Analysis of Existing Noise Barriers on Type I Projects

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• Background
  – Encountered issue on how to analyze existing noise barriers
  – PD&E study for the Tampa Bay Express (TBX) project (adding express lanes) on I-4 in the Tampa, Florida area
QUESTION?
How do we analyze existing barriers?

23 CFR 772 does not contain guidance.

After consultation with FHWA Headquarters……..
There is guidance at:

“Consideration of Existing Noise Barriers in a Type I Noise Analysis”
• FHWA Guidance:
  – Outlines process for considering feasibility and reasonableness of replacing or improving existing noise barriers.
  – As usual, the process involves determination of existing noise levels and prediction of future noise levels associated with the project, using the state’s process.
• In general:
  – New analysis should be done for a “common noise environment/noise sensitive area”.
  – Analyze the entire “common noise environment/noise sensitive area” without the existing noise barrier using new geometry and future traffic to determine if there are new impacted receptors.
  – Insert the existing barrier to determine if it meets the requirements of the state’s noise policy (reasonableness and feasibility). Does the existing barrier work (reasonable and feasible)?
    • Yes? → Leave existing barrier in place
    • No? → Consider retrofit or replacement
FHWA recommendations:

- **Retrofitting:**
  - Extending the length of the existing barrier
    - **Feasibility** – consider only the impacted receptors behind the extension.
    - **Reasonableness** – consider only benefited receptors behind the extension (using only the square footage of the extension).
  - Extending the height of the existing barrier
    - **Feasibility** – Consider only the new impacted receptors.
    - **Reasonableness** – Consider only the new benefited receptors (using only square footage being added).
• Retrofittting (cont.)
  – Adding length and height
    • Feasibility – Consider the new impacted receptors.
    • Reasonableness – Consider the new benefited receptors (use only the square footage being added and new benefited receptors).
• **Replacement**
  – **Feasibility** – Consider *all* receptors impacted under the no barrier scenario.
  – **Reasonableness** – Consider *all* benefited receptors benefited by the new barrier (use total square footage of the new barrier).

• **Another option other than above:**
  Consider *all* impacted and benefited receptors identified for the entire noise barrier as a whole (existing + retrofitted length, height or combination)
• Concerns raised by FDOT staff/consultants:
  – Not evaluating abatement for all impacted receptors
  – Include demolition cost?
  – Amount of additional noise reduction provided
• Work with FDOT staff, Noise Task Team and several consultants
• “Refinements” to FHWA guidance
• Many iterations – “How do we best address this”?
• Some versions resulted in “formulas”
  – Too confusing for staff, consultants, and public
• Decided to keep it simple and in-line with current FDOT Noise Policