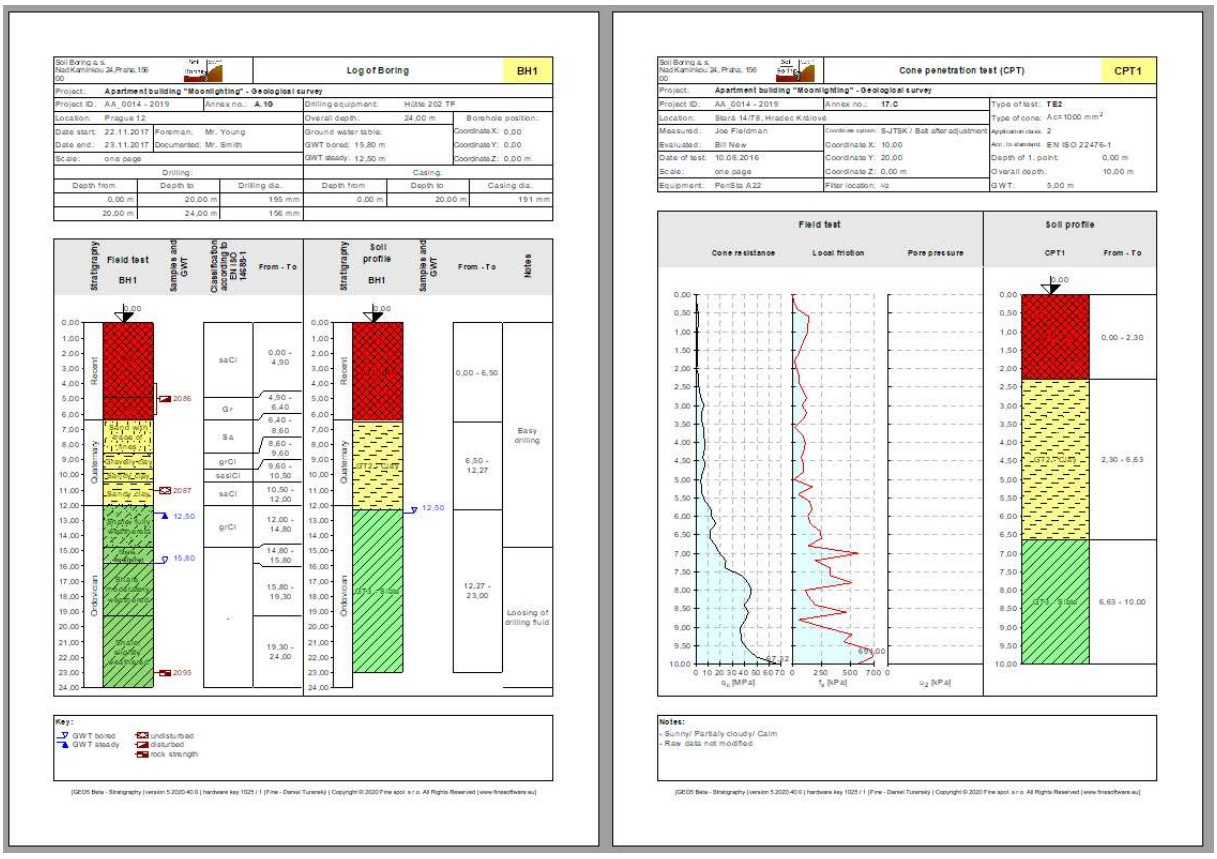
Interpretation of Field Tests into the Soil Profiles

Program: Stratigraphy
File: Demo_manual_43_1.gsg
Demo_manual_43_2.gsg

Boreholes and some other field tests have to be simplified or interpreted for geotechnical design or the creation of a 3D subsoil model. It is necessary to create geotechnical types of soils, define the thicknesses of soil layers for each test.

Assignment: Interpret the field tests from Engineering Manual No. 42 into the soil profile.

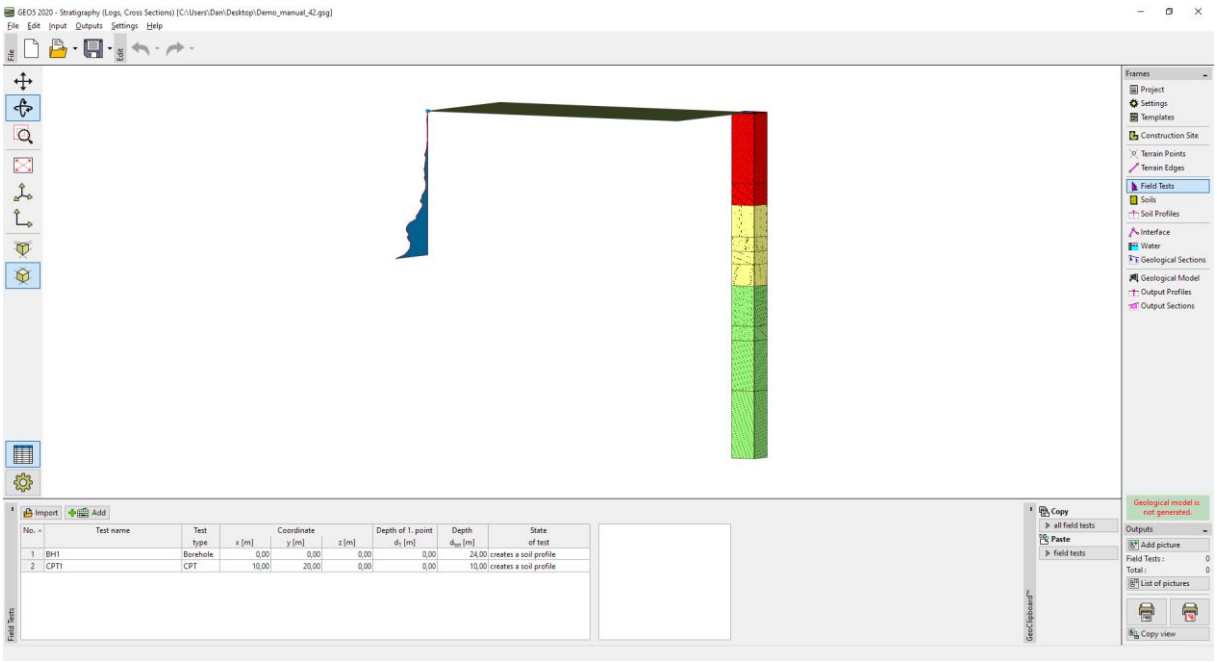


Solution:
There are two ways we can proceed:

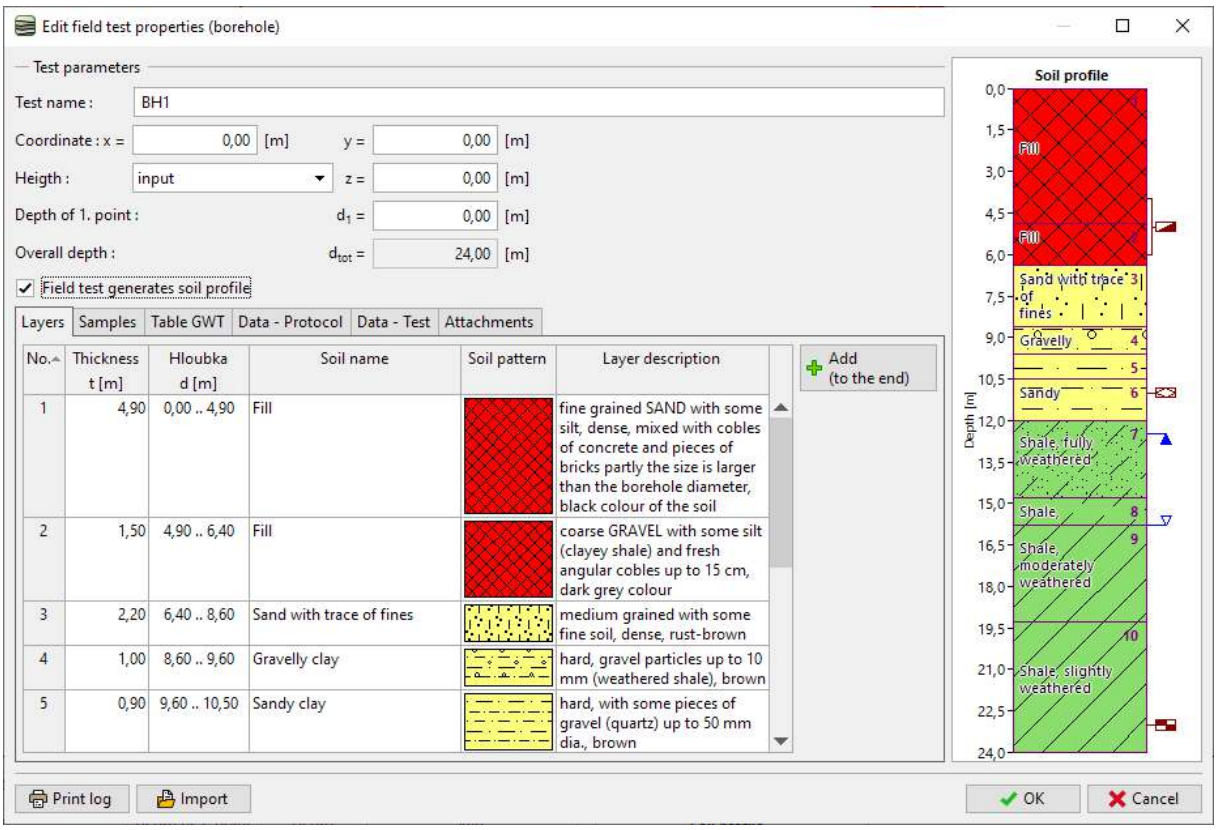
- Interpret the field tests separately in the “Soil Profile” frame
- Interpret the field tests when creating geological sections
- Combination of both ways

Approach 1 – Interpretation of field tests in "Soil Profile" frame

We will open the Demo_manual_42.gsg file and look at the entered tests – borehole "BH1" and CPT "CPT1".



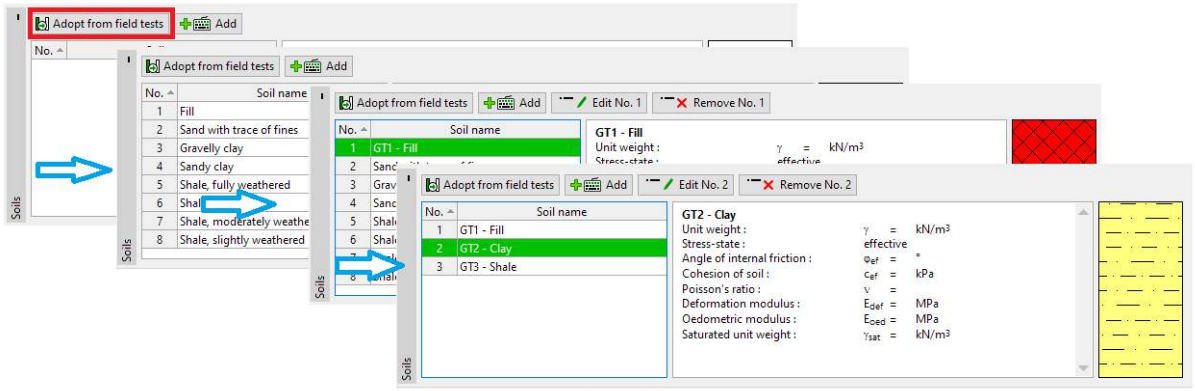
First, we will look at the borehole protocol and think about which geotechnical soil types we want to create.



The solution is never exactly clear; there are always different ways of simplification – for example:

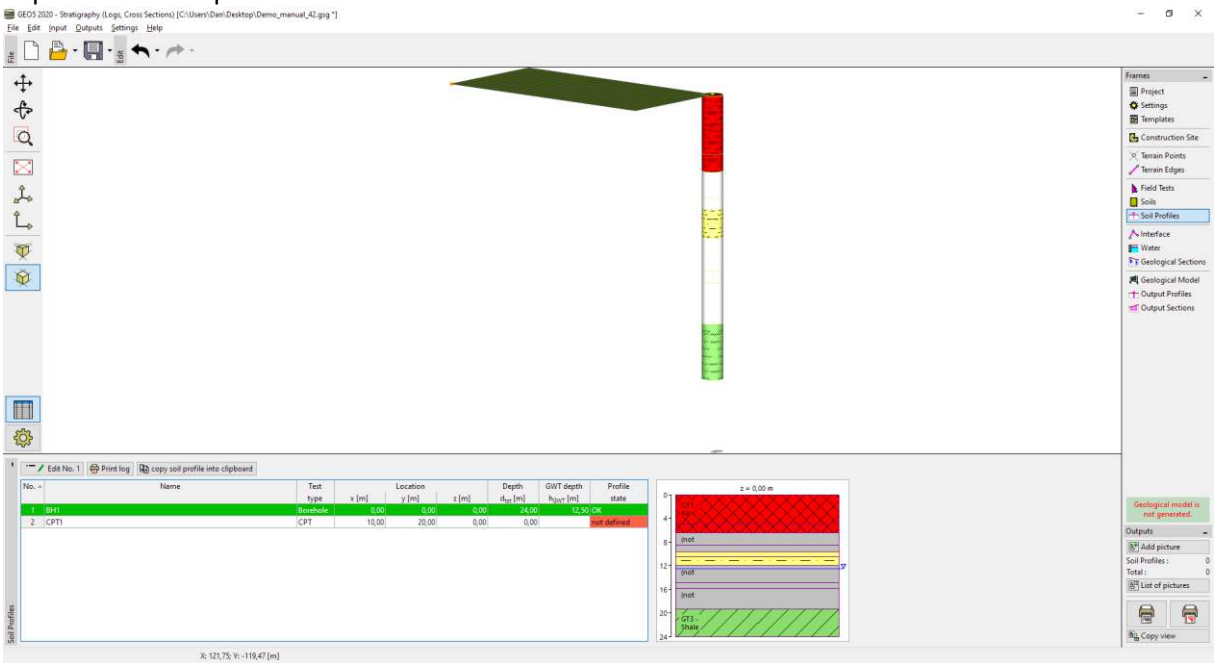
- GT1 Landfill, GT2 Sand, GT3 Clay, GT4 Weathered Slate, GT5 Slate
- GT1 Landfill, GT2 Fine-grained soils, GT3 Slate

In our example, we will choose a significant degree of simplification, and we will continue to work with three geotechnical types only. We will switch to the “Soils” frame. So that we do not have to input the names, samples, and colours of the soil again, we will take them from the tests. We will change the individual names of the soils and delete the other soils.



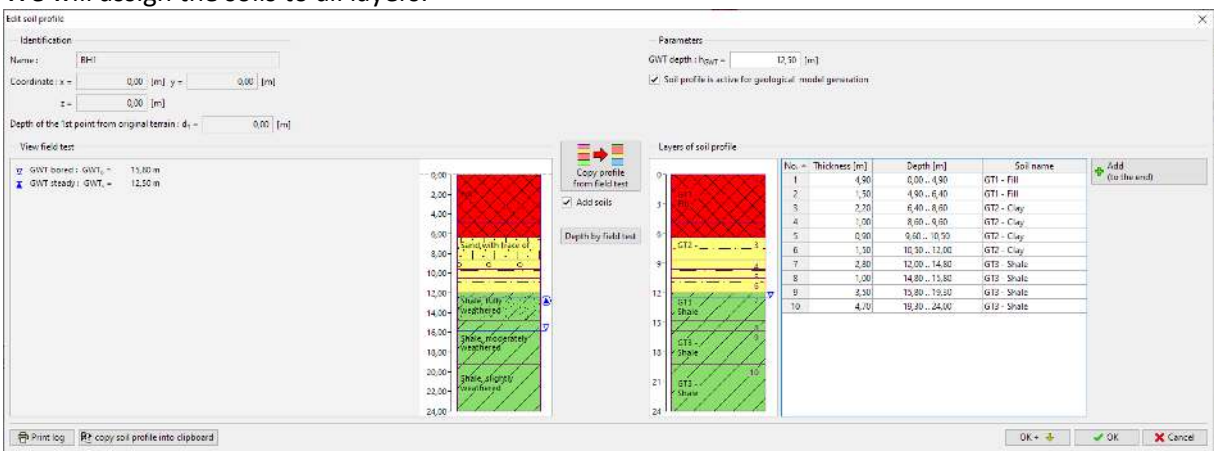
Note: New soils can also be added when creating a Soil profile or Geological section; it is not necessary to return to this frame.

