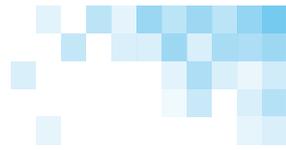
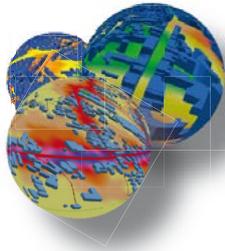


IMMI



Noise mapping with IMMI



Tutorial



IMMI Tutorial Noise Calculation

Version 2011



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1 Introduction to the Program and Practical Exercises

1.1 General Information

This section provides an introduction to the practical application of IMMI by means of examples. The example exercises correspond to the examples in the tutorial NOISE.

- **A simple example: point sound source with attenuation**
- **A road as emission source of traffic noise: design with scanned-in maps**

After having completed these exercises, you will not be an IMMI expert yet, but you will be familiar with using the program for a great number of noise forecast tasks.

1.2 A Simple Example: Point Sound Source with Attenuation

The following simple example ("circular saw in front of noise barrier") will show you step by step how to edit an immission calculation with IMMI.

Naturally, there are alternative editing steps. That is why you should "search" the program for additional possibilities after you have become familiar with the procedure described here. Reading the explanations on the menu system will be particularly helpful.

Note: The first example uses the element library BNPM. This guideline is highly suitable for beginners because it shows the different noise types in a clear structure. Today, however, this guideline is no longer in effect. In IMMI, it is still supported only for the purpose of this practical exercise.

1.2.1 Starting the Program

In the first step, IMMI is started and a new project is created.

- Double-click on the IMMI program icon to start IMMI.

- This will open the starting dialogue. Click on the **Create new Project** button and then on **OK** to edit an "empty" project.

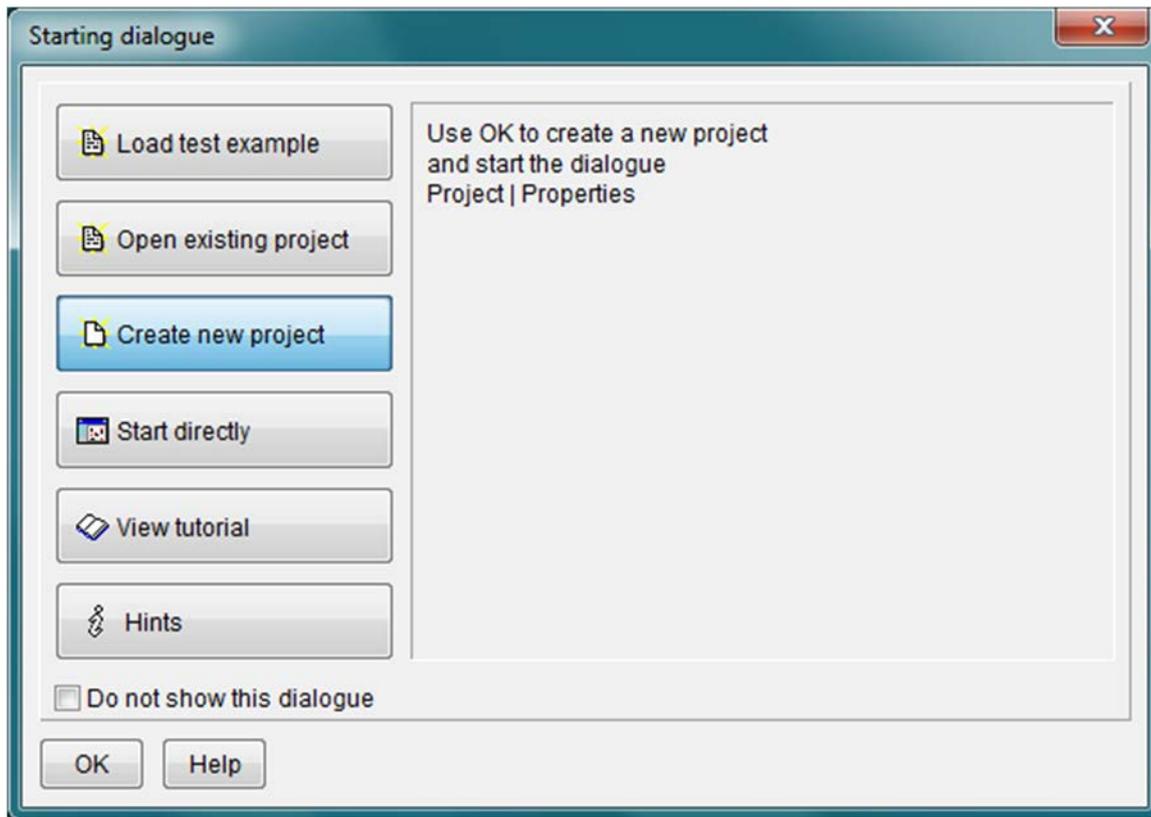


Figure 1: Starting dialog for creating a new "empty" project

1.2.2 Preparatory Steps

In the beginning, only make the settings below. This first example is particularly intended to facilitate working with IMMI. For that reason, element libraries are not yet used at this point.

- Verify that **Topic** is set to **Noise**.
- Click on **Select element libraries** and activate the **BNPM** element library.
- Click on **OK** to exit the dialogue.
- In the Emission variant field, set the **number of emission variants to 1** so that only one rating period will be taken into account. Use the arrow buttons next to the input field.

- Set **Duration/h** to 24

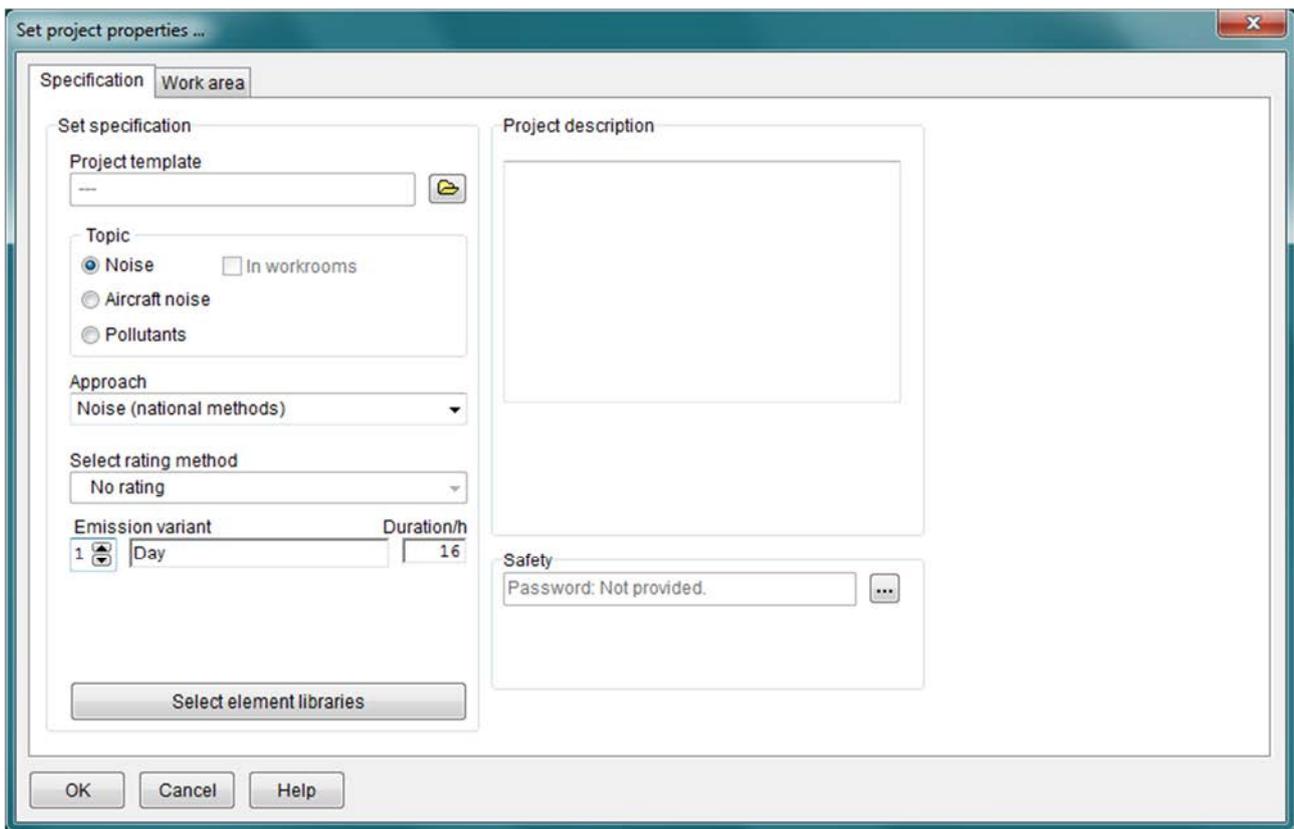


Figure 2: Setting the properties of the project

- Select the **Work area** tab and apply the work area limits which are preset there:

x/ m 0 to 1000

y/ m 0 to 1000

z/ m 0 to 100

Terrain height in the corners:

z1 to z4 0 m

- Click on the **OK** button to confirm these values. This will open the map which is the central editing window in IMMI.

1.2.3 Entering a Point Source and a Noise Barrier

In the following steps, the geometry of a source and the screening wall is designed on the monitor by means of the mouse.

- Select **BNPM** from the tool box in the left.
- Select the **Point source** () element type.
- Click on **Draw elements** in the **Design** tool box.
- Left-click on the desired position (**x = 500 m, y = 500 m**) on the map.

- Since the Open element dialog instantly button is activated, the appropriate input mask will open directly after you have generated the point sound source.

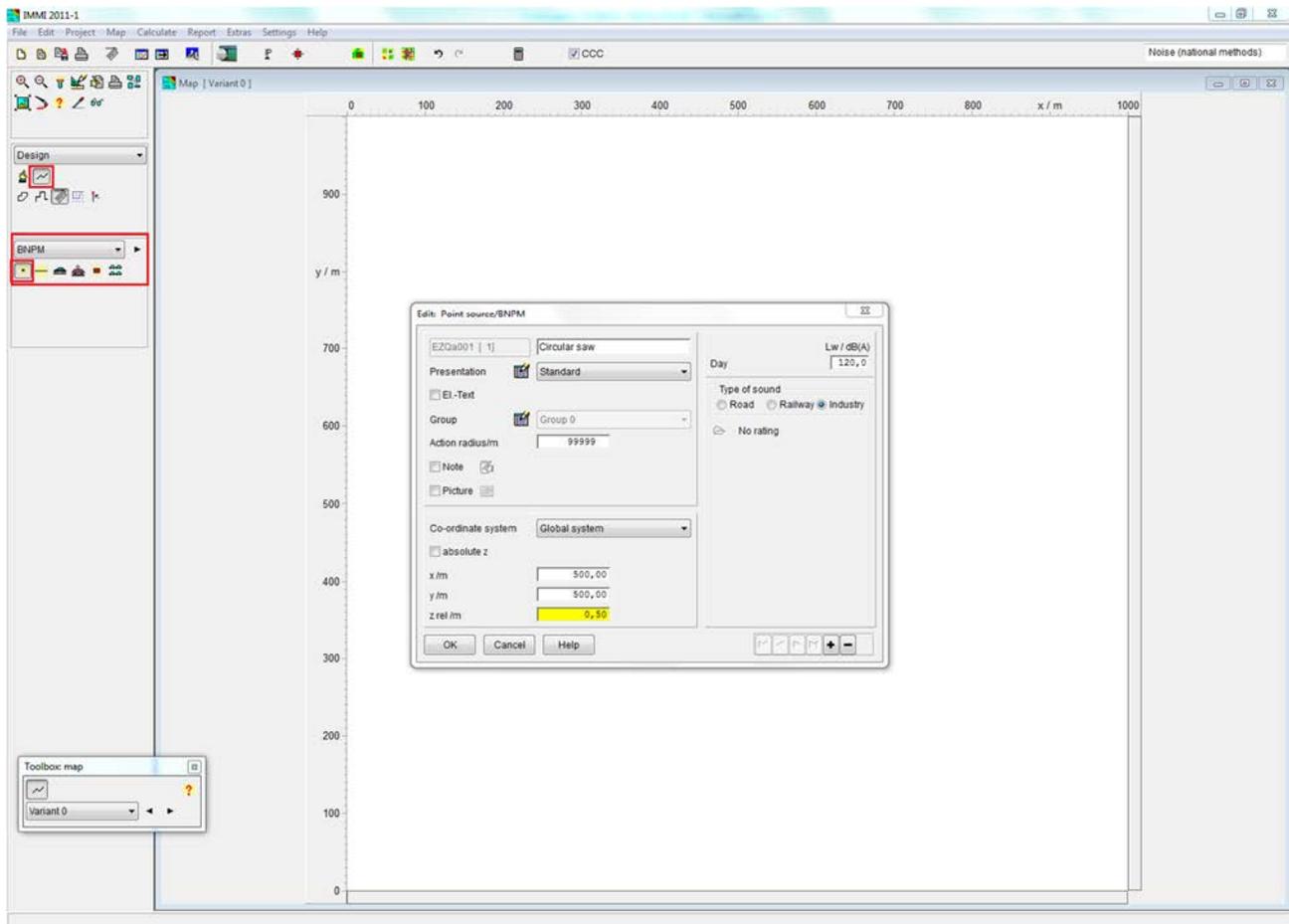


Figure 3: Digitizing a point sound source

- Enter the following data in the input dialog:
 - The point sound source is a **circular saw**.
 - Emission value for the period Day: **Lw = 120 dB(A)**.
 - Select **Industry as the type of sound**.
 - z-coordinate **z rel/m = 0.5 m**
- Confirm your entries with **OK**.
- Move to the **Standard element library**.
- Click on the  - **Wall element** button to select the wall element type.
- Left-click approx. at **x = 400 m, y = 450 m** to set the first node.
- Set the second node approx. **at x = 600 m, y = 450 m**.
- **Right-click** to complete your entry of the element geometry.
- This will open an input dialog.
- Click on Geometry input and, in the **z (rel/m) column, enter z = 5.0 m as the height for the first node and z = 7.0 m for the second node (inclined wall)**.

- Exit the input dialog by clicking on **OK** twice.

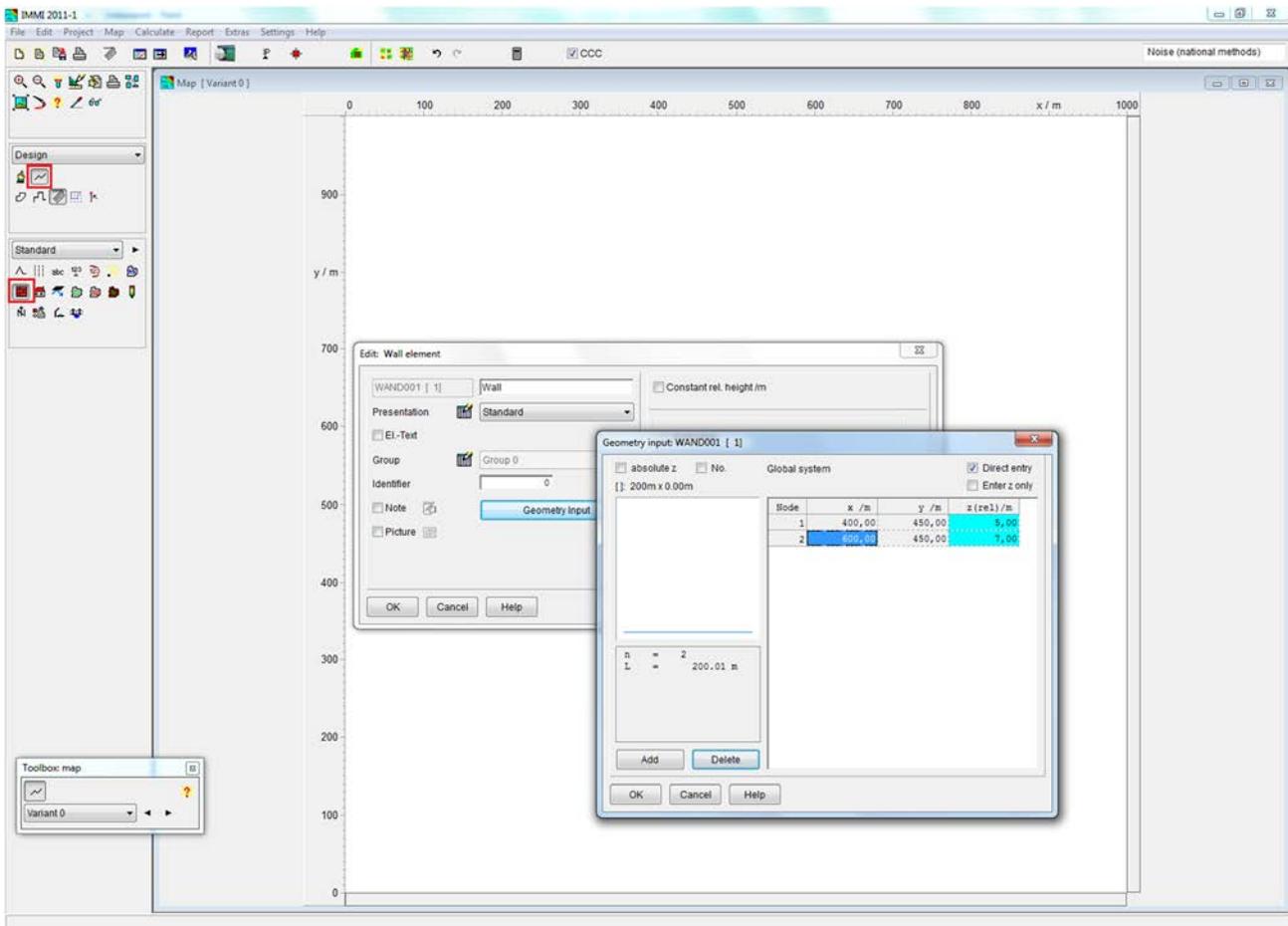


Figure 4: Entering the screening wall

1.2.4 Calculating a Reception Point Grid

In the next step, an area-type reception point grid is calculated.

