

TNM FAQs with Guidelines

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This document contains all information listed in the [TNM FAQs with Guidelines web page](#). The first section contains frequently asked questions (FAQs) about general TNM information.

The information is current as of April 2004.

Following the “General Information” section are FAQs. In reviewing the FAQs, the following should be kept in mind:

- The FAQs are sorted by TNM menu item (in large **bold** font).
- Some FAQs may also fall into a sub-menu item (underlined font).
- FAQs apply to all versions of TNM, unless specified.
- The number preceding each FAQ denotes the commonness of the FAQ, where a “1” is a FAQ most commonly asked and a “3” is a FAQ least commonly asked.

For example:

Menu: File *TNM menu item*

Save *TNM sub-menu item*

FAQs apply to all versions of TNM unless specified, as it is here.

(Applies to TNM Versions 1.0b and above only)

1 - I ran the official TNM test case in Version 2.1. Why didn't I obtain the same results as the table listed in Figure 75 (Page 152) of the TNM User's Guide?

The output in Figure 75 was calculated using TNM Version 1.0. Some of these sound levels are slightly different because of minor acoustical changes implemented in Version 1.0b. For information regarding these changes please refer to the [Version 1.0b release notes](#). If you are using TNM Versions 1.0b or higher, refer to the output table on Page 25 of the [TNM 2.0 User's Guide Addendum](#).

FAQ rating. FAQs rated 1 are most commonly asked.

For questions not addressed in this FAQ with Guidelines document, please email support@trafficnoisemodel.org for assistance.

General Information

1 - What are TNM's system requirements?

The minimum recommended system requirements for the most current version of TNM are:

- # Microsoft® Windows 98, ME, NT, 2000, or XP
- # 500 MHz Intel® Pentium or equivalent, Pentium III recommended
- # 32 MB of RAM or above recommended
- # 10 MB of available hard-disk space for installation
- # Up to 1 MB of available hard-disk space for each TNM run.
- # Super VGA (1024 x 768), 16-bit colors, configured with “small” fonts;
- # CD-ROM compatible drive

Minimum system requirements for older versions of TNM such as 1.0, 1.0b can be found on Page 2 of the TNM User's Guide.

1 - Where can I obtain TNM?

TNM Version 2.5 can be purchased from the [McTrans Center](#) for \$695. Owners of previous versions of TNM (1.0, 1.0a, 1.0b, 1.1) can purchase the TNM 2.5 at the discounted price of \$495 -- almost 30 percent off the regular TNM price.

*Current registered users of TNM Version 2.0 receive the TNM Version 2.5 upgrade at no charge. Users who purchased any version of TNM **on or after March 1, 2002**, may also obtain the 2.5 upgrade at no charge.

1 - What is the most recent version of TNM?

The most recent version of TNM is [Version 2.5](#) released in April, 2004.

1 - Can I run multiple versions of TNM on my computer?

Yes, some users may want to switch from TNM 1.1 to 1.0b when calculating sound level contours, since 1.0b performs better with contour calculations. To run different multiple versions of TNM, install each version in its own unique directory. To install TNM 1.1 along side TNM 1.0b, for example, you'll need to assign each version a unique system file; prior to Version 2.0, TNM installations use the same system files (download this [set of instructions](#)).

1 - Where can I upgrade TNM from Version 1.0b to Version 1.1?

Please send your user registration information to [TNM Tech Support](#) for verification. The support team will then provide you with a link to download the free upgrade.

1 - Where can I upgrade TNM from Version 1.0b to the most recent version, TNM 2.5?

Owners of previous versions of TNM (1.0, 1.0a, 1.0b, 1.1) can purchase TNM 2.5 at the discounted price of \$495.

1 - How do I configure my monitor display to work with TNM?

You will need to set your computer monitor's resolution to 1024 x 768 or greater, 16 bit colors or greater, and the smallest available font size. You can usually accomplish this in the computer's Control Panel, Display, Settings function.

1 - Should I turn my computer screen saver off while running TNM?

TNM sometimes crashes when certain screen savers start. If this happens, discontinue your screen saver when running TNM.

1 - What is a "move" data error during installation?

TNM setup places some temporary files in your temp directory. This is usually C:\TEMP, but may be different for computers on a network. Copy the TNM installation file to your local C:\TEMP directory on your computer and run the file from there.

1 - Where can I obtain a copy of the TNM User's Guide 2.5 Addendum?

The TNM User's Guide Addendum can be found on the [TNM Version 2.5](#) web page or by clicking [here](#).

1 - Where can I obtain technical support?

Services are available to help you with your questions. Registered owners are entitled to receive technical support and information on upgrades and supplementary guides. For installation and supplementary guide information, users may contact the McTrans Center at (352) 392-0378 or <http://mctrans.ce.ufl.edu>. For technical support, users are encouraged to take advantage of this Frequently Asked Questions page and other features in our [support page](#). Users may also contact TNM technical support via email (support@trafficnoisemodel.org).

1 - Do I have to use TNM?

The TNM software will replace STAMINA 2.0/OPTIMA as the official FHWA highway traffic noise prediction model 6 months after the release of TNM version 2.5 (April 2004). Please see the official [FHWA memo](#) for more details. Until that time, STAMINA 2.0/OPTIMA will still be acceptable for use. Contact your State Highway Agency for guidance.

1 - Why does TNM Version 1.1 sometimes crash when I try to open an input dialog or an output table?

A Microsoft® Windows 95/98/ME compatibility bug has been discovered in TNM Version 1.1. This error does not occur for Windows NT or Windows 2000 users. To avoid this error (after creating a new run and after calculating a run), close the run, then re-open it. All dialogs and tables will then open correctly. This has been corrected in TNM Version 2.0 and above.

1 - Is it possible to copy and paste multiple rows? TNM requires you to insert each row individually. Here is a trick:

1) Randomly draw a multi-segment roadway (e.g., a 10 segment roadway) on plan view.

2) In the input receiver dialogue you will see multiple rows created by this roadway. Now just cut and paste from your spreadsheet onto the dialogue box.

You can also export a GIS program into both a DXF file(s), and an Excel spreadsheet. Then, import the DXF file into TNM and convert each TNM Object to its appropriate feature. Finally, cut/paste point names from corresponding excel sheet.

It may also be important not to paste overly precise numbers into coordinate cells. For example, avoid pasting 46.78 as a coordinate, since TNM allows only values to the nearest 0.1. You could actually use Excel's Round() function for this, rather than relying upon display rounding. TNM's limit on coordinate precision is built into its database structure. It is not just a display matter in TNM's spreadsheets.

2 - What is the difference between TNM "dialogs" and TNM "tables"?

TNM input dialogs located in the Input menu accept all your text input. TNM tables provide input and result summaries for documentation and printout purposes only.

2 - Why can't I get to some of the buttons on the right side of a dialog?

You will need to set your computer monitor's resolution to 1024 x 768 or greater, 16 bit colors or greater, and the smallest available font size. You can usually accomplish this in the computer's Control Panel, Display, Settings function.

2 - I entered data into the header area, but why doesn't it show up in the Plan view?

Some items in the dialog header area are used to enter default information that you would like subsequently created objects to contain. For example, you might first input your desired values of roadway width and pavement type in the roadway dialog header area. Then, as you digitize subsequent roadways, those new roadways now contain the values you entered in the header.

Menu: File

Save

2 - Is there a character limit in naming my TNM run?

TNM may not open a run with a combined path and run name exceeding 87 characters in length. In addition, if you wish to compute contours, then the combined pathname of your TNM run and every folder in its path must satisfy DOS's maximum of 8.3 characters and DOS's restriction against some characters (such as "spaces"). For example, 12345678.123 is a valid file name. Therefore, the run must be saved directly on the C: drive when calculating contours.

2 - How do I delete unwanted TNM runs?

To delete a TNM run, you may delete the subdirectory from a file manager like Windows Explorer. Be sure you do not have runs saved as subdirectories of the run, or they will be deleted also.

Import DXF/Stamina

1 - Does TNM import DXF Point Objects?

TNM does not import DXF points, such as potential receiver locations. As a work-around, the user may connect points with a polyline in the CAD program prior to import, then after import, snap-digitize TNM receivers to the DXF points in the polyline.

(Applies to TNM versions 1.1 and above)

1 - When I import Metric DXF files in TNM the background units are incorrect. How do I fix this?

TNM 1.1 and TNM 2.0 have a bug with metric DXF file importing. To use these DXF files:

- 1) Open or create a METRIC TNM run
- 2) Import DXF file
 - a) Select Import as Background
 - b) Select FEET as units (I know this is silly)
- 3) Register DXF Background (Under Setup)
 - a) click 3 points on the screen
 - b) when the dialog opens, re-type the coordinates in the left boxes into the right boxes.
 - c) when all coordinates are re-typed hit OK
- 4) Recalculate full view (Under View)

The background units will now be in metric units correctly.

To import a different DXF file repeat steps 2 to 4. If you need to re-open the TNM run repeat these steps each time you re-open the file.

1 - My DXF file is about a 6 MB file. Is that too big?

Your DXF files should be fine up to about 20 MB if it is imported as a background. If you are importing it as objects, we do not recommend DXF sizes above 3MB. TNM has a difficult time processing DXF files above this size limit.

1 - What's the difference between importing my DXF file as Objects and as Background?

Importing a DXF file as Objects means all objects and their associated attributes are preserved. You then convert the imported DXF objects to TNM objects. Importing a DXF file as Background is much faster and means all objects and text are imported as a graphical depiction, commonly referred to as a "background" or "wallpaper." You then create new TNM objects by digitizing/tracing over the DXF background. Refer to Section 4.7.2 in the User's Guide for more information.

1 - What DXF objects can TNM import?

Table 1 in the [TNM User's Guide Addendum](#) shows the items TNM Version 2.0 can and cannot import.

1 - How do I import large DXF files as Objects?

For large DXF files, importing as Objects will take longer than importing as Background. You may want to "freeze" DXF file layers, import, and convert the files, incrementally. This is because TNM creates intermediate objects during import as Objects that can take up memory and slow down the program. (Consult your CAD program manual for details on CAD layers). Refer to Section 4.7.2 in the User's Guide for more information.

1 - I imported a DXF file. Why can't I see anything in the Plan View?

In the Edit menu, select the Select Everything menu item. If still, nothing is displayed then all DXF items which TNM is not able to import as Objects may have been placed in the Background. In the View menu, select Show/Hide and click on the DXF Background checkbox. Then click on the OK button. Refer to Section 6.2 in the User's Guide for more information.

1 - Why can't I import my Stamina file?

TNM will only import official STAMINA 2.0/OPTIMA input files. These files have a .DAT extension. The example Stamina file located in the \Examples\Results directory is an example of the official Stamina 2.0 format.

1 - What happened to the alpha factors in my imported STAMINA files?

STAMINA alpha factors are not imported since TNM uses an entirely new methodology for computing ground effects (see Appendix D on Pages 147-149 of the TNM User's Guide).

(Applies to TNM versions 1.0, 1.0b, 1.1, 2.0 only)

1 - How do I import shielding factors in my STAMINA files?

After selecting File, Import Stamina-2.0 Input Files from the menu, be sure to select the Import Shielding Factors check box in the resultant import window. TNM will import the

shielding factors from your STAMINA files as adjustment factors. Refer to Section 4.7.1 in the User's Guide for more information. Please also note that TNM Version 2.0 imports STAMINA shielding factors as **positive** adjustment factors, such that the shielding factors (and adjustment factors) are **added** to the sound level results. Users should manually flip the signs of the adjustment factors in their STAMINA file if they wish to have the absolute values of the shielding factors **subtracted** from the sound level results. This has been addressed in TNM Version 2.1.

(Applies to TNM version 2.1 and above)

1 - How do I import shielding factors in my STAMINA files with TNM Version 2.1 and above?

After selecting File, Import Stamina-2.0 Input Files from the menu, be sure to select the Import Shielding Factors check box in the resultant import window. TNM will import the shielding factors from your STAMINA files as adjustment factors. Refer to Section 4.7.1 in the User's Guide for more information. Beginning with TNM Version 2.1, positive STAMINA shielding factors are imported as **negative** "adjustment factors," such that the shielding factors are **subtracted** from the sound level results (negative adjustment factors are added). Negative STAMINA shielding factors are imported as positive "adjustment factors," such that the absolute values of the shielding factors are **added** to the sound level results (positive adjustment factors are added).

2 - Why can't I open the example files?

The files contained in the TNM/Examples directory are examples for import into TNM. Create a new run in TNM, then import the desired example file, instead of opening it.

(Applies to TNM version 2.0 and above)

2 - Can you import multiple DXF files "as background" in TNM Versions 2.0 and later?

Yes, you would have to work with one DXF file at a time. Import a single DXF file, create all the objects you need, and then import a second file on top of or next to the objects.

3 - Can I simultaneously import more than one DXF file as objects?

Do not import more than one DXF file as objects at one time. After using each DXF file, File, Close the run, then File, Open it again, and then import the next DXF.

Open

1 - What is a TNM "run"?

A TNM run is actually the name of a subdirectory containing two files generated by TNM (OBJECTS.IDX and OBJECTS.DAT). You decide the name of the run when you first create the run in TNM. A TNM run stores everything about that run, including the input data, the sound level results, and remembered barrier analyses and parallel barrier designs. Because a TNM run is, in itself, a subdirectory, TNM will let you create a run anywhere, including within another run. However, note that "nested" runs do not inherit anything from their "parent" runs.

1 - Can I open runs created in older versions of TNM in the most recent version of TNM?

Any run created using older versions of TNM (e.g., Versions 1.0, 1.0a, 1.0b, and 1.1) can be opened in TNM 2.0 and above. TNM 2.0 (and above) will ask you if you would like a backup copy of the run automatically saved during the opening process. If you do not save a backup copy of the run, a run opened by TNM 2.0 (and above) will be **permanently** converted and will not be able to be opened in previous versions of TNM.

1 - Can I open runs created in the most recent version of TNM with older versions of TNM?

Any run created/opened using TNM Version 2.0 and above will open in Version 1.1, but not in older versions of TNM (e.g., Versions 1.0, 1.0a, and 1.0b).