We will select the borehole BH1 – we see, that the interface of layers and partly even the soils were copied from the specified borehole.

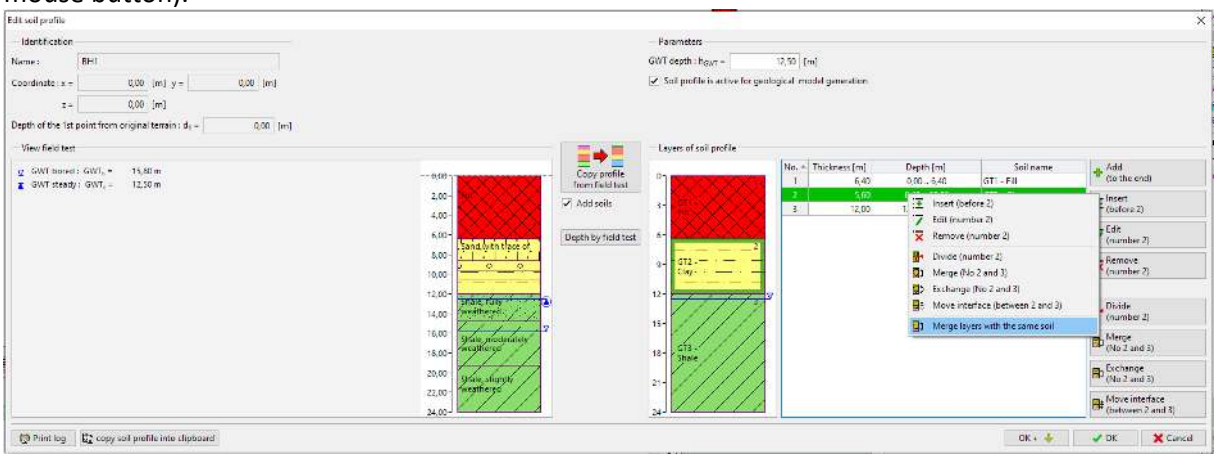


We will open the soil profile and edit it.

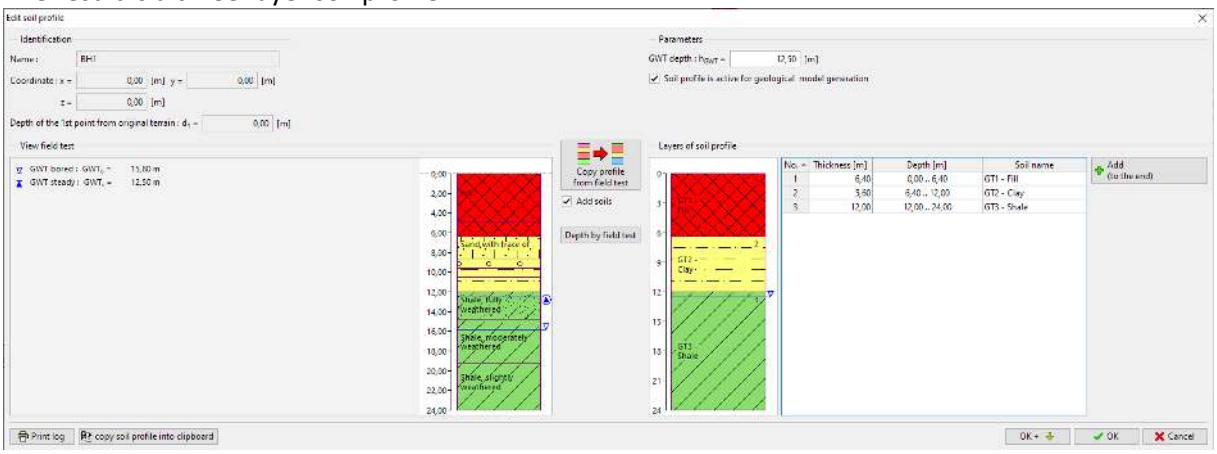
We will assign the soils to all layers.

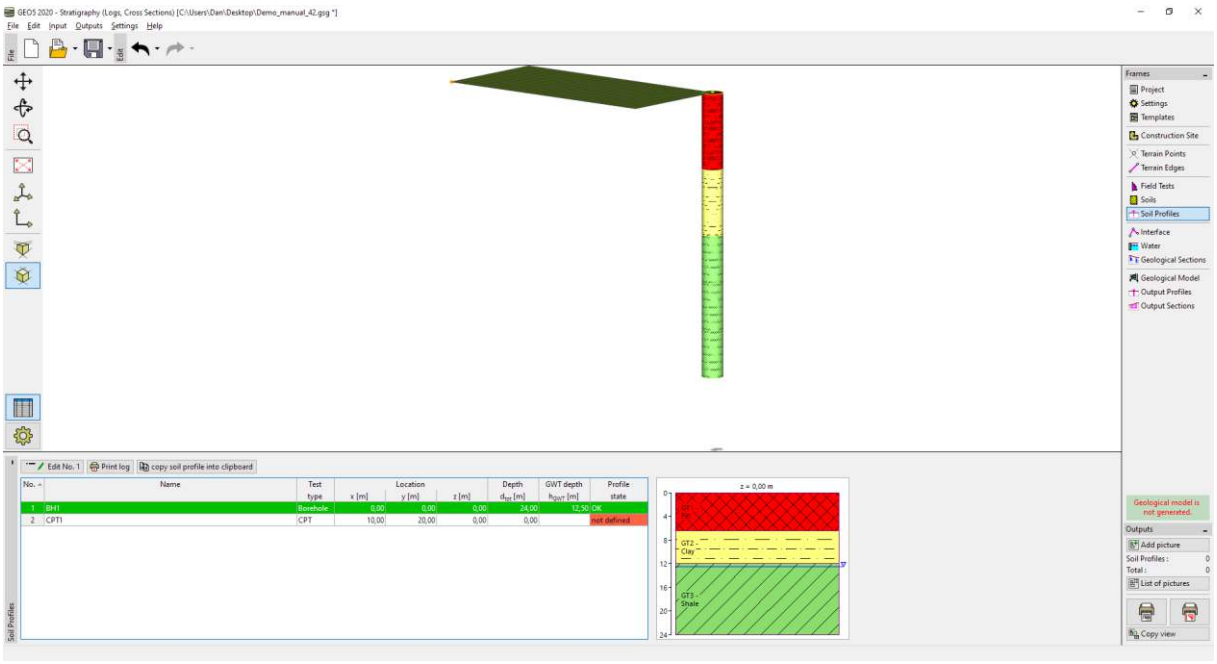


Finally, we will remove the redundant interfaces – the easiest way is to merge the same layers into one by using the “Merge layers with the same soil” option in context menu (available using right mouse button).

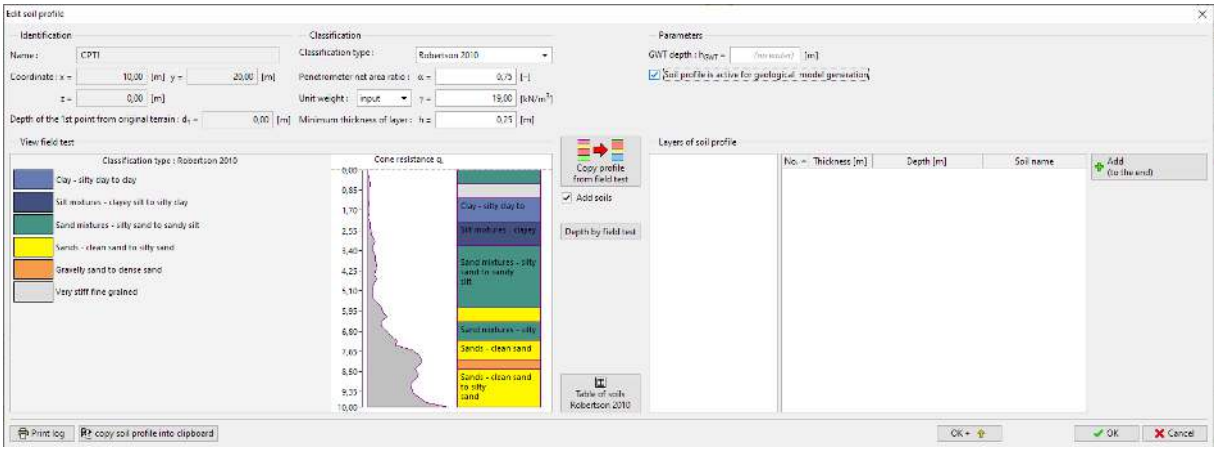


The result is a three-layer soil profile.