- Select the **<Calculate | Definition | Calculation grid>** menu item.
- Click on **Edit** to define the grid dimensions.
- Ensure that the step sizes in both **x- and y-direction** is **20 m**. Leave the grid field setting as it is, i.e. **Work area**.
- Enter **2 m** under **z/m (relative)**.

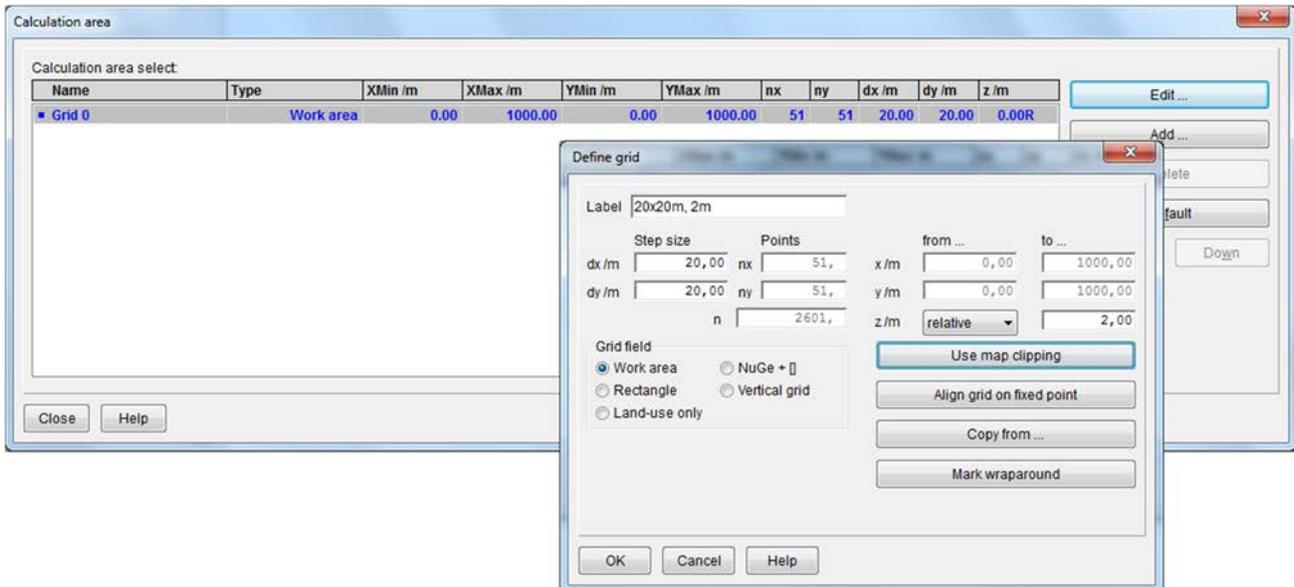


Figure 5: Defining a grid

- Click on **OK** and then on **Close** to complete your entry.
- Save the project with **<File | Save Project As ... >**. Enter a name.

Note: The filename extension of **IMMI project files is .IPR.**

- Start calculation of the grid by selecting the **<Calculate | Calculate grid>** menu item or clicking on the  button.
- Click on **Calculate** to start calculation.
- The reception point grid calculated is displayed.
- Select the **<Calculation | Save>** menu item. Enter a name and save the grid.

Note: The filename extension of **IMMI grid files is .IRD.**

- Click **Close** to leave the dialogue.

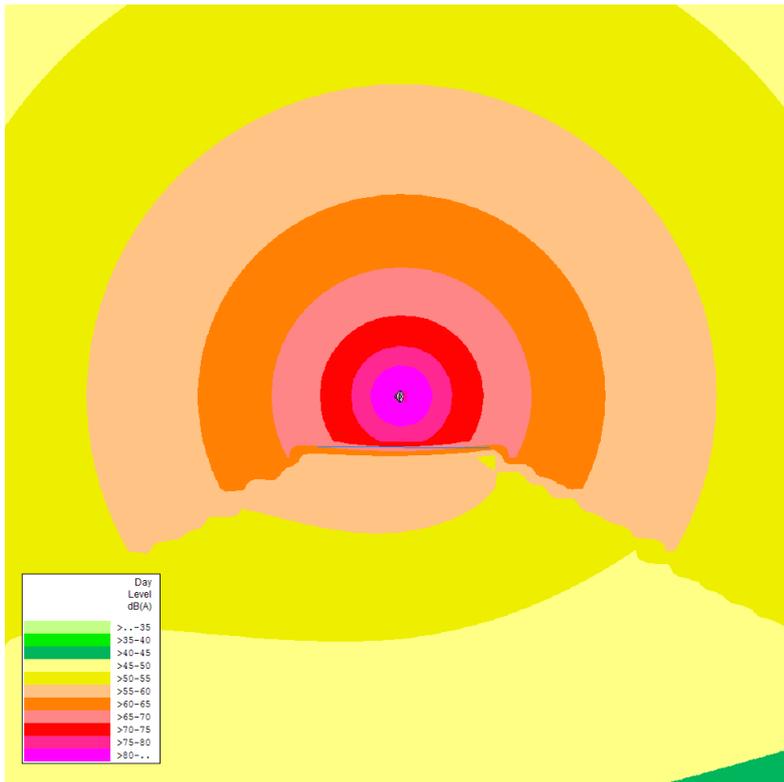


Figure 6: Calculated grid

- To use the possibilities of an additional graphical evaluation, click on the Define map content button () and select **Map: Grid and Layers: Day**.
- Select **Grid of squares** from Presentation in the same dialogue.
- Click on **OK** to view the grid.
- Also try the other presentation options.

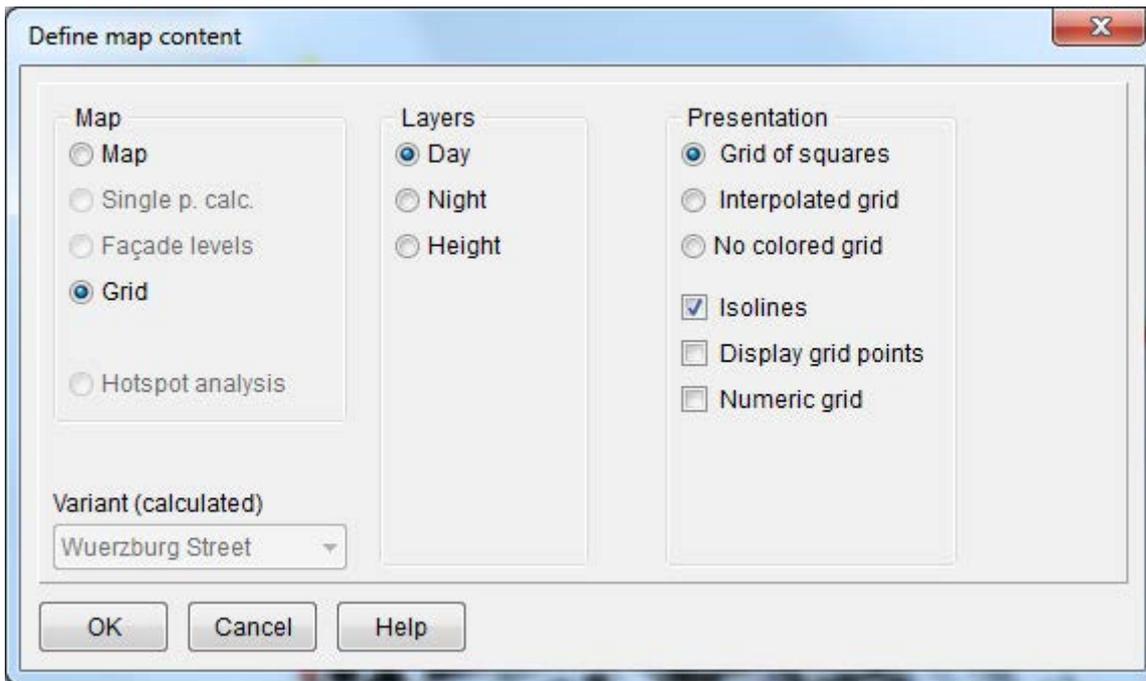
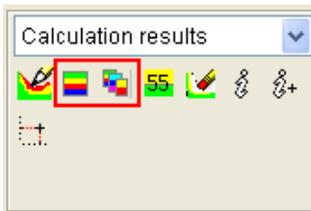


Figure 7: Define map content

- To change the color scale, select the **Edit colour scale** or **Select colour scale** function in the Calculation results mode.



- Try the other functions and change the grid presentation.

**You have now successfully completed your first self-created project.
Congratulations!**

Note: You can open the Simple.IPR example by selecting the **<File | Open Project ...>** menu item and then moving to the Examples\Noise\Tutorial subfolder in the IMMI installation directory.

1.3 Traffic Noise –Design with Scanned-in Maps

A major tool for editing projects in IMMI is designing them on the screen on the basis of scanned-in maps. This is illustrated by the following example of a traffic noise project.

1.3.1 Fitting the Background Image

In the first step, a background image is downloaded and fitted. This image will form the basis of the entire project which is established as follows.

- Select <**File | New Project**> to open the **Set project properties ...** dialog.
- On the Specification tab, select **No Rating** from the Select rating method field.
- Move to the **Work area** tab and define the work area in x- und y-direction by selecting **0 - 2000 m for the x- and y-values**.
- Click **OK** to close the input dialog.
- To open the background image, select the <**Map | Install | Open background image**> menu item.
- Click on **Add** to open a new background image.
- Click on **Search** and select **UETTING.BMP** from the IMMI installation directory (...\\Examples\\Tutorial\\).

There are four functions to support you in fitting the background image selected:

- 1) With reference points: Enter the number of reference points.
- 2) With image parameters: Define the dimensions of the image (height and width) and specify the image origin.
- 3) With scanner parameters: Enter scale and resolution.
- 4) With georeferencing files: Automatic fitting

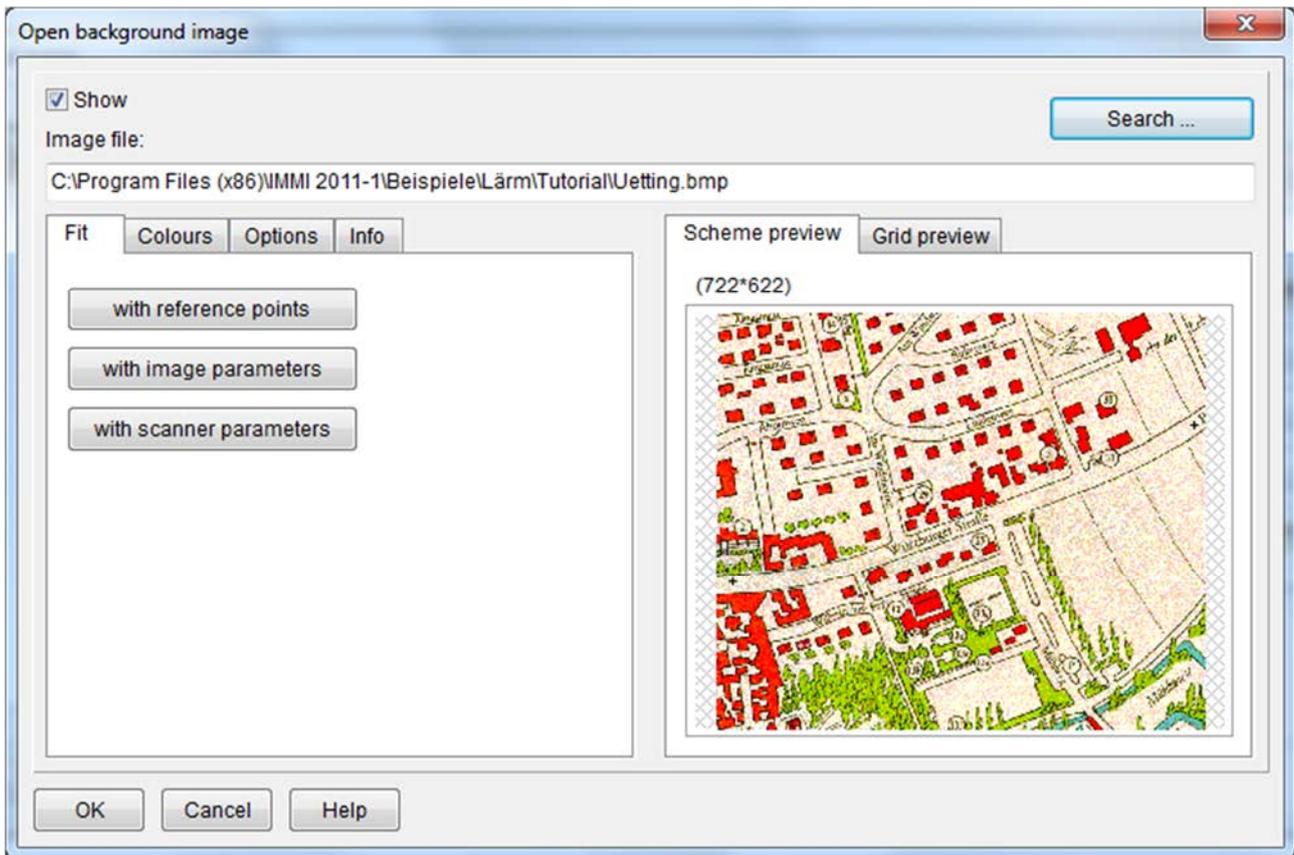


Figure 8: Fitting a background image

- Click on the **with reference points** button.
- The image will be displayed in the preview window. The zooming buttons allow you to zoom into and out of the image.
- Click on the left-hand cross on the Würzburger Straße to set the first reference point. Enter the following coordinates in the dialog for the first reference point:
 $x = 530, y = 790$
- Click OK to exit the dialog.
- Click on the right-hand cross and enter the following coordinates for the second reference points:
 $x = 1435, y = 1100$

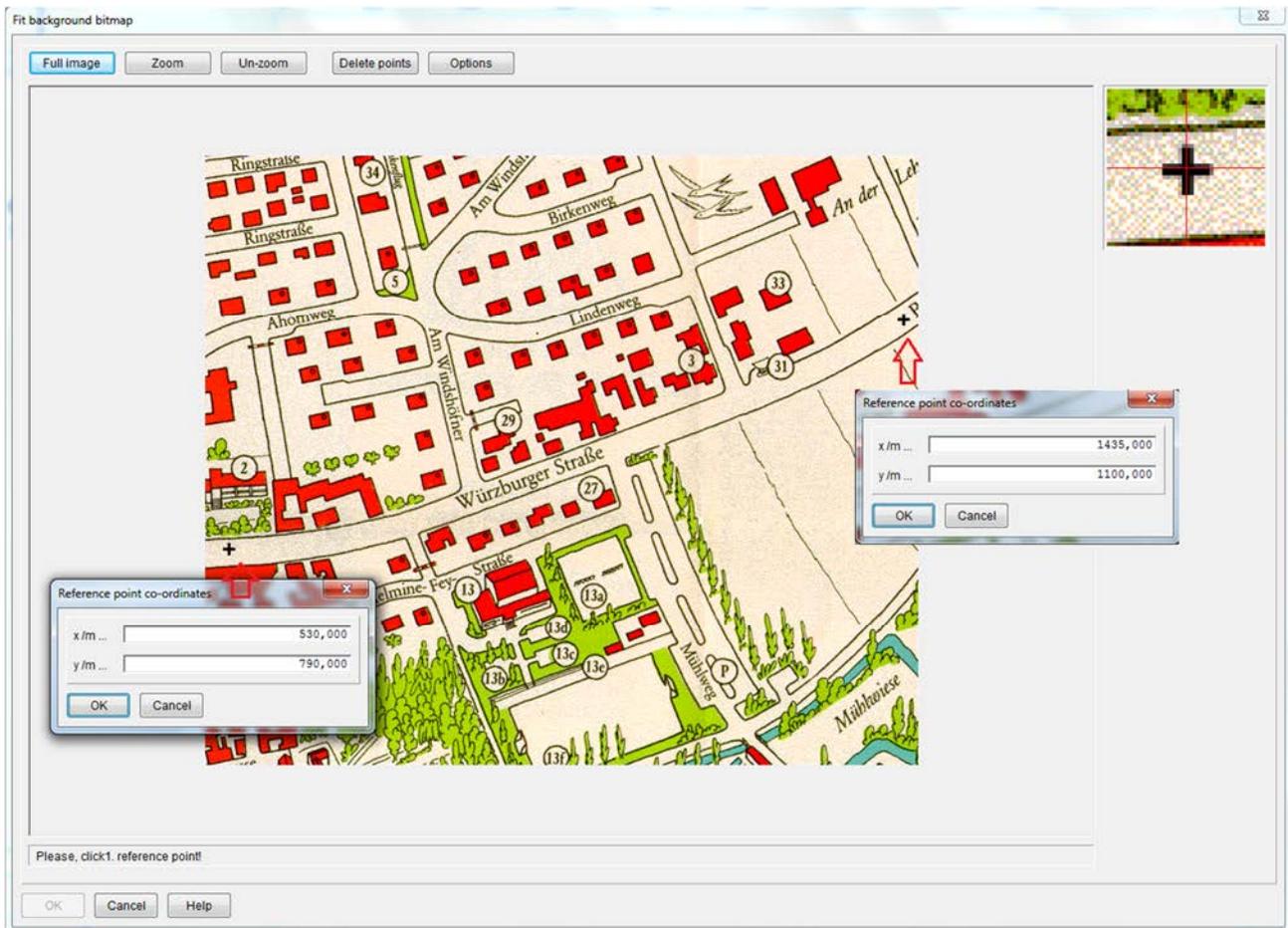


Figure 9: Entering reference point coordinates

- Confirm your entries with **OK**.
- Exit the dialog with **OK**.
- The fitting result will be displayed. Click on **Close** to exit the display.

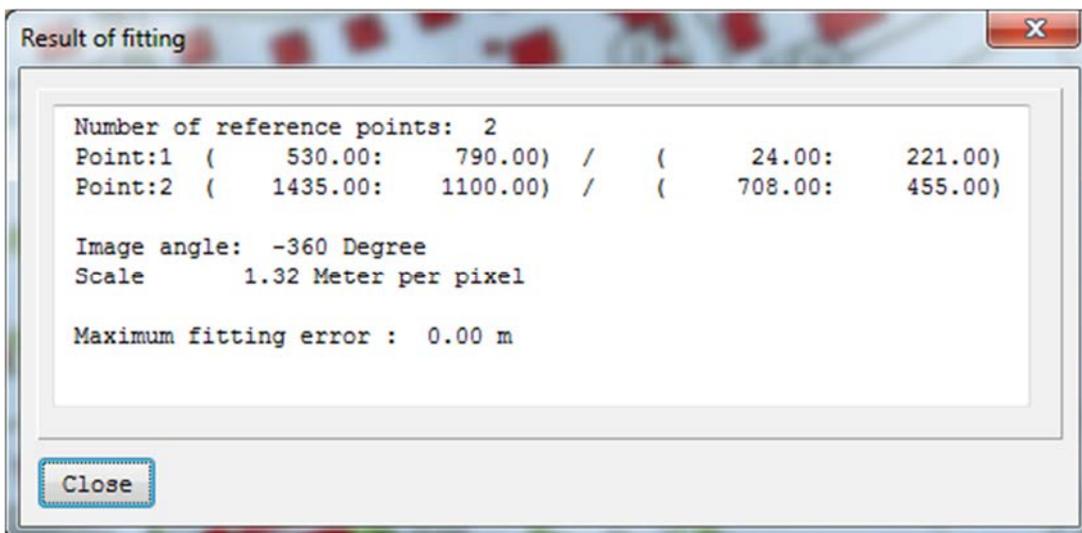


Figure 10: Displaying the fitting result

- Close all dialogues.

While you continue editing the project, you will encounter some familiar functions. That is why these functions will be addressed only briefly at this point. If you are in doubt, again read the first part of this tutorial once.

1.3.2 Editing the Project

In the next step, a road and several buildings are designed on the basis of the fitted background image.

- Choose the **Design mode** from the tool box in the left and select **XP S 31-133** as the element library.
- Initially, design the road axis along the **Würzburger Straße**. Since we start from the fact that the actual assessment area is limited to the background image, the roads should extend a little beyond the image.

Initially, you should digitize the roads only roughly. You can later fine-adjust the course of the road axis by means of the following useful functions: **Move**, **Turn**, **Move node** and **Insert node**.

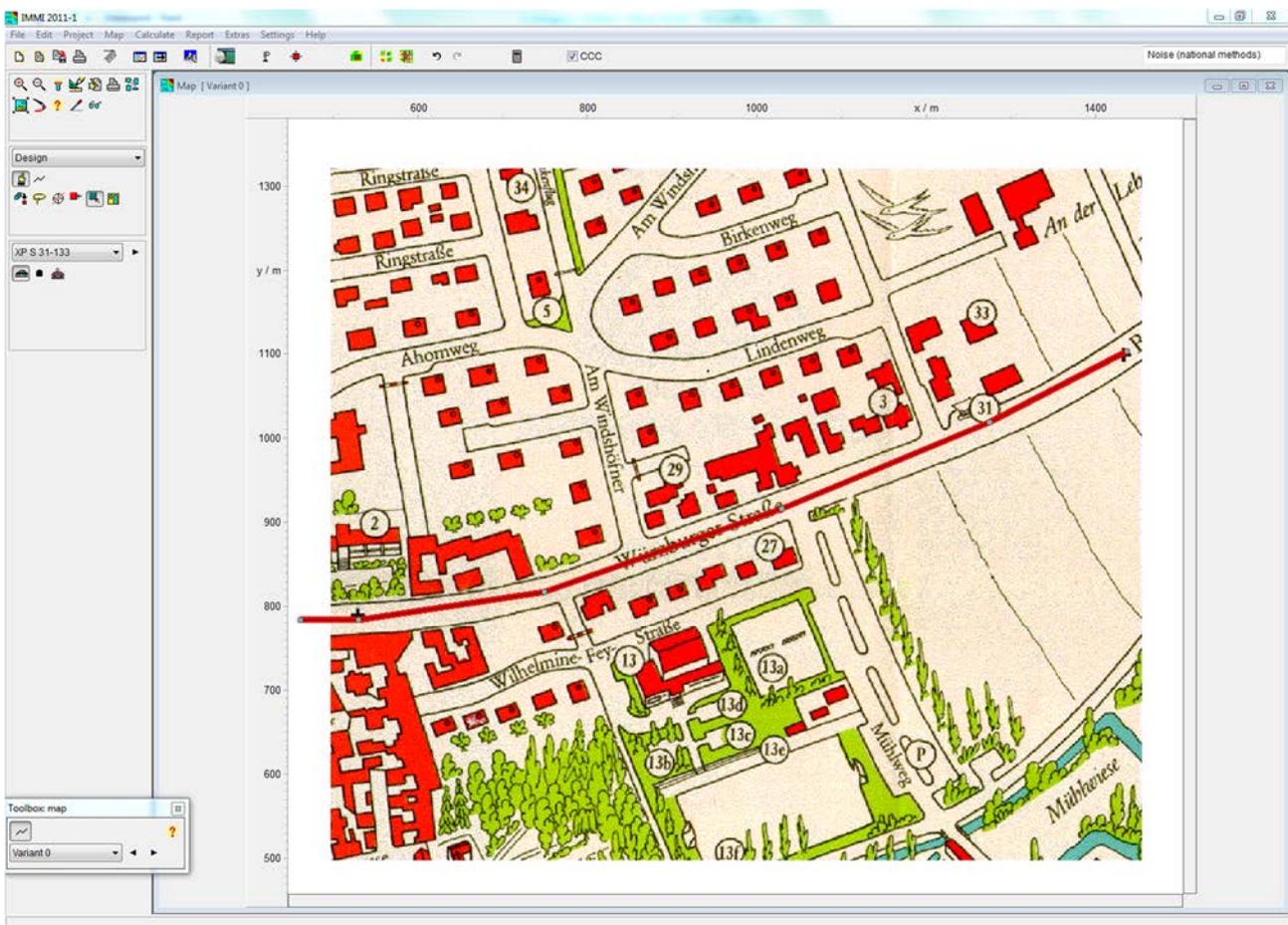


Figure 11: Designing the road axis on the map

- Right-click to complete your design. This will automatically open the input dialog.
- Enter **Würzburger Straße** (Just to improve your German!) as the element name.

- To enter traffic data, select **ADT** (average daily traffic load) from the Input field and click on the button for opening the input dialog (📁).
- Enter **10,000** in the ADT in vehicles/day input field. The rating periods and emission variants are automatically calculated for **Day and Night**.

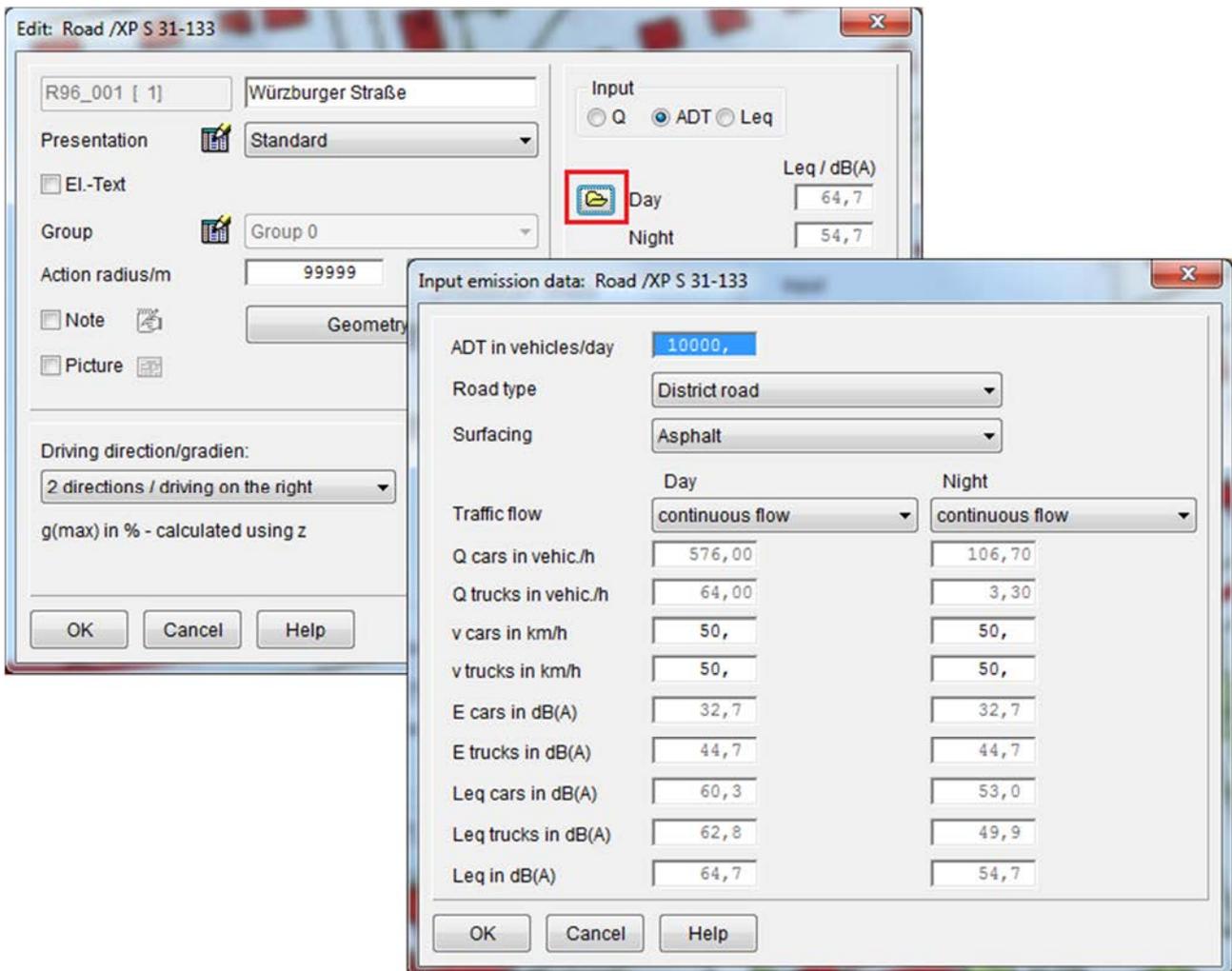


Figure 12: Input dialog for a road according to XP S 31-133

- From the Road type list box, select **District road** and **Asphalt** as road surface layer.
- Select **continuous flow** as traffic flow.
- Ensure that the speed for both passenger **cars and trucks is 50 km/h**.
- The following emission levels are calculated:

Leq = 64,7 dB(A) Day

Leq = 54,7 dB(A) Night

Now try to change the editable values to better understand the influence of the various parameters. As you will see, the new Leq emission levels will be updated immediately, based on the values edited.

- Click **OK** to quit.
- Enter **2m** for the Distance carriageway centreline to road centreline

- Complete your entry with **OK**.
- Save the project with **<File | Save Project as>**.

Note: The filename extension of **IMMI project files is .IPR**.

In the next step, a building obstructing the free propagation of sound will be entered.

- Using the lens () –**Select new clipping** –zoom into the center of the map to show the big rectangular house directly at the Road in the clipping.

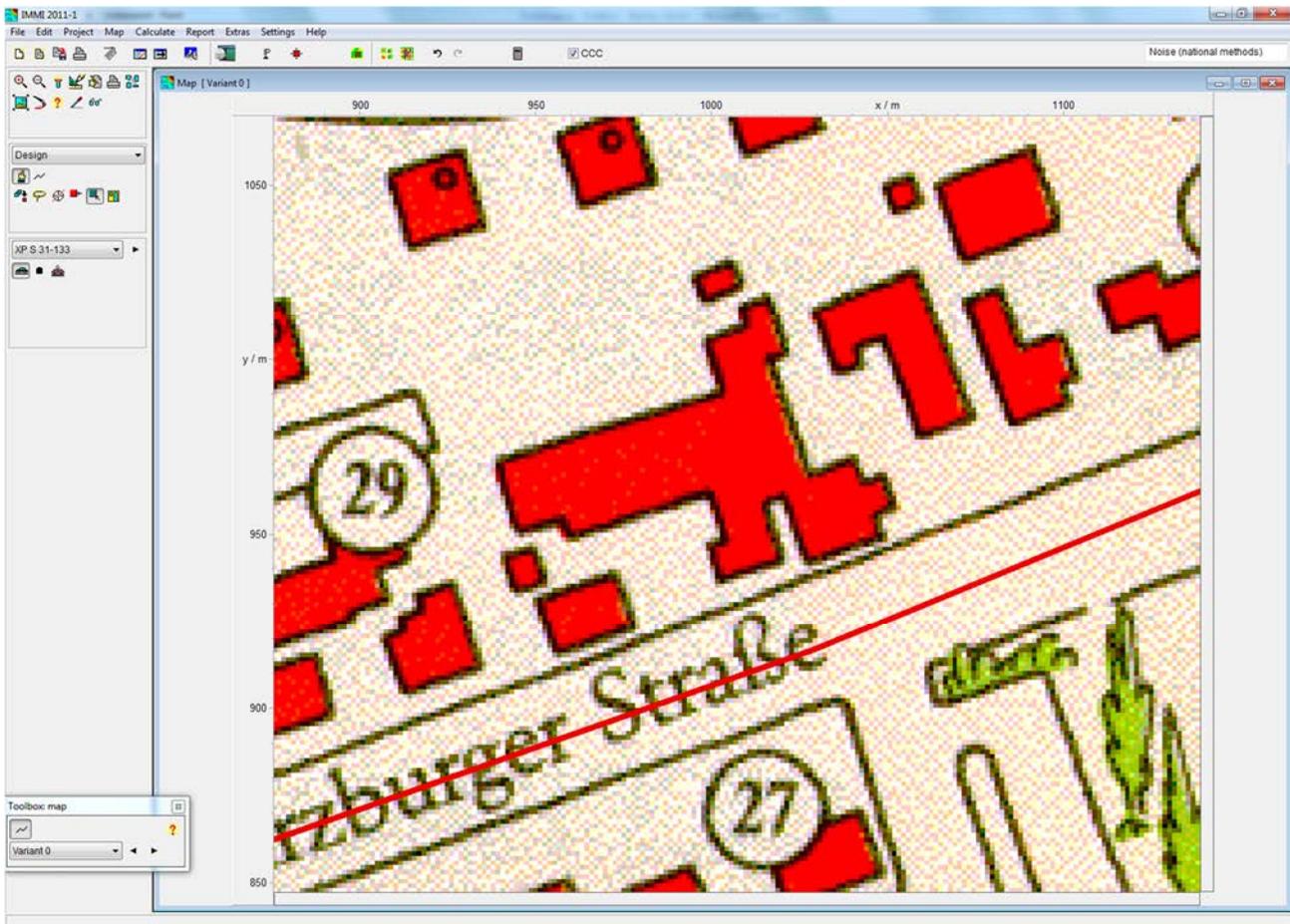


Figure 13: Zooming into the map clipping to be edited, using the lens

Note: You can move the map clipping in any direction by clicking on the mouse wheel or pressing the arrow keys on your keyboard. This requires the Edit element tool.