1 - What does an "unable to find master dictionary" error mean when I try to create a new run or open an existing run?

It means someone has moved/copied components of the TNM program without updating the Windows system file, TNM.INI (or TNM2.INI for Version 2.0). The TNM.INI file, usually found in your Windows or Windows/System directory, needs to be edited to reflect where the TNM directories have been moved/copied to. When installing TNM 1.1 along side TNM 1.0b, for example, you'll need to assign each version a unique system file because prior to Version 2.0, TNM installations use the same system files (download this [set of instructions](#)).

1 - Why doesn't my run open?

In some instances, TNM will not open a run whose name contains greater than 87 characters (including the path). The workaround is to move the run out of embedded subdirectories and closer to the root C drive. For example, if your run is located in C:\subdir1\subdir2\subdir3\subdir4\subdir5\...\run, move it to c:\run.

1 - Why should I breakdown my run into smaller runs?

Smaller runs mean shorter run-times. In addition, a large run usually contains many input objects over large distances, where certain receivers are unaffected by remote roadways, barriers, etc. As a result, you might want to enter all input into a "master" run and then split the master run into smaller sub-runs for computation. In this manner, you can duplicate selected portions of the master run in smaller individual runs, each relevant to a single barrier design, for actual calculation and barrier analysis.

1 - What kinds of files can be imported into TNM?

You can import DXF files created by CAD programs, such as Intergraph MicroStation® and AutoCAD®, and STAMINA 2.0/OPTIMA input files, which are usually identified with a .DAT file extension. TNM comes with one example of each file type. You supply actual files for your own projects. You may put these files anywhere you wish on your hard drive, or even on floppy disks. You may also give them any extension you wish. TNM recognizes them by their content, not their extension.

1 - How can I print my input?

To print your input/output data, open the appropriate input/output table in the Tables menu. Then select Print in the File menu or Print Tables in the Tables menu. You cannot print input dialogs; they are only for entering input data.




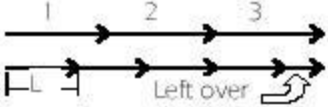



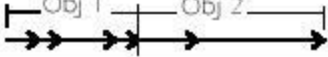

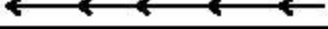






2 - How do I use the Set Print Scale when printing in TNM?

The Set Print Scale allows you to setup a ruler unit equal to a map distance. The “1 inch” (or “1 cm”) actually means the distance between tick marks on the plot axes, not necessarily one inch (or one centimeter) on the paper. Clicking on the box just below the “fit to page” box activates this scale capability. You can check the scale by using File, Print Preview. If a set scale is not entered, TNM will automatically set a scale such that the view shown in the active window is maximized for printing on one sheet. Also, note that Printer Margins do not affect the location of the axes, which are fixed, just the location, and thus size of the plotted objects.

Menu: Edit

1 - How does the edit graphic functions work?

Below is a summary on how the edit graphic menu functions:

Edit item	Before	After
Add Point Within Segment		
Subdivide Segment: Number of Segments Length of Resulting Segments		
Combine Two Objects		
Divide an Object in Two		
Reverse Direction		
Delete Entire Object		
Delete Start Point		
Delete End Point		

1 - Why doesn't Undo work when I mistyped a data entry?

The Undo is used to undo graphical edits only.

1 - Can I cut/copy/paste graphical objects?

No, the cut/copy/paste selections are used in input dialog editing only. You can move an object by holding down the Ctrl key and then drag the object, but you cannot cut/copy and paste it.

1 - Why doesn't the delete key work?

The delete key is not supported in the TNM software. To delete an object, use the mouse to select it in the Plan View, then in the Edit menu, select Delete Entire Object.

(Applies to TNM version 1.1 only)

1 - Why doesn't copy and paste work in my input dialogs in TNM Version 1.1?

In TNM 1.1 input dialogs, changes to data in a dialog's spreadsheet area are reflected in RED until the user selects the Apply button to apply the changes. Unfortunately, this also means in order to paste values into any dialog fields, those fields will need to be in the edited (RED) mode before pasting the values. A simple workaround is to type zeros into those fields you want to paste external values into, then once the fields are RED, paste the values and apply. This has been corrected beginning with TNM Version 2.0.

Menu: View

1 - Why doesn't my Skew Section show all the objects that I'd selected?

The entire desired object or segment must be displayed within the Plan View for it to be selected. Zoom out to show the entire object/segment that is desired for display prior to creating a Skew Section.

1 - Why can't I see my object point names and numbers?

Ensure that the desired items are checked in the Show/Hide dialog which can be accessed using the View menu. Refer to Section 6.2 in the User's Guide and Section 2.3.1 in the [User's Guide Addendum](#) for more information.

1 - Why does Full View show me my objects reduced in one corner of the Plan view?

Use Recompute View Extents in the View menu to recompute the active run's coordinate extents. If that doesn't work then there must be an object in the blank-looking area of the Plan View. Use your mouse to select the blank area and see if any objects become highlighted. Then use Delete Entire Object in the Edit menu to delete these objects.

Menu: Setup

General

2 - Why can't I register coordinates of zero?

You must type in a 0 even if the default display shows 0.00.

3 - What are the setup defaults for TNM?

TNM has built in default values for every parameter of every input type. For newly created TNM runs, the following are default values:

Setup, General

Input and display units: Metric

Traffic entry type: LAeq1h Hourly

Relative Humidity: 50%

Temp. (deg C): 20 degrees

Default ground type: Lawn

Line of sight check, subsource height (m): 3.5

Distance limit (m): 150

Roadways

Roadway width 3.66 m.

Pavement type: Average

Speed constraint 0.0: km/hr

Vehicles affected: 100

Control Device: none

Receivers

Dwelling Units: 1

Height Above Ground: 4.92 ft (1.5 m)

Existing Level (dBA): 0.00

Noise Reduction Goal (dB): 8.00

Impact Criteria Level (dBA): 66

Substantial Increase (dB): 10

(However, for converted TNM 1.0b runs brought into TNM 2.0 or later, the Noise Reduction Goal, Impact Criteria Level, and Substantial Increase defaults are set to zero)

Barriers

Type: Wall

Pert. Increment: 0

Pert. Up:0

Pert Down: 0

Height (m): 0

Min. Height (m): 0

Max Height (m): 30.48

Cost (\$/sq m): 0

Additional Cost (\$/sq m): 0
NRC Lside: 0
NRC Rside: 0

Building Rows
Avg. Height (m): 0
Building Percentage (%): 20

Ground Zones
Type: Pavement
Flow Resistivity (cgs Rayls): 20,000

Tree Zones
Avg. Height (m): 0.00

Contour Zones
Contour Tolerance (dB): 1
Minimum Grid spacing (m): 60.96
Grid height (m): 1.52

3 - What kind of digitizer should I use with TNM?

Any manufacturer/model that meets the [LCS/Telegraphics Wintab Interface Specification \(www.wintab.com\)](http://www.wintab.com), preferably with a 16-button puck (which offers more input functionality).

3 - Why doesn't my digitizer work with TNM?

You may want to check with your digitizer manufacturer (www.pointing.com/HWVENDOR.HTM) for their latest drivers. Also, there might be a conflict between WINTAB32.DLL files: TNM's installation program puts a copy of WINTAB32.DLL in directory TNM\PROGRAM on your hard disk. This version of WINTAB32.DLL works for some digitizers. Unfortunately, it sometimes interferes with other digitizers. If your digitizer does not work with TNM, then delete the file TNM\PROGRAM\WINTAB32.DLL. Be careful not to delete your own digitizer's version of WINTAB32.DLL, which will be in another directory depending upon your digitizer installation.

Register Plan

2 - How do I enter Z coordinates while digitizing everything else?

Enter Z coordinates as you digitize. Just after you click on a point to digitize its XY coordinates, press the "A" button on the digitizer puck. A Z-coordinate window is shown on the screen. Still at the digitizer, enter the point's Z coordinate with the puck numerals, 0 through 9. You must include two decimal digits. For example, to enter 120, press 12000. The value 120.00 will be displayed. If you pressed 120, only, 1.20 will be displayed. If needed, use the following digitizer puck buttons to edit the Z coordinate:

"B" to backspace or "C" to clear. Press the "E" button to enter the coordinate. Then proceed to the next point. Receiver Z coordinates entered from the puck must be typed in with two extra 00s (e.g. 14.00). Users should also register widely spaced points, especially first and second points.

2 - Is it recommended that I digitize Z coordinates?

The intent for TNM was to allow you to digitize Z coordinates from paper highway profile sheets. To do so, you would need to register the profile sheets. However, TNM profile registration currently requires a 1:1 horizontal to vertical scale for profiles. All highway profiles have exaggerated vertical scales and, thus cannot be used for digitizing Z coordinates by TNM.

2 - Why does TNM give me an accuracy warning when my coordinates are off by a small amount?

While registering plan sheets, TNM computes the expected coordinates of the third point, and shows them in the Computed cells of the Verification box. If you decide that the computed and target coordinates are close enough, click OK. After you click OK, you receive a registration accuracy warning if the computed coordinates are off by more than 0.05 % (1.52 meters (5 ft.) in 3048 meters (10,000 ft.)). This warning is merely a guide; you may feel that a larger difference is acceptable.

2 - Does TNM accept the default XY coordinates of zero when digitizing objects?

If a coordinate is zero, you must re-enter it, even though it already appears entered as 0.00.

Menu: Input

Receivers

1 - TNM outputs “invalid” results listed in the Sound Levels results table when I model berms. What is causing this error message?

The toe of the berm (end of slope) can bury receivers and it may not be obvious. This will cause “invalid” results for that receiver. Use the skew view to make sure the toe of the berm is not overlapping a roadway or receiver location.

1 - How do I assign adjustment factors in TNM?

For instructions on how to assign adjustment factors in TNM 1.0, 1.0b, and 1.1, please refer to Pages 68-70 in the TNM User’s Guide.

For TNM 2.0, you may assign Adjustment Factors in three ways:

1. Graphically, using the **Input, Adjustment Factors** menu choice.
2. Graphically, using the Select button in the Receiver input dialog box.
3. Using the Edit button in the Receiver input dialog box.

The following paragraphs discuss problems with these functions in Version 2.0 and previous releases. These problems have been addressed in Version 2.1 and above.

Users have found that using methods 2 and 3 can occasionally cause crashes in TNM Version 2.0. Use **File, Save** very often.

Graphical assignment of Adjustment Factors with the Select button is tricky in TNM 2.0 because it is easy to delete previously assigned factors.

Clicking on the Show button in the Receiver input dialog box for a given receiver will highlight all roadway segments in the Plan view to which you have assigned Adjustment Factors for that receiver before addressing new ones. However, in TNM 2.0, this button only works properly when assigning factors by the **Input, Adjustment Factors** menu choice.

Also, if you do not graphically select *all* previous roadway segments already assigned for *this* receiver, their adjustment factors will be deleted when you assign the value to the new segments. When you do select them, their adjustment factors will NOT be changed to the new value; they will retain their old values. Note that you do *not* have to graphically select roadway segments for which Adjustment Factors were assigned for a *different* receiver, only for previous segments already assigned *for this receiver*.

You must Apply your changes in the Receiver input dialog box, close the table and then re-open it to see the updated factors.

For the methods of assigning adjustment factors other than the **Input, Adjustment Factors** menu choice, the **Input Adjustment Factors** table does not automatically update if it is open as you assign Adjustment Factors. You must Apply your changes in the Receiver input dialog box, close the table and then re-open it to see the updated factors.

Instructions on how to assign adjustment factors in TNM 2.1 and above are given in the actual adjustment factor input dialog box.

1 - Why are my computed sound level results sometimes lower than my inputted Existing Levels?

TNM uses your inputted existing levels solely as the baseline for judgment of relative noise impact - that is, impact due to a substantial increase in sound level.

1 - How do you add background noise to TNM results?

TNM does not currently incorporate the existing background noise levels in its results. The "Existing Level", that can be input for each receiver, is only used to determine the "Increase over Existing" in the results tables. To account for background noise in TNM, it must be added in externally. First, the TNM user must determine/measure the appropriate background noise levels. In many cases, the background level can be measured in the same or similar neighborhood at a distance from the roadway where the highway traffic noise is not heard. Then, TNM's predicted levels can be logarithmically combined with the background noise level (in a simple process in a separate spreadsheet). See the equation below:

$$L_{adj.} = 10 \times \log_{10} \left(10^{(L_{TNM}/10)} + 10^{(L_B/10)} \right)$$

, where L_{TNM} = TNM-generated sound pressure levels [dB(A)], and
 L_B = Background noise level [dB(A)].

1 - Why don't my sound levels decrease when I input Adjustment Factors?

TNM uses adjustment factors to algebraically add, not subtract, from calculated sound levels. Therefore, if you want adjustment factors to reduce calculated sound levels -- say for attenuations that TNM does not calculate -- you must enter them as negative numbers.

Please refer to the Menu: File, Import DXF/Stamina section of this document for a discussion on importing Stamina shielding factors as adjustment factors.

2 - Should I use adjustment factors for building rows or tree zones?

In most cases, no. Adjustment factors should not be entered for building rows or tree zones. Adjustment factors can be used in TNM to account for specific pavement type (after your state receives FHWA approval), atmospheric conditions other than absorption, parallel barrier degradations, and other propagation effects not calculated by TNM. In addition, adjustment factors may be used to calibrate the model to measured data (if your state allows such calibration).

2 - Does calculating new active receivers invalidate previous sound level results?

Calculating for newly “active” receivers invalidates previous active receivers’ results. If you run TNM with active receivers and then add more active receivers, TNM invalidates results for previously calculated ones when you try to calculate for newly activated ones. The exception is if you calculate “All” receivers the **Calculate, Current Run, All Receivers** command after calculating only some receivers using the **Calculate, Current Run, Active Receivers** command. In this case, you will get a message box asking if you want to recalculate the already-calculated receivers or if you want to skip recalculating those receivers with results.

2 - How do I model a reference microphone above a barrier?