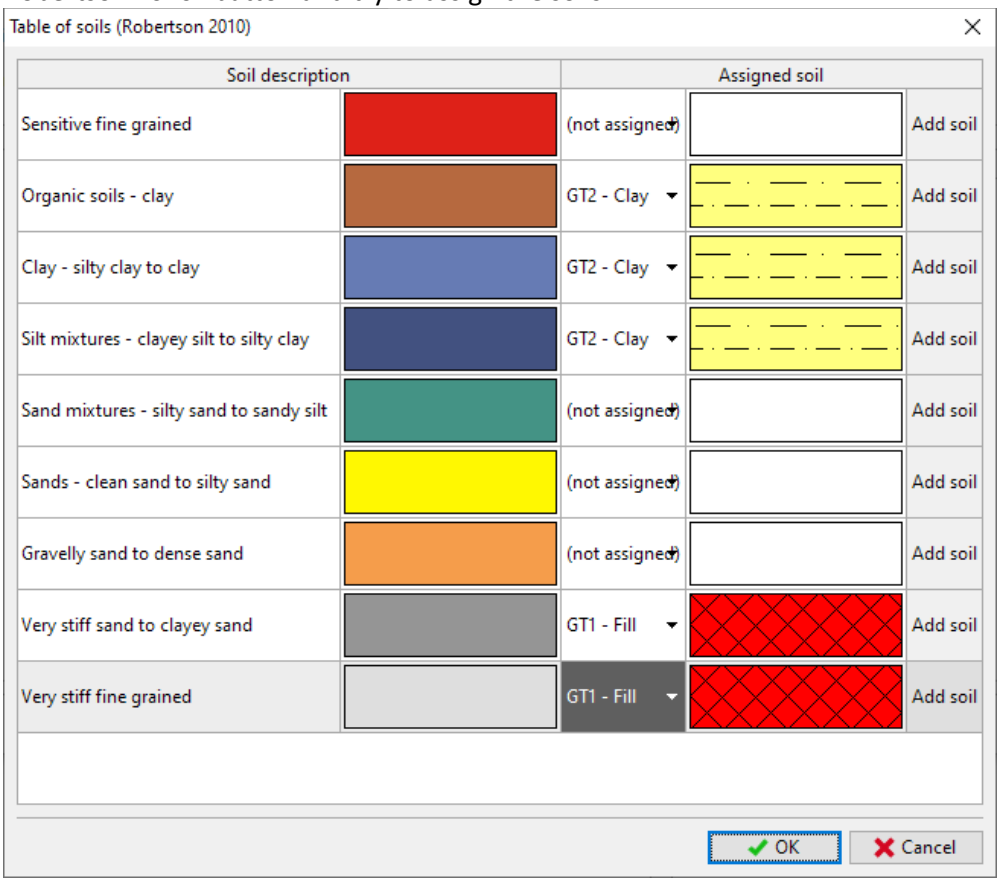




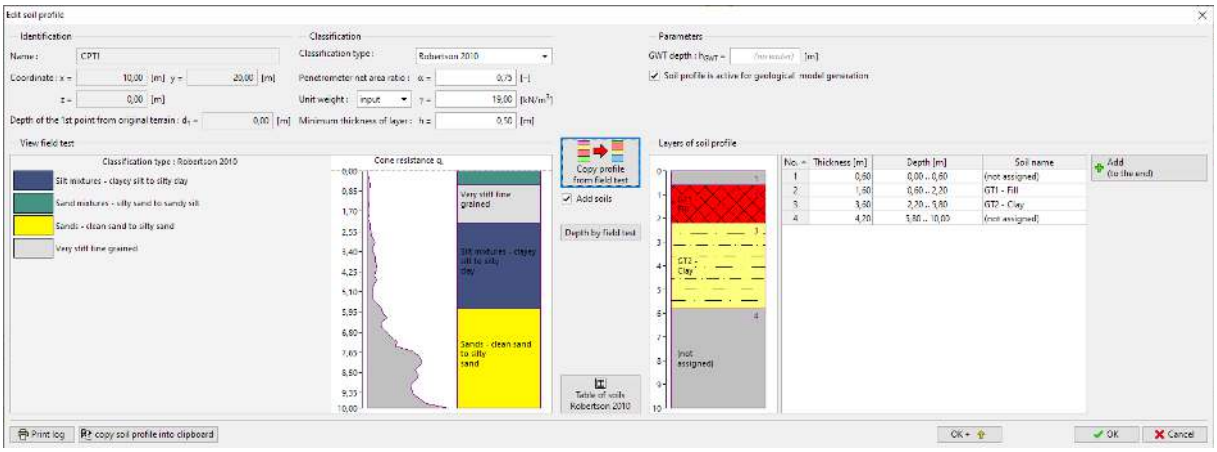
Next, we will interpret the CPT. When the dialog box opens, the program evaluates the CPT test by the Robertson method and will design the soil layers.



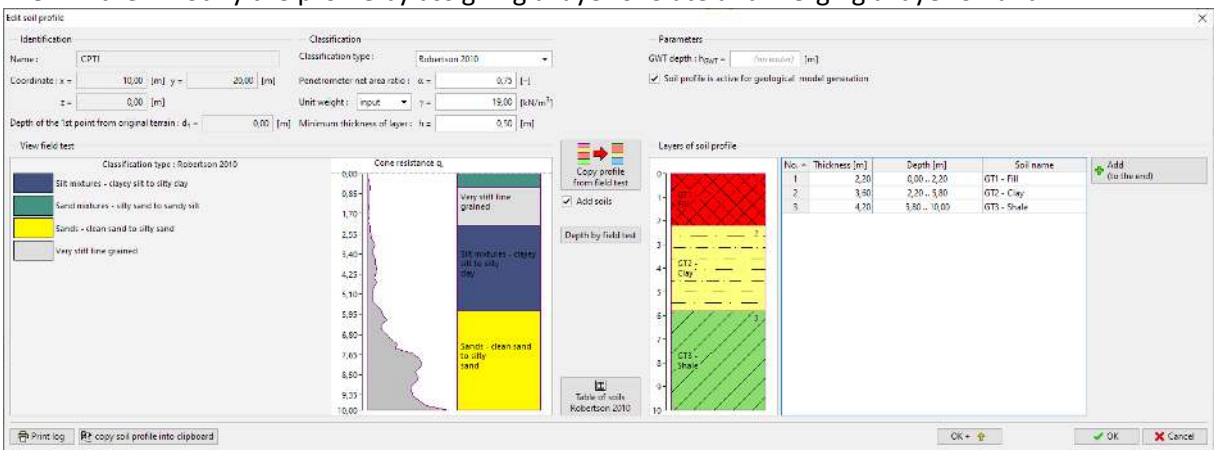
We can assign soil types, according to Robertson, to our geotechnical types. Press the “Table of soils Robertson 2010” button and try to assign the soils.