- Ensure that you have selected **Draw elements** () in the **Design** mode.
- Select the **Building** () element from the **Standard** element library.
- Re-digitize the building on the background image. Right-click to close the building automatically.

Since the Open element dialog instantly button () is activated by default, the appropriate dialog for entering the building parameters is opened automatically.

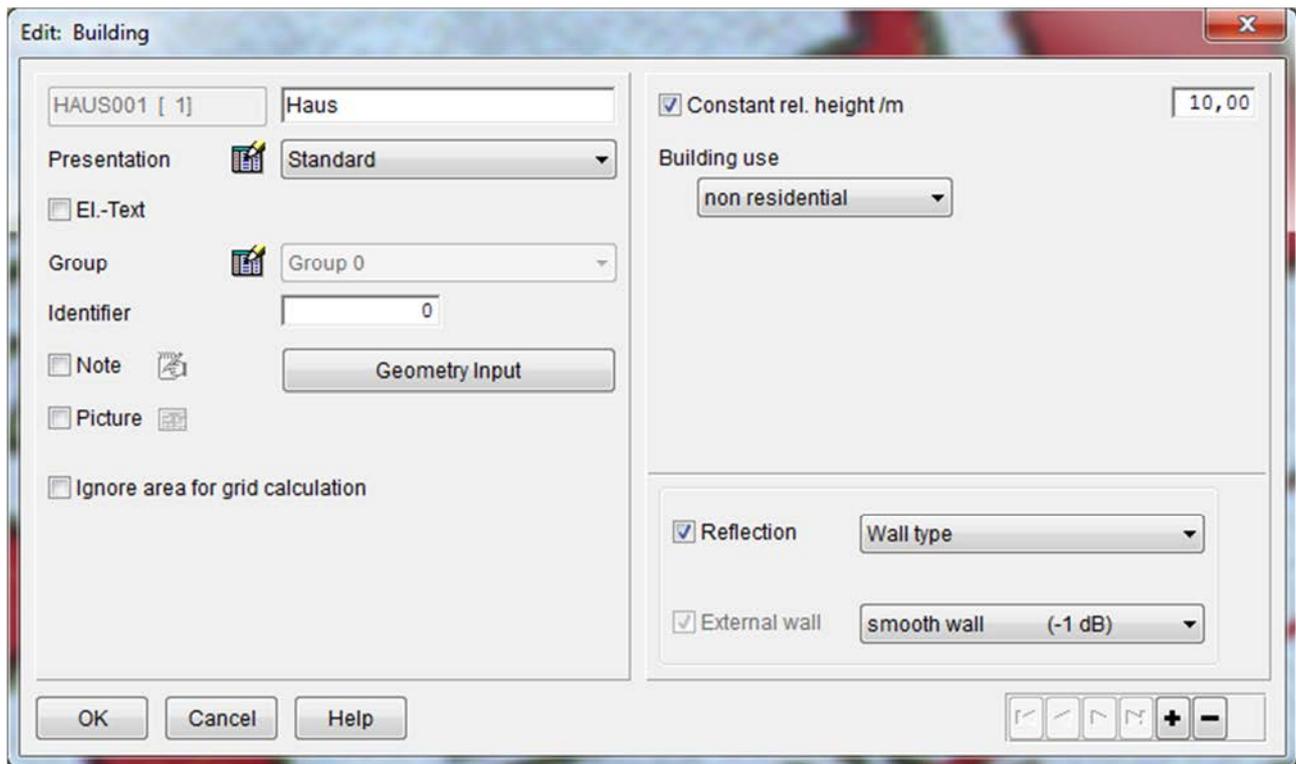


Figure 14: Input dialog for defining a building

- Enter an element name.
- Enter **10 m as constant relative building height**.
- Activate **Reflection** and select **smooth wall** as **Wall type** with an absorption loss of **1 dB**.

- Complete your entry with **OK**. The map should now show the following building presentation:

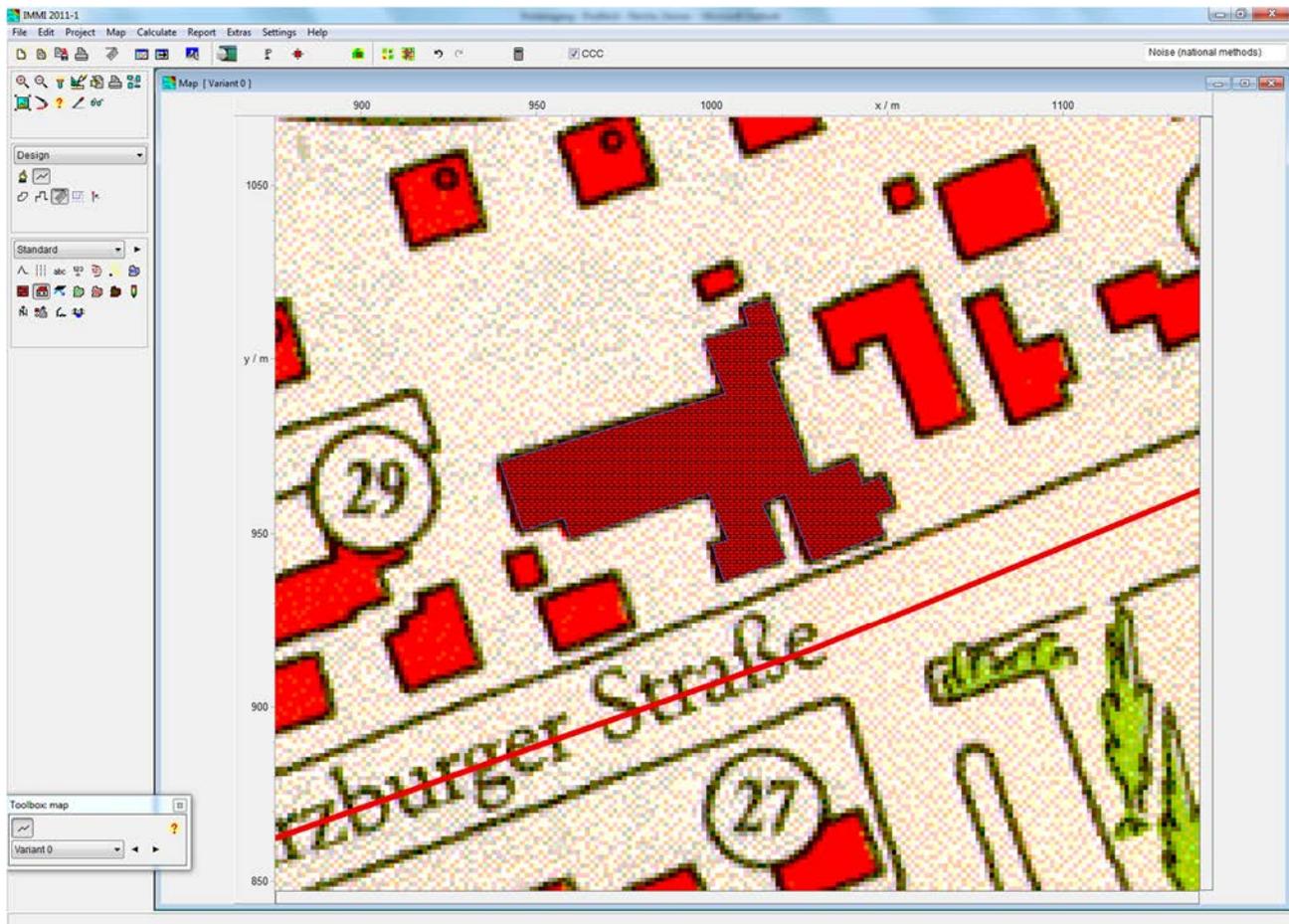


Figure 15: Designed building on the map

You can, of course, select the type of element presentation as desired.

- Draw three to four additional buildings and set the appropriate individual parameters.
- To change the presentation, select the **<Settings | Display attributes | Additional attributes>** menu item.

Note: Select Standard to change the default setting.

- This opens the selection list of the various element types. Click on **Add** to define a new attribute.
- Enter an attribute name.
- Click on **Hatches** to select a filling or shading. Click **OK** to quit.

- Click on the Colour-Button to select a **Color**.

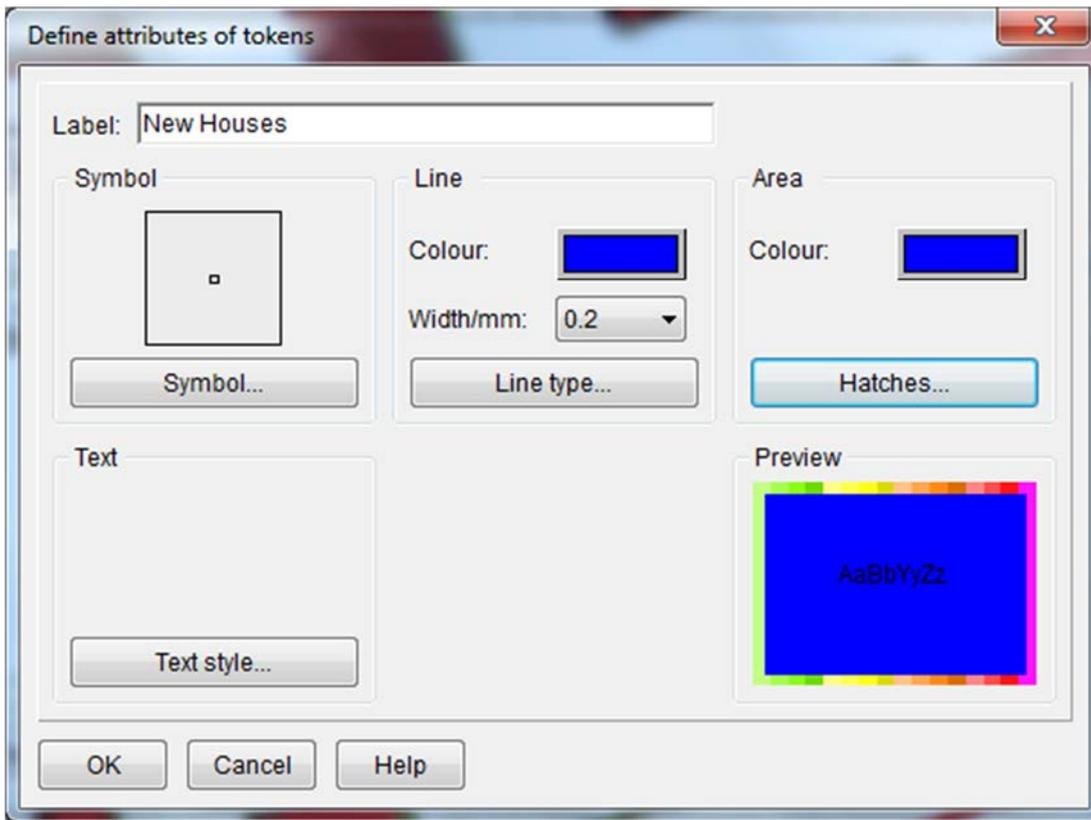


Figure 16: Defining additional attributes

- Exit the dialog with **OK** and **Close** the dialog.
- Select a building by left-clicking on the edge of the element (Caution! **Edit element** in **Design** mode)
- Double-click on the edge of the element. This opens the input dialog of the element where you select the **Edit element** menu item.

- Select the new defined attribute from the **Presentation** list box.

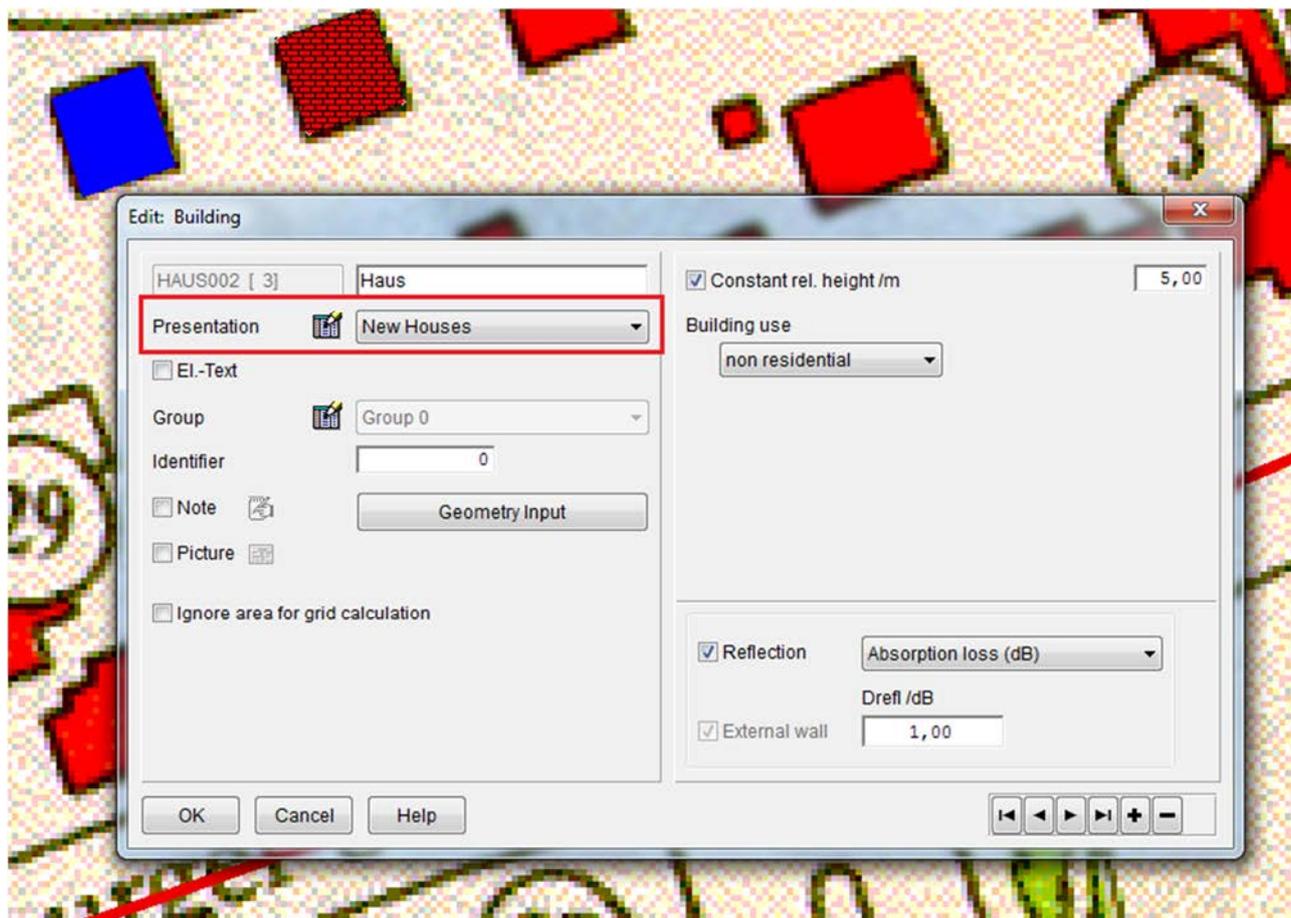


Figure 17: Building with different color attributes

- Exit the dialog with **OK**.

1.3.3 Defining Receiver Points

In the next step, the essential receiver points are entered. These are the points to be subsequently subjected to single-point calculation.

This can be achieved in two ways:

- 1) **Use the mouse and design as you desire:** This requires that you activate the Receiver point button in the Standard element library and left-click to position the point on the map in the Design mode.
- 2) **Use the Generate reception points macro:** A certain number of receiver points is automatically generated at a building. This has the advantage that, in addition to selecting the exact position (e.g. distance of 0.5 m from the wall of the building), time can be saved while several different reception point heights are generated (e.g. modelling the various floors).

We use the macro in our example.

- Select the **Edit element** function in the **Design** mode.

- Left-click on the building on the map to select it. The footer will show the element type and name. The display of the building changes (nodes are shown clearly).
- Right-click to open the pop-up menu.
- Click on the **Macros** option and select **Generate receiver points**.



