*<Note: Use this template when the analysis indicates* ***noise impacts and at least one abatement measure was both feasible and reasonable****.>*

Traffic Noise Analysis Report

<Project Name>

<CSJ Number(s)>

<District>

<Report Date Month/Year>

*The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 17, 2025, and executed by FHWA and TxDOT.*

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*<Use this template when a traffic noise analysis indicates* ***noise impacts, and at least one abatement measure was both feasible and reasonable.*** *Gray highlighted text provides instructions or indicates where additional project information may be needed. Remove gray highlighted text before submitting the traffic noise analysis report. Additional instructions on using this template can be found in ENV’s Standard Language for Documenting Traffic Noise Analyses.>*

*<Include a short paragraph before the Introduction that describes the project and indicates why a traffic noise analysis was required (i.e. why it is a Type I project).>*

# Introduction

This analysis was accomplished in accordance with TxDOT’s (FHWA-approved) Traffic Noise Policy (2019).

Sound from highway traffic is generated primarily from a vehicle’s tires, engine and exhaust. It is commonly measured in decibels and is expressed as "dB."

Sound occurs over a wide range of frequencies. However, not all frequencies are detectable by the human ear; therefore, an adjustment is made to the high and low frequencies to approximate the way an average person hears traffic sounds. This adjustment is called A-weighting and is expressed as "dB(A)."

Also, because traffic sound levels are never constant due to the changing number, type and speed of vehicles, a single value is used to represent the average or equivalent sound level and is expressed as "Leq."

The traffic noise analysis typically includes the following elements:

* Identification of land use activity areas that might be impacted by traffic noise.
* Determination of existing noise levels.
* Prediction of future noise levels.
* Identification of possible noise impacts.
* Consideration and evaluation of measures to reduce noise impacts.

The FHWA has established the following Noise Abatement Criteria (NAC) for various land use activity areas that are used as one of two means to determine when a traffic noise impact would occur.

Table 1. FHWA Noise Abatement Criteria (NAC)

| **Activity Category** | **FHWA (dB(A) Leq)** | **Description of Land Use Activity Areas** |
| --- | --- | --- |
| A | 57(exterior) | Lands on which serenity and quiet are of extra-ordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. |
| B | 67(exterior) | Residential |
| C | 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  |
| D | 52(interior) | Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios |
| E | 72(exterior) | Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F. |
| F | -- | Agricultural, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing. |
| G | -- | Undeveloped lands that are not permitted. |

A noise impact occurs when either the absolute or relative criterion is met:

**Absolute criterion** - The predicted noise level at a receptor approaches, equals, or exceeds the NAC. "Approach" is defined as one dB(A) below the NAC. For example: a noise impact would occur at a Category B residence if the noise level is predicted to be 66 dB(A) or above.

**Relative criterion** - The predicted noise level substantially exceeds the existing noise level at a receptor even though the predicted noise level does not approach, equal or exceed the NAC. “Substantially exceeds” is defined as more than 10 dB(A). For example: a noise impact would occur at a Category B residence if the existing level is 54 dB(A) and the predicted level is 65 dB(A).

When a traffic noise impact occurs, noise abatement measures must be considered. A noise abatement measure is any positive action taken to reduce the impact of traffic noise on an activity area.

# Analysis

The FHWA traffic noise modeling software (TNM 2.5) was used to calculate existing and predicted traffic noise levels. The model primarily considers the number, type and speed of vehicles; highway alignment and grade; cuts, fills and natural berms; surrounding terrain features; and the locations of activity areas likely to be impacted by the associated traffic noise.

The approved traffic data used in this analysis is included in **Attachment X**.

*<If applicable, include any project-specific information related to the noise analysis. This could include location of an existing TxDOT-constructed noise barrier, assumptions or adjustments made to the traffic data, or discussion of other major noise sources in the project area.*

*If the project is on new location (all or part) and existing noise levels were measured rather than modeled, include a short discussion of the measurement methodology and attach field data sheets to the report. Add footnote to results table to indicate that existing noise levels are based on field-measured values. If project is entirely on new location, then remove validation section below.>*

# Validation

*<This summary paragraph assumes that the existing model was validated. If validation did not occur, additional discussion is required – refer to Section 5.1.3 of the Traffic Noise Policy Implementation Guidance. Attach the validation study documentation (see Example B – Existing Model Validation Study Report in ENV’s Standard Language for Documenting Traffic Noise Analyses).>*

A validation study was performed in order to ensure that traffic noise is the main source of noise and to verify that the existing model accurately predicts existing traffic noise based on current conditions. Model validation compares field-collected sound level measurements to traffic noise levels calculated in an existing condition model that used field-collected traffic parameters. Differences between the measured and calculated levels for this project were within the +/- 3 dB(A) tolerance allowed by FHWA. Therefore, the existing noise model is considered validated for this project. Additional information on the validation study is included in **Attachment X.**

# Results

Existing and predicted traffic noise levels were modeled at receiver locations (**Table 2** and **Figure X**) that represent the land use activity areas adjacent to the proposed project that might be impacted by traffic noise and potentially benefit from feasible and reasonable noise abatement.

*<In the table below, identify each representative receiver by a numeric designator (R#) and a short description (one or two words) that corresponds to the land use activity area type in the NAC table.*

*Report noise levels in whole numbers. For example, if the result in the TNM software was 64.8, enter 64 in the table. Drop the number after the decimal point – do not round!*

*Make sure to update the predicted year in the table header.>*

Table 2. Traffic Noise Levels dB(A) Leq

| **Representative Receiver** | **NAC Category** | **NAC Level** | **Existing** | **Predicted 20XX** | **Change (+/-)** | **Noise Impact (Yes/No)** |
| --- | --- | --- | --- | --- | --- | --- |
| R1 Residential | B | 67 | 64 | 66 | +2 | **Yes** |
| R2 (one or two-word description) |  |  |  |  |  |  |
| R3 |  |  |  |  |  |  |
| R4 |  |  |  |  |  |  |
| etc. |  |  |  |  |  |  |

As indicated in **Table 2**, the proposed project would result in a traffic noise impact at one or more representative receiver locations.

*<If applicable, discuss any atypical results, such as why predicted traffic noise levels are lower or much higher than existing levels.>*

Noise abatement measures were considered for each location with predicted noise impacts.

# Abatement Analysis

Before any abatement measure can be proposed for incorporation into the project, it must be both feasible and reasonable. Feasibility and reasonableness considerations include constructability, the predicted acoustic reductions provided by an abatement measure, a cost allowance, and whether the adjacent receptors desire abatement. Receptors associated with an abatement measure that achieve a noise reduction of five dB(A) or greater are called benefited receptors.

In order to be "feasible," the abatement measure must benefit a minimum of two impacted receptors AND reduce the predicted noise level by at least five dB(A) at greater than 50% of first-row impacted receptors.

In order to be "reasonable," the abatement measure must also reduce the predicted noise level by at least seven dB(A) for at least one benefited receptor (noise reduction design goal) and not exceed the standard barrier cost of 1,500 square feet per benefited receptor. In addition, an abatement measure may not be reasonable if the construction costs are unreasonably high due to site constraints, as determined through an alternate barrier cost assessment.

The following noise abatement measures were considered: traffic management, alteration of horizontal and/or vertical alignments, acquisition of undeveloped property to act as a buffer zone, and the construction of noise barriers.

**Traffic management** – Control devices could be used to reduce the speed of the traffic; however, the minor benefit of one dB(A) per five mph reduction in speed does not outweigh the associated increase in congestion and air pollution. Other measures such as time or use restrictions for certain vehicles are prohibited on state highways.

**Alteration of horizontal and/or vertical alignments** – Any alteration of the existing alignment would displace existing businesses and residences, require additional right of way and not be cost effective/reasonable.

**Buffer zone** – The acquisition of undeveloped property to act as a buffer zone is designed to avoid rather than abate traffic noise impacts and, therefore, is not feasible.

**Noise barriers** – Noise barriers in the form of noise walls are the most commonly used noise abatement measures and were considered for this project.

Noise barriers would not be feasible and reasonable for any of the following impacted receptors, and therefore, are not proposed for incorporation into the project:

*<The following are example write-ups that discuss the results of barrier analyses that were NOT feasible and/or reasonable. Instructions and additional examples can be found in Example C – Example Noise Abatement Paragraphs in ENV’s Standard Language for Documenting Traffic Noise Analyses>.*

**R1** and **R2** ‑ These receivers represent a total of 5 residences with driveways connecting to the roadway. A continuous noise barrier would restrict access to these residences. Gaps in the noise barrier would satisfy access requirements, but the resulting non-continuous wall segments would not be sufficient to achieve the minimum, feasible reduction of 5 dB(A) for a majority of impacted receptors or the noise reduction design goal of 7 dB(A).

**R5, R6,** and **R7** ‑ These receivers are separate, isolated residences, which are not associated with a neighborhood or subdivision. Because a noise abatement measure must potentially benefit a minimum of two impacted receptors, noise abatement for these locations is not feasible.

**R8** and **R9** – These receivers represent a group of six impacted receptors in the Sunnyside subdivision, with backyards adjacent to the roadway. A continuous noise barrier up to 20 feet in height, placed along the ROW would not be sufficient to benefit a majority of the impacted receptors or meet the 7 dB(A) noise reduction design goal. Therefore, a noise barrier is not proposed for this location.

**R10** and **R11** - These receivers represent 10 impacted receptors in Piney Woods neighborhood with backyards adjacent to the roadway. A continuous noise barrier 16 feet in height and approximately 1,275 feet in length was modeled along the ROW. This barrier would achieve the minimum feasible reduction of 5 dB(A) for eight receptors while meeting the 7 dB(A) noise reduction design goal at one of those receptors. However, the square footage of abatement (20,400 square feet or 2,550 square feet per benefited receptor) would exceed the reasonable, cost-reasonableness criterion of 1,500 square feet per benefited receptor.

# Proposed Abatement

Noise barriers would be feasible and reasonable for the following impacted receptors, and therefore, are proposed for incorporation into the project (**Table 3**).

*<The following is an example write-up that discuss the results of a barrier analysis that was both feasible and reasonable. Instructions and additional examples can be found in Example C – Example Noise Abatement Paragraphs in ENV’s Standard Language for Documenting Traffic Noise Analyses*

*Note that the writeup must include both a narrative description and the summary proposal table. The paragraph following the table (“statement of likelihood”) is also required.>.*

**R12** through **R15** - These receivers represent 20 residences in The Oaks subdivision with backyards that face the roadway. Eighteen of the first-row receptors have predicted traffic noise impacts. Based on preliminary calculations, a noise barrier approximately 1,920 feet in length and 10 feet in height would reduce noise levels by at least 5 dB(A) for 14 benefited receptors and meet the noise reduction design goal of 7 dB(A) for two of those receptors. With a total area of abatement of 19,200 square feet or 1,378 square feet per benefited receptor, the barrier would also be cost reasonable.

Table XX. Noise Barrier Proposal (preliminary)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Barrier** | **Representative Receivers** | **Total # Benefited** | **Length (feet)** | **Height (feet)** | **Total Sq. Ft.** | **Sq. Ft. per****Benefited Receptor** |
| 1 | R12 through R15 | 14 | 1,920 | 10 | 19,200 | 1,371 |
| 2 |  |  |  |  |  |  |

Any subsequent project design changes may require a reevaluation of this preliminary noise barrier proposal. The final decision to construct the proposed noise barrier will not be made until completion of the project design, utility evaluation, and polling of all benefited and adjacent property owners and residents.

# Noise Contours for Land Use Planning

*<Determine contours for undeveloped or vacant land uses within the corridor. It is acceptable to round to the nearest five or ten foot distance. If contour distances for multiple areas are identified, add a column to the left side of the table to identify each area. If the project corridor is fully developed, include a statement to that effect and delete rest of the section.>*

To avoid noise impacts that may result from future development of properties adjacent to the project, local officials responsible for land use control programs must ensure, to the maximum extent possible, that no new activities are planned or constructed along or within the following predicted (20XX) noise impact contours.

|  |  |  |
| --- | --- | --- |
| **Land Use** | **Impact Contour** | **Distance from Right of Way** |
| NAC category B & C | 66 dB(A) | XX feet |
| NAC category E | 71 dB(A) | XX feet |

# Construction Noise

Noise associated with the construction of the project is difficult to predict. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns. However, construction normally occurs during daylight hours when occasional loud noises are more tolerable. None of the receptors is expected to be exposed to construction noise for a long duration; therefore, any extended disruption of normal activities is not expected. Provisions will be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

# Local Official Notification and Date of Public Knowledge Statement

A copy of this traffic noise analysis will be available to local officials. On the date of the environmental decision for this project (Date of Public Knowledge), FHWA and TxDOT are no longer responsible for providing noise abatement for new development adjacent to the project.

# List of Attachments

1. Map figures

*<For instructions on preparing Map Figures, see Section 10.3 in ENV’s Traffic Noise Policy Implementation Guidance.>*

1. Traffic data
2. Existing model validation study
3. Field measurement data sheets, if new location roadway

*<See also Section 10.5.2 in ENV’s Traffic Noise Policy Implementation Guidance for other optional documentation that may be attached to this traffic noise analysis report or uploaded separately to the project file (ECOS).>*

*<Note: The traffic noise analysis report is not complete until the associated noise model files are uploaded to ECOS in a .zip file. See Section 10.5.3 in ENV’s Traffic Noise Policy Implementation Guidance for instructions on how to prepare noise model files for submittal.>*