



Delaware Department of Transportation



SR 1 Widening SR 273 to Roth Bridge

Noise Analysis Public Workshop

September 24, 2013

6:00 PM – 9:00 PM

Wilbur Elementary School

Agenda

- ▶ Project Background
- ▶ What is Noise?
- ▶ DeIDOT's Noise Policy
 - Key Definitions
 - Noise Impact
 - Noise Analysis Process
 - Noise Mitigation
 - Feasible & Reasonable
- ▶ Noise Analysis Results
- ▶ Project Next Steps
- ▶ Questions

Project Background

- ▶ Project limits:
 - North of SR 273 to Roth Bridge

- ▶ Why is this project needed?
 - Address congestion
 - Improve safety
 - Improve system connectivity
 - Improve local access to SR 1
 - Ensure emergency access & evacuation routes



What is Noise?

- ▶ Noise, as associated with roadways, is a function of traffic volume, speed & location relative to user (distance & height).



What is Noise?

COMMON INDOOR AND OUTDOOR NOISE LEVELS

Common Outdoor Noise Levels	Noise Level dBA	Common Indoor Noise Levels
	110	Rock Band
Jet Flyover at 1,000 ft.	100	Inside Subway Train (NY)
Gas Lawn Mower at 3 feet		
Diesel Truck at 50 feet	90	Food Blender at 3 feet
Noisy Urban Daytime	80	Garbage Disposal at 3' Shouting at 3 feet
Gas Lawn Mower at 100'	70	Vacuum Cleaner at 10'
Commercial Area	66	Normal Speech at 3'
	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Small Theater, Large Conference Room (Background)
		Library
Quiet Suburban Nighttime	30	
		Bedroom at Night, Concert Hall (Background)
Quiet Rural Nighttime	20	
		Broadcast & Recording Studio
	10	Threshold of Hearing
	0	

Adapted from Guide on Evaluation and Attenuation of Traffic Noise, AASHTO-1974 (revised 1993).

DelDOT's Noise Policy

▶ Key Definitions

- **Receptor** - A discrete or representative location of a noise sensitive area(s), for any of the defined land uses
- **Benefited Receptor** - The recipient of an abatement measure that receives a noise reduction at or above 9 dBA. A benefited receptor shall be classified as either an impacted receptor or a non-impacted receptor that receives a 9 dBA or greater reduction
- **Design Year** - The future year used to estimate the probable traffic volumes for which a roadway is designed
- **Common Noise Environment** - A group of receptors within the same Activity Category that are exposed to similar noise sources and levels; traffic volumes, traffic mix, and speed; and topographic features. Generally, common noise environments occur between two secondary noise sources, such as interchanges, intersections, or cross-roads



DeIDOT's Noise Policy

▶ DeIDOT's Noise Abatement Policy (Summarized)

- Complies with FHWA's Procedures for Abatement of Highway Traffic Noise and Construction Noise; Title 23 Code of Federal Regulations (CFR) Part 772.
- A noise impact is assessed and mitigation is considered, when either of the following conditions are satisfied:
 - Predicted design-year noise levels approach (defined as 1 dBA less) or exceed the FHWA noise abatement criteria, e.g., for Category B, a design-year noise level of 66 dBA; or
 - An increase of 12 dBA, or greater, over existing conditions.

DelDOT's Noise Policy

▶ FHWA's Noise Abatement Criteria

Activity Category	Activity Leq(h)	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary 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	Agriculture, 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.

DelDOT's Noise Policy

▶ Noise Analysis Process

- ✓ Identify Noise-Sensitive Land Uses
- ✓ Collect Existing Ambient Noise Data
- ✓ Develop Existing Condition Noise Model using FHWA Traffic Noise Model (TNM)
- ✓ Calibrate Model (i.e., Compare Computed to Ambient Noise Levels)
- ✓ Analyze Transportation Alternatives
- ✓ Predict Design-Year Noise Levels
- ✓ Identify Noise Impacts

Assess Mitigation Options for Feasibility / Reasonableness

DelDOT's Noise Policy

- ▶ Types of Noise Mitigation
 - Noise Barriers or Berms
 - Traffic Management Measures
 - Alteration of Horizontal or Vertical Alignments
 - Acquisition of Real Property to serve as a noise buffer zone

DeIDOT's Noise Policy

- ▶ DeIDOT policy for noise mitigation analysis requires that the mitigation be:
 - **FEASIBLE** → The combination of acoustical and engineering factors considered in the evaluation of a noise abatement measure
 - **REASONABLE** → The combination of social, economic, and environmental factors considered in the evaluation of a noise abatement measure

DelDOT's Noise Policy

▶ FEASIBLE

- Mitigation considers the following:
 - Safety conditions;
 - Barrier height;
 - Access requirements for driveways and entrances;
 - Maintenance requirements;
 - Topography;
 - Drainage;
 - Utilities;
 - Other noise sources in the area;
 - Etc.