TNM will not allow a microphone to be positioned exactly over a barrier. Offset your receiver position horizontally by 0.1 ft or 0.1 m.

2 - How do I activate/deactivate receivers?

In the receiver input dialog, go to the Notes tab. In the active column, check/uncheck desired receivers to activate/deactivate them from calculations as desired.

3 - Is there any information regarding what to do to account for the loss of noise indoors?

Chapter 8 of "Measurement of Highway Related Noise" (Report FHWA-PD-96-046, May , 1996) has measurement procedures for determining building noise reduction in the vicinity of an existing highway (if this is your scenario). If you are trying to forecast interior noise levels for a new highway, [HUD guidelines](#) has a method for building IL.

Roadways

(Applies to TNM version 2.5 only)

1 - How do I model roadway medians?

The recommendation on how to model medians has changed from previous versions of TNM. For TNM Version 2.5, the following recommendations apply:

- 1) the minimum recommended width is still 3.05 m (10 ft);
- 2) if the median is a ground type other than the default, use a ground zone to model the median; and
- 3) for a ground zone median, ***avoid overlapping or matching edges with the adjacent roadways.***

(Applies to TNM version 1.0, 1.0b, 1.1, 2.0, and 2.1)

1 - How do I model roadway medians?

Users should model roadway medians when the median is greater or equal to 3.05 meters (10 ft.). If you are using a default ground type of field grass, create a ground zone of field grass between two roadways to model a grass median. If you are using any default

ground type other than field grass, create a ground zone of lawn between two roadways to model a grass median.

For all roadways, it is necessary for the median to overlap the roadway edges as defined by their widths because TNM will default to the pavement until it reaches the edges of the roadways. For medians less than 10 ft, use 1 roadway without traffic to model the median or use 2 wide roadways that overlap. Also, do not snap ground zone points to the roadway points when modeling the median. Often check that they are properly overlapping using the Skew Section view.

(Applies to TNM version 1.0, 1.0b, 1.1, 2.0, and 2.1)

1 - Do I need to be careful to avoid my roadway widths from overlapping?

No. Instead, try to actually guarantee overlap, so that TNM does not insert an unwanted gap in the roadway pavement, which would in effect introduce impedance discontinuities. The overlap can be as little as 0.03 m (0.1 ft). Avoid exactly matching the edges of the roadways.

(Applies to TNM version 2.5 only)

1 - Do I need to be careful to avoid my roadway widths from overlapping?

No. Instead, try to actually guarantee overlap, so that TNM does not insert an unwanted gap in the roadway pavement, which would in effect introduce impedance discontinuities. The overlap can be as little as 0.03 m (0.1 ft). Avoid exactly matching the edges of the roadways. Also, avoid overlapping or matching roadway edges with the adjacent ground zones (e.g. medians).

1 - What is "average" pavement?

A pavement type consisting of REMEL data measured on DGAC and PCC pavements combined. Use "average" pavement in nearly all situations. See Appendix A of the TNM User's Guide for FHWA policy related to pavement type.

1- How should roadway intersections be modeled?

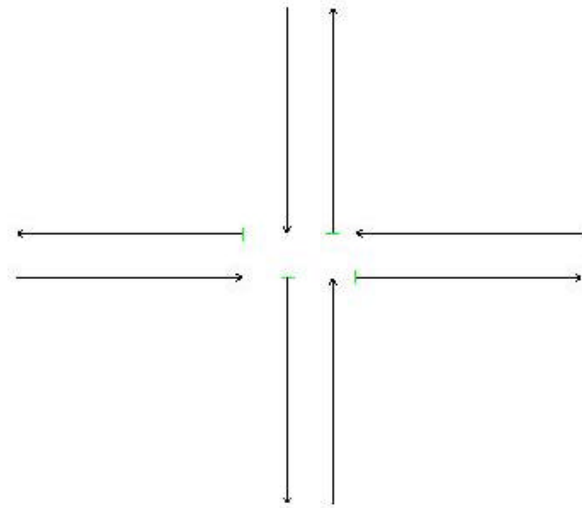
Two accepted methods exist for modeling intersections in TNM: (A) modeling roadways that stop short of and restart after an intersection, and (B) modeling a complex series of intersecting roadway segments. Both methods produce comparable sound level results at receivers that are not directly adjacent to the intersection being modeled. However, method (A) is much less complex and easier to model, whereas method (B) provides more accurate results at receivers directly adjacent to the intersection. It is up to the individual TNM user to determine which modeling method might be most beneficial to their modeling project.

Method (A): If you are modeling an intersection and do not have receivers close to the intersection, then follow these steps:

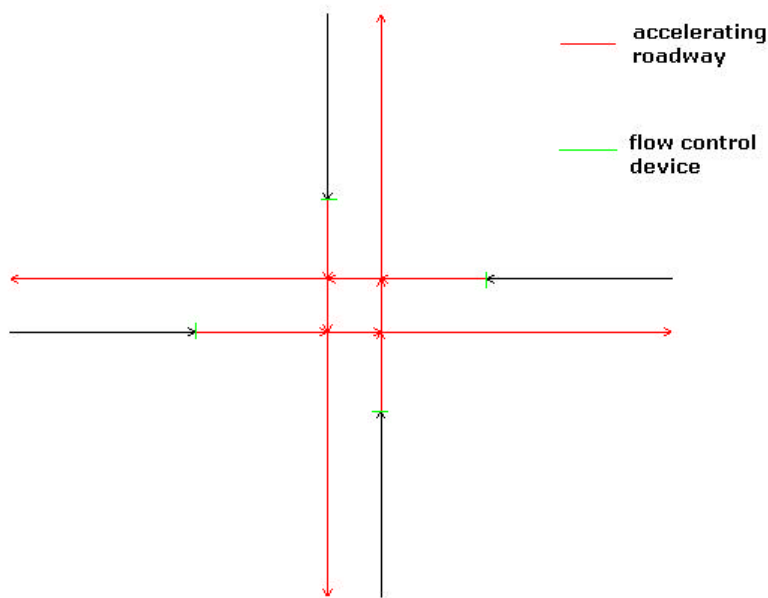
1. Start two roadways, one for each direction, (north/south) and stop short of the intersection.
2. Start two roadways right after the intersection (also north/south).

3. Repeat the same steps for roadways going east/west. Use flow control devices to model acceleration roadways that leave the intersection. Be sure to verify direction of traffic flow when modeling intersections.

The intersection should look like this:



Method (B): If you are modeling an intersection with receivers close by, then more detail is needed. Follow the same steps as the previous sample but instead, start modeling the accelerating roadway at the beginning of the roadway entering the intersection, making sure that each roadway contains segments that end at each applicable intersection point (see example below):



It is very important that the coordinates of each roadway segment at a given intersection are identical, otherwise TNM will produce an “Inconsistent Intersection” error. It may not be sufficient to use the TNM Snap Tool when modeling roadway intersections, so make sure to enter in the intersecting roadway coordinates individually in the input dialog boxes.

It is also important, that each accelerating section of roadway is modeled entirely as one TNM roadway (highlighted in red in the above illustration). The acceleration roadway cannot be split into separate roadways, because TNM cannot continue the vehicle acceleration from one roadway to another.

Keep in mind that the noise effect due to acceleration varies by vehicle type. For example, the acceleration effect is greater for autos than for the other vehicle types, because autos are quiet for cruise throttle at low speeds. (Compare the various emissions graphs in the TNM Technical Manual.)

1 - Can TNM model vehicle deceleration?

TNM does not have a function that allows you to model true deceleration. Some users believe that by putting a traffic control device on the other end of a roadway, therefore reversing the direction will decelerate the vehicle instead of accelerating it. This is not true. Modeling a roadway in the reverse direction will cause vehicles to accelerate away FROM the flow traffic device. This would reverse the direction of traffic flow, and would produce emission levels and frequency spectra acoustically different from deceleration. Roadways must always be digitized in the direction of traffic flow.

Although TNM does not have a function that allows you to model true deceleration, sound users have tried decreasing sound levels in TNM by breaking a roadway into multiple segments with decreasing speeds. Please note that although this does lower sound levels, it will produce emission levels and frequency spectra acoustically different from real life deceleration. Also, keep in mind that a decrease in sound level for decelerating traffic on a roadway may not be discernable at the receiver(s) if the sound levels from nearby roadways are dominant.

1 - How should I model TNM roadways when considering grade adjustments?

Each mainline should be modeled as a continuous TNM Roadway (not several, strung together end to end) especially when dealing with grade adjustments. When importing STAMINA files that have several roadways and grades in each segment, be sure to combine these roadways into one long TNM roadway, since TNM does not link speeds between roadways.

You should not start a mainline roadway in the middle of a road with an upgrade. If you have to start a new TNM roadway some distance on an existing roadway with an upward grade, you may want to manually input a lower speed for heavy trucks. You may calculate this speed using Figure 46 on Page 57 of the TNM Technical Manual. Heavy trucks will already be slowed down from the point where the grade meets the new roadway. Be sure to model a separate truck lane, if one exists.

1 - How do I model roadway shoulders?

Use roadways with no traffic to model shoulders. Using an empty roadway also allows you to drop the elevation of the shoulder since shoulders usually drop 6 inches or so. Apply good engineering judgment when considering modeling such a small change in elevation. When modeling shoulders with overlapping roadways, TNM draws the slope from the center of the roadway to the edge of the shoulder.

1 – How do I create a user-defined vehicle?

In order to create a user-defined vehicle, you will need sound level emissions data for each vehicle that you are using in the model. To measure the necessary data:

- 1) Obtain a copy of the official TNM measurement method from FHWA, "Measurement of Highway Related Noise" (Report FHWA-PD-96-046, May , 1996).
- 2) In accordance with the official method, measure A-level emissions as a function of speed for your user-defined vehicle type. As required by the official method, measure under the following reference conditions:
 - Cruise throttle
 - Level grade
 - Dense-graded asphalt pavement (DGAC) or Portland cement concrete (PCC)

These measurements will result in the following 4 parameters for your user-defined vehicle type:

(a) Similar TNM Type:

The Similar TNM Type represents the vehicle type from the standard list of five TNM vehicle types (i.e., autos, medium trucks, heavy trucks, buses and motorcycles) which is most closely aligned with the user-defined vehicle. The assignment should be based on similarities in subsurface heights, acceleration characteristics, and frequency spectrum.

(b) Minimum Level:

The Minimum Level represents the emission level at idle and at very low speeds as defined by the engine/exhaust noise ("C" coefficient).

(c) Slope:

The Slope ("A" coefficient) is determined from the analyses of the user's emission level measurements data.

(d) Reference Level:

There is actually a small mix up in the TNM code, so instead of entering the "Reference Level" in this input-field in order to calculate the "B" coefficient, TNM needs the user to simply enter in the "B" coefficient. The Reference Level represents the emission level for the user-defined vehicle measured at 50 mph. If a preliminary analysis was not performed, the "B" coefficient is easily found from the standard emission level equation

since all other variables in the equation are known. Be sure to substitute the emission level at 50 mph into the equation when determining the "B" coefficient.

1 - When inputting traffic speeds, should I use the posted speed limits?

No. When modeling roadway traffic speeds, use actual vehicle speeds. Do not use posted speed limits. Obtain a traffic engineer to obtain actual traffic counts, speeds, volume, and input into TNM. Although lane-by-lane speed and volume is not necessary, HOV and truck restricted lanes should be implemented.

The following websites also contain speed data:

<http://www.metrokc.gov/home/>

<http://www.dfwinfo.com/trans/tcins/>

<http://www.denvergov.org/trafficcountsearch.asp>

http://www.tdot.state.tn.us/Chief_Engineer/assistant_engineer_Planning/planning/mapping_&_statistics_office/adt.htm

<http://www.ahtd.state.ar.us/Maps/Traffic%20County%20Maps/2000%20ADT/TrafficCount.htm>

1 - How long should my roadways be?

A rule-of-thumb is that a roadway should be minimally 8 times the distance between the roadway and the most-distant receiver, with the receiver centered along the roadway.

(Applies to TNM version 1.0, 1.0b, 1.1, and 2.0)

2 - How do I input L_{dn} and L_{den} data in TNM?

In versions previous to 2.1, TNM automatically assumes a 50/50 split of ADT between day and night for L_{dn} and a 33/33/33 split of ADT between day, evening, and night for L_{den}. It is recommended that users not use L_{dn} and L_{den} but instead modify Equation 15 on Page 66 in the TNM Technical Manual to compute equivalent hourly volumes.

The equivalent volumes would give a LA_{eq1h} that is actually a DNL or CNEL. Then input this as LA_{eq1h} traffic type. (Note: When using Equation 15, %day + %evening + %night = 100%; for input to TNM, %day = %evening = %night = 100%).

Also keep in mind that although lane-by-lane speed and volume is not necessary, HOV and truck restricted lanes should be implemented.

* Calculations for L_{dn} and L_{den} have been modified to incorporate more representative numbers of hours in TNM Version 2.1. Only if your total hourly traffic volumes are the same for each hour of the day, this modification will now produce more representative L_{dn} and L_{den}.

(Applies to TNM version 2.1 and 2.5)

2 - How do I input L_{dn} and L_{den} data in TNM Version 2.1 and above?

Calculations for L_{dn} and L_{den} have been modified in TNM Version 2.1 and above to incorporate accurate numbers of hours (L_{dn}: 15 hours day and 9 hours night; L_{den}: 12 hours day, 3 hours evening and 9 hours night).

The calculations for L_{dn} and L_{den} in TNM Version 2.0 and all previous versions assumed the entered ADT value was split evenly between day and night for L_{dn} and day, evening, and night for L_{den} . For example, for L_{dn} the previous versions assumed the same total traffic passed by during the 15-hour day as passed by during the 9-hour night. This resulted in higher hourly volumes during the night than during the day, because the same 15 hours of daytime traffic was compressed into only 9 nighttime hours. Because the calculations were not accounting for the different number of hours included in day, evening, and night, erroneously high sound levels were being calculated for L_{dn} and L_{den} .