Figure 18: Generating reception points automatically

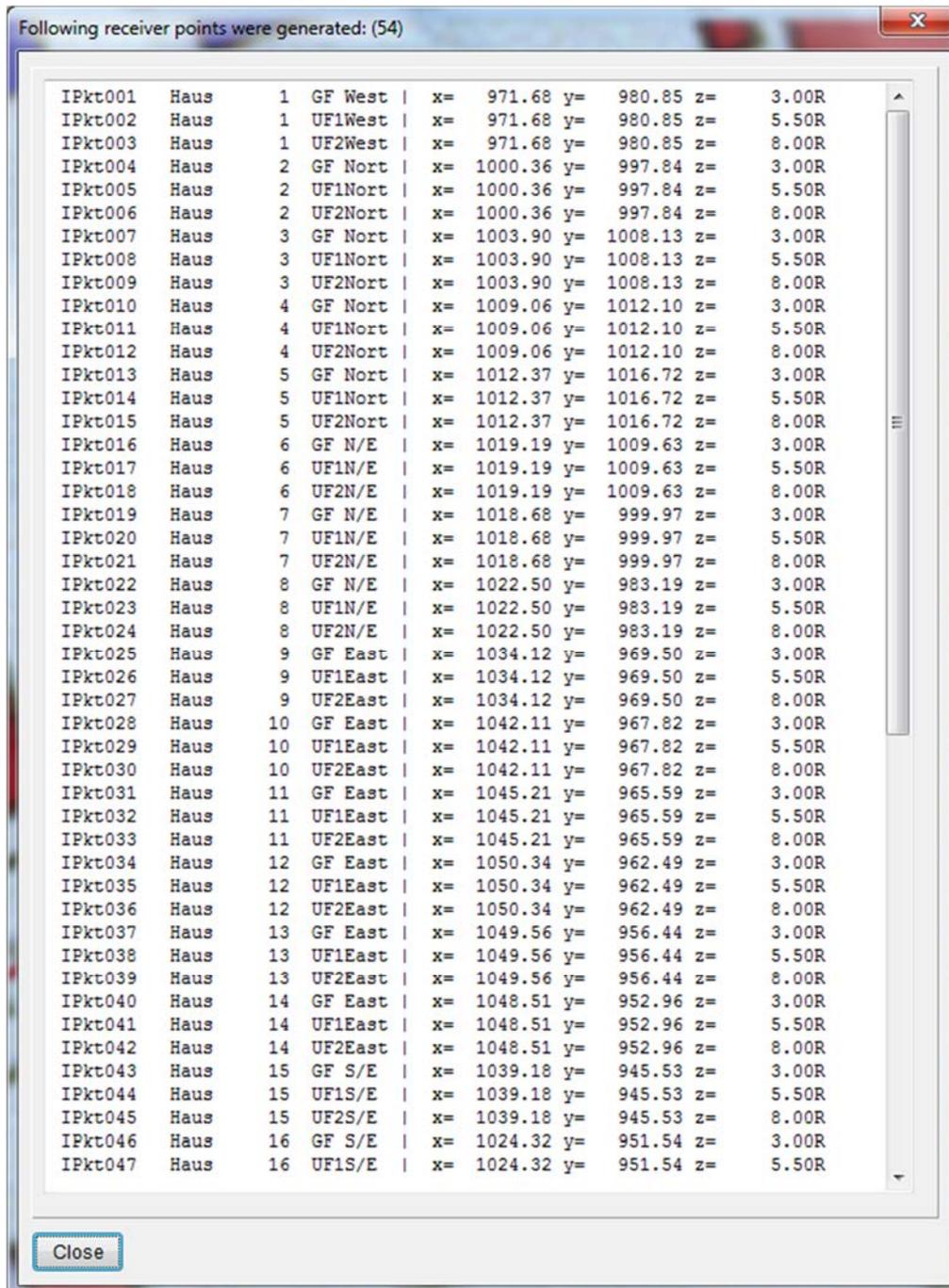
- Enter the parameters specified in the figure below.

 A screenshot of the 'Generate receiver points' dialog box. The dialog is divided into two main sections. The left section, 'Align on elements', has a text field containing 'HAUS001 Haus'. Below it, 'z co-ordinates' has radio buttons for 'absolute' and 'relative', with 'relative' selected. Further down, there are input fields for 'Ground-floor z0 /m' (value: 3,00), 'Floor height dz /m' (value: 2,50), and 'Number of floors' (value: 3). A checked checkbox 'Use group' is followed by a dropdown menu showing 'Group 0'. At the bottom left, there are input fields for 'Limiting val. [dB(A)]' for 'Day' and 'Night'. The right section, 'Position relative to element', has radio buttons for 'inside', 'outside', and 'both sides', with 'outside' selected. Below this is an input field for 'Distance from element ds /m' (value: 0,50) and an unchecked checkbox 'Multiple points per section'. At the bottom right, there is a checked checkbox 'Document orientation (put north indicator)'. At the very bottom of the dialog are 'OK', 'Cancel', and 'Help' buttons.

Figure 19: Input dialog for generating reception points

The system will now generate receiver points on each building wall –always centrally between the bordering nodes. These receiver points are located at a distance of 0.5 m from the wall both on the ground floor and on the second and third floors. The building is located in the common residential area.

- Complete your entry with **OK**.
- A list showing the generated reception points appears.



ID	Building	Floor	Wall Orientation	X	Y	Z
IPkt001	Haus	1	GF West	971.68	980.85	3.00R
IPkt002	Haus	1	UF1West	971.68	980.85	5.50R
IPkt003	Haus	1	UF2West	971.68	980.85	8.00R
IPkt004	Haus	2	GF Nort	1000.36	997.84	3.00R
IPkt005	Haus	2	UF1Nort	1000.36	997.84	5.50R
IPkt006	Haus	2	UF2Nort	1000.36	997.84	8.00R
IPkt007	Haus	3	GF Nort	1003.90	1008.13	3.00R
IPkt008	Haus	3	UF1Nort	1003.90	1008.13	5.50R
IPkt009	Haus	3	UF2Nort	1003.90	1008.13	8.00R
IPkt010	Haus	4	GF Nort	1009.06	1012.10	3.00R
IPkt011	Haus	4	UF1Nort	1009.06	1012.10	5.50R
IPkt012	Haus	4	UF2Nort	1009.06	1012.10	8.00R
IPkt013	Haus	5	GF Nort	1012.37	1016.72	3.00R
IPkt014	Haus	5	UF1Nort	1012.37	1016.72	5.50R
IPkt015	Haus	5	UF2Nort	1012.37	1016.72	8.00R
IPkt016	Haus	6	GF N/E	1019.19	1009.63	3.00R
IPkt017	Haus	6	UF1N/E	1019.19	1009.63	5.50R
IPkt018	Haus	6	UF2N/E	1019.19	1009.63	8.00R
IPkt019	Haus	7	GF N/E	1018.68	999.97	3.00R
IPkt020	Haus	7	UF1N/E	1018.68	999.97	5.50R
IPkt021	Haus	7	UF2N/E	1018.68	999.97	8.00R
IPkt022	Haus	8	GF N/E	1022.50	983.19	3.00R
IPkt023	Haus	8	UF1N/E	1022.50	983.19	5.50R
IPkt024	Haus	8	UF2N/E	1022.50	983.19	8.00R
IPkt025	Haus	9	GF East	1034.12	969.50	3.00R
IPkt026	Haus	9	UF1East	1034.12	969.50	5.50R
IPkt027	Haus	9	UF2East	1034.12	969.50	8.00R
IPkt028	Haus	10	GF East	1042.11	967.82	3.00R
IPkt029	Haus	10	UF1East	1042.11	967.82	5.50R
IPkt030	Haus	10	UF2East	1042.11	967.82	8.00R
IPkt031	Haus	11	GF East	1045.21	965.59	3.00R
IPkt032	Haus	11	UF1East	1045.21	965.59	5.50R
IPkt033	Haus	11	UF2East	1045.21	965.59	8.00R
IPkt034	Haus	12	GF East	1050.34	962.49	3.00R
IPkt035	Haus	12	UF1East	1050.34	962.49	5.50R
IPkt036	Haus	12	UF2East	1050.34	962.49	8.00R
IPkt037	Haus	13	GF East	1049.56	956.44	3.00R
IPkt038	Haus	13	UF1East	1049.56	956.44	5.50R
IPkt039	Haus	13	UF2East	1049.56	956.44	8.00R
IPkt040	Haus	14	GF East	1048.51	952.96	3.00R
IPkt041	Haus	14	UF1East	1048.51	952.96	5.50R
IPkt042	Haus	14	UF2East	1048.51	952.96	8.00R
IPkt043	Haus	15	GF S/E	1039.18	945.53	3.00R
IPkt044	Haus	15	UF1S/E	1039.18	945.53	5.50R
IPkt045	Haus	15	UF2S/E	1039.18	945.53	8.00R
IPkt046	Haus	16	GF S/E	1024.32	951.54	3.00R
IPkt047	Haus	16	UF1S/E	1024.32	951.54	5.50R

Figure 20: List of generated reception points

- Click on **Close** to return to the map.

You can now see the receiver points that have been generated on various sidewalls. In the next step, the display of the map is switched to 3D mode where it is easier to examine the spatial arrangement.

- To start the 3D Viewer, select the <Map | **Edit layer** | **Generate 3D view** > menu item or click on the **Generate 3D-View** () button.
- Deactivate the Apply formal control checkbox.

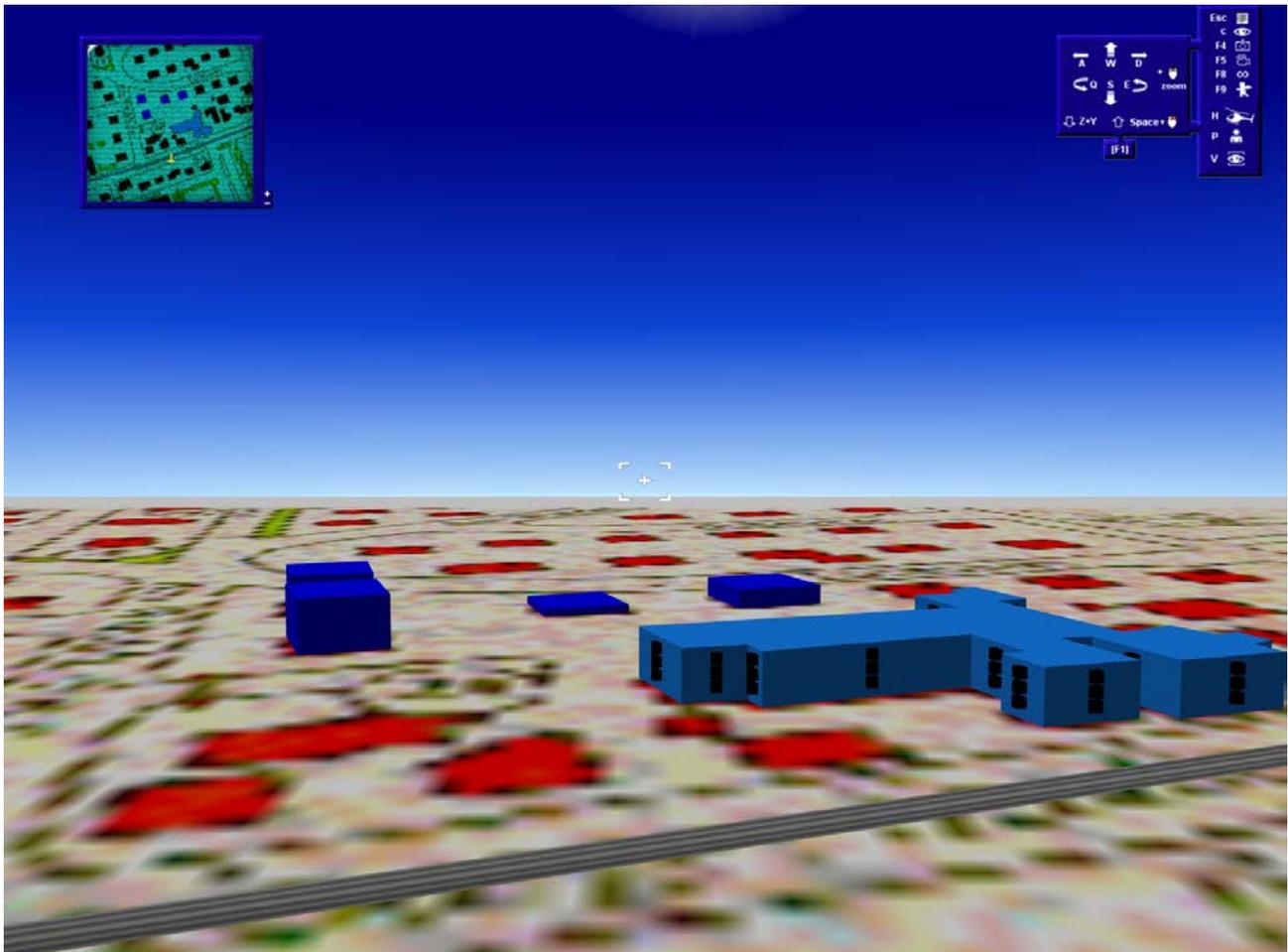


Figure 21: 3D view of the generated reception points

For detailed information about the 3D Viewer, please refer to the online help or the 3D Viewer Manual.

- Press the **ESC** key and select Exit to return to the map.

1.3.4 Defining Compass (Meteorology)

Do not forget the Compass: It is very important for calculations according to XP S 31-133!

- Choose the **Design** mode from the tool box in the left and **Draw elements** () and select  - **Compass** from the standard library.

- Insert the NPFL on the map.

Note: Meteorology according XP S 31-133

Select the <**Calculate | Calculation parameters | Parameters for element libraries | XP S 31-133**> menu item. This opens a dialog where you can choose or insert a meteorology. The meteorology for France according XP S 31-133 appendix 1 is already included.

1.3.5 Single-Point Calculation

In the following, you learn how to perform an immission calculation at certain reception points.

- To start single point calculation, either click the  - button in the header or proceed via the <**Calculate | Receiver points**> menu.
- In the lower frame of the central dialogue deactivate **All**.
- Click the button **Selection** under Receiver points to select 3 points. Select 3 receiver points at different heights.
- Select the points by means of the arrow buttons.

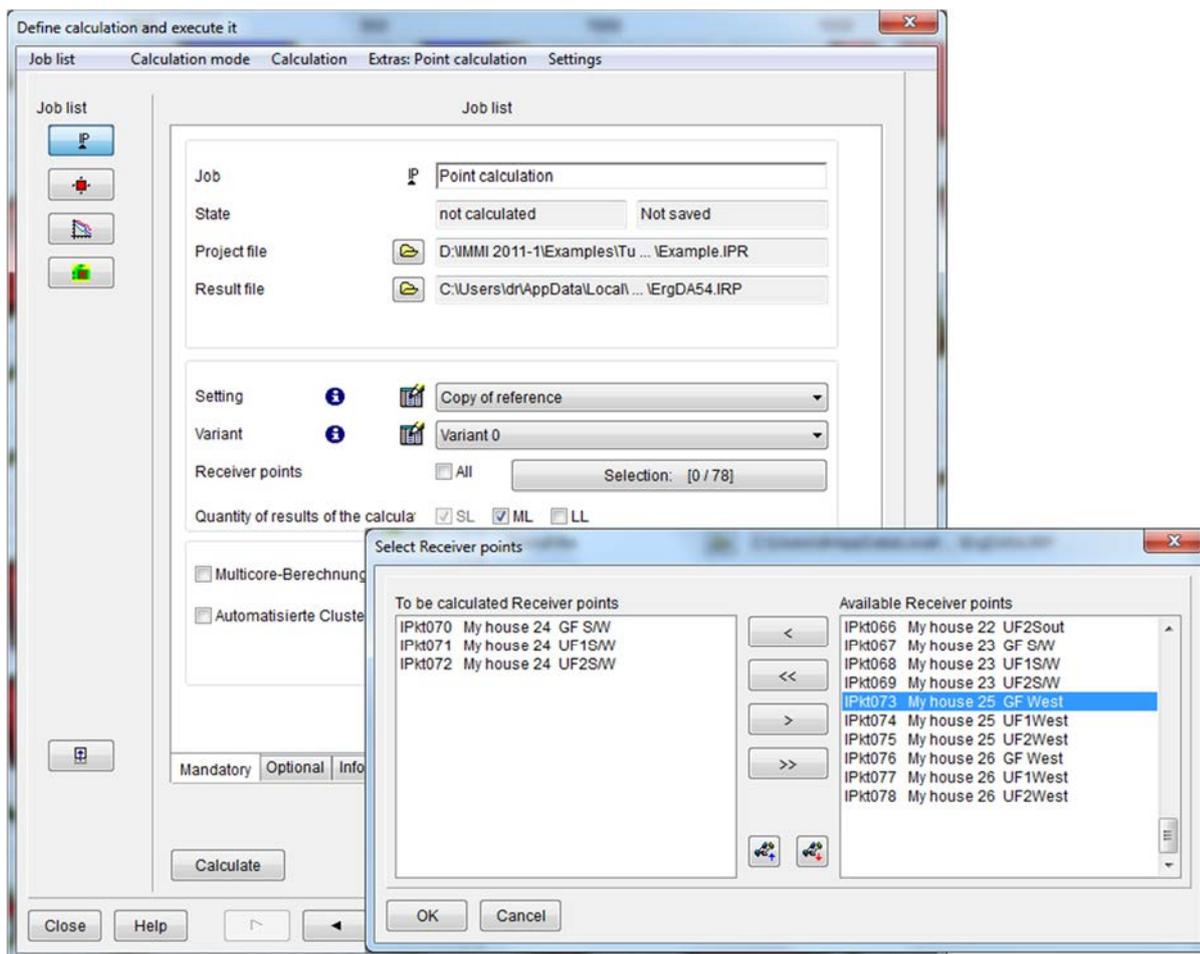


Figure 22: Dialog for calculating reception points

- Click on **OK** to exit the selection.
- To start the calculation, click **Calculate**. The calculation is completed within a few seconds. The result is shown in the Express list.
- Click on the **Results** tab.
- Under **Short list**, select **Noise level** and click **Show**.