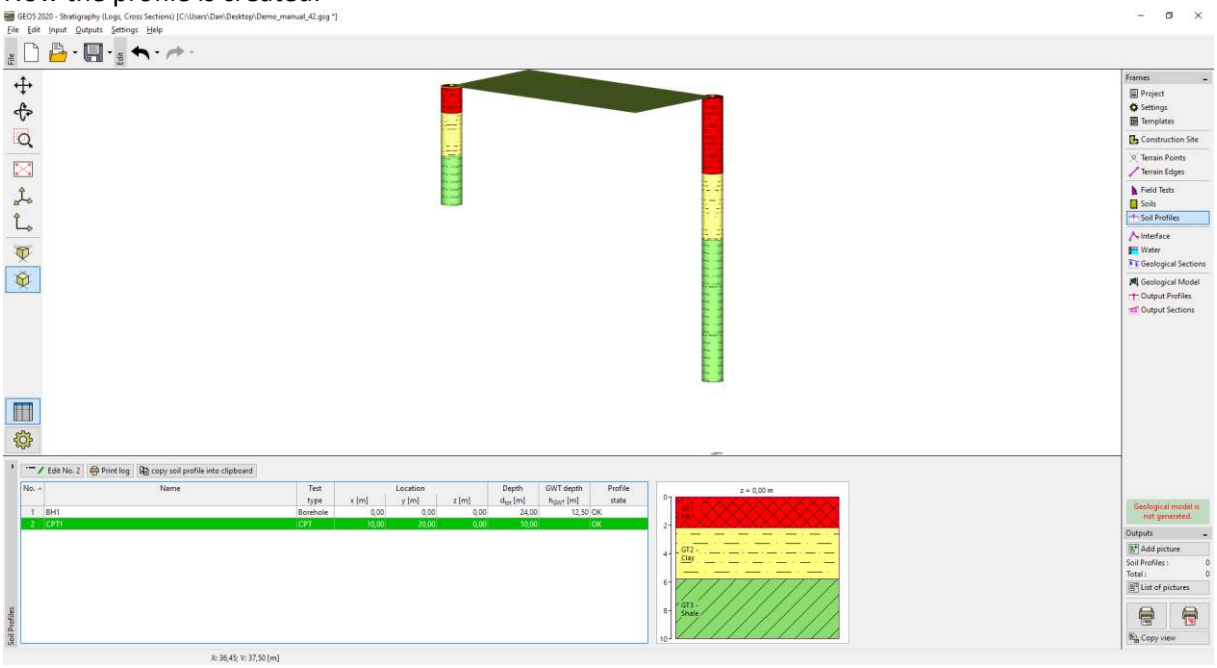
We will change the size of the minimal layer to 0.5 m to reduce the number of layers and assign the created layers to the profile.



We will then modify the profile by assigning a layer of Slate and merging a layer of landfill.



Now the profile is created.



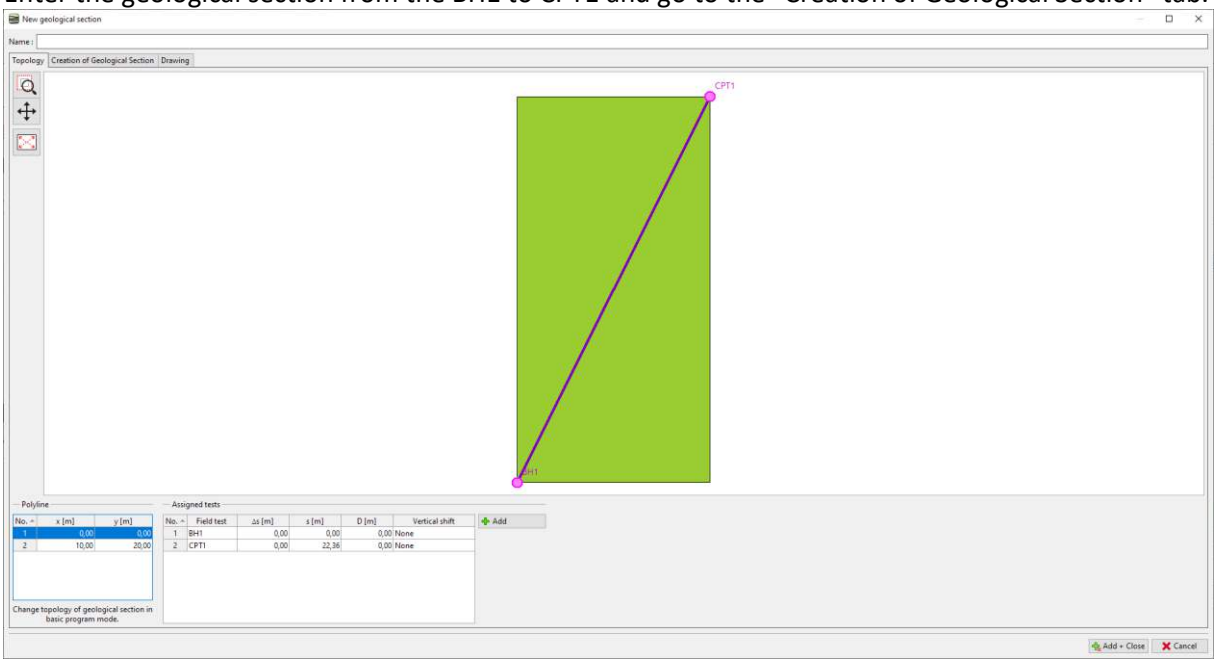
Approach 2 – creation of soil profiles using Geological Sections

This method has the advantage that we can create our idea for multiple profiles at the same time. We can also leave the decision of which geotechnical types to create until the creation of the section.

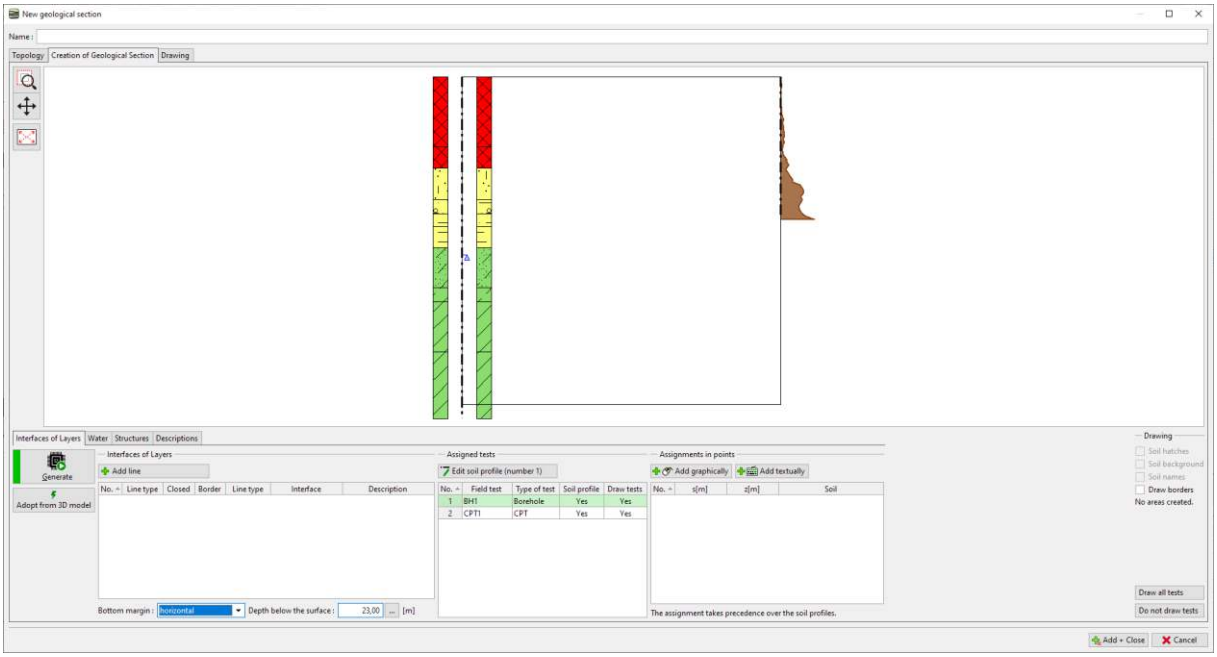
Again, we open *Demo_manual_42.gsg* file.

We will go to the "Geological Sections" frame.