TNM Version 2.1 and above accounts for actual numbers of hours by dividing the traffic equally among all the hours of the day—that is equal hourly traffic in each hour of the day. This still may not be realistic for your project. If not, we suggest the following:

- Decide volumes and speed for a typical peak-traffic hour (a.m. combined with p.m.), along with its duration in hours.
- Do the same for a typical daytime off-peak hour, for a typical evening hour (between 1900 and 2200), and for a typical nighttime hour (between 2200 and 0700).
- Then use TNM to compute four separate L_{Aeq1h} values for these four typical hours.
- Then average these four results by decibel arithmetic (see equation below), where each typical-hour result is first weighted by the number of hours it represents, and where (1) nighttime hour sound levels are increased by 10 dB, and (2) for L_{den} only, evening hour sound levels are increased by 5 dB. The increases account for the lower tolerance of people to noise during these time periods.
- The result will be a relatively accurate value of L_{dn} (or of L_{den}).

This value of L_{dn} or L_{den} will be accurate only if your projections of nighttime and evening truck traffic are reasonably accurate.

Equations for calculating L_{dn} and L_{den} :

$$L_{dn} = 10 \times \log_{10} \left(\frac{t_1}{24} \times 10^{(L_1/10)} + \frac{t_2}{24} \times 10^{(L_2/10)} + \frac{3}{24} \times 10^{(L_3/10)} + \frac{9}{24} \times 10^{([L_4+10]/10)} \right)$$

, where

- $L_1 = L_{Aeq1h}$ for peak daytime traffic,
- t_1 = number of hours L_1 represents,
- $L_2 = L_{Aeq1h}$ for off-peak daytime traffic,
- t_2 = number of hours L_2 represents,
- $L_3 = L_{Aeq1h}$ for evening traffic,
- $L_4 = L_{Aeq1h}$ for night traffic, and
- $t_1 + t_2 = 12$ hours.

$$L_{den} = 10 \times \log_{10} \left(\frac{t_1}{24} \times 10^{(L_1/10)} + \frac{t_2}{24} \times 10^{(L_2/10)} + \frac{3}{24} \times 10^{([L_3+5]/10)} + \frac{9}{24} \times 10^{([L_4+10]/10)} \right)$$

2 - How does TNM compute acceleration on roadways with traffic-control devices?

For TNM roadways with a traffic-control device, TNM computes accelerating speeds along the roadway's length as a function of vehicle type and roadway grade until the final speeds are attained or the end of the roadway is reached. For the next roadway, TNM begins anew with that roadway's input speeds. In other words, while TNM tracks speeds from one roadway segment to the next, it does not link speeds from one roadway to the next.

If you know that vehicles will continue to accelerate past the endpoint of the TNM traffic-device roadway, you must extend this roadway if you wish to allow for continuing acceleration. For example, if heavy truck acceleration will continue past the physical merge point of an on-ramp with the mainline, you may wish to extend the on-ramp past this physical merge point, parallel to the mainline, so that heavy trucks will come close to reaching input speed before the end of the on-ramp roadway. Use Figure 45 on Page 57 of the TNM Technical Manual to compute this length.

The need to extend this full length depends on the number of trucks on the ramp compared to the mainline and the proximity of receivers. If you have a lower number of heavy trucks on the on ramp compared to the main road, then you don't have to extend it all the way out until it reaches the main road speed. It is very often not necessary to extend the ramp roadway the full distance. In addition, vehicle emissions levels at high speeds (particularly above 40 mph) do not differ much between cruise-throttle and full-throttle vehicles. For this reason, your computations will generally be sufficiently accurate even if you stop traffic-controlled TNM roadways quite short of the full distance implied by Figure 45 in the Technical Manual.

2 - How do I calculate roadway contributions?

In cases with multiple roadways or roadway segments, some users may want to determine roadway contribution by calculating sound levels for a specific roadway or segment. This can be done by zeroing out the traffic on all of the roadways except the one(s) being investigated, so only its contribution will be included in the receivers' sound levels. Use a zero-traffic roadway, instead of removing the roadway. Do not remove a roadway while checking for other roadway contributions, because roadways help define the ground plane.

2 - When should I use "on struct"?

Be sure to use "on struct" (located in the General tab of the Roadways Input dialog box) for roadways that are on structure, such as an overpass. It is best to add "on struct" as the final step before calculation after you've made all changes to your run; some users have found that TNM sometimes scrambles the on-structure barriers database when they edit roadways and barriers that are already selected to be "on struct".

In TNM Version 2.1 and above, you may have to click the "on-struct" box several times before it will respond. Try double-clicking it, then single-clicking it.

2 - How do I model roadways with super elevated roadways (cross-slopes)?

On roadways that have super-elevation (perpendicular to the direction of traffic flow): If the roadway is relatively flat, you can use 1 wide roadway (limiting this to 3 lanes of traffic) or multiple, slightly overlapping roadways. If the roadway has a large amount of super-elevation, use separate, slightly overlapping roadways with changing elevations to approximate the cross-slope.

2 - Should I model slow and fast lanes separately?

Users should model slow and fast lanes separately, because the shape of the vehicle's 1/3-octave band frequency spectra is a function of speed and thus propagation, barrier attenuation, ground attenuation, and tree zone attenuation will be sensitive to speed. If you have a multiple lane roadway all with similar lane speeds, users are still recommended to avoid combining more than 3 lanes into a single TNM roadway. Also remember to overlap TNM roadways.

2 - Should I model HOV and truck lanes separately?

Pay close attention to HOV lanes, truck lanes, etc. HOV lanes and truck lanes have different speeds and traffic volume by vehicle type that will affect sound level results. Model these lanes as separate TNM roadways.

2 - When does TNM stop acceleration for traffic on a roadway?

TNM will stop acceleration when it reaches its user input target speed (speed inputted in the traffic input tab), but will maintain full throttle throughout the entire segment. If the roadway is shorter than the length specified in Figures 43-45 in the TNM Technical Manual, then the traffic will not reach the target speed(s) by the end of the roadway. This is not a problem if the traffic has reached a high-enough speed (particularly above 40 mph) so that the cruise-throttle and full-throttle emissions are nearly the same.

2 – When digitizing roadways, how close should I match the curves in the Plan View?

When digitizing roadways, try to match curves in the Plan View within plus or minus 2 m (6 ft). This will almost always ensure the sound level results are precise to within 1 decibel. Keep in mind that cases with elevation changes may be more affected from a small change in object location. With no nearby receivers, you may relax this precision. In addition, always try to maintain approximately the correct roadway length on tight curves, by "straddling" the actual roadway centerline with your straight-line-segment approximation within TNM. Concerning Z coordinates, Section 8.3.3 of the TNM User's Guide discusses the need for additional roadway points to adequately match the vertical roadway coordinates.

2 - Are roadways allowed to intersect with other TNM objects?

In general, do not allow roadways to intersect any other type of TNM input. In addition, do not digitize roadways inside of tree zones. TNM will also detect and report all illegal intersections during Input, Input Check (see Section 8.15 in the TNM Users Guide). Roadways can intersect other roadways, but only at a common roadway point (same X, Y

and Z coordinates). Sometimes it is necessary to physically type in these identical coordinates, rather than relying upon TNM's "snap."

2 - What is the maximum speed I can model heavy trucks in TNM?

When modeling heavy trucks, do not use speeds in excess of 120 km/hr (75 mph) on roadways with grades greater than 1.5 percent. Doing so will cause TNM to output an error message and stop sound level calculations.

2 - I am interested in modeling vehicles idling. Would modeling their speed limit at 1 mph accomplish this and be an accurate representation?

This could work in some cases, but you need to think about why /under what condition you are modeling. Remember that TNM is set to model a constant flow line source. Idling vehicles are more of a stationary point/area source if they are stationary for a long period. If you want to include the effects of stopped vehicles at a signal or some similar source, they would produce an insignificant portion of the total noise, which would be dominated by acceleration away from the light. It is recommended that users work this type of problem out with paper and pen instead.

2 - How can the newer pavement types be credited in the TNM?

TNM currently allows the user to select from 4 pavement types: DGAC, OGAC, PCC, and an average pavement type (combined DGAC and PCC). These data are based on measurements performed in seven States around the country. Incorporating new advanced pavement is possible, however future implementation will depend on FHWA policy, and a statistically sufficient amount of in-situ data measured using a consistent methodology. Current FHWA policy states, "Unless definite knowledge is available on the pavement type and condition and its noise generating characteristics, no adjustments should be made for pavement type in the prediction of highway traffic noise levels." The use of a pavement type other than "Average" must be substantiated and approved by the FHWA, in advance of its use. "Future case" runs should also use average pavement unless otherwise justified.

2 - If I have a 45 mph secondary road with a stop sign, it appears to me that taking flow control into account is not really necessary. Are people finding meaningful differences by including flow control?

We would definitely recommend modeling the flow control device. Although you will not see a large difference between the A-weighted Sound Levels for Autos at 45 mph Cruise and the A-weighted Sound Levels for Autos accelerating in speeds of 0 to 45 mph Full Throttle (as seen in Figures 7 & 8 of the TNM Tech Manual), the vehicle emission spectra vary greatly over that range (as seen in Figures 17 - 20), and should be taken into account.

2 - We are provided ADT traffic volume for a given roadway. Page 63, Item 4 at the bottom of the page (TNM User's Guide) asks if you wish to apply traffic to the entire roadway. Does the software divide the ADT between northbound and southbound or does the user have to input half? e.g. if the combined traffic in both directions is 22,000, does the user enter 11,000 or 22,000?

If you are given an overall ADT, which encompasses lanes in both directions, you will need to split that up amongst the lanes you modeled in TNM. At a minimum, that will be 50/50 for northbound/southbound, but it could be more complex if you modeled more lanes (i.e.: 3 separate northbound lanes, a separate HOV lane, etc.). In your example, if you had only two roadways (one for each direction), you would split the 22,000 and enter 11,000 as your ADT for your northbound roadway and 11,000 for your southbound roadway. Inputting ADT assumes you are calculating Ldn or Lden. If you wish to calculate LAeq1h, you must switch the Traffic Entry Type to LAeq1h and input hourly traffic volume.

2 - Why do my Stamina roadways only show 3 vehicle types?

Because Stamina only allowed 3 vehicle types, TNM imported the roadway traffic similarly. To populate Stamina roadways with TNM's five vehicle types, create a new road to replace the Stamina road by using the Snap tool and the roadway toolbar icon to trace over the existing Stamina road. Copy the traffic from the Stamina road and enter the additional traffic for the buses and/or motorcycles. Then delete the original Stamina road.

2 - What is the point of taking noise field measurements - just to see if your data is close?

Field noise measurements can be done for comparison. If you are modeling traffic noise, you're likely writing up a report or section of a report with your findings. If you have a field monitoring point, you can enter that in as your ambient noise level, and then when you run your analysis, TNM will automatically identify which receptors exceed the ambient level.

99 times out of a hundred you will be designing noise barriers for some future condition. In the real world of highway design, that is typically twenty years from the anticipated first year of operation. That future condition will consist of traffic volumes, traffic mix, and operating speed based on assumed parameters. The future roadway/receiver geometry for improvement projects will certainly change, sometimes dramatically between the roadway and the modeled receivers. Other times there will be only minor modifications on the roadway cross section between the roadway and receivers when the improvements are made primarily toward the median area.

You either have a Type 1 (substantial alteration to existing highway or highway on new alignment) or a Type 2 project (retrofit barrier on existing highway). Existing measurements are essential for both scenarios given adequate funding. For Type 1 projects, one of the measures of an impact is a substantial increase over your existing conditions (see your States guidance on defining "substantial"). Taking measurements in an area where a new highway is proposed (few noise sources) is essential as this area has the highest potential for a "substantial increase over existing noise", and truly can't be modeled since there are no traffic sources. For other Type 1 projects where existing noise sources are present, modeling would work if you're pressed and you have a simple area. It is recommended to monitor peak noise conditions, calibrate to existing conditions (using traffic you counted during monitoring), and then re-model for existing conditions using more statistically documented traffic for the base year (monitoring data is snap shot

in time). Then modify this file for future conditions.

2 - How do I use my traffic data to "calibrate" my TNM run to existing conditions?

The following excerpt is taken from the report, Validation of FHWA Traffic Noise Model (TNM) Phase I (Report number FHWA-EP-02-031, August, 2002) and provides guidelines on calibrating your model:

The approach for calibrating TNM to measured data depends on the state noise policy for the state of the highway project. Although each noise analyst should refer to their state noise policy, the following guidance gives examples of how to best use TNM for highway traffic sound level predictions.

In California, the Department of Transportation (Caltrans) gives specific guidance on calibrating a noise prediction model [Hendriks 1998]. Their calibration process is defined as follows: an adjustment is made to the calculated future noise levels by algebraically adding a calibration constant derived from the difference between measured and calculated noise levels at representative sites. The types of sites to which the calibration process is applied include highway widening projects, design of retrofit noise barriers, or other improvements that do not significantly change highway alignment or profile. Sound levels are measured at representative locations at a site during peak noise hour, in accordance with FHWA's measurement procedures [Lee 1996], and the site is modeled using exact site geometry and traffic input. The difference between measured and predicted sound levels is then calculated and applied to future sound levels, unless it is 1 dB or less; if the difference is 5 dB or greater, the measurements should be investigated. Please refer to the Caltrans document [Hendriks 1998] for further details.

In Florida, the Department of Transportation (FDOT) also gives specific guidance on calibrating a noise prediction model [Lindeman 2001]. FDOT takes a different approach than Caltrans. Field measurements are conducted along all existing or proposed roadway segments or links that may be affected by the resulting highway traffic noise. Sound levels are measured at a representative site during peak noise hour, in accordance with FHWA's measurement procedures [Lee 1996], and the site is modeled using exact site geometry and traffic input. A comparison is made between the predicted and measured sound levels; if the levels are within ± 3 dB of one another, this is considered an indication that the model is within an accepted level of accuracy. If the difference is greater than ± 3 dB, further investigation into the problem is required; this may require adjusting the model (improving modeling techniques) and/or repeated field measurements for verification, investigating until an acceptable difference is reached. Please refer to the FDOT document [Lindeman 2001] for further details.