Table 1: Single-point calculation results –short list

Short list		Point calculation			
Noise prediction					
Variant 0		Setting: Copy of reference			
		Day		Night	
		LV	L r,A	LV	L r,A
		/dB	/dB	/dB	/dB
IPkt070	My house 24 GF S/W		62,8		52,8
IPkt071	My house 24 UF1S/W		62,7		52,7
IPkt072	My house 24 UF2S/W		62,7		52,7

- Study the results, and the numerous functions of lists.
- Click the  button to quit the list.
- You can view all created lists one after the other.
- Once you have finished quit all open dialogues.

1.3.6 Variants

The established dataset consists of one calculation variant only, i.e. Variant 0. That means that, presently, all generated elements are included in calculation. Below, however, we will extend the dataset that we can generate and calculate selected variants.

To achieve this, enter a further element –a section of a road –in the map. .

- Select the **Design** mode and activate the **Draw elements** function.
- Open the **XPS S31-133** element library and select the **Road** element.

- Draw an additional road at the position shown in the figure below:

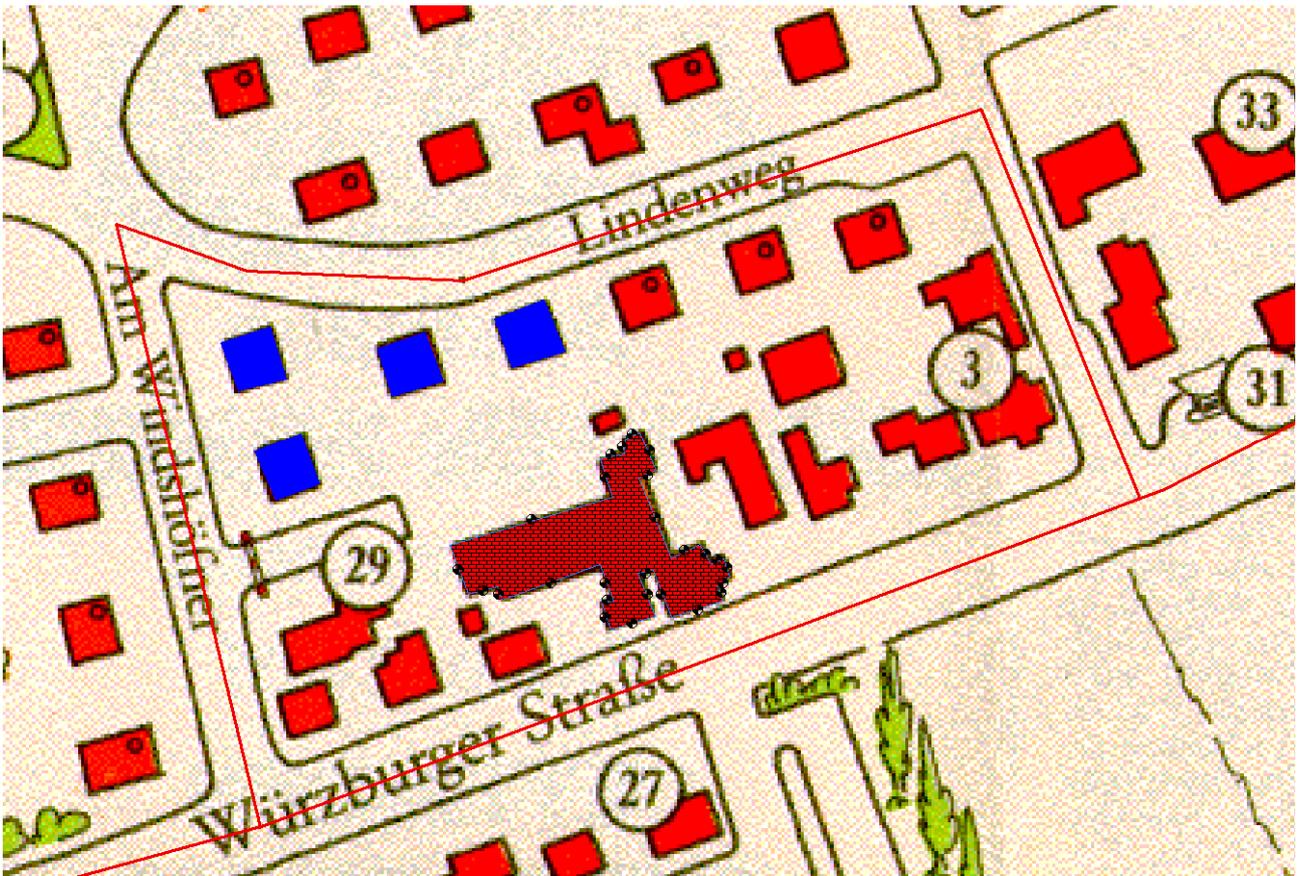


Figure 23: Adding a road

- Right-click to complete your entry. The input dialog will be opened automatically.

- Enter the parameters describing the street (traffic load, road type, name according to the figure below):

The image shows two overlapping dialog boxes from a software application. The background dialog is titled 'Edit: Road /XP S 31-133'. It contains several input fields and options: 'R96_002 [2]' in a text box, 'Lindenweg' in another text box, a 'Presentation' dropdown menu set to 'Standard', a 'Group' dropdown menu set to 'Group 0', an 'Identifier' text box with '0', and an 'Action radius/m' text box with '99999'. There are also checkboxes for 'EI.-Text', 'Note', and 'Picture', and a 'Driving direction/gradien' dropdown menu set to '2 directions / driving on the right'. The foreground dialog is titled 'Input emission data: Road /XP S 31-133'. It has a table of input parameters for Day and Night. The parameters include ADT in vehicles/day (900), Road type (District road), Surfacing (Asphalt), Traffic flow (continuous flow), and various noise metrics (Q cars/trucks, v cars/trucks, E cars/trucks, Leq cars/trucks, and Leq in dB(A)).

	Day	Night
ADT in vehicles/day	900,	
Road type	District road	
Surfacing	Asphalt	
Traffic flow	continuous flow	continuous flow
Q cars in vehic./h	51,84	9,60
Q trucks in vehic./h	5,76	0,30
v cars in km/h	50,	50,
v trucks in km/h	50,	50,
E cars in dB(A)	32,7	32,7
E trucks in dB(A)	44,7	44,7
Leq cars in dB(A)	49,9	42,6
Leq trucks in dB(A)	52,3	39,4
Leq in dB(A)	54,3	44,3

Figure 24: Input dialog for an additional road

In the following stage of the project, you will create several variants in order to become more familiar with the variants function. For a better understanding of variants and element groups, please read the following excerpt from the manual.

Using Variants:

The option of calculation variants allows editing of different variants within one and the same project. That means that, while a variant is calculated, specific elements are activated for or excluded from calculation.

This requires two steps:

The first step is to assign elements which are to be activated in one variant but deactivated in another to a special element group.

The second step is to define calculation variants and to determine the element groups to be activated in the particular variant.

Using Element Groups:

Element groups form the basis for the calculation of variants. Unless additional entries are made, there is always exactly one element group, i.e. Group 0.

Create the following variants:

- Contributions of **Wuerzburg Street** and **Linde Street** on the 3 reception points,
- Contribution of **Wuerzburg Street** only, and
- Contribution of **Linde Street** only.

To achieve this, define these calculation variants in the program.

- Select the <**Project | Element Groups + Variants**> menu item.
- Activate the **Variants** tab.
- Click **Add** to add the "Wuerzburg Street" variant.
- Enter **Wuerzburg Street** in the Label field.
- Complete your entry with **OK**.
- Proceed as described above to add the **Linde Street** variant.

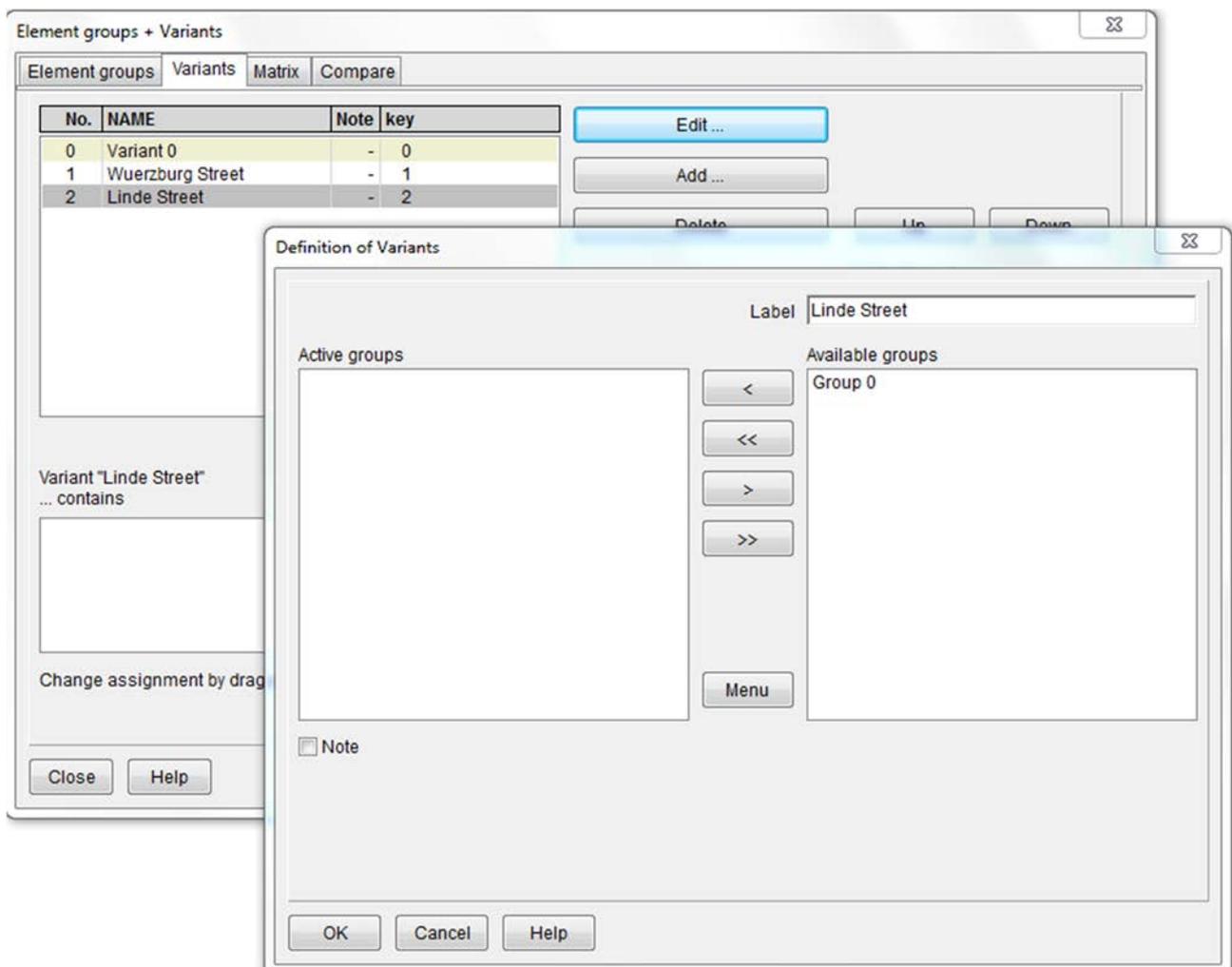


Figure 25: Creating variants

The default setting of all elements, on being generated, is "Group 0". The order of variants aims at assigning different group names to the various elements and to

determine the groups to be active in the variants defined so that they are involved in calculation and also they determine the groups to be explicitly excluded so that they will not be included in calculation.

Our variants only differ in their noise causes, i.e. the roads. That is why a new group should be assigned to Wuerzburg Street and Linde Street. At first, however, new group names must be defined.

- Activate the **Element groups** tab.
- Click **Add** to enter a new group.
- Enter **Wuerzburg Street**.
- Confirm your entry with **OK**.
- Proceed as described above to define the **Linde Street group**.

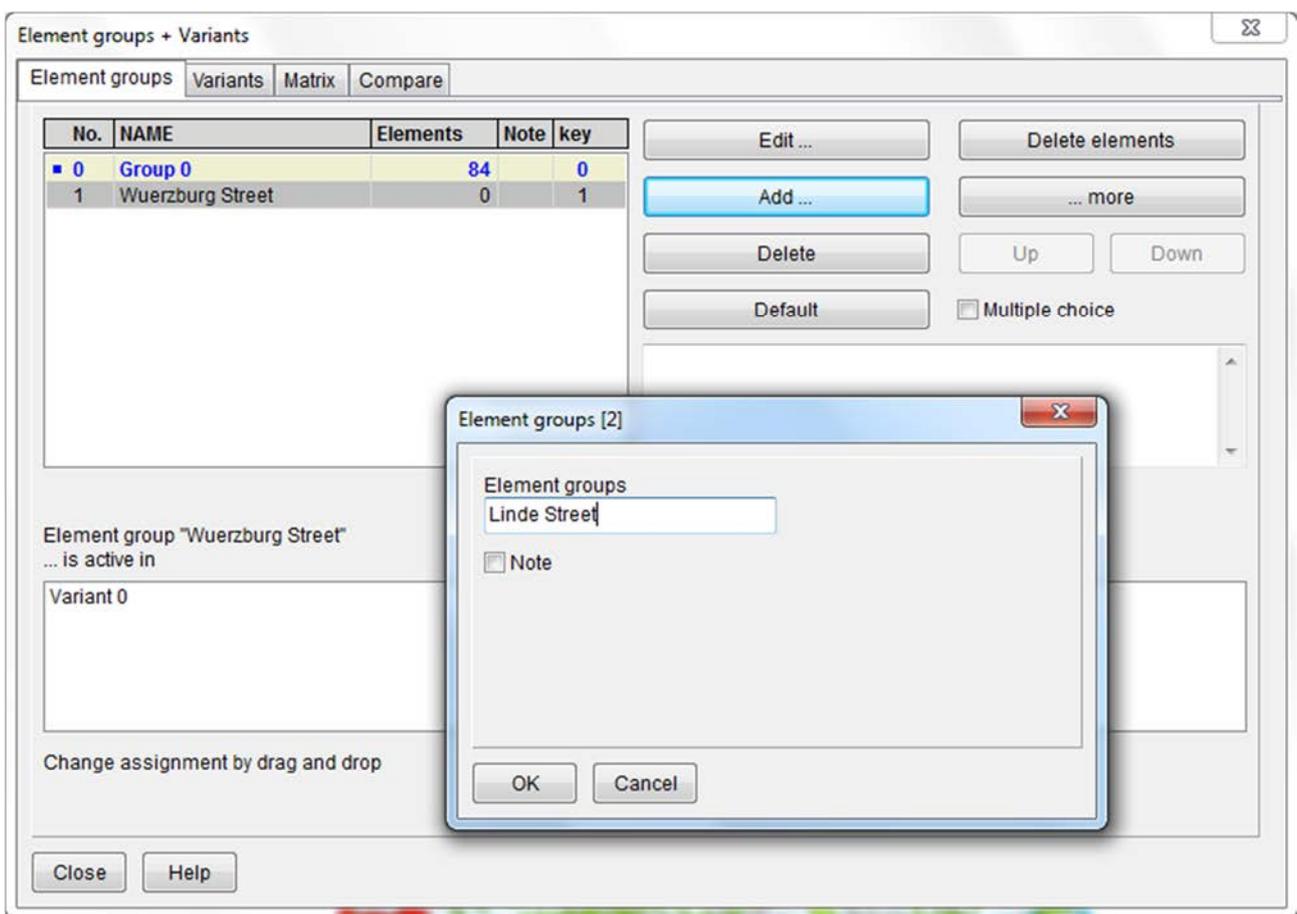


Figure 26: Creating element groups

The new groups are now defined. The next step is to assign the groups to the variants defined. This is achieved in the Variants tab.