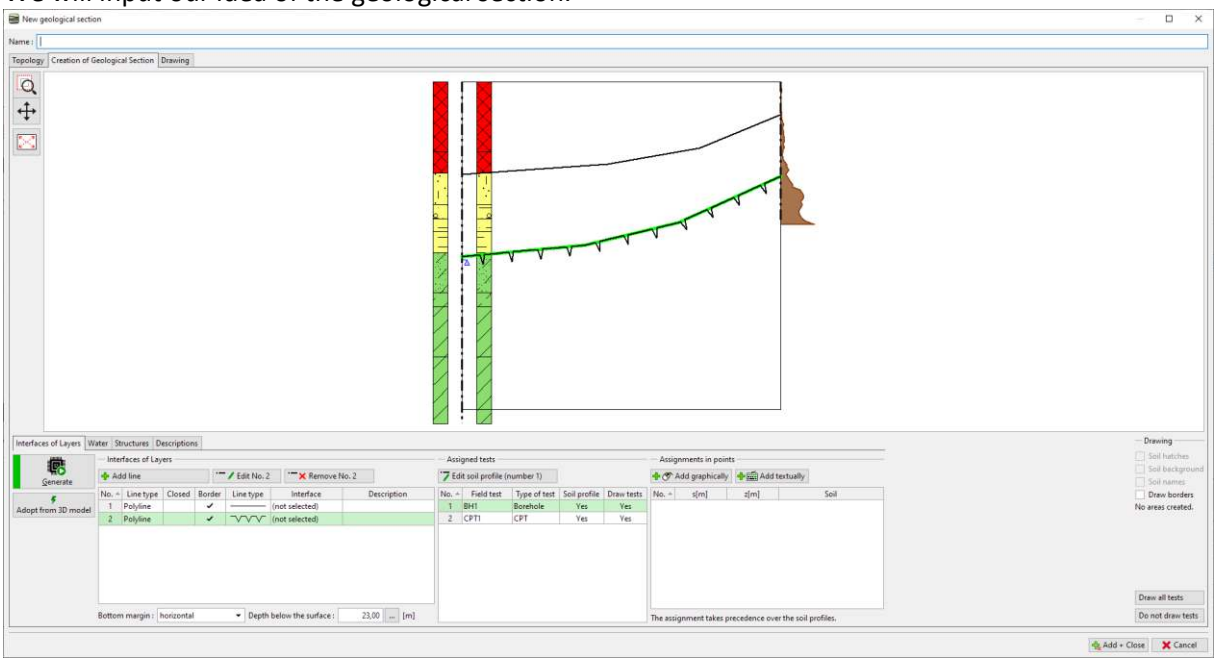
Enter the geological section from the BH1 to CPT1 and go to the "Creation of Geological Section" tab.



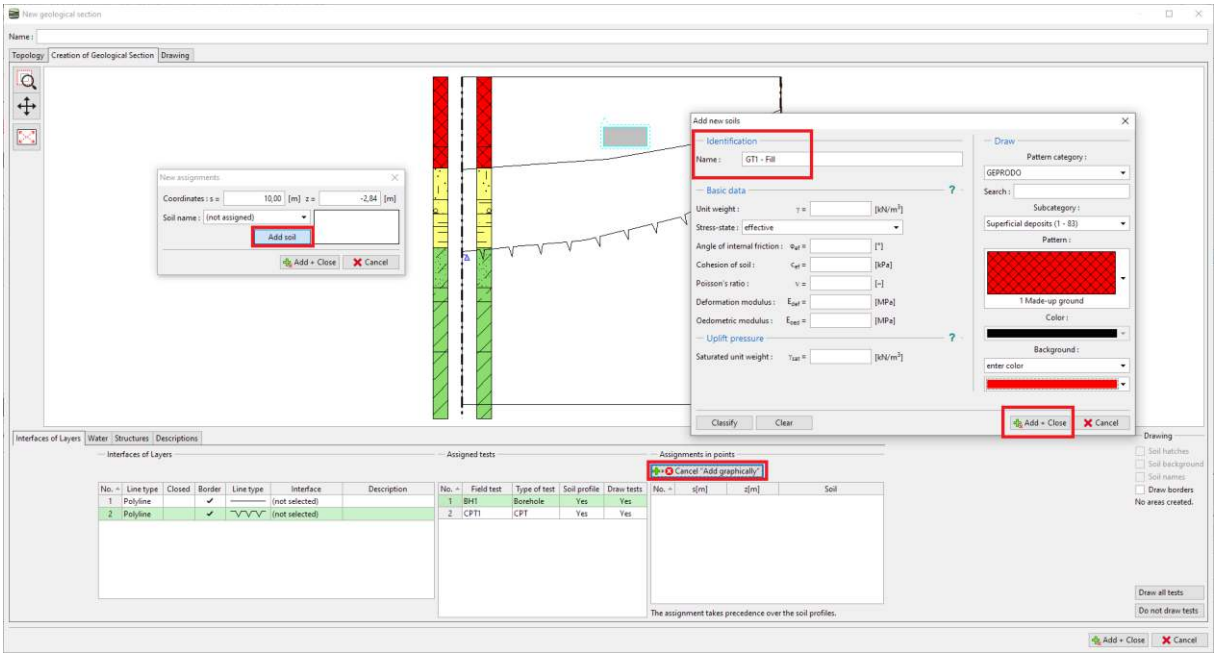
We see selected field tests. Soil profiles display on the axis of test, but they aren't created yet.



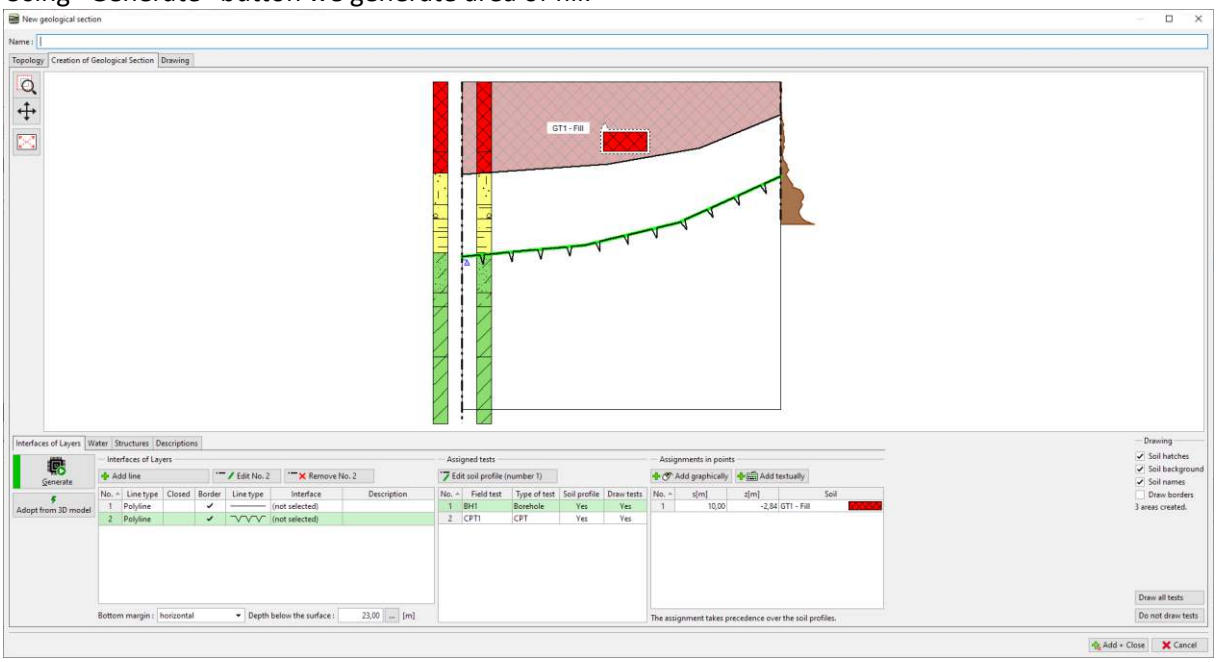
We will input our idea of the geological section.



