

Import of Road Traffic Data

SP Net info 60

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Traffic noise projects of medium and big size include a special challenge: How to load a huge amount of traffic data into the SoundPLAN memory without too much manpower? The answer depends on the format of the traffic data. In principle you have two possibilities: Shape files import or Ascii Table import.

Shape files import: More and more information related to a geographical position are these days stored in GIS (Geographic Information Systems) software like ArcGIS, MapInfo and QGIS. Cabling and sewer underneath the terrain, rainfall, density of population just to state a few examples. The Shape files format defined by ESRI – the producer of ArcGIS – can host any property you want to assign to an object at a given geographical position. Not like the dxf-format that only comes with the geometry (x, y, z) of the object. For road noise the relevant properties are average daily traffic, distribution of each vehicle category over the 24 hours, travelling speed, data for road profile etc.

In a Shape file coordinates and properties are saved in separate files. The properties are saved in a database file with extension .dbf. This file can be opened with the SoundPLAN Spreadsheet. An example – hosting data for standard RTN96 with 3 time slices and number of passages per vehicle category – is shown in Fig 1.

SoundPLAN Spreadsheet 8.2 (Dbase table) - [C:\Users\jkl\Documents\SoundPLAN projects 82\Net Info 60\Road.dbf]

File Edit Title Table Tools Options Help

Log book

1	2	19	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
GEODBID	NAME	Section_ID	SINGLEEMI	LEFTLANE	RIGHTLANE	DISTANCET	DISTANCETO	CENTRALRE	EMISSIONC	VCARS	VHEAVY	DLSURFACE	3_CARS_D	3_HEAVY_D	3_CARS_E	3_HEAVY_E	3_CARS_N	3_HEAVY_N
508	Old Kent Road	1	0	2,75	2,75	1,50	1,50	0,00	1	50,0	50,0	1	1223,1	407,7	239,4	128,9	135,0	110,5
508	Old Kent Road	2	0	2,75	2,75	1,50	1,50	0,00	1	50,0	50,0	1	4486,8	1495,6	878,1	472,8	495,3	405,3
508	Old Kent Road	3	0	3,00	3,00	2,00	2,00	0,00	1	50,0	50,0	1	4486,8	1495,6	878,1	472,8	495,3	405,3
509	Kingsland Road	4	0	3,75	3,75	1,75	1,75	0,00	1	100,0	80,0	1	5431,6	1810,5	1063,0	572,4	599,6	490,6
509	Kingsland Road	5	0	2,75	2,75	1,38	1,38	0,00	1	50,0	50,0	6	5431,6	1810,5	1063,0	572,4	599,6	490,6
509	Kingsland Road	6	0	3,25	3,25	1,50	1,50	0,00	1	50,0	50,0	6	4309,7	1436,6	845,4	454,1	475,8	389,3
509	Kingsland Road	7	0	3,25	3,25	1,50	1,50	0,00	1	70,0	70,0	6	4309,7	1436,6	845,4	454,1	475,8	389,3
509	Kingsland Road	8	0	3,25	3,25	1,50	1,50	0,00	1	70,0	70,0	6	5809,2	1936,4	1136,9	612,2	641,3	524,7
509	Kingsland Road	9	0	3,25	3,25	1,50	1,50	0,00	1	100,0	80,0	6	5809,2	1936,4	1136,9	612,2	641,3	524,7
510	River Street	10	0	3,25	3,25	1,50	1,50	0,00	1	50,0	50,0	1	1652,8	550,9	323,5	174,2	182,5	149,3
510	River Street	11	0	3,25	3,25	1,50	1,50	0,00	1	50,0	50,0	1	1652,8	550,9	323,5	174,2	182,5	149,3
510	River Street	12	0	3,25	3,25	1,50	1,50	0,00	1	50,0	50,0	1	1652,8	550,9	323,5	174,2	182,5	149,3
511	Jamaica Road	13	0	4,00	4,00	2,00	2,00	0,00	1	50,0	50,0	1	2361,5	787,2	462,1	248,8	260,7	213,3
511	Jamaica Road	14	0	3,25	3,25	1,50	1,50	0,00	1	50,0	50,0	1	2361,5	787,2	462,1	248,8	260,7	213,3
511	Jamaica Road	15	0	3,25	3,25	1,50	1,50	0,00	1	50,0	50,0	1	2361,5	787,2	462,1	248,8	260,7	213,3
511	Jamaica Road	16	0	3,50	3,50	1,90	1,90	0,00	1	50,0	50,0	1	2361,5	787,2	462,1	248,8	260,7	213,3
512	Great Dover Street	17	0	3,00	3,00	2,00	2,00	0,00	1	50,0	50,0	1	3274,8	818,7	785,7	138,7	316,9	35,2
512	Great Dover Street	18	0	2,75	2,75	1,38	1,38	0,00	1	50,0	50,0	1	3274,8	818,7	785,7	138,7	316,9	35,2
512	Great Dover Street	19	0	2,75	2,75	1,38	1,38	0,00	1	50,0	50,0	1	4745,6	1186,4	1138,6	200,9	459,2	51,0
512	Great Dover Street	20	0	2,75	2,75	1,38	1,38	0,00	1	50,0	50,0	1	4745,6	1186,4	1138,6	200,9	459,2	51,0
512	Great Dover Street	21	0	2,75	2,75	1,38	1,38	0,00	1	50,0	50,0	1	4745,6	1186,4	1138,6	200,9	459,2	51,0