Variant 0 cannot be edited because, here, all groups are always active. That means that, in our example, Variant 0 always includes both roads in calculation.

- Activate the **Variants** tab.
- Select the **Wuerzburg Street** variant.
- Click **Edit**. This will open the dialog for the definition of variants.

- Using the arrow buttons in the middle of the dialog, move the **Group 0** and **Wuerzburg Street** element groups to the left to the Active groups window.

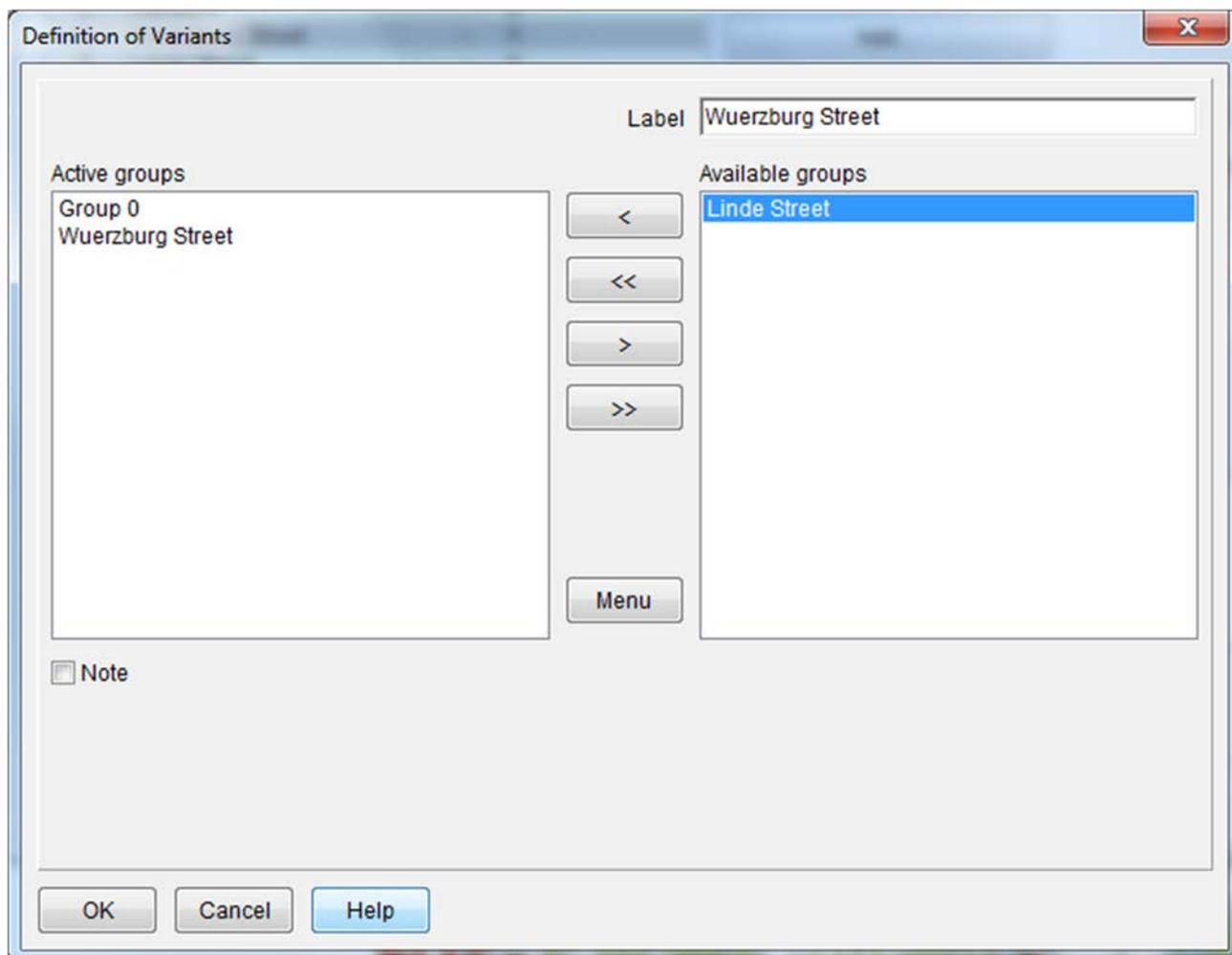


Figure 27: Assigning element groups in variants

- Exit the dialog with **OK**.

- Now select the **Linde Street variant** from the list and click on **Edit**.

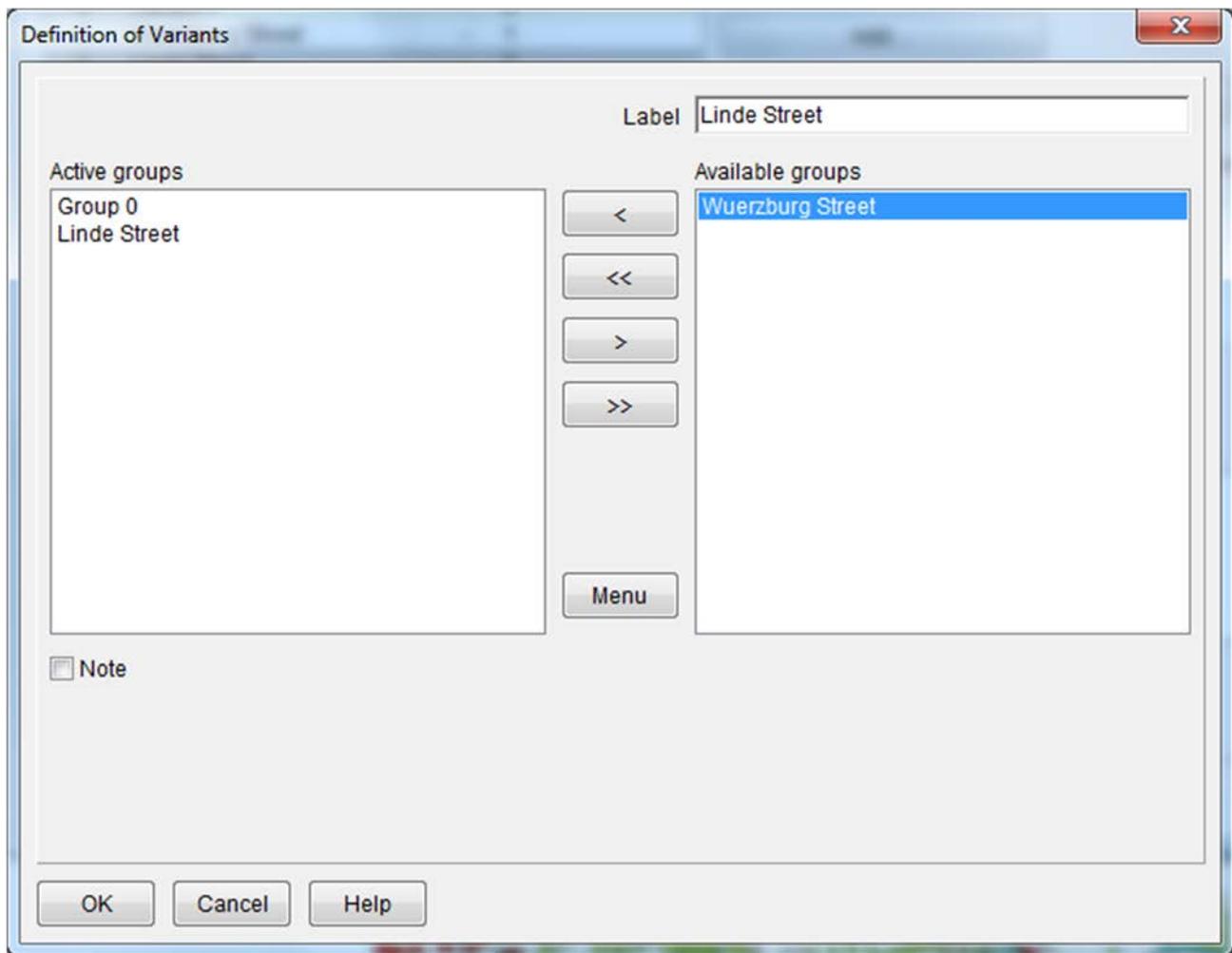


Figure 28: Assigning element groups in variant Linde Street

- Using the arrow buttons in the middle of the dialog, move the **Group 0** and **Linde Street** element groups to the left to the Active groups window.
- Exit the dialog with **OK**.

- Activate the **Matrix tab** to verify the assignment.

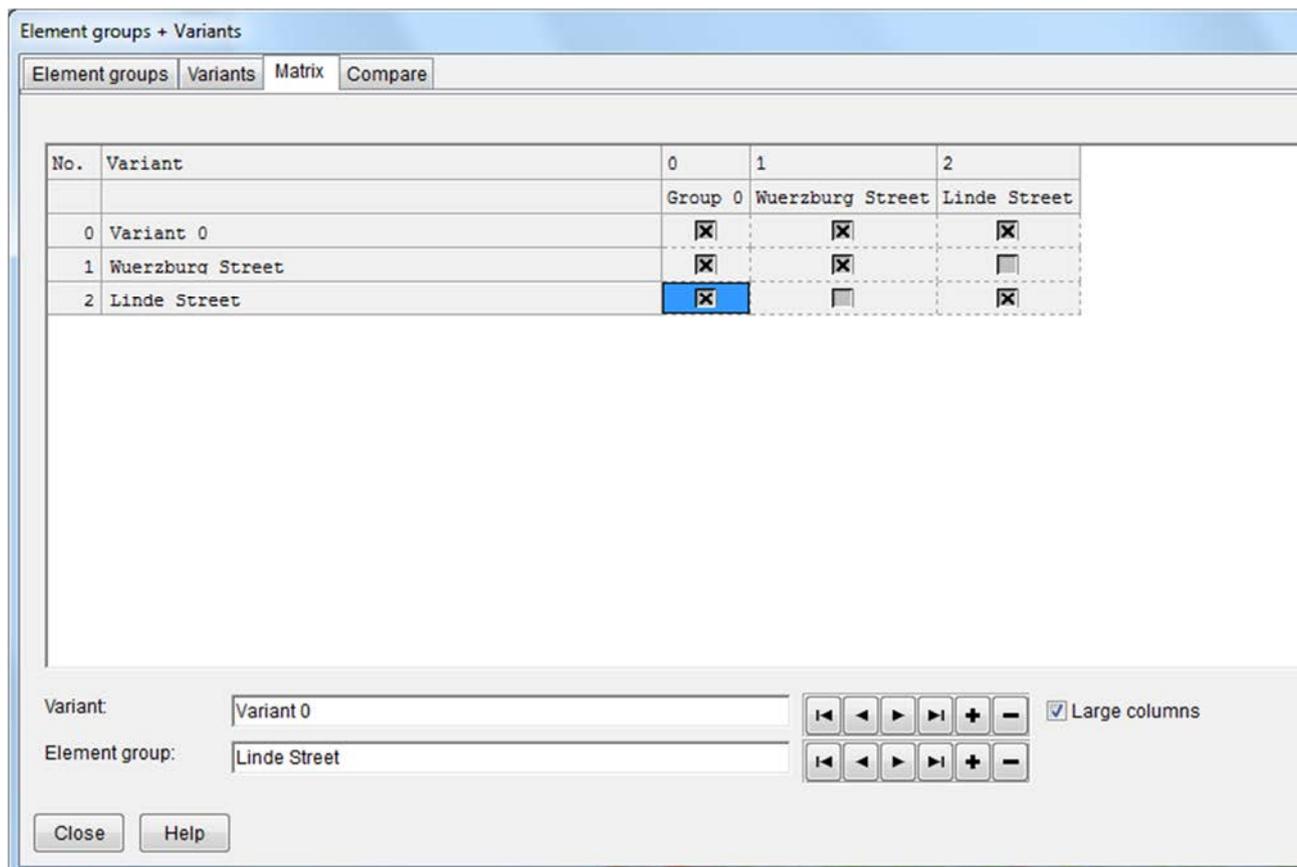


Figure 29: Matrix showing an overview of the variants including assigned element groups

- Click on **Close** to exit the dialog.

In the final step, the **Wuerzburg Street** and **Linde Street** elements must still be assigned to the new group. This is achieved on the elements level.

- Open the input dialog of the **Wuerzburg Street** element by **double-clicking on the element**.

- Change the Group entry to Wuerzburg Street.

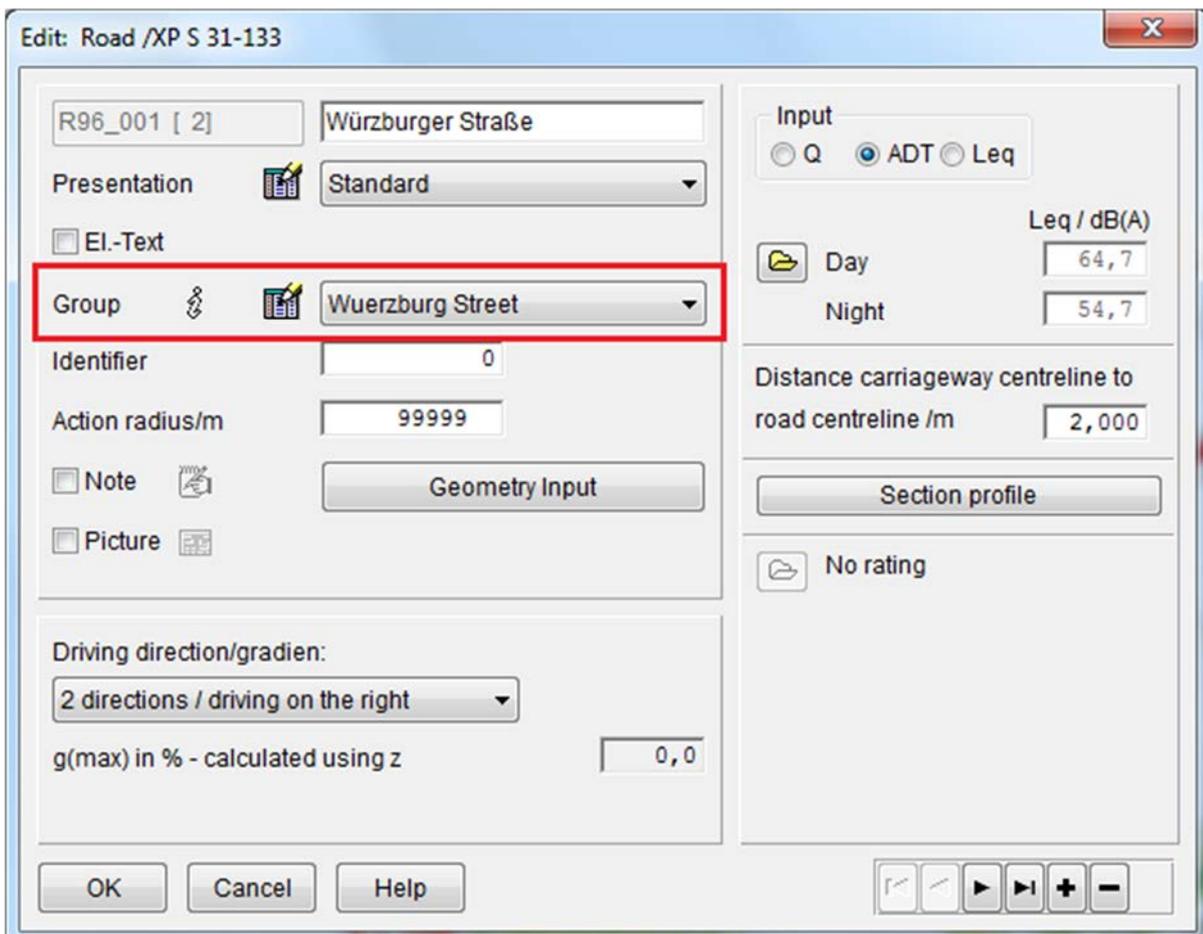


Figure 30: Assigning the element group in the element

- Confirm your entry with **OK**.
- Proceed as described above for assigning the **Linde Street** element to the Linde Street element group.

The effects of the variants created can be simply seen from the map.

- Using the arrow button of the Map tool box (Activate on menu **Settings | Toolbox: Map**), switch between variants and look at the changes in the map.



Figure 31: Map tool box for switching between variants

Once all assignments have been made correctly, both roads will be displayed whenever you call Variant 0. However, if you call the Wuerzburg Street or Linde Street variant, only the related road will be displayed.

If you wish, you can make another single-point calculation as described above. You can then also select variants after having selected the reception points.

