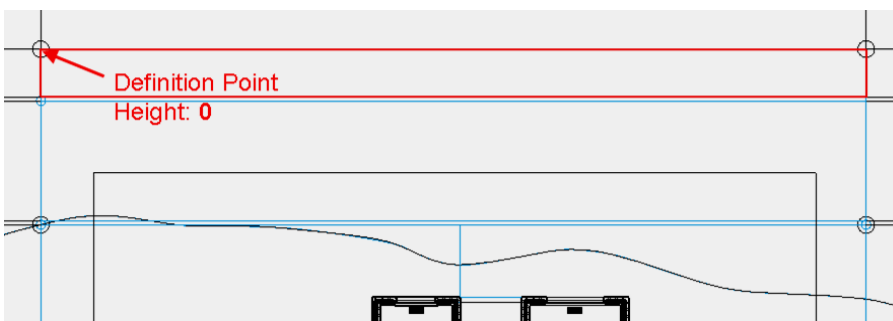
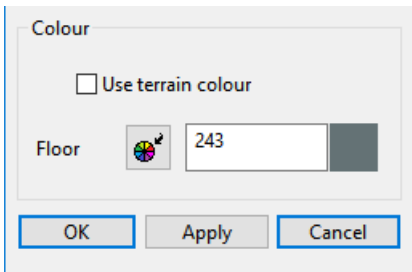
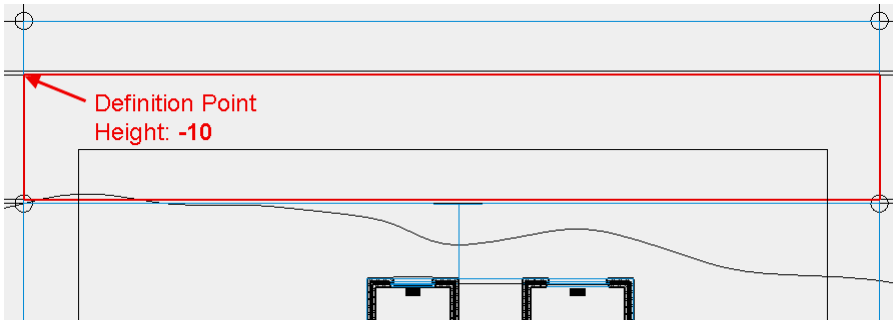
The terrain now looks as follows:



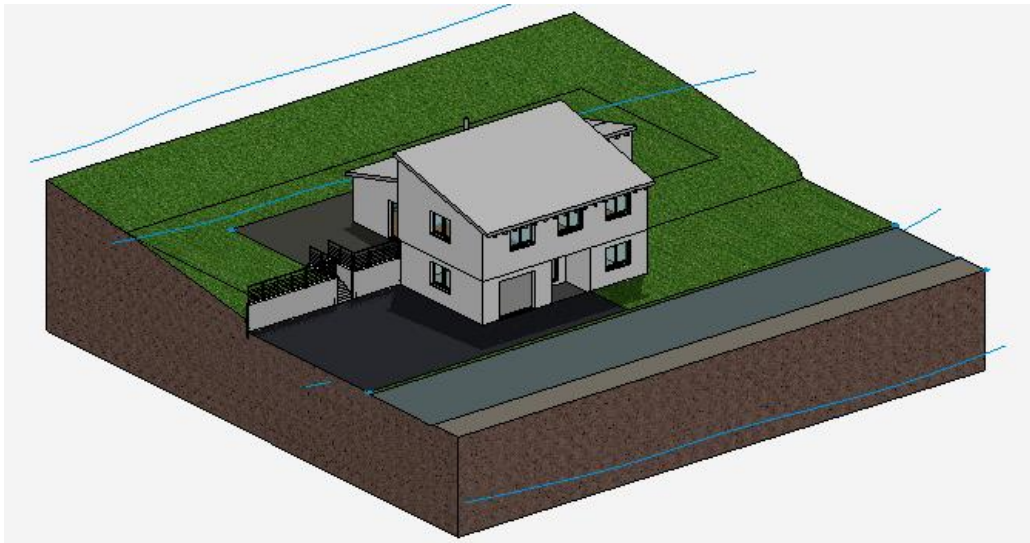
18. Draw additional terrain surfaces



Ensure that the terrain surfaces are the same distance apart as specified in the template.



