

DETERMINE NEED FOR NOISE ABATEMENT EVALUATION

Predicted noise levels for each receptor are compared to the Noise Abatement Criteria (NAC) to determine noise impacts. For example, in the chart below, the noise level at Receptor R1 in the existing and future no-build conditions are less than the residential NAC of 67 dB(A). The future build noise level would exceed the residential NAC of 67 dB(A). A noise abatement evaluation would be required. For Receptor R2, the future build noise level does not approach the residential NAC of 67 dB(A). Therefore, no further evaluation is needed.

Receptor	Description	Existing	Future No Build	Future Build	Noise Abatement Analysis
R1	Multi-family	63	65	68	Y
R2	Single family	60	62	64	N

FREQUENTLY ASKED QUESTIONS

1. Were noise levels predicted for my house?

The first step in conducting a noise analysis is to select representative receptors, each signifying a common noise environment (CNE) with similar land use, similar distance to roadway, and the same basic topography. If your house was not selected, it was included in the CNE and noise levels at your home can be expected to be similar to those predicted for the representative receptor.

2. Why doesn't IDOT analyze noise for every house?

Every house in close proximity to the roadway is considered in the noise analysis, either directly or indirectly by representation in an area. Predicting noise levels at every house is not necessary when similar characteristics would provide similar noise levels. The selected representative receptor generally represents the worst-case of all receptors included in the area.

3. Why don't we use noise monitoring results instead of modeling results?

Monitored noise levels provide a snapshot of existing conditions, reflecting weather and traffic conditions for that time period only. Also, since noise monitoring detects all noise sources present at the site, it may artificially increase the traffic noise levels. Noise levels for the impact analysis are worst hour traffic noise condition and may vary from the noise monitoring results. Also, only computer noise modeling can predict future traffic conditions, which are needed to determine traffic noise impacts.

4. Where did IDOT get the traffic data used in the computer model?

Two types of traffic data may be used in traffic noise modeling: 1) Worst Hour Traffic Noise Condition, and 2) Average Daily Traffic (ADT), the total traffic volume in a given period divided by the number of days in that period. Current ADT volumes can be determined by continuous or periodic traffic counts.

Existing traffic volumes are typically generated from actual traffic counts. Future traffic volumes, based on typical traffic growth rates, planned development and projected area growth, are typically projected by IDOT or a metropolitan planning organization.



State of Illinois
Illinois Department of Transportation

HIGHWAY TRAFFIC NOISE

NOISE ANALYSIS

- Project Types
- Regulations
- Noise Monitoring
- Noise Modeling

The Illinois Department of Transportation maintains over a 16,000-mile state highway system per year. This includes 1,890 miles of interstate roads.

TYPE I PROJECTS

A noise analysis is required for Type I projects. Type I projects include the following:

- Construction of a highway on new location.
- Physical alteration of an existing highway where there is either a Substantial Horizontal or Vertical Alteration.
- Addition of a through-traffic lane(s) (including HOV lane, High-Occupancy Toll (HOT) lane, bus lane, or truck climbing lanes).
- Addition of an auxiliary lane (except when used as a turn lane).
- Addition/relocation of interchange lanes/ramps to a quadrant to complete an existing partial interchange.
- Restriping existing pavement to add a through-traffic lane or an auxiliary lane.
- Addition of a new/substantial alteration of a weigh station, rest stop, ride-share lot or toll plaza.

FEDERAL REGULATIONS

Different land uses have different noise criteria for impacts. A traffic noise impact occurs when predicted future build noise levels approach, meet or exceed the Noise Abatement Criteria (NAC) warranting a noise abatement analysis. The NAC for various common land uses are shown below:

Leq(h), dB(A)	Description of Land Use
67 (Exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails and trail crossings.
72 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands.

IDOT POLICY

In Illinois, traffic noise impacts are determined to occur in the following situations:

- Design year (typically 20 years into the future) build traffic noise levels are predicted to approach, meet, or exceed the NAC, with approach defined as 1 dB(A) from NAC. OR
- Design year (typically 20 years into the future) build traffic noise levels are predicted to substantially increase (greater than 14 dB(A)) over existing noise levels.

COMPUTER NOISE MODELING

The FHWA approved computer Traffic Noise Model (TNM) is used to predict noise levels. There are three main steps when conducting noise modeling:

- Step 1** – Select representative common noise environments (CNEs).
- Step 2** – Determine model inputs.
- Step 3** – Compare existing and future build noise levels predicted by the model to IDOT policy to determine noise impacts.

NOISE MONITORING

Noise monitoring is a tool that provides information for existing conditions only. Computer noise modeling is used to predict traffic noise levels for existing and future conditions (build and no build) and is the tool used to predict potential traffic noise impacts.

RECEPTOR SELECTION

The first step in conducting a noise analysis is to select representative receptors. The representative receptor is the worst-case receptor within a CNE that shares the following characteristics with the other receptors:

- a) Similar land use
- b) Similar distance to roadway
- c) Same basic topography

RECEPTOR TYPES

IDOT defines a receptor as a sensitive land use where frequent outdoor human use occurs and where a low noise level would be of benefit. Receptors typically include homes, schools, hospitals, nursing homes, parks, motels, and offices.

INPUTS USED IN TNM

Ten typical inputs are needed to estimate noise by TNM:

1. **Traffic Volumes** - Peak Hourly Traffic - The highest hourly traffic volume of the day.
2. **Traffic Composition** - Automobiles, medium trucks and heavy trucks.
3. **Traffic Speed** - Input into the model as the average vehicle speed or posted speed.
4. **Receptor Location and Elevation** - Distance between receptor and edge of roadway. Receptor and roadway elevations are also input.
5. **Roadway Design and Width** - The roadway layout along with roadway width (typically number of lanes x 12-ft. width). Each direction of traffic is input.
6. **Terrain Lines** - Contours of surrounding topography that may include berms, ditches, slopes, input when terrain lines affect noise.
7. **Ground Zones** - Areas of different ground type such as lawn, pavement, water, hard soil, loose soil, field grass.
8. **Building Rows** - Outline and height of adjacent buildings, input when they shield an adjacent area.
9. **Tree Zones** - Areas of trees/vegetation, input when dense vegetation occurs.
10. **Traffic Controls** - Stop and go traffic characterized as stop controlled intersections, signalized intersections, or toll booths.