Whatever the calibration process, it is important to apply good engineering judgment to the modeling and field measurements. Among other items, the placement of the microphone(s), site geometry, surrounding objects, extraneous noise, and highway traffic noise fluctuations must all be considered. Referring specifically to the sound level measurements, it is important to capture multiple samples of an appropriate length when measuring highway traffic sound levels. For highway noise measurements, guidance on

the sample period to use and the number of samples to obtain can be found in the noise barrier standard [ANSI 1998] and FHWA's highway noise measurements report [Lee 1996]. Briefly summarizing, it is recommended to capture at least three acoustically clean samples (with six being preferred), where the sample length depends on the traffic flow; very steady traffic flow requires 5-minute acoustical averages and less steady traffic flow (but not sparse traffic) requires 15-minute acoustical averages.

Hendriks 1998 Hendriks, Rudolf W., *Technical Noise Supplement: A Technical Supplement to the Traffic Noise Analysis Protocol* (California Department of Transportation, Division of Environmental Analysis, Sacramento, CA, 1998) - Website URL for document: www.dot.ca.gov/hq/env/noise/index.htm

Lindeman 2001 Lindeman, Winfield M., *Project Development and Environmental Manual (PD & E)*, Part 2, Chapter 17 (Florida Department of Transportation, Tallahassee, FL, 2001) - Website URL for document: www11.myflorida.com/emo/pubs/pdeman/pdeman.htm

2 - When should I use average pavement?

FHWA policy states, "Unless definite knowledge is available on the pavement type and condition and its noise generating characteristics, no adjustments should be made for pavement type in the prediction of highway traffic noise levels." The use of a pavement type other than "Average" must be substantiated and approved by the FHWA, in advance of its use. "Future case" runs should also use average pavement unless otherwise justified.

In measured vs. predicted studies, users should pay close attention to pavement type. Many users compare predicted levels and measured levels, find a difference and apply it directly to the results. They should be cautious when doing this with future cases. Keep in mind terrain line changes that may occur.

FHWA is currently approving use of open-graded asphalt concrete (OGAC) in some states. To gain approval, the states must demonstrate with measurements the noise reduction obtained by the pavements within their state.

3 - Can TNM calculate two traffic types simultaneously (i.e., LAeqh1h and Ldn)?

Use only one Traffic Entry Type per TNM run. TNM cannot combine different types in the same run, including use of Hourly volumes for some roadways and hourly percentages for others. Please refer to the Entering Traffic Volume section on Pages 61-63 of the TNM Users Guide for instructions on how to enter traffic data.

3 - What happens when I switch the direction of a TNM roadway?

TNM uses the starting point of a roadway segment to define the roadway. When you switch the direction of a roadway, the information for a roadway segment will now shift to a neighboring roadway segment. This is because the roadway now takes the original starting point going one direction and uses it as a starting point for the other direction. This can present a problem, if the input data of your roadway is significantly different

from segment to segment, because now the information might conceivably be on the incorrect segment.

Roadway before directions are reversed:



Roadway after direction is reversed. Notice the highlighted segment has shifted because the starting pointing of that segment is now going the opposite direction:



A good practice is to digitize or graphically input each roadway in the direction of flow. When you import a DXF file that has roadways in opposite directions, change the direction of the roadway before applying traffic data.

Please note, that when you reverse the direction of a roadway with a flow control device, the flow control device gets moved to the other end of the roadway—that is, to the roadway’s new “start point.” In most cases, this is not desired. It is important to digitize a roadway in the direction of traffic, and when you are satisfied with the roadway’s coordinates, then apply the traffic and flow control device.

Roadway with a flow control device on one end:



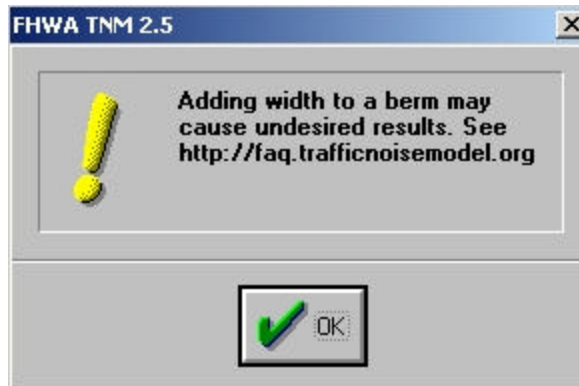
Roadway after direction is reversed. The flow control device has moved to the other end of the roadway as a result.



Barriers

(Applies to TNM version 2.5 only)

1 - Why does TNM give a flat top berm warning when I enter in a non-zero berm top width value?



A new pop-up warning box is generated each time a user enters a non-zero top-width for berms, which warns against using flattop berms in TNM. This prohibits the user from modeling a flattop berm with the barrier/berm function. For information on why it is recommended that flat top berms not be modeled, please read the FAQ below "Should I model my berm as a wedge or with a flat top?"

1 - Should I model my berm as a wedge or with a flat top?

In all versions of TNM, it is recommended that TNM users only use wedge berms (a default berm top-width of 0.0), because TNM had shown some apparent anomalies in the diffraction algorithms for berms with a top width (flat top berms). These anomalies may also surface for other TNM geometries that produce terrain shapes similar to flat top berms (i.e. rising slope, leveling off, and then recessing slope). This problem does not manifest itself for geometries that come to a peak, and in many instances, flat top berm geometries can be effectively modeled with wedge berms.

If modeling flat-top-berm-like geometries with terrain lines, it has been found that by rounding-off any sharp corner geometries in TNM with 2 terrain lines per corner instead of just 1, the anomalies in the diffraction algorithms associated with flattop-berm-like geometries can be minimized and even eliminated. This has been shown to improve results as long as the slope of the "rounded" corner is not too shallow (similar to the flat top; 5:1 run to rise, or greater) or steep (steeper than the slope of the berm).

1 - What are the three ways of entering barriers that will affect the sound level results?

1. Perturbable-height barrier: Only affects the sound level in the "with barrier" case. Barrier attenuation is not included in the "no barrier" sound level. The "no barrier" and "with barrier" sound levels will be different. Perturbable-height barriers allow for multiple adjustments to the barrier height (one of them being to a height of zero) when performing a barrier analysis. To implement: set the "#up," "#down," and increment size to non-zero values.
2. Single-height barrier: Only affects the sound level in the "with barrier" case. Barrier attenuation is not included in the "no barrier" sound level. The "no barrier" and "with barrier" sound levels will be different. Single-height barriers

allow for only one adjustment (to a barrier height of zero) when performing a barrier analysis. To implement: leave the “#up” and “#down” perturbations at zero, but make the increment size non-zero.

3. Fixed-height barrier: affects the sound level in both the “no barrier” and “with barrier” cases. Barrier attenuation is included in the “no barrier” sound level, which will equal the “with barrier” sound level if there are no other perturbable or single-height barriers in the run. These barriers are generally used for permanent structures, such as an existing wall, bridge parapet, or a crash barrier; they may not be perturbed in barrier analyses. To implement: set all three perturbation values to zero.

1 - How and when do I model Jersey barriers?

If you model Jersey barriers, use fixed-height barriers; this applies to roadside or median jersey barriers. Be careful when modeling median jersey barriers; TNM does not currently account for reflections back across the roadway (except in the parallel barrier module).

1 - How does TNM calculate insertion loss?

When a barrier is present in a TNM run, TNM accounts for both the sound reduction generated by the diffraction over the barrier and ground effects for any sound that reaches the ground between the barrier and receiver (where TNM accounts for the shadow zone). The net effect of barrier diffraction, combined with the partial loss of the ground effect, is the barrier insertion loss.

Insertion loss = barrier attenuation - (loss of ground effects)

= barrier attenuation - (no barrier ground effects - with barrier ground effects)

TNM does not currently incorporate the existing background level in determining the final insertion loss; TNM users must determine when it is appropriate to incorporate the background levels. The background level can be measured in the same or similar neighborhood at a distance from the roadway where the highway traffic noise is not heard. TNM's predicted "with barrier" level can be logarithmically combined with the background level (in a simple process in a separate spreadsheet) to determine the insertion loss. For information on how to add background noise please see the FAQ, “How do you add background noise to TNM results?” under the Calculate menu.

At far distances, the existing background noise is typically at higher sound levels than the received highway noise, so accounting for background noise is essential. There are cases where meteorological effects (e.g., wind speed and direction, temperature lapse or inversion) can play a major role in the received sound levels, causing the highway noise to exceed the background noise. Since TNM does not currently account for these meteorological effects, users must apply good engineering judgment when modeling receivers at far distances.

1 - How does ground type affect insertion loss?

Here are some examples of how ground type can affect insertion loss:

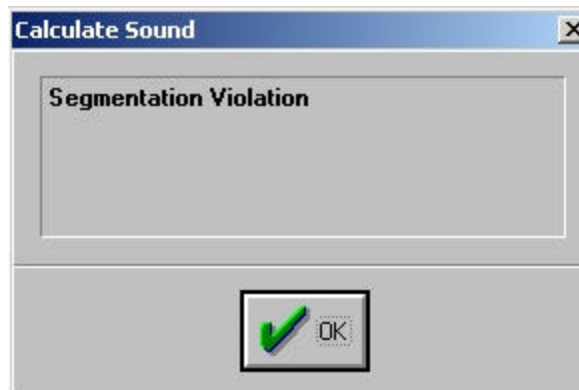
When removing absorptive ground cover between a barrier and a receiver, you are removing the loss of soft ground attenuation in the shadow zone and should therefore increase the insertion loss.

When replacing ground cover with an acoustically more absorbent ground cover between a barrier and a receiver, you are increasing the loss of soft ground attenuation in the shadow zone and should therefore decrease the insertion loss.

1 - I'm perturbing the barrier up and down in the barrier view, but why aren't the results in the tables changing?

Barrier View must be the active window when you open all other barrier-related windows, to link windows together. Otherwise, tabulated results will not change as you shift barrier heights up/down. Check the Barrier Design name in the table; if it reads "Input Heights", close the table, click on Barrier View and then re-open the table.

1 - I started to do a simple test run, which passes the input check and then immediately gives a "Segmentation Violation" dialog and stops the calculation. What does this mean?



There are certain TNM object placements that will cause TNM to overflow. Because TNM performs many of its geometric calculations by drawing triangles along the source-receiver path, division by zero calculations are possible if the extensions of the objects are pointing at receiver locations.

Overflows also are more likely to occur if there is a high density of path-oriented objects (e.g., terrain lines, building rows), such as two terrain lines too close together. When deciding how close your terrain lines should be, always take line-of-sight into account. For example, cases involving noise barriers may have different elevations in front of and behind the barrier; if not modeled properly, the highest vehicle source (at a height of 3.66 m [12 ft.]) could be inadvertently blocked by the barrier or exposed to the receiver. In general, use good engineering judgment to simplify your geometry.

If TNM outputs a segmentation violation message, don't click OK right away; make a

note of which receiver caused it to crash, and try moving the location slightly, or disabling it in future calculations.

1 - Why are my "No Barrier" and "With Barrier" sound level results the same?

If you enter a value of 0 for all of the perturbation parameters (Increment, #Up, and #Down), TNM will designate the particular barrier as a fixed-height barrier. To designate a design barrier without perturbations (single height barrier), enter values in the Increment column. To designate a design barrier with perturbations (perturbable-height barrier), also enter values in the #up and/or #down columns.

1 - Does TNM account for sound being reflected off a barrier back over the roadway?

No. This feature is not yet implemented in TNM. As a result, the columns, "Reflections ?", and the associated next three columns are grayed out and not available for selection/editing. To see how some users have modeled sound being reflected off a single barrier, please refer to the FAQ in the Parallel Barrier section regarding single wall reflections.

(Applies to TNM version 1.1 only)

1 – Why doesn't TNM 1.1 recognize my berm design?

TNM 1.1 ignores berms in calculating sound level results. Please use TNM Version 1.0b or 2.0 (or later versions) when calculating runs with berms.

1 - TNM outputs “invalid” results listed in the Sound Levels results table when I model berms. What is causing this error message?

The toe of the berm (end of slope) can bury receivers and it may not be obvious. This will cause “invalid” results for that receiver. Use the skew view to make sure the toe of the berm is not overlapping a roadway or receiver location.

1 - How does TNM calculate Barrier Noise Reduction?

TNM calculates barrier NR as the difference in sound level before and after installation of a barrier, where the source, ground, and atmospheric conditions have been judged as equivalent. NR accounts for both the barrier shielding effect and the loss of ground effects in the shadow zone behind the barrier. For sound that reaches the ground behind a barrier, TNM accounts for ground effects. Note that TNM's Barrier Noise Reduction (NR) is the term used for Insertion Loss (IL).

Keep in mind that TNM does not currently include background or existing sound levels in its NR calculations. You should always consider background sound levels when presenting final NR values, especially when receivers are placed a far distance from the roadway(s). Background sound levels should be logarithmically added (see equation below) to your predicted sound levels in order to obtain accurate NR values.

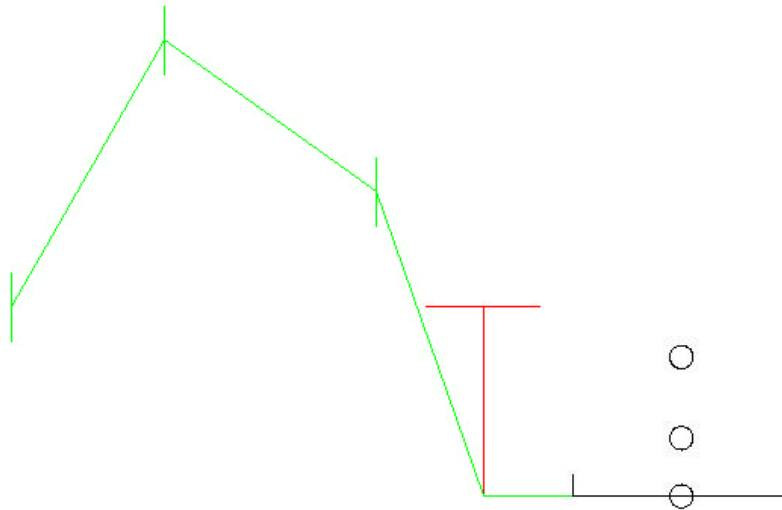
Also, keep in mind that TNM does not currently include meteorological effects such as wind and temperature gradients in its NR calculations. These meteorological effects can influence sound levels at far distances.