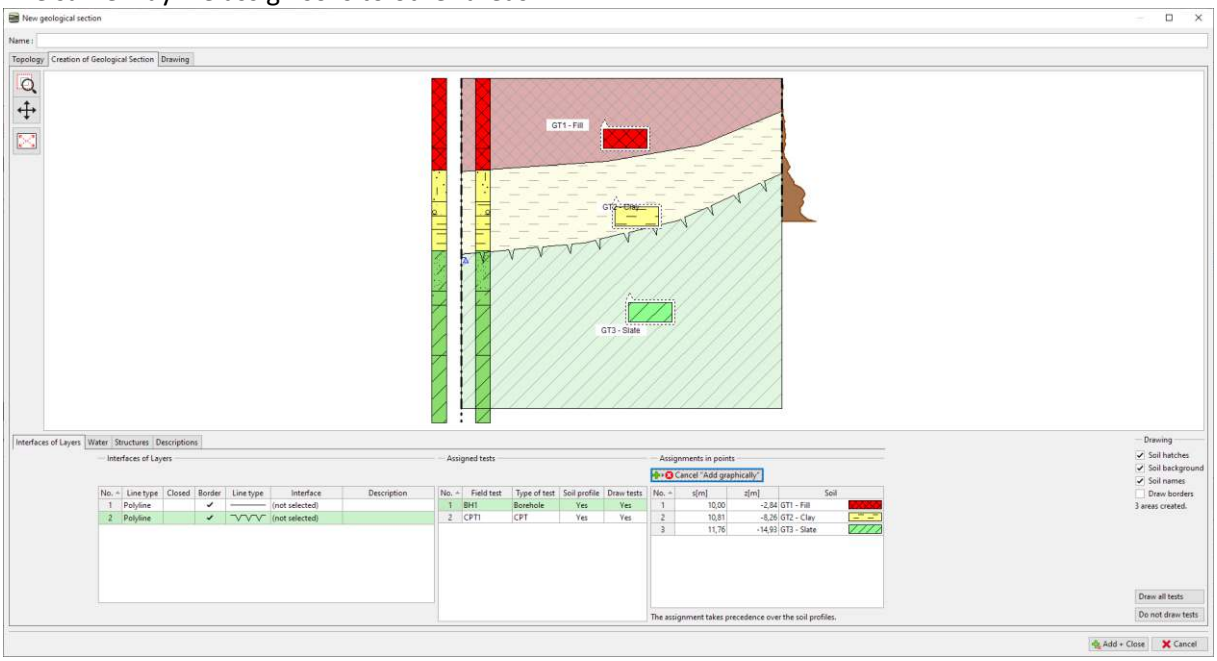
We input assignment points to the areas and assign soils, resp. geotechnical types. If the type is not created already, we can do it now.



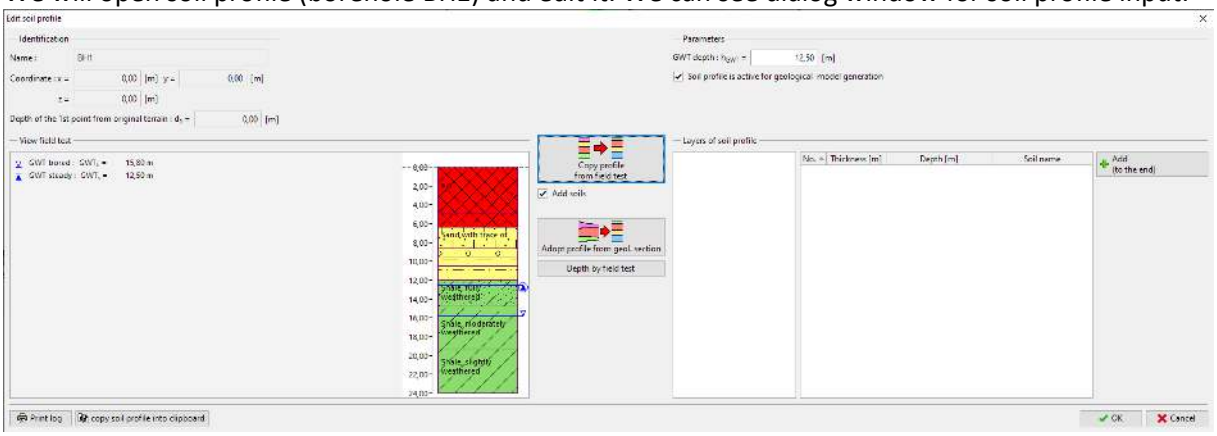
Using “Generate” button we generate area of fill.



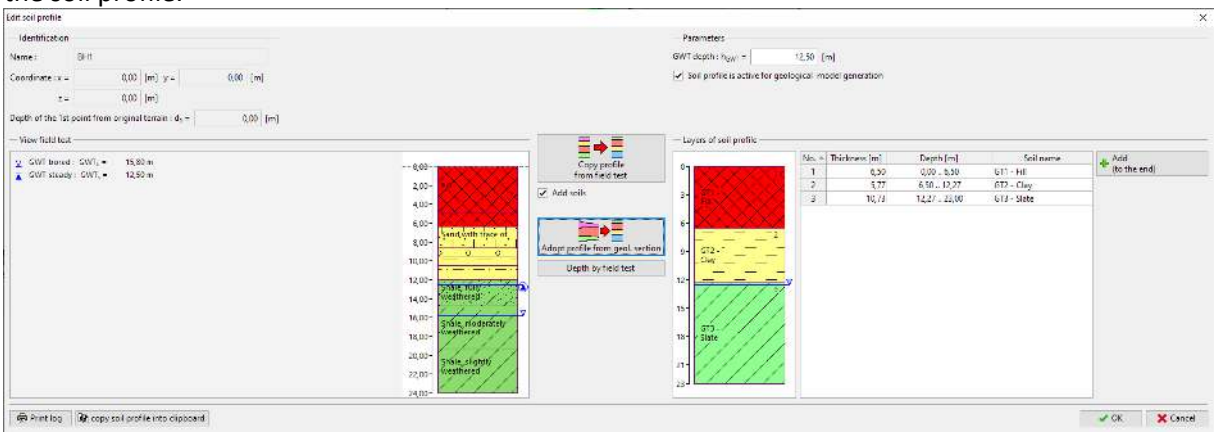
The same way we assign soils to other areas.



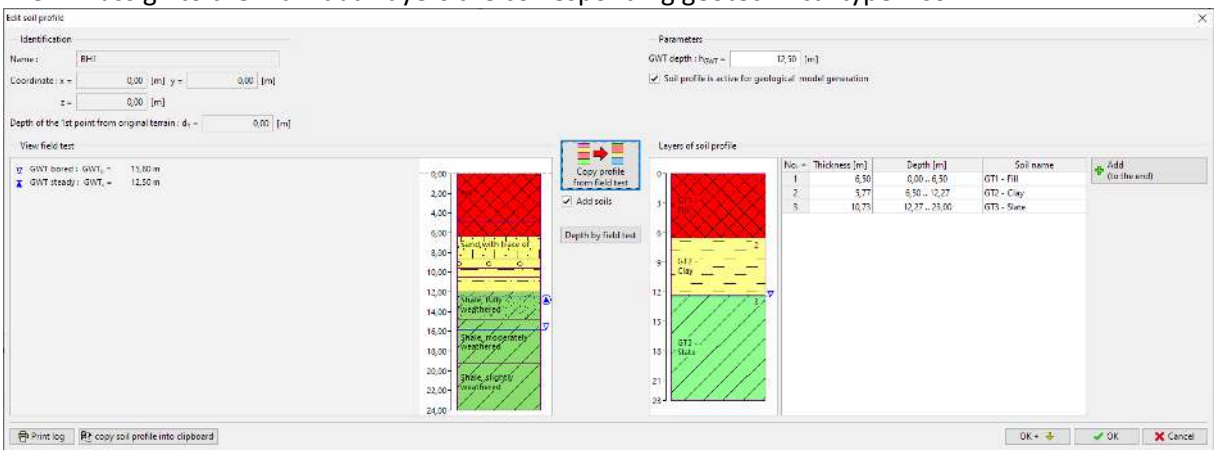
We will open soil profile (borehole BH1) and edit it. We can see dialog window for soil profile input.



