

FHWA Traffic Noise Model® (TNM) Version 2.5 Release Notes:

Dear TNM users,

A new version of TNM, Version 2.5, is now available. TNM 2.5 is the first version of the software, since the original release, with major improvements to the acoustics. Users should expect to see predicted sound levels that are different than sound levels predicted with previous versions of TNM.

The following documents accompany the TNM 2.5 release (each of these items can also be found on the official TNM website, <http://www.trafficnoisemodel.org>):

- 1) FHWA release and phase-in memo
- 2) Update to the FHWA TNM User's Guide
- 3) Update to the FHWA TNM Technical Manual
- 4) Updated TNM FAQs with Guidelines
- 5) Preview of the updated TNM Validation Phase 1 results

Note to TNM users who exercise the Ldn (DNL) and/or Lden (CNEL) functions: Please see related text in the "Recommendations for the use of TNM 2.5" section for important information.

TNM 2.5 includes the following:

Changes in the acoustics

TNM 2.5 was developed to address the following issues: 1) the over-prediction found in the TNM Validation Phase 1 data results; and 2) an anomaly related to diffraction points. Steps taken to address these issues include:

- 1) an improvement was made to the implementation of the vehicle emission level database - a more comprehensive methodology was applied in correcting the measured emission levels back to the source; and
- 2) a bug in the acoustics code was identified and corrected, where related diffraction algorithm parameters were improved.

TNM 2.5 predictions have been validated by comparing to measured sound levels from Phase 1 of the TNM Validation. Please see the file TNM25ValPh1Preview.pdf for a review of the updated validation results; a comprehensive update to *Validation of FHWA's Traffic Noise Model® (TNM): Phase 1* is forthcoming. For updates to the TNM Technical Manual, please refer to the following documents: TNM25TechManUpdatePart1.pdf and TNM25TechManUpdatePart2.pdf.

Error messages and inputs added/updated:

- 1) 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, and prohibits the user from modeling a flattop berm with the barrier/berm function.

Recommendations for the use of TNM 2.5

- 1) *Ldn (DNL) and Lden (CNEL) functions*

The ADT distribution is set at 9/24ths night and 15/24ths day for Ldn (DNL) [9/24ths night, 3/24ths evening, and 12/24ths day for Lden (CNEL)], which assumes the hourly volumes are equal for each of the 24 hours. If this assumption does not apply to your situation, you will need to compute hourly Leqs for typical hours of the day, then average them together properly in a spreadsheet to calculate Ldn (DNL)[Lden (CNEL)]. Specific guidance on how to do these calculations is found in the FAQs with Guidelines on the TNM website (<http://www.trafficnoisemodel.org>) under

input-roadways, less frequently asked questions. (This is also recommended for TNM 2.1.)

2) *Roadway medians*

The recommendation on how to model medians has changed from previous versions of TNM. For TNM 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.

3) *Overlapping roadways*

As with previous versions of TNM, overlapping roadways is *still recommended*. The overlap can be as little as 0.03 m (0.1 ft). Avoid exactly matching the edges of the roadways. The acoustics processes in TNM 2.5 do behave differently than previous versions, but this recommendation remains.

4) *Flat-top-berm-like geometries*

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.

In TNM 2.5, the user is prohibited from modeling a flat top berm with the barrier/berm function. 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).

5) *Terrain undulations*

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. 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*; although TNM automatically "smooths" away minor elevation changes, TNM 2.5 does so less aggressively, allowing for greater detail in terrain changes. Remember to take line-of-sight into account when choosing to model a terrain line.

Installation Instructions

1. On the Windows taskbar, click [Start]. Select Run.
2. Click [Browse]. Navigate to your CD-ROM drive.
3. Double-click on Setup.exe and follow the onscreen instructions.*

*Note, when choosing a directory to install TNM Version 2.5, you must choose a directory on your local (or network) drive that meets DOS

requirements (e.g. C:\TNM25). Do not use a directory that contains spaces and periods anywhere in the pathname. Calculating contours in TNM requires use of NMPlot, a DOS program. DOS programs cannot understand long file names (8 character max in TNM) or names with spaces, periods, or other DOS-illegal characters (e.g., ' / , ; ^ + [] " = * ? | < : >).