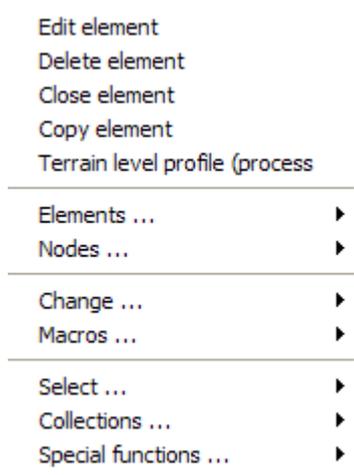
It is obvious that the variants function is extremely flexible so that a great number of variants can be involved, such as typically with/without noise barrier, with/without by-pass, with/without industrial noise percentage and with/without individual emission sources.

1.3.7 Further Features

The section below treats some features of IMMI once again in more detail so that you will get to know further options provided by the program.

In many cases, you can right-click to open a pop-up menu providing many useful functions.

- Select a building and right-click. This opens the following pop-up menu:



- Activate and try the various functions.

1.4 Grid Calculation

In this chapter you will learn how to calculate a grid.

Before starting the calculation zoom to the area of the background image.

- Choose <Calculate | Definition | Calculation grid> and click **Edit** to change the predefined grid. The step size should be 2m x 2m, the height 1,6m.

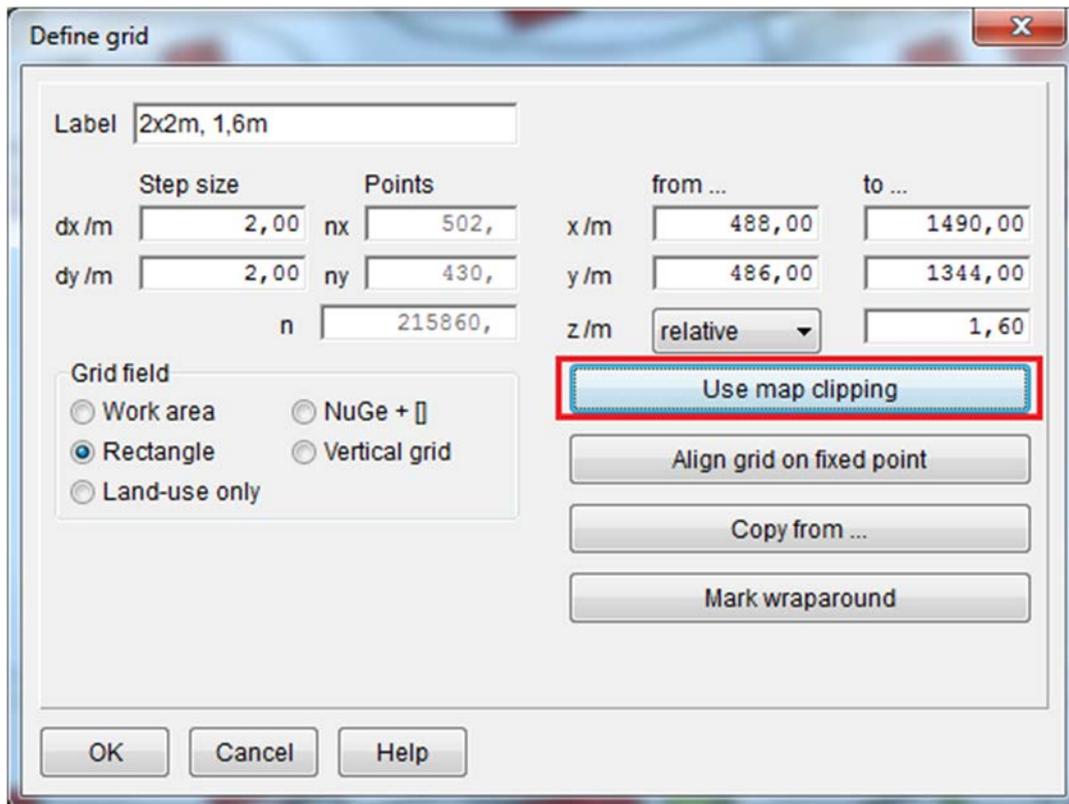


Figure 32: Definition of the grid

- Close all dialogues with **OK**.

- Choose **<Calculate | Calculate grid>** from the main menu to start the calculation.

Equation 1: Start the grid calculation

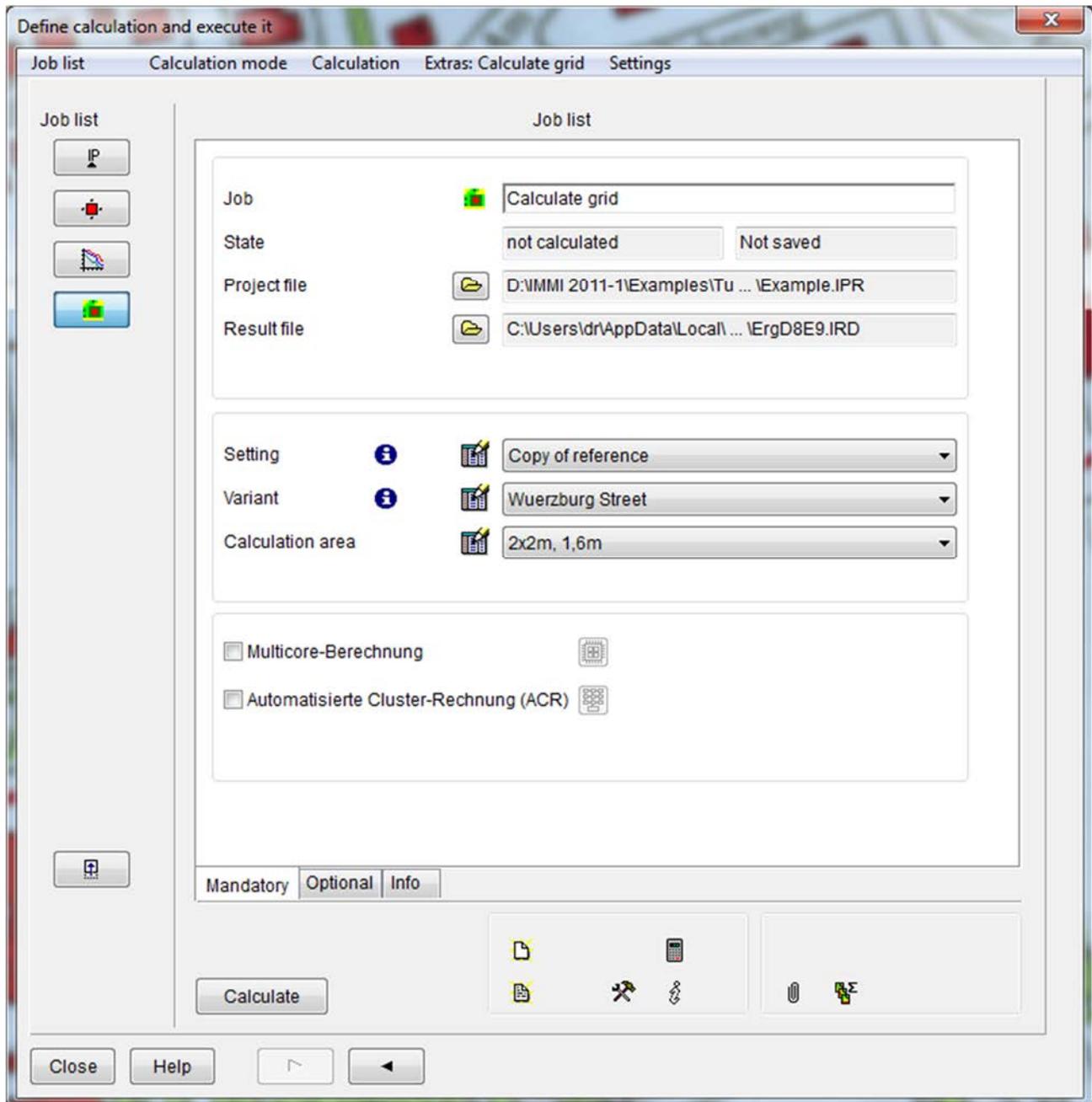


Figure 33: Define calculation

- Click **Calculate** to start the grid calculation.
- After the calculation, select **<Calculation | Save>** in the CCC menü to save the grid.
- **Close** the dialogue and study the result showing in the map.

1.4.1 Documentation

The last section provides information about important documentation tools.

1.4.1.1 Printing the Map

- Select the **<Report | Print>** menu item.

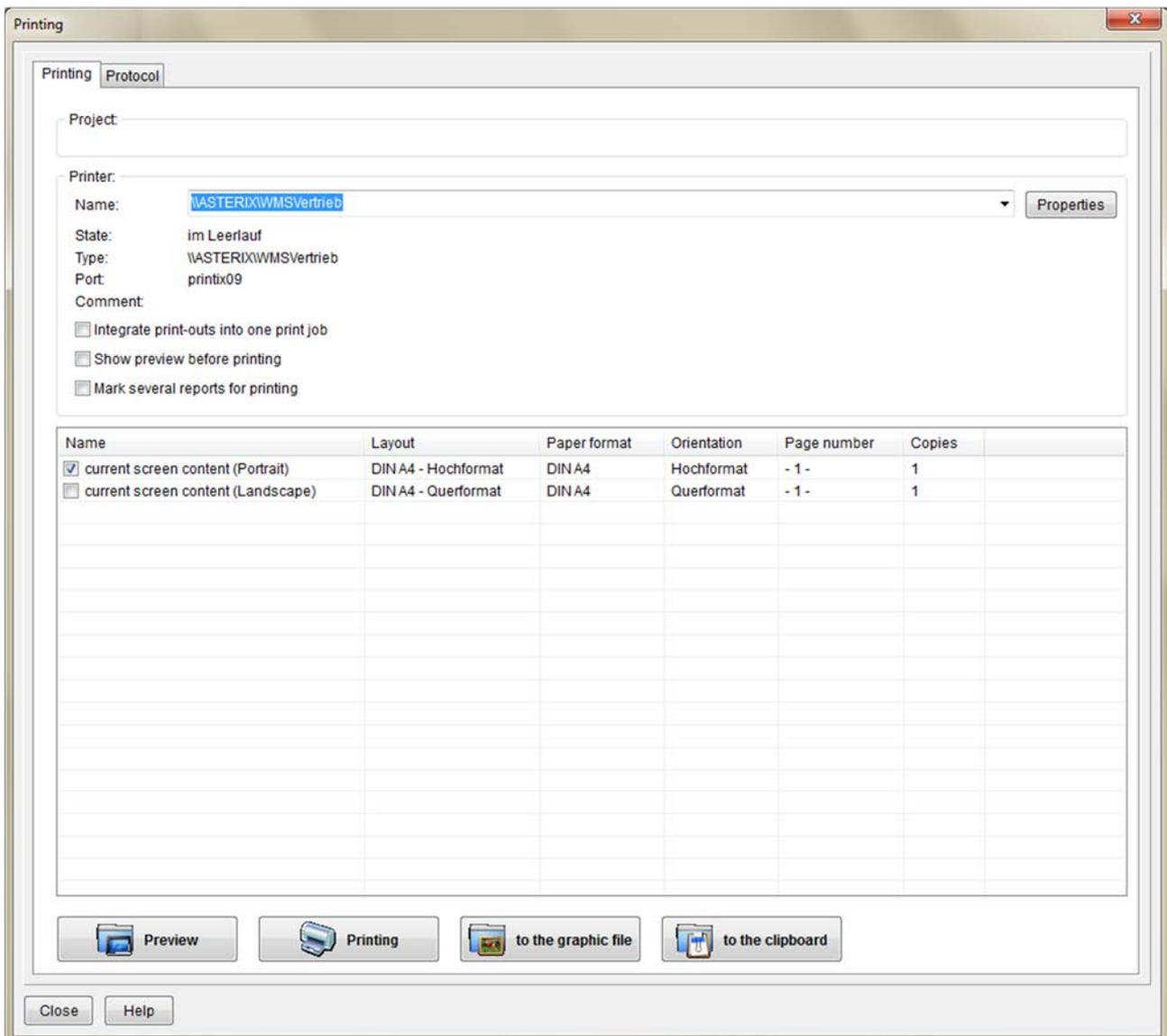


Figure 34: Printing the map

- Select **current screen content (Portrait)** layout and click on **Printing**
- Exit the dialog with **Close**.

1.4.1.2 List of Input Data

A documentation should also contain a list of all input data of the project as well as a list of variants, the dimensions of the work area, etc.

- Select the **<Report | List of input data>** menu item.
- Select the **Sound sources only** list and click on **Show lists**.
- Look at the list.

- Try the various functions.

Table 2: List of input data

The screenshot shows a software window titled 'List of input data' with a 'Variant 0' dropdown. It displays two road segments, R96_001 and R96_002, with their respective input parameters. Below these, there is a table for 'Gradients and gradient correction Dstg for roads'.

Element	Name	Section	s [m]	ds [m]	Gradient %	Gradient %	Dstg [dB]	Dstg [dB]	Dstg [dB]	Hint
			m	m	co-ord.	for calc.	Day	Night		
R96_001	Wuerzburg Street	1	0,00	145,02	0,00	0,00	0,00	0,00		Max
		2	145,02	137,11	0,00	0,00	0,00	0,00		
		3	282,13	206,40	0,00	0,00	0,00	0,00		
		4	488,53	391,70	0,00	0,00	0,00	0,00		
		5	883,23	231,00	0,00	0,00	0,00	0,00		
		6	1111,23	191,55	0,00	0,00	0,00	0,00		
R96_002	Linde Street	1	0,00	255,00	0,00	0,00	0,00	0,00		Max

- Additional task: Create an individual list.

1.5 Creating a conflict map

In your IMMI installation directory, you will find the exemplary data record `Staedtep.ipr` under **<Examples | Tutorial>**. By way of this example, we will show you how to create conflict maps and difference grids.

To get an overview of the target values for the various utilization types, the representation of a Sensitivity map (Noise target values) is created in a first step.

- In the Toolbox on the left, select the **Thematic maps** mode.
- Click the  - **Noise target values** button to show the target values. Select an evaluation period. The resulting screen should look like this:

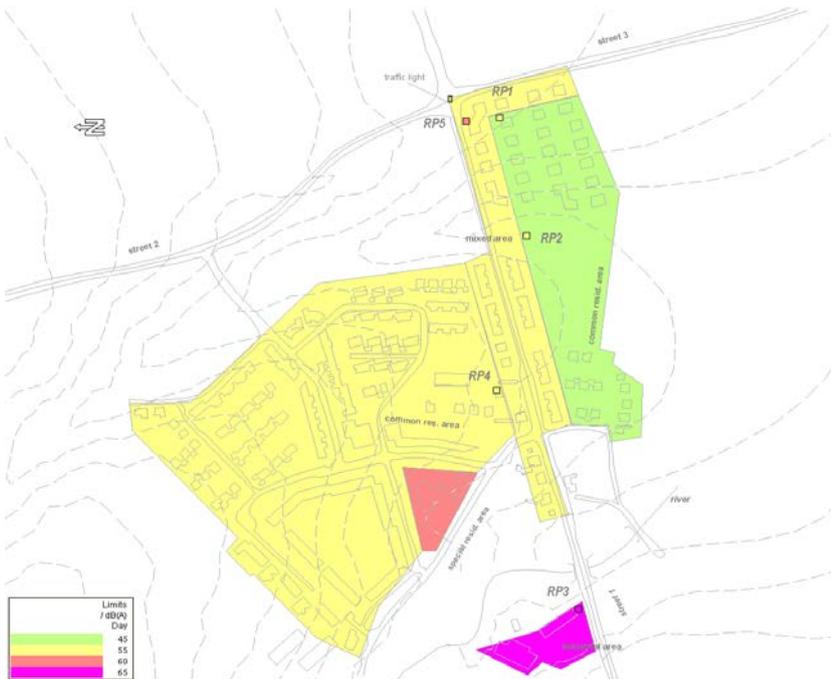


Figure 35: Display of the target values for daytime

- Now, via **<Calculate | Calculate grid | Calculate | Open>**, load the grid `Staedtep.IRD` from the IMMI Examples file.
- Select the menu **<Extras: Calculate grid | Processing | Evaluate>**.
- Click on **Evaluate**. Under **Select operation**, select: **Conflict map**. It is possible to activate all time periods.

The grid that is shown now displays the comparison between the target values and the calculated noise levels.

But the representation could be made even more meaningful for reporting purposes. Accordingly, only exceedances of the target values should be shown. Non-exceedances, though desirable in the interest of noise protection, are not meaningful in the representation of conflicts.

- Quit the dialog for grid calculation.

- In the Toolbox on the left, click on the  **-Change colour scale** button to re-define the grid scaling.
- Under **Scale**, select **Fixed-linear scale**, as well as 0 as a Minimum and **1 dB(A) as Step size**. Now, you see the new color scale in the preview. In the preview, click on the **first line ... < 0.0 dB(A)** and assign the **colour white** (bottom right of the color range chart). Now, the conflict map will be displayed in the desired manner. The conflicts are readily visible.



Figure 36: Conflict map

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