DelDOT's Noise Policy

▶ REASONABLE

- More than 50% of the benefitted receptors want the noise mitigation
- Provides a 9 dBA noise reduction
- Noise mitigation to be cost-effective, i.e., cost not to exceed \$25,000 per benefitted residence

$$\frac{\text{Noise Mitigation Cost}}{\text{\# of Benefitted Receptors}} < \$25,000$$

Noise Analysis Results

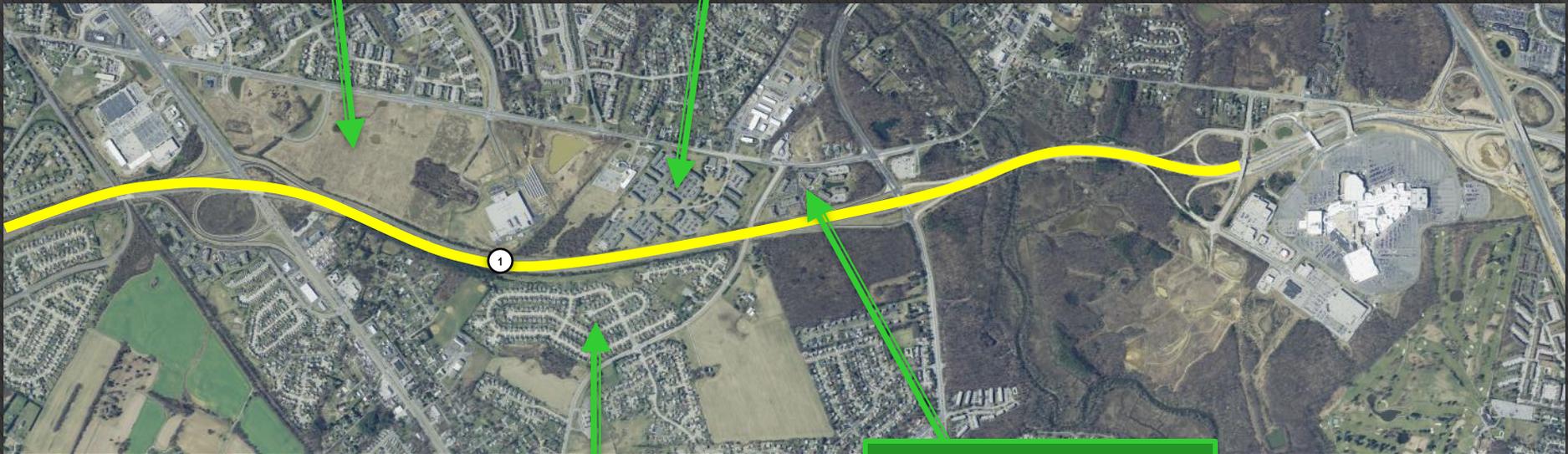
- ▶ 905 noise receptors have been analyzed
 - 255 receptors exceed the noise level criteria for the existing condition
 - 447 to 471 receptors exceed the noise level criteria for the design year future build condition, depending on the alternative

Noise Analysis Results

- ▶ Noise mitigation is considered **FEASIBLE** and **REASONABLE** for the following locations:
 - School Bell Apartments
 - Christiana Meadows Apartments
 - Whethersfield/Christiana Meadows Community
 - Proposed Lincoln Center Community

**Proposed Lincoln
Center Community**

**Christiana Meadows
Apartments**



**Whethersfield/Christiana
Meadows Community**

**School Bell
Apartments**

Project Next Steps

- ▶ Continue Public Outreach on alternatives
- ▶ Draft Environmental Document (spring 2014)
- ▶ Environmental Document Public Workshop (spring/summer 2014)
- ▶ Final Environmental Document (fall 2014)

Thank You!

Comments / Questions?