Equation to add two dB levels ($C = A + B$), where A, B, and C are all expressed in decibels:

$$C = 10\log[10^{(A/10)} + 10^{(B/10)}]$$

1 - How do I model concrete retaining walls?

Model a fixed height barrier representing your retaining wall (no perturbations), then put a terrain line a few meters (1.52 m – 3.05 m [5-10 ft.] should work fine) behind it at an appropriate elevation. Also, if you view a cut section, you can see the terrain line starts at the barrier's bottom elevation(s), and sharply go up to the location of the elevation input for the terrain line. This method should eliminate the "false" ground attenuation obtained with the dual terrain line method. An example is illustrated below:



2 - Should I model berms that are median barriers?

Yes. If a berm is a median barrier then it should definitely be modeled. Median barriers should be modeled as fixed-height barriers, unless the barrier is part of a noise barrier design, which is uncommon.

A fixed-height barrier is a barrier that affects the sound level in both the “no barrier” and “with barrier” cases. Barrier attenuation is included in the “no barrier” sound level, which will equal the “with barrier” sound level. Fixed-height barriers are generally used for permanent structures, such as an existing wall; they are ineffective in barrier analyses. To implement: set all three perturbation values to zero.

A Berm Top Width currently needs to be equal to zero. Do not use flat top berms.

(Applies to TNM version 2.1 and 2.5)

2 - In the Shielded List for structure barriers, why does it appear to have text and fields pertaining to adjustment factors?

This is a bug in TNM 2.1 and 2.5 that displays text regarding adjustment factors in the Shielded List. The data in the fields are **correct**. Ignore the text regarding adjustment factors and add roadways/segments to the shielded list as you normally would.

2 - Which roadway segments can be shielded by structure barrier segments?

Structure barrier segments may shield both *structure* roadway segments and *non-structure* roadway segments. They are assigned by the user in the **Barriers** input dialog box under **Structure, Edit***. When in doubt, assign more roadway segments rather than fewer as being potentially shielded by each structure barrier segment. At a minimum, include adjacent roadways that are shielded. Also, it is good practice to not assign the shielded roadway segments to the structure barrier segments until all graphical editing has been completed. Scrambling sometimes occurred in TNM 1.0b, that is, it may assign different (incorrect) roadway segments to the structure-barrier segments. If you graphically add more roadway segments to the shielded list after initial assignments, you must reselect the previously assigned ones, or they will be removed from the shielded list for that barrier segment.

*Note that there is a bug in TNM 2.1 and 2.5 that displays text regarding adjustment factors in the Shielded List. The data in the fields are **correct**. Ignore the text regarding adjustment factors and add roadways/segments to the shielded list as you normally would.

2 - What does an “HPP Count Mismatch” error message mean?

This error can be caused when there is a barrier underneath a structure roadway. Remove the barrier or split the roadway into 2 roadways with a small gap between them to let the barrier “pass through” in the plan view and re-calculate the run. Note that a barrier’s benefit might be nullified by underdeck reflections, which are not accounted for in TNM.

2 - What does a “segment skipped” error message mean?

This error can be caused by a barrier that overlaps a roadway surface. Use View, New View, Skew Section to search around the obviously possible places, then move the overlapping barrier further from the roadway centerline.

2 - Why am I able to shift a fixed-height barrier to zero height?

There is a bug in barrier view that incorrectly allows you to shift fixed-height barriers to zero height. Doing so will incorrectly reduce the cost to zero but acoustical calculations will be correct (input height).

2 - How long should my barriers be?

A rule-of-thumb is that a barrier should be minimally 8 times the distance between the barrier and the most-distant receiver, with the receiver centered along the barrier.

2 - How do I know which is the left or right side of a barrier?

Each barrier has a left and right side, depending upon the direction you input it. As you walk along the barrier in the direction of input, the left side of the barrier is to your left, the right side to your right. In all graphical views, TNM draws barriers as arrows, to show

their input direction and thereby their left and right sides. You may have to zoom in on a barrier to see the arrows.

3 - Does TNM calculate multiple perturbable barriers simultaneously?

TNM does not calculate more than 2 perturbable barriers simultaneously between a roadway and the closest receiver. TNM will only choose the two most effective perturbable barriers based on their INPUT heights (not the perturbable heights) and calculate levels for those barriers only. Please refer to the Perturbable barrier reduction section on Page 77 of the TNM tech manual.

3 - What steps should I take to place a wall on top of a berm?

When placing a wall on top of a berm, you must have the same number of segments, going in the same direction with the exact x-y coordinates, or TNM will output an error message and stop sound level calculations. The Z-bottom of the wall barrier must equal to the Z-bottom of the berm plus the berm Height at each point. When a wall is placed on the berm, the berm cannot be perturbed. Also, when putting walls on top of berms, type in coordinates (do not use snap tool).

To include the berm of the berm/wall combination in the “no barrier” case (i.e., the berm is not part of the abatement feature), set all of its perturbation parameters (increments, up and down) to zero, making it a fixed-height barrier.

If the berm of the berm/wall combination is going to be part of the abatement, leave the up and down perturbations at zero (making it a single-height barrier), but include a non-zero number in the increment box; the berm’s noise reduction will not be included in the “no barrier” results. However, during barrier design, you may only perturb the wall barrier on top of the berm. The berm should remain at a constant height throughout design. To change the berm height, edit the berm input height and the Z-bottom of the corresponding wall barrier, and re-run. Previous “remembered” Barrier Designs will be invalid.

Building Rows

1 - How precise should I be when considering the height of building rows?

Generally, plus or minus 2 m (6 ft) is precise enough for average height, as long as most buildings are within a story of one another and as long as the road is not on fill where the height may become more critical.

1 - How about precision in determining building spacing?

It is not necessary that building spacing be highly regular. You do not have to be overly precise in this parameter: +/- 10-20% should be good enough.

1 - Does TNM account for the actual locations of gaps along a building row?

TNM does not account for the actual location of gaps along a building row. For this reason, it predicts average results behind the building row -- that is, average of locations

directly behind gaps and locations directly behind building structures.. If you wish more precise results, you must input each individual building structure as a separate TNM barrier. For example, consider modeling buildings as separate TNM barriers for model calibration runs for measuring sites beyond the first row of houses.

1 - Should I input a building row or a barrier?

TNM does not allow you to enter a building percentage greater than 80 percent. If your building percentage is greater than this, input a noise barrier instead of a building row. Please refer to the previous Q/A, “Does TNM account for actual locations of gaps along a building row?”, for more information.

2 - How much attenuation does TNM contribute for building rows?

In the case of multiple building rows, TNM first identifies all building rows that interrupt the effective source-receiver path. Rows that do not interrupt the propagation path are ignored. For each row that interrupts the path, TNM determines which building row has the most effective attenuation at the 630 Hz frequency band. For this building row, the actual attenuation is calculated for all 1/3-octave frequency bands. For each remaining row that interrupts the propagation path, an attenuation of 1.5 dB is applied to each 1/3-octave band. The maximum attenuation for any number of building rows has been set to 10 dB. For a listing of maximum attenuation for each 1/3-octave band please refer to Table 13 on Page 100 in the TNM Tech Manual.

3 - The Building Row dialog is cutoff on the right so I can't enter a building row percentage.

You will need to set your computer monitor's resolution to 1024 x 768 or greater, 16 colors or greater, and the smallest available font size. You can usually accomplish this in the computer's Control Panel, Display, Settings function.

Terrain Lines

1 - Should I use terrain lines as often as possible?

No. Minimize the use of terrain lines. Don't include terrain lines for small ground inflection points. In general, model terrain lines when there are ground undulations of 1.52 m (5 ft.) or greater. If a more detailed terrain analysis is desired, smaller ground undulations can be included. Always take line-of-sight into account when choosing to model a terrain line. As an example, cases involving noise barriers may have different elevations in front of and behind the barrier; if not modeled properly, the highest vehicle source (at a height of 3.66 m [12 ft.]) could be inadvertently blocked by the barrier or exposed to the receiver. In general, use good engineering judgment to simplify your geometry.

Terrain Lines should also be used to define the ground:

- At the toe of a slope, for roadways on extensive fill.
- At the top of a slope, for depressed roadways.

- Just off the structure of roadways on structure.
- At the top edge of retaining walls, for roadways in cut.

1 - How does TNM handle terrain lines?

Insert terrain lines wherever you wish TNM to know the general height of the terrain between source and receiver. However, please note that small changes in terrain elevations have little effect on the final sound levels. TNM's ground-smoothing algorithm will automatically "smooth" away minor elevation changes prior to sound level calculations to reduce computation time. TNM has shown some weaknesses in the diffraction algorithms, which would be invoked when computing the effects of terrain lines (This has been corrected in TNM version 2.5). Please refer to the previous terrain line FAQ, "Should I use terrain lines as often as possible?" for guidance on the use of terrain lines.

1 - Where should I put terrain lines?

Typical terrain lines might lie: Along the bottom of deep (1.52 m (5 ft.) or greater) drainage ditches that parallel the roadway; Along the top edge of slope for depressed roadways; Along the edge of fill for roadways on fill or on structure; Along the ridge of an intervening hill; Along a line of constant elevation (top of line) of an intervening hill. Please refer to the terrain line FAQ above, "Should I use terrain lines as often as possible?" for further guidance.

1 - Where should I not put terrain lines?

It is not necessary to enter terrain lines where the Z coordinates of other input serve to define the topography, such as: Z (pavement) of roadways, at the edge of pavement rather than at the roadway centerline; Z (ground) of receivers; Z (bottom) of barriers, including berms; Z (bottom) + Height of berms, but at the edge of the berm top width, rather than at the berm centerline; Z (ground) of building rows; Z (ground) of the perimeter of tree zones.

1 - Should I model my berm as a wedge or with a flat top?

In all versions of TNM, it is recommended that TNM users only use wedge berms (a default berm top-width of 0.0), because TNM had shown some apparent anomalies in the diffraction algorithms for berms with a top width (flat top berms). These anomalies may also surface for other TNM geometries that produce terrain shapes similar to flat top berms (i.e. rising slope, leveling off, and then recessing slope). This problem does not manifest itself for geometries that come to a peak, and in many instances, flat top berm geometries can be effectively modeled with wedge berms.

If modeling flat-top-berm-like geometries with terrain lines, it has been found that by rounding-off any sharp corner geometries in TNM with 2 terrain lines per corner instead of just 1, the anomalies in the diffraction algorithms associated with flat-top-berm-like geometries can be minimized and even eliminated. This has been shown to improve results as long as the slope of the "rounded" corner is not too shallow (similar to the flat top; 5:1 run to rise, or greater) or steep (steeper than the slope of the berm).

Ground Zones

(Applies to TNM version 1.0, 1.0b, 1.1, 2.0, and 2.1)

1 - When should I model grass medians?

Users should model grass medians when the median is greater or equal to 3.05 meters (10 ft.). If you are using a default ground type of field grass, create a ground zone of field grass between two roadways to model a grass median. If you are using any default ground type other than field grass, create a ground zone of lawn between two roadways to model a grass median.

For all roadways, it is necessary for the median to overlap the roadway edges as defined by their widths because TNM will default to the pavement until it reaches the edges of the roadways. For medians less than 10 ft, use 1 roadway without traffic to model the median or use 2 wide roadways that overlap. Also, do not snap ground zone points to the roadway points when modeling the median. Often check that they are properly overlapping using the Skew Section view.

(Applies to TNM version 2.5 only)

1 - How do I model roadway medians?

The recommendation on how to model medians has changed from previous versions of TNM. For TNM Version 2.5, the following recommendations apply:

- 1) the minimum recommended width is still 3.05 m (10 ft);
- 2) if the median is a ground type other than the default, use a ground zone to model the median; and
- 3) for a ground zone median, ***avoid overlapping or matching edges with the adjacent roadways.***

(Applies to TNM version 1.0, 1.0b, 1.1, 2.0, and 2.1)

1 - How do I model roadway medians?

Users should model roadway medians when the median is greater or equal to 3.05 meters (10 ft.). If you are using a default ground type of field grass, create a ground zone of field grass between two roadways to model a grass median. If you are using any default ground type other than field grass, create a ground zone of lawn between two roadways to model a grass median.

For all roadways, it is necessary for the median to overlap the roadway edges as defined by their widths because TNM will default to the pavement until it reaches the edges of the roadways. For medians less than 10 ft, use 1 roadway without traffic to model the median or use 2 wide roadways that overlap. Also, do not snap ground zone points to the roadway points when modeling the median. Often check that they are properly overlapping using the Skew Section view.

1 - Does a tree zone automatically define the ground type?

No. If you want a ground type other than the default, you must use a ground zone to define the type of ground inside tree zones. If you are using a tree zone, surround the tree zone with a ground zone of Loose Soil to account for the ground effects of that tree zone.

1 - When should I enter in a ground zone?

Enter ground zones only where the ground differs from your ground-type default, except in the cases of roadway medians. TNM automatically sets the ground type to the default everywhere outside of your ground zones. In addition, only enter ground zones for relatively large patches of ground. For example, if several local streets intervene between source and receiver, enter them as ground zones if they cover a sizable fraction (20 to 30 percent or more) of the intervening ground, especially if they lie midway between source and receiver. Do not bother being too precise when locating the exact edges of ground zones. Note that TNM automatically places pavement along each roadway, depending upon the roadway's width. For this reason, ground zones are not needed to define pavement. Be careful not to allow two ground zones to touch one another.

2 - What is the definition of field grass?

Field grass is described as high and thick meadow grass with dense roots. It is more absorptive than lawn.

2 - How do I model hard and soft ground?