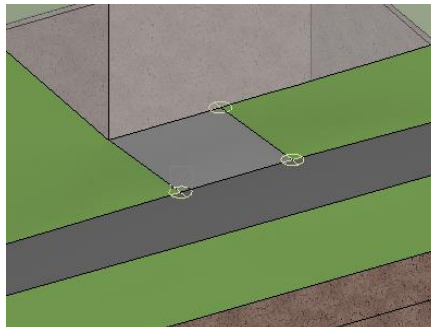
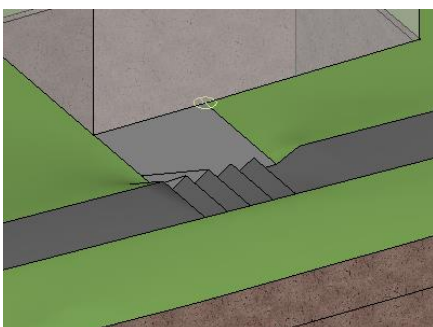
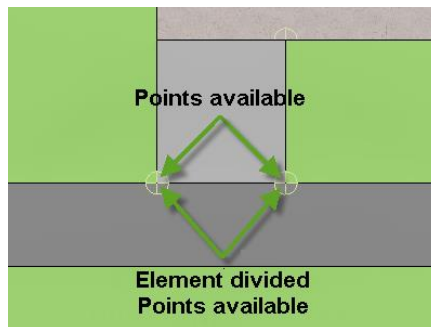
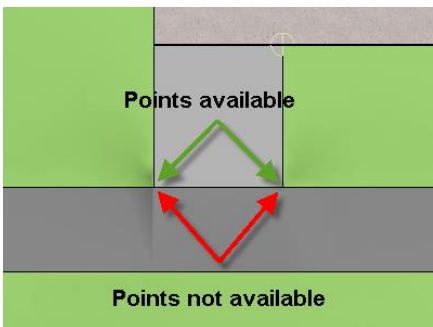
The terrain now looks as follows:



WORKSHOP END

### EXPLANATION

If terrain edges/surfaces are located exactly on top of each other, the 3D nodes are identical. After selecting the terrain surface you can insert additional points by clicking on a handle or gripper of the contour. Click on the terrain surface and divide the element on the relevant points. Height points must be set on these 3D nodes.



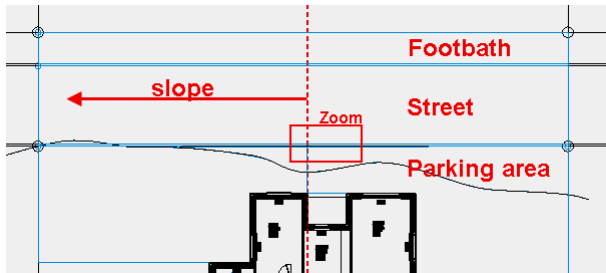


## MODIFY TERRAIN SURFACES

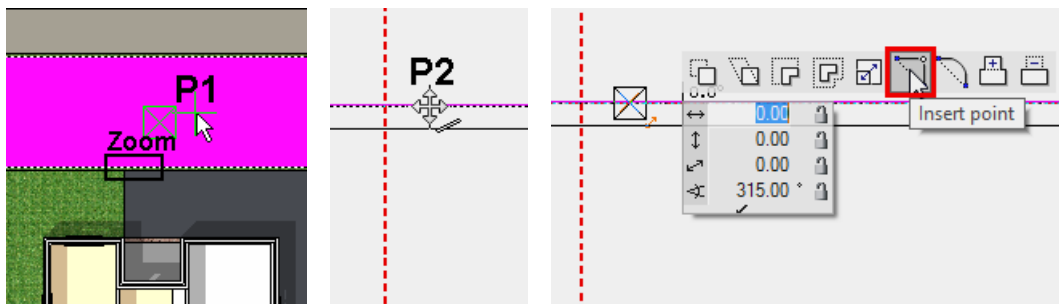
### WORKSHOP

The street is to have a slope after the area in front of the house. To do so, the contours must be adjusted.

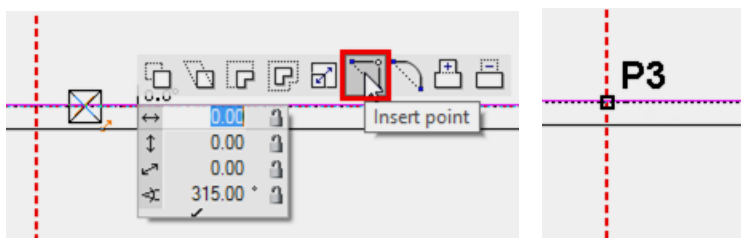
1. First, draw a vertical help line onto the edge of the forecourt.



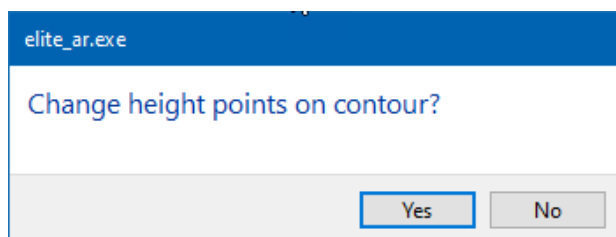
2. Change to the solid model and then select the terrain surface of the street **P1**. Change back to the wire-frame and zoom the picture to the given area. Move the cursor onto the lower element of the polygon until the double arrow appears. With one click **P2** you activate the current manipulation function in the Input Assistant. To display the function selected directly on the cursor, press the [Tab] key.



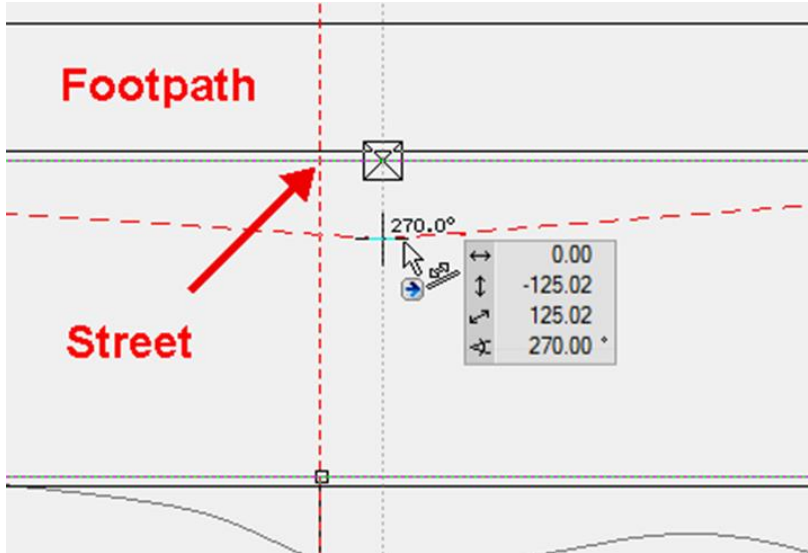
3. Select the function INSERT POINT and set a new point on the help line **P3**.