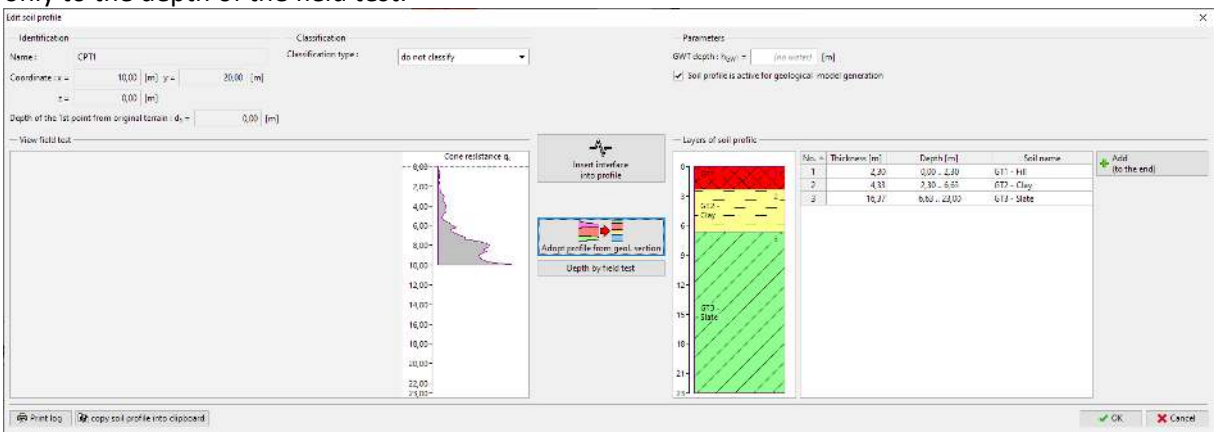
Using “Adopt profile from geol. section” button all data from geological section are transferred into the soil profile.



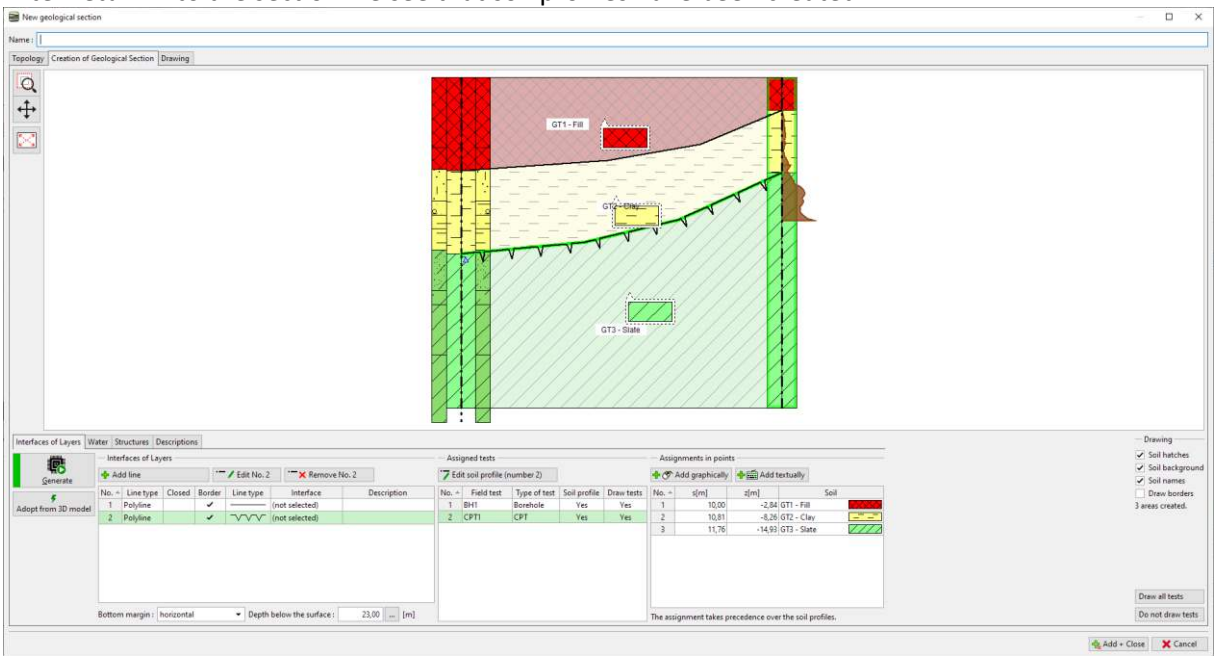
We will assign to the individual layers the corresponding geotechnical type – soil.



We will repeat the process for the CPT as well. It can be done to the depth of the model (below) or only to the depth of the field test.

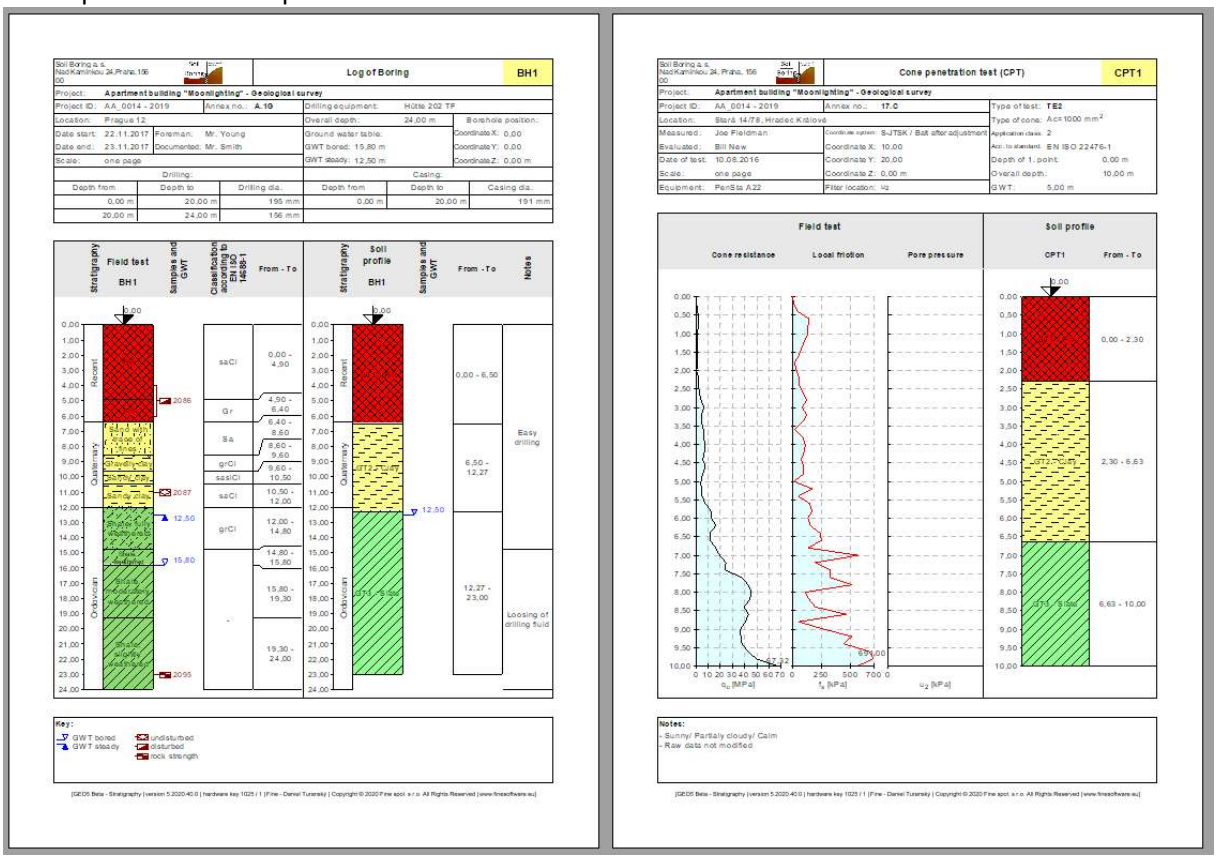


After return into the section we see that soil profiles have been created.



Working with Soil Profiles

The program, resp. the selected template contains protocols for printing the soil profiles – as a field test report and its interpretation.



Next, we can generate a 3D model of the subsoil from the created soil profiles.