Use TNM's Hard Soil ground zone type, if you would like to model a generic acoustically hard ground surface. Use TNM's Lawn ground zone type, if you would like to model a generic acoustically soft ground surface.

Tree Zones

1 - Does a tree zone automatically define the ground type?

No. If you want a ground type other than the default, you must use a ground zone to define the type of ground inside tree zones. If you are using a tree zone, surround the tree zone with a ground zone of Loose Soil to account for the ground effects of that tree zone.

1 - How does TNM compute tree zone attenuation?

TNM computes tree attenuation per the International Standards Organization (ISO 9613-2, "Acoustics - Attenuation of Sound During Propagation Outdoors - Part 2). This standard requires that trees be sufficiently dense to completely block the view along the propagation path. This requires dense undergrowth as well as dense tree-top foliage. Do not include a TNM tree zone unless its vegetation is sufficiently dense.

1 - When should I model tree zones?

TNM allows the user to model "tree zones." FHWA policy states that such zones should consist of long, wide regions of heavy, non-deciduous woods and undergrowth, not just individual trees or several rows of trees. The vegetation also must be sufficiently dense to completely block the view along the sound propagation path. This requires dense

undergrowth as well as dense tree-top foliage. "Tree zones" should not be modeled unless they have this vegetative density.

Please refer to the Tree Zones section on Page 126 in the TNM Users Guide for more details.

Menu: Calculate

1 - TNM outputs “invalid” results listed in the Sound Levels results table when I model berms. What is causing this error message?

The toe of the berm (end of slope) can bury receivers and it may not be obvious. This will cause “invalid” results for that receiver. Use the skew view to make sure the toe of the berm is not overlapping a roadway or receiver location.

1 - How does TNM calculate insertion loss?

When a barrier is present in a TNM run, TNM accounts for both the sound reduction generated by the diffraction over the barrier and ground effects for any sound that reaches the ground between the barrier and receiver (where TNM accounts for the shadow zone). The net effect of barrier diffraction, combined with the partial loss of the ground effect, is the barrier insertion loss.

Insertion loss = barrier attenuation - (loss of ground effects)

= barrier attenuation - (no barrier ground effects - with barrier ground effects)

TNM does not currently incorporate the existing background level in determining the final insertion loss; TNM users must determine when it is appropriate to incorporate the background levels. The background level can be measured in the same or similar neighborhood at a distance from the roadway where the highway traffic noise is not heard. TNM's predicted "with barrier" level can be logarithmically combined with the background level (in a simple process in a separate spreadsheet) to determine the insertion loss.

At far distances, the existing background noise is typically at higher sound levels than the received highway noise, so accounting for background noise is essential. There are cases where meteorological effects (e.g., wind speed and direction, temperature lapse or inversion) can play a major role in the received sound levels, causing the highway noise to exceed the background noise. Since TNM does not currently account for these meteorological effects, users must apply good engineering judgment when modeling receivers at far distances.

1 - How does ground type affect insertion loss?

Here are some examples of how ground type can affect insertion loss:

When removing absorptive ground cover between a barrier and a receiver, you are removing the loss of soft ground attenuation in the shadow zone and should therefore increase the insertion loss.

When replacing ground cover with an acoustically more absorbent ground cover between a barrier and a receiver, you are increasing the loss of soft ground attenuation in the shadow zone and should therefore decrease the insertion loss.

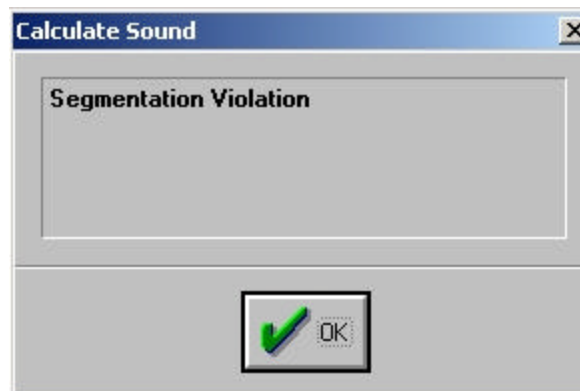
1 - How do you add background noise to TNM results?

TNM does not currently incorporate the existing background noise levels in its results. The "Existing Level", that can be input for each receiver, is only used to determine the "Increase over Existing" in the results tables. To account for background noise in TNM, it must be added in externally. First, the TNM user must determine/measure the appropriate background noise levels. In many cases, the background level can be measured in the same or similar neighborhood at a distance from the roadway where the highway traffic noise is not heard. Then, TNM's predicted levels can be logarithmically combined with the background noise level (in a simple process in a separate spreadsheet) See the equation below:

$$L_{adj.} = 10 \times \log_{10} \left(10^{(L_{TNM}/10)} + 10^{(L_B/10)} \right)$$

, where L_{TNM} = TNM-generated sound pressure levels [dB(A)], and
 L_B = Background noise level [dB(A)].

1 - I started to do a simple test run, which passes the input check and then immediately gives a "Segmentation Violation" dialog and stops the calculation. What does this mean?



There are certain TNM object placements that will cause TNM to overflow. Because TNM performs many of its geometric calculations by drawing triangles along the source-receiver path, division by zero calculations are possible if the extensions of the objects are pointing at receiver locations.

Overflows also are more likely to occur if there is a high density of path-oriented objects (e.g., terrain lines, building rows), such as two terrain lines too close together. When deciding how close your terrain lines should be, always take line-of-sight into account. For example, cases involving noise barriers may have different elevations in front of and behind the barrier; if not modeled properly, the highest vehicle source (at a height of 3.66 m [12 ft.]) could be inadvertently blocked by the barrier or exposed to the receiver. In general, use good engineering judgment to simplify your geometry.

If TNM outputs a segmentation violation message, don't click OK right away; make a note of which receiver caused it to crash, and try moving the location slightly, or disabling it in future calculations.

1 - Do I lose my results if the program crashes?

No. If some of the receivers finished calculations, but the Sound Level Results table is grayed out, you can recover those already calculated receivers. Restart TNM. Re-open the run. In the Calculate menu, select Sound Levels. When TNM is finished with Input Check and starts calculations, select the Cancel button. The Sound Level Results table in the Tables menu should now be selectable.

1 - Why are my "No Barrier" and "With Barrier" sound level results the same?

Unless you enter a non-zero number for the your barrier increment parameters, TNM will designate the particular barrier as a fixed-height barrier (e.g., Jersey barrier). To designate a design barrier, enter values in the Increment, #up, and/or #down columns.

1 - How does TNM handle terrain lines?

Insert terrain lines wherever you wish TNM to know the general height of the terrain between source and receiver. However, please note that small changes in terrain elevations have little effect on the final sound levels. TNM's ground-smoothing algorithm will automatically "smooth" away minor elevation changes prior to sound level calculations to reduce computation time. TNM has shown some weaknesses in the diffraction algorithms, which would be invoked when computing the effects of terrain lines (This has been corrected in TNM version 2.5). Please refer to the previous terrain line FAQ, "Should I use terrain lines as often as possible?" for guidance on the use of terrain lines.

(Applies to TNM versions 1.0b and above)

1 - I ran the official TNM test case in Version 1.0b/1.1/2.0/2.1/2.5. Why didn't I obtain the same results as the table listed in Figure 75 (Page 152) of the TNM User's Guide?

The output in Figure 75 was calculated using TNM Version 1.0. Some of these sound levels are slightly different because of minor acoustical changes implemented in Version 1.0b, and more significant changes implemented in Version 2.5. For information regarding the acoustical changes in TNM 1.0b-2.1, please refer to the [Version 1.0b release notes](#). If you are using TNM Versions 1.0b or higher, refer to the output table on Page 25 of the [TNM 2.0 User's Guide Addendum](#). For information regarding the acoustical changes in TNM 2.5, please refer to the [Version 2.5 release notes](#), and refer to the output table in the [TNM 2.5 User's Guide Addendum](#).

(Applies to TNM versions 1.0, 1.0b, 1.1 only)

1 - What does a "DB" error mean?

It is a database error. The TNM database manager has an internal fix, which can be accessed in the File menu using the Cleanup Run selection.

1 - What does a "Floating Point" error mean?

It is probably an error encountered in your geometry. Usually moving the receiver coordinates, which caused the crash, slightly will remove the error. Please send any runs with receivers invalidated to [TNM Technical Support](#) for further testing and diagnosis. A run consists of an OBJECTS.DAT and an OBJECTS.IDX file. Also provide an indication of which receiver the error occurred on and a detailed description of the error message.

1 - What does an "HPP Count Mismatch" or an "SQRT Domain" error mean?

It is probably an error encountered in your geometry. This error usually occurs when you have a barrier where a segment is actually underneath a roadway on structure. Usually eliminating the portion of the barrier underneath the structure roadway will remove the error. Please send any runs with receivers invalidated to [TNM Technical Support](#) for further testing and diagnosis. A run consists of an OBJECTS.DAT and an OBJECTS.IDX file. Also provide an indication of which receiver the error occurred on and a detailed description of the error message.

2 - What does a "Subdivision missed a segment" error mean?

This message was created for diagnostic purposes only. Clicking OK will continue calculations.

3 - What does an "Assertion failed - Lemis" error mean?

Check your traffic input and make sure the speed and volume data in the columns weren't switched when entered.

Menu: Barrier Analysis

1 - Why do my barrier analyses seem to disappear?

When using Remember As to save a barrier analysis, be sure you are using a new name or TNM will overwrite your previous analysis without warning. Use File, Save or nothing will be saved on disk.

1 - Why don't the results tables reflect changes I make in the barrier analysis?

TNM dynamically links the Barrier Analysis module with TNM tables. To properly make this linkage, the Barrier view must be the active view at the time you open each results table.

2 - Why can't I create a new Barrier Analysis?

Have you selected the desired receiver(s) and barrier segment(s)? If so, then also make sure that the Plan view is the active window before selecting New in the Barrier Analysis menu.

2 - Why does Line-of-Sight show yellow markers?

Barrier analyses, which include more than 1 barrier, will produce yellow markers for all but 1 barrier. Users should either combine barriers before performing Line-of-Sight, or perform separate analyses.

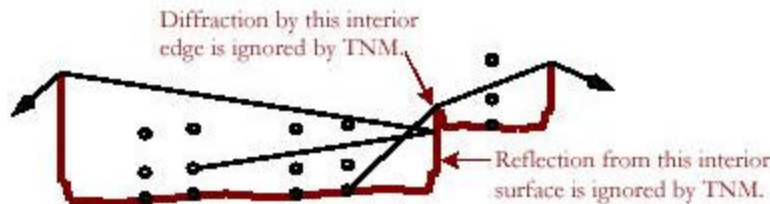
Menu: Parallel Barriers

1 - Can I use the Parallel Barrier analysis module to calculate single wall reflections?

Some TNM users have simulated single barrier reflections, by making one of the parallel barriers very small (i.e.: 0.3 meters, 1 ft.). Use the results from this parallel barrier calculation and apply it as an adjustment factor. This process has not been validated.

1- Can TNM model more than 2 parallel barriers?

Yes, it can be modeled as a single cross section in the Parallel Barriers module. However, keep in mind that when a parallel barrier section contains two separate vertical surfaces offset on the same side of a road (i.e. a retaining wall near the edge-of-pavement and a barrier at the right-of-way), (1) TNM parallel-barrier accuracy is degraded somewhat for receivers on that same side of the roadway (TNM may under-compute or over-compute the noise increase), and (2) TNM may under-compute the noise increase for receivers on the opposite side of the roadway. Please refer to the diagram below:



1 - How often should I analyze parallel barriers if the cross-section shape changes along the roadway?

If the cross-section shape changes along the roadway, analyze parallel barriers every 100 meters (328 ft.). For close-by receivers, adopt results of the nearest analysis. For receivers farther back, dB-average (see equation below) the results from several analyzed sections.

Equation for dB averaging (also known as “energy averaging”):

$$L_{ave.} = 10 \times \log_{10} \left(\left[10^{(L_1/10)} + 10^{(L_2/10)} + \dots + 10^{(L_n/10)} \right] / n \right)$$

1 - When should I analyze my parallel barriers?

Research has shown that the magnitude of the performance degradation associated with parallel reflective noise barriers is linked to the ratio of the separation (width) between the barriers and the average height of the barriers. Definitely analyze parallel barriers when the cross-section’s width-to-height ratio (W:H) is less than 10:1. When the ratio is between 10:1 and 20:1, you may still want to analyze the cross-section with TNM. If the ratio is greater than 20:1, you do not necessarily have to analyze the cross-section. Such a

calculation will yield inconsequential sound-level increases. Please refer to the Parallel Barriers Menu section on Page 103 of the TNM Users Guide for more information.

2 - Can I model inclined barriers or barriers with an angled lip in TNM?

Yes, you can model inclined barriers in TNM's Parallel Barrier Module. The Parallel Barriers feature allows the user to model inclined barrier bases, angled barrier lips or even overall tilted barriers by editing the Parallel Barriers->Cross Section, either graphically or in the input dialog box. Once the cross section is designed, run Parallel Barriers->Calculate and apply the calculated adjustments to the appropriate receivers. TNM users should use caution and good engineering judgment when implementing these adjustment factors, because (1) the Parallel Barrier Module only accounts for 2 dimensional sound propagation, so receivers outside of the selected cross section will not be represented by the adjustments; and (2) the use of angled barriers in TNM's Parallel Barrier Module has not been validated against field measurements.

2 - How do I draw a customized cross-section in the Parallel Barriers module, instead of using the cross section TNM builds?

Click on the Add Surface button (refer to Cross Section on Page 105 of the TNM Users Guide) and create the surface starting from the left diffracting edge and continue to the right diffracting edge, **all as one input object**. Be sure to create enough segments needed to define the cross section within +/- 0.3 meters (1 ft.), including super elevation and other section details.

2 - What are some things I should consider when calculating Parallel Barriers Cross Sections?

Note that the initial heights of the parallel barriers are based on the Input Heights that you entered in the Barrier input dialog box. If you are doing a parallel barrier analysis for other heights, you will need to adjust the heights either graphically or in the Parallel Cross Section input dialog box. It is incorrect to assume that the calculated multiple reflections sound level increase will be the same for two different sets of barrier heights.

2 - Where should I place additional roadways in an existing parallel barrier analysis?

When you snap new roadways to a cross section, sometimes their bottom point ends up slightly below the roadway cross-section. Ensure all additional roadways are slightly above the Parallel Barriers cross-section line. Otherwise, tire noise will emanate below the roadway's surface and none of it will contribute to the computation.

2 - Do I need to make sure I cross through receivers when creating my parallel barrier section cut?

No. Receivers that are included in your section cut will appear in the barrier analysis. If they are not included, you can still input analysis locations (parallel barrier receivers) later on.

3 - Do changes to the Parallel Barriers module input data invalidate results?

Making changes to Parallel Barriers input data after calculations does not invalidate previous parallel barrier results. Instead, the results table (Parallel Analysis Location Table) displays “results must be calculated if any objects are modified.” Users should recalculate after a change is made to the input data to ensure that the barrier results reflect current changes.

Note* When using Remember As to save a new parallel barrier design, be sure you are using a different design name or TNM will overwrite your previous design without warning. You must also File, Save or nothing will be saved on disk.

Menu: Contours

1 – When I tried to calculate a contour of sound levels, NMPlot outputs an “invalid floating point error” and then halts contour calculations. What is causing this?

There are a number of input errors that may cause this:

- 1) It is an error encountered in your geometry. Change any point of your contour zone slightly (0.305 meters [1 ft.] will do) and recalculate the contour sound levels.
- 2) The built-in version of NMPlot is a DOS program, so it cannot understand long file names, long folder names, or names with “spaces” and other DOS-illegal characters in them. To properly run noise contours, the path name must satisfy DOS’s maximum of 8.3 characters and DOS’s restriction against some characters (such as “spaces”). For example, 12345678.123 is a valid file name. Therefore, users must save their run in a folder directly on the C: drive and also keep their run and contour names to a minimum number of characters.
- 3) You must also have a "barrier design" in your run. To create a barrier design, select your desired barrier and receivers with the mouse, and then click on Barrier Analysis->New. A new "Barrier View" will open. If you want the contours to be generated for a barrier set at the input height, then click on Barrier Analysis->Remember As. Here you can type in a name for your barrier design, click OK and it is saved. You can then exit out of the "Barrier View," select the contour you wish to calculate, and click on Contours->Define Contour Levels. Input your contour level data and then click on Contours -> Calculate. You will now be prompted to select a barrier design, and the one you just created will be included in the list. Select it and contours will begin calculating. If there are no other problems with the run, this will generate contours for your run.

(Applies to TNM versions 1.1 and 2.0 only)

1 - In Version 1.1: I took care of the "Out of Memory" problem, but now when I run NMPlot, I receive a FATAL ERROR message about the file format created by Noisemap not being the one expected by NMPlot. I had already downloaded NMLOTX.EXE Version 3.06, so I don't think that's the problem. Is this something fixed in Version 2.0?

Some TNM 1.1 users are experiencing problems computing contours. We do not recommend using Version 1.1 to generate contours, but instead use Version 1.0b or TNM 2.0 and higher. TNM Version 2.0 has addressed many issues in calculating contours. Also, remember when calculating with contours that NMPlot is a DOS application with an 8-character filename/directory limit. If your TNM run name is greater than 8 characters or is embedded within many subdirectories or has long subdirectory names, then NMPlot may display errors. Shorten your run name or move your run out to the main C: directory to run contours.

1 - Are contours allowed to intersect other TNM objects?

While contour zones can intersect other TNM objects, users should be advised not to intersect or encompass roadways and barriers with contour zones, because contouring

logic can break down in areas of steep noise gradients, such as near the ends of barriers. Furthermore, users should avoid encompassing an entire TNM run with a contour zone. To compute a contour zone about a barrier/roadway, create a contour zone in front of the barrier/roadway and behind the barrier/roadway.

1 - How do I workaround an "NMPlot Out of Memory" error?

If your computer displays an "Out of Memory" error while running NMPlot, modify your computer's memory allocation for MS-DOS applications as follows: open an MS-DOS window; select the MS-DOS window's upper-left icon; select Properties in the resultant pull-down menu; select the Memory tab; then increase the values shown. For Windows NT and Window 2000, this step is not necessary since memory allocation is handled automatically by the operating system.

1 - How do I workaround an NMPlot "run-time 200" error in TNM previous to Version 2.0?

The original version of NMPlot included in the TNM package was having difficulties running on today's fast computers (typically faster than 200 MHz) giving some users a runtime error message. Users should download the newer DOS version of NMPlot, [Version 3.06](#), which corrects this error. To use Version 3.06, replace the existing NMPlotX.EXE file located in your TNM/PROGRAM/NMPlot directory with the new executable file. NMPlot version 3.06 is released with TNM versions 1.1 and above.

1 - How do I workaround a NMPlot "run-time 216" error?

NMPlot may be experiencing difficulties handling large coordinates systems (coordinates in the millions). Try scaling down all the coordinates in your run. For example, if all your coordinates are 12,7xx,xxx.xx, then scale them down to 7xx,xxx.xx.

1 - How do I workaround a "Noisemap grid file could not be opened" error?

NMPlot is a DOS application with an 8-character filename/directory limit. If your TNM run name is greater than 8 characters or is embedded within many subdirectories or has long subdirectory names, then NMPlot may display this error. Shorten your run name or move your run out to the main C: directory to run contours.

(Applies to TNM version 1.1 only)

1 - How do I obtain contours to run in TNM Version 1.1?

Some TNM 1.1 users are experiencing problems computing contours. Use TNM Version 1.0b or TNM 2.0 (or later versions) to generate contours.

1 - Why does TNM require a barrier in my run in order to run contours?

You must select a "Remembered" barrier analysis prior to continuing on to calculating contours. A Remembered barrier design is required because TNM needs to know what sound level results to compute contours for since contour calculations will not be computed for all barrier designs, i.e., all perturbation-height combinations. Refer to Sections 10 and 12 in the TNM User's Guide for more information.

1 - How do I run contours without a barrier?

To obtain contours for a "no barrier" case, create a "dummy" barrier with no height, create a barrier analysis, and then use Remember As to save the "dummy" design.

1 - When will the contour module be updated?

Development is underway to implement the Windows version of NMPlot (Version 4.7) into TNM. In the interim, for users who would like to use some of the additional features that can be found in the Windows Version of NMPlot, it is available on the [NMPlot website](#). To use Version 4.7, download and run install_nmplot.exe. Note that the contours viewed using NMPlot Version 4.7 will be external to TNM.

1 –Why do contours take so long to run?

Based on user-input parameters, TNM generates a grid and interpolates the ground elevation at all grid points within the user-defined contour zone. If the user inputs a large contour zone and a very small contour precision, TNM will require a longer time to generate and interpolate those grid points. It is recommended that you carefully consider the size and tolerance of the desired contour zone area prior to calculating contours.

1- I developed a noise reduction contour and saved the contour set with an extension of “.nrc”, but when I try to load the contour set, TNM asks for a file with extensions of “.slc”, “.idc”, or “.ilc”. How do I open the previously save contour set?

This is a bug in TNM. To open your previously saved contour set, type in the full name of your contour set with the “.nrc” extension. If you cannot remember the full name of the contour set, the actual contour set file is located in the same folder as your TNM run.

2 - Are there specific objects that need to be present when producing contours?

To produce contours, you must have at least one TNM Roadway, Receiver and Barrier anywhere within the run. The receiver and barrier do not need to be in the vicinity of where you want contours. You must also have a "barrier design." To create a barrier design, select your desired barrier and receivers with the mouse, and then click on Barrier Analysis->New. A new "Barrier View" will open. If you want the contours to be generated for a barrier set at the input height, then click on Barrier Analysis->Remember As. Here you can type in a name for your barrier design, click OK and it is saved. You can then exit out of the "Barrier View," select the contour you wish to calculate, and click on Contours->Define Contour Levels. Input your contour level data and then click on Contours -> Calculate. You will now be prompted to select a barrier design, and the one you just created will be included in the list. Select it and contours will begin calculating. If there are no other problems with the run, this will generate contours for your run.

To calculate open field contours, create a “dummy” barrier by using zero as the height of the barrier. The barrier does not need to be in the open field, but if it is, remember that its Z-ground defines the ground elevation and thus will affect the contour. Also, you must have at least initiated a Barrier Analysis and have a “remembered” design to choose for the contouring, even if it is a no-height barrier. You do not have to have calculated the sound levels at your regular receivers, however

2 - What contour tolerance should I use in TNM?

Typically, use 1 dB. However, some Users have used larger tolerances for specific project-related purposes.

2 - What is the minimum grid spacing that should be used when computing contours?

Do not use the default of 61 m (200 ft), which is too large. Use very small grid spacing, such as 1.52 meters (5 ft.), for runs with rapid sound level changes (near barriers, for example). Larger spacing, such as 15.24 meters (50 ft.), can give incorrect results near barriers.

2 - What grid height should I use when computing contours?

Typically, use 1.52 meters (5 ft). However, make sure your contour zone is big enough to encompass all relevant user-input ground elevations, which TNM uses to compute the ground elevations of contour grid points.

2 - Is there a character limit when naming Grid Files and contour sets?

Since the current version of NMPlot used by TNM is a DOS program, your Grid File must satisfy DOS's maximum of 8.3 characters and DOS's restriction against some characters (such as "spaces"). For example, 12345678.123 is a valid file name. This limit means you are very constrained because a given grid file is for a specific contour zone with a specific set of values for tolerance, spacing and height for a specific barrier design in a specific TNM run. It is essential to keep a log of the grid file names and the related conditions that they represent.

Keep in mind that changing the size of a contour zone does not invalidate a previously computed grid file, even though the calculated contours can be affected by being close to the borders of the contour zone. Also, changing the geometry of other TNM objects does not invalidate a grid file for a given TNM run (even when adding terrain points that obviously will change the sound levels). Such changes do invalidate results at the user-input receivers, however.

3 - Why do the calculated contour lines seem to intersect one another and give separate sound level results?

Sometimes contour lines can intersect one another within a given contour zone and give separate sound level results. This is caused by ending the contour zone too close to where the sound level is rapidly changing. Do not end the contour zone near barrier ends, building row ends, or roadway ends. This can also happen when the grid spacing is too large.

3 - Can I encompass my entire TNM run with a noise contour?

It is recommended that users do not encompass an entire TNM run with a noise contour. While contour zones can intersect other TNM objects, users should be advised not to intersect or encompass roadways and barriers with contour zones, because contouring logic can break down in areas of steep noise gradients, such as near the ends of barriers.

(Applies to TNM version 1.0b only)

3 - I'm using Version 1.0b to calculate contours but NMPlot says that the contour settings were either too high or too low. What does that mean?

During a contour sound level calculation, an NMPlot error may show up in your computer task bar and read,

"All contour levels are set either too high or too low. No contours will be generated. Would you like the have new contour levels automatically calculated?"

Disregard this message. It is a bug in NMPlot itself and does NOT affect the acoustics. Click "Yes" and the contour will complete its calculations.

3 - After calculating contours, the contour lines are displayed but no text is displayed for any object in the view. What is causing this?

The contour has not been fully calculated, therefore not displaying any results. There may be some intersecting roadways or other objects that are interfering with your contour calculation. Please send your case to support@trafficnoisemodel.org and we will investigate it. Zooming in and then zooming out or minimizing the plan view window and maximizing it may show the contour levels (if they were calculated).

This can also mean that in your other views, the labeling of text/point numbers is missing. But they are there - you're computer just doesn't know how to display them.

1) Ensure that the desired items are checked in the Show/Hide dialog, which can be accessed using the View menu; and (2) refer to Section 6.2 in the User's Guide and Section 2.3.1 in the User's Guide Addendum for more information on how to manually tell your computer how to display text.

Menu: Tables

Print Tables

(Applies to TNM version 1.1 only)

1 - Why can't I print any of my tables in TNM Version 1.1?

Some users are experiencing problems printing tables in TNM Version 1.1. It is currently unknown why only some users are experiencing this. As a workaround, the tables may be copied/pasted or exported to a spreadsheet program, such as Excel, and printed from there. This has been corrected in TNM Version 2.0 and later versions.

1 - What does "invalid" mean in my results tables?

TNM will show "invalid" for those receivers it skipped during calculations due to computation errors. TNM skips these receivers rather than interrupt calculations. To recalculate a skipped receiver, try moving its coordinates slightly, then recalculate. If you have a berm in your run, ensure that the berm slopes do not overlap any receivers. *Note that TNM Version 2.1 resolved many cases in which TNM was improperly giving "invalid" results.

(Applies to TNM versions 1.1, 2.0, 2.1, and 2.5)

2 - When I print the results tables, why don't I see results for the active barrier design?

When using the **Tables, Print Tables** dialog box, all of the results tables are only printed for the INPUT HEIGHTS case, not the currently active barrier design. If you would like printouts related to the active barrier design, use **File, Print** for each separate table, when it is the active window.

2 - Why can't I open my Sound Level Results tables?

The Sound Level Results tables are only available if TNM has any computed results. If some of the receivers finished calculations, but the Sound Level Results table is grayed out, you can recover those already calculated receivers. Restart TNM. Re-open the run. In the Calculate menu, select Sound Levels. When TNM is finished with Input Check and starts calculations, select the Cancel button. The Sound Level Results table in the Tables menu should now be selectable.

2 - What does "inactive" mean in my results tables?

TNM will show "inactive" for those receivers it skipped during calculations because they have been inactivated in the Receiver Input dialog in the Notes tab. To re-activate a receiver, go to the Receiver Input dialog, Notes tab and click on the checkbox for that receiver in the Active column.

2 - What does "no calc" mean in my results tables?

TNM will show "no calc" for those receivers it did not get to compute because the user cancelled calculations.

2 - Why doesn't my exported table data include the header information?

The export function only exports table data. To copy the header information, hold down the left mouse button and drag the mouse over the gray buttons to the left of the table to highlight the header rows. Then use CTRL+C and CTRL+V to copy/paste the rows, respectively.