Fig 1 A database file with road properties opened with SoundPLAN Spreadsheet.

Each row in this table represents a road section inside which properties are unchanged. The column headers – ‘field names’ – specify the property. If the Shape file was generated by an external supplier, it might include properties which are irrelevant for noise mapping. Also, the field names are not always to be understood intuitively. It can be recommended to modify the file before the import so you (and maybe even SoundPLAN, see later) recognize the field names and the irrelevant columns do not clutter the view. If you do not have access to GIS software, you can use the SoundPLAN Spreadsheet to do this. **Important:** The field headers can have max 10 characters and no blanks or special characters. The .dbf – file must be saved in the project folder, otherwise the Spreadsheet cannot see it.

Once the Shape file is ready for import go to File > Import > ‘ESRI Shapefile’ and point to the .shp file. Import can be restricted to a specific area, and even split into multiple geofiles according to areas (e. g. borrow by borrow), see Fig 2.

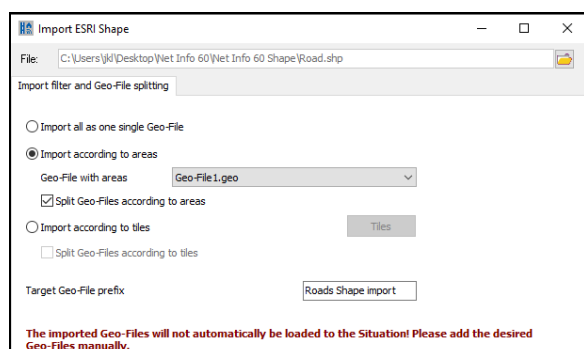


Fig 2 Restrict the import to certain area(s).

In the next window first select the object type. On the left side of the window the field names in the source file appears. On the right side all usual road properties from the selected standard can be seen. Now put the cursor on 'no import' for a specific property, find the matching property on the property list and create a link between the two by clicking the left pointing arrow (or double click on the property). If you spent time introducing informative names for the column headers of the .dbf-file, it will be rather obvious which links to create. See Fig 3. Moreover, if you reuse the headers in other .dbf-files, all links will be created automatically as soon as you have selected the object type since SoundPLAN in this case is able to recognize the field names.

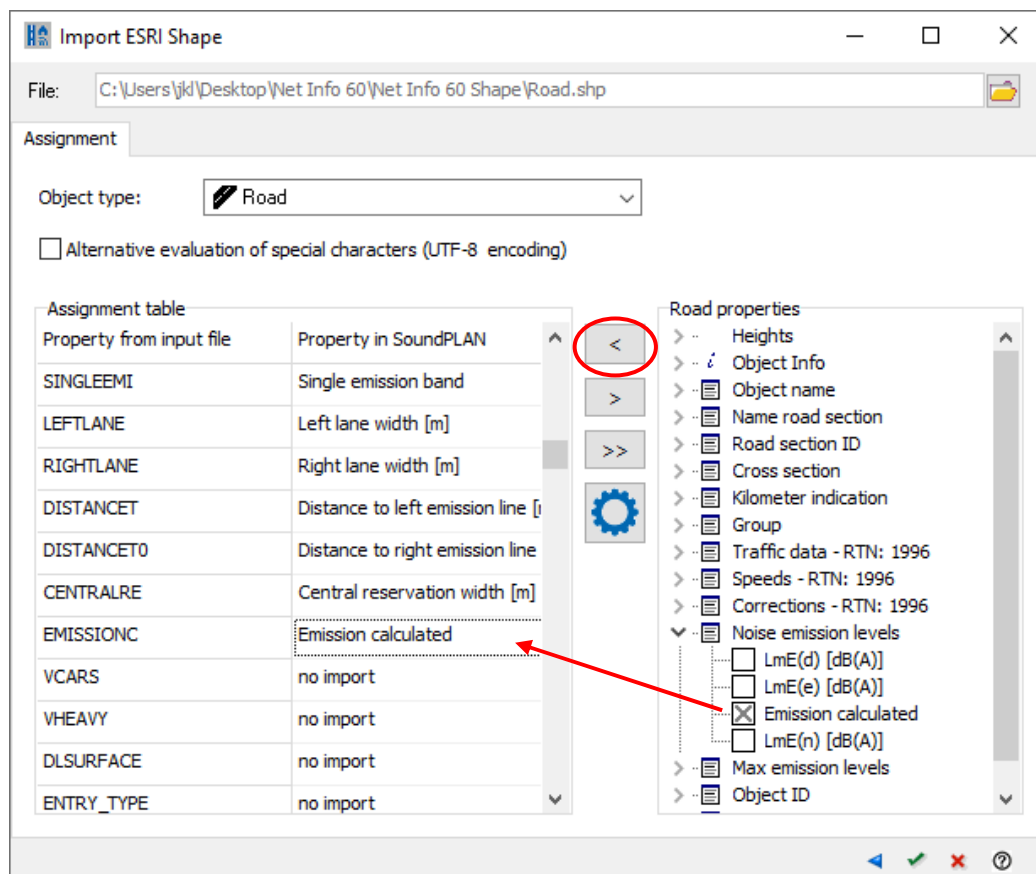


Fig 3 The Shape files import window.

When all links are created and you hit the green check mark to proceed, the normal road property window pops up. This gives you a chance to define a property that was not included in the shape file, and which are common for all imported roads, e. g. the tick mark for 'Single emission band'.

The needed traffic data to complete the road emission depends on the entry type. Basically, the program needs to know the number of passages of each vehicle category during each time slices. These data can be established for example by stating ADT plus a reference to a record in the Road time histogram library. Or the number of passages per vehicle category per time slice can be included directly in the Shape file. SoundPLAN works with 5 different entry types, se Fig 4.

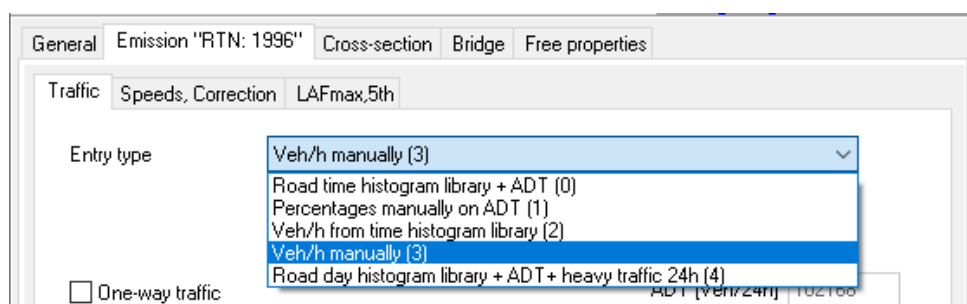


Fig 4 Entry types for road traffic.

Fig 5 shows an overview of valid combinations of data when the selected standard is RTN96. The figures in red font and in brackets refer to the entry type ID (= the number in brackets after the name, see Fig 4).

Road properties

Traffic data - RTN: 1996

- (0), (1), (4) ☐ Road type ID
- ☐ Entry type
- (0), (1), (4) ☐ ADT [Veh/24h]
- ☐ One-way traffic
- ☐ Traffic flow direction (One-way)
- ☐ k(d)
- ☐ pLight (d) [%]
- ☐ pHeavy (d) [%]
- ☐ k(e)
- (1) ☐ pLight (e) [%]
- ☐ pHeavy (e) [%]
- ☐ k(n)
- ☐ pLight (n) [%]
- ☐ pHeavy (n) [%]
- (2) ☐ lib# for Light
- ☐ lib# for Heavy
- ☐ Veh/h (d) [1/h]
- ☐ Light/h (d) [1/h]
- ☐ Heavy/h (d) [1/h]
- ☐ Veh/h (e) [1/h]
- (3) ☐ Light/h (e) [1/h]
- ☐ Heavy/h (e) [1/h]
- ☐ Veh/h (n) [1/h]
- ☐ Light/h (n) [1/h]
- ☐ Heavy/h (n) [1/h]
- (4) ☐ p24hLight [%]
- ☐ p24hHeavy [%]

Speeds - RTN: 1996

Fig 5 Combinations of needed traffic data, RTN96

A specific column stating the entry type is not needed in the Shape file. From the available data in the file, the program concludes which entry type the data are aiming at.

For entry type (1) and (3) some of the properties are mutual dependent. E. g. pLight [%] + pHeavy [%] must add up to 100 %.

If the import is based on records in the Road time histogram (entry type (0), (1) and (4)) or Time histogram (entry type (2)), these libraries MUST be established before the import. The figures to include in the .dbf-file are the key code for the record (see Fig 6).

###	Element name
1	ab 3 RLS-90 highway
2	ab 3 RLS-90 federal highway
3	ab 3 RLS-90 District-/state-/comm. rd.
4	ab 3 RLS-90 community road
5	ab 2 VBUS highway
6	ab 2 VBUS federal highway
7	ab 2 VBUS District-/state-/comm. road
8	ab 2 VBUS community road
9	town near centre (shopping)
10	District road rural area

Fig 6 Key codes

For further details about road entry types please check Net Info 88.

Once the traffic data have been loaded into the model, it is fairly easy to create another traffic scenario. For this the import type 'DBF ...' can be used. For example, the speed can be changed this way without having to start from scratch again: Open the .dbf file in SoundPLAN spreadsheet and save it again after changing the speed. Go to GeoDatabase > Import > DBF... and point to the freshly generated variant of the .dbf file. Now import the file, but this time only with links to the speeds. And finally, double click on a property that can be used as a unique search key, typically Section ID. The import procedure will search for section ID's and replace the former speed values whereas all other properties are kept. If you use a search key which is not unique for each road segment, but the same for multiple segments you must tick for 'Multiple assignment'. Note that the property used as search key will be displayed in red font and also appear in the cell Search key, see Fig 7.

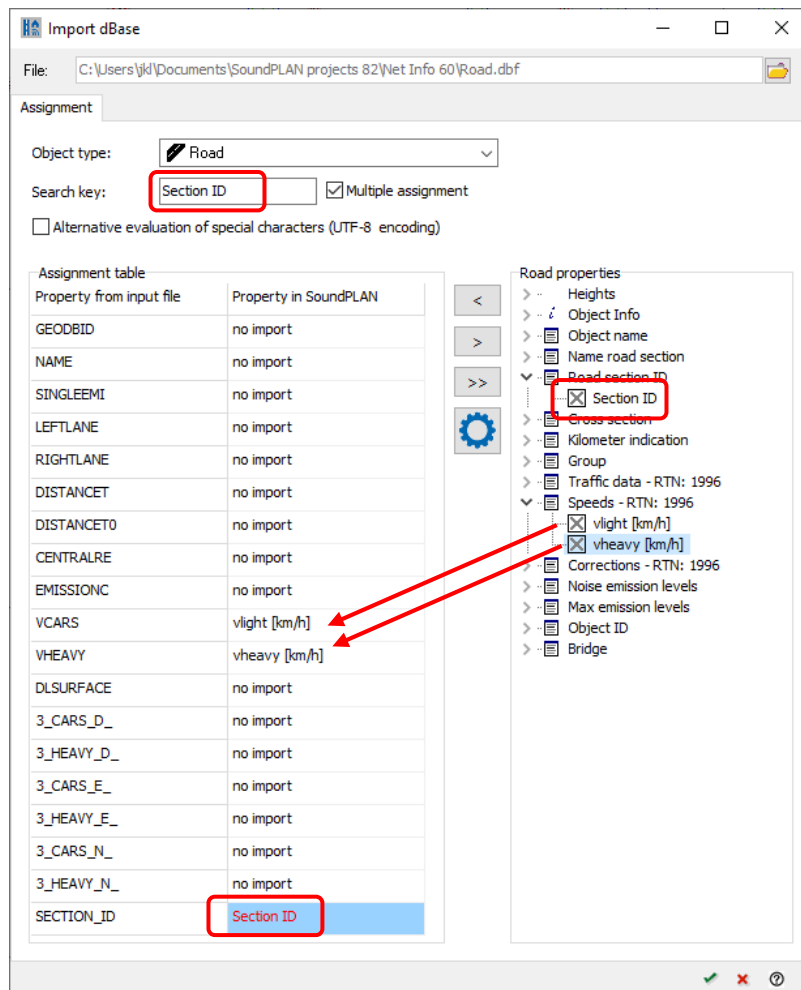


Fig 7 A search key is displayed in red font.

Ascii Table import: The ESRI Shape file import handles the coordinates 'behind the user interface', you do not have to pay attention to (x, y, z). In this aspect the Ascii Table import is different; you must create links for the coordinates too. Apart from this the procedure is pretty much the same as with the Shape import.

In a first step the program needs some basic info about the txt-file. Most likely the data originally came from an Excel spreadsheet which was saved as a tab delimited txt file. And most likely some headers were used in that spreadsheet. Therefore, tick as shown in Fig 8.

File: C:\Users\jld\Documents\SoundPLAN projects 82\Ascii T import\RTN96_Lden_w_geometry_emis3.txt

Format

☐ Fixed column width

☒ Field separator Tab ☐ Treat successive field separators as one

Text identification

Start import with line 1

☒ First line contains column header

Object separator empty line

Comment lines begin with *

Number of columns to import 27

☐ Alternative evaluation of special characters (UTF-8 encoding)

x	y	h1	h2	Emission calculated	Name	Central res
760219,28	2054970,92	466,29	466,29	1	Kings Hat	0
760227,05	2054945,78	466,29	466,29	1	Kings Hat	0
760239,61	2054909,36	467,17	467,17	1	Kings Hat	0
760256,15	2054857,41	467,29	467,29	1	Kings Hat	0
760266,56	2054820,66	468,10	468,10	1	Kings Hat	0
760271,54	2054807,79	467,29	467,29	1	Kings Hat	0
760043,84	2054581,56	473,38	473,38	1	Route 66	0
760063,34	2054591,35	473,05	473,05	1	Route 66	0
760083,68	2054599,76	472,35	472,35	1	Route 66	0
760118,42	2054613,54	471,14	471,14	1	Route 66	0
760133,86	2054617,89	470,63	470,63	1	Route 66	0
760154,53	2054620,21	470,57	470,57	1	Route 66	0
760190,76	2054622,86	469,95	469,95	1	Route 66	0

Fig 8 First basic info about the txt file must be submitted.

In the next step the import can be restricted to certain areas just like for Shape files import, see Fig 2 and the accompanying text on page 1. Finally create links between the usual road properties and the matching data from the input file. If the input file does not contain all relevant properties there is a possibility to define default properties just like during the Shape files import.

Also this import type offers the Search key feature.