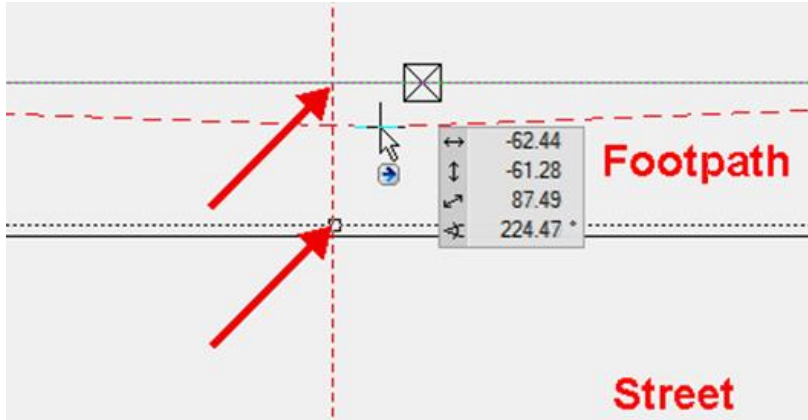
The following prompt can be answered with no.



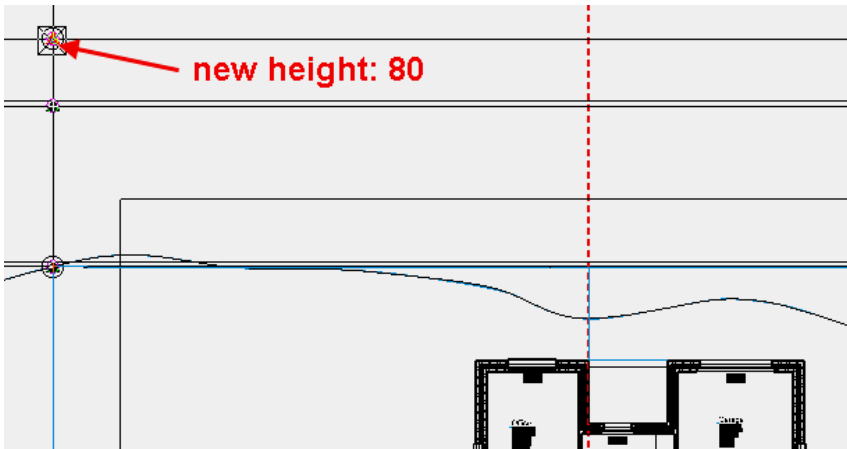
4. The street is still selected. Move the cursor to the upper element of the polygon until the quadruple arrow appears again. Click once to activate the manipulation function. The function last selected INSERT POINT is still active and the new point can be inserted on the help line. The following prompt can be answered with no.



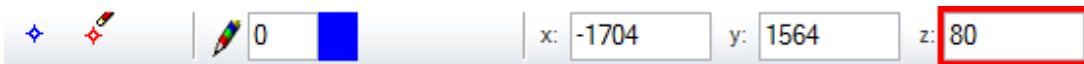
5. Do the same for the footpath. Select the terrain surface and move the cursor onto the lower element of the polygon until the double arrow appears. Click on the element and insert a new point. Repeat for the upper element.



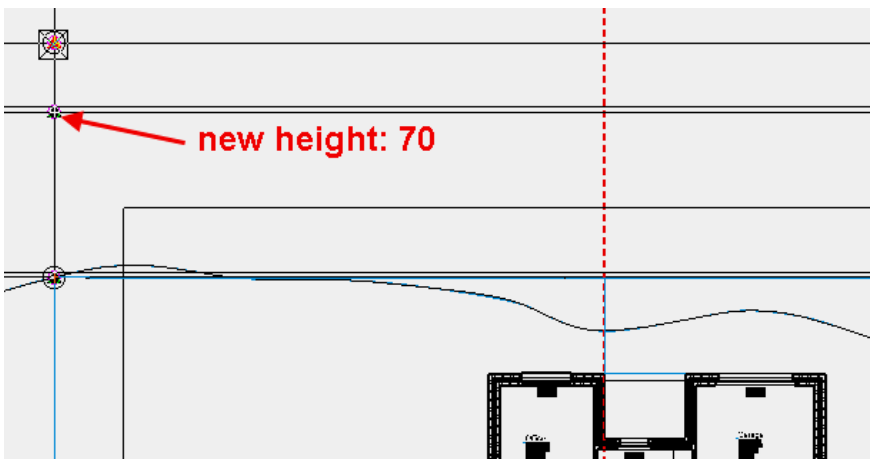
6. The height points can now be changed and/or new ones added. First, change the existing points by clicking on a definition point.



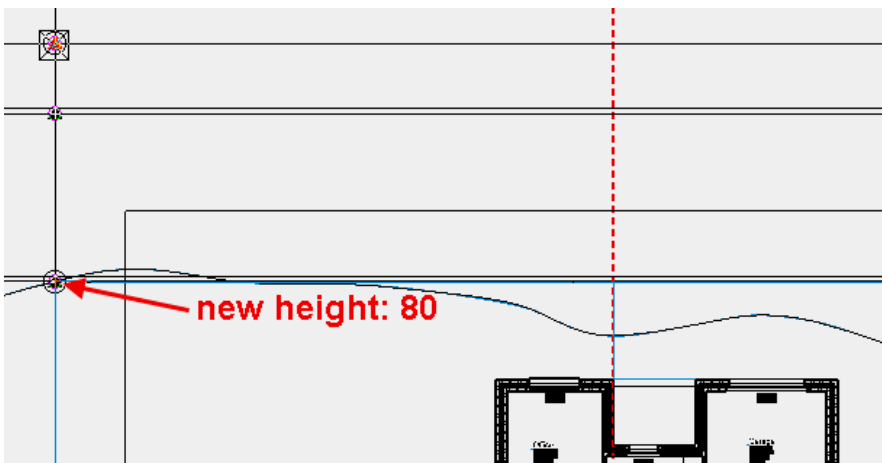
7. In the properties bar, enter the height **80** for the z coordinate and then cancel the function with [Esc].



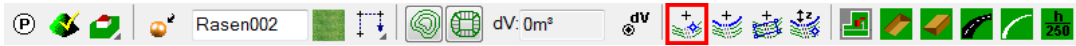
8. Click on the next point and change the height to **70**.



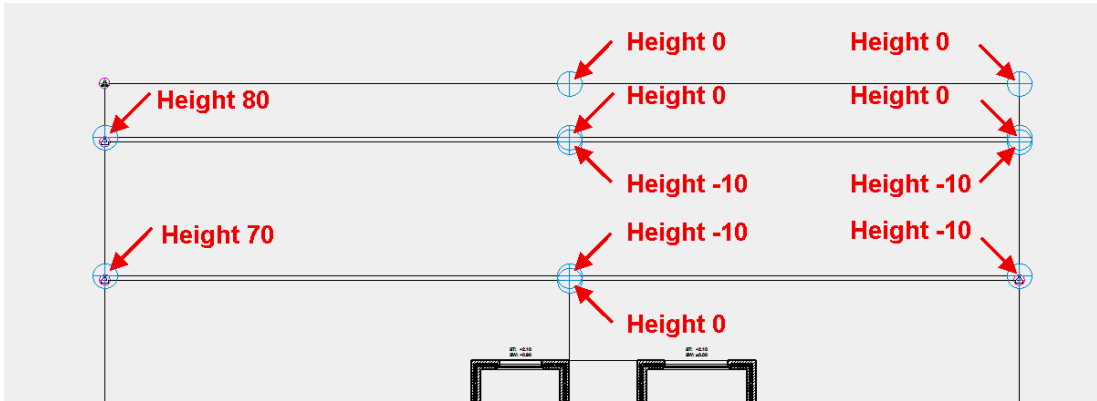
9. Also change the last point to the height **80**.



10. New heights must now be assigned to the terrain surfaces. Start the function NEW DEFINITION POINT.



11. For the z coordinate specify the height and set the points onto the corners and 3D nodes of the terrain surfaces. Complete the function with [Enter].



The terrain should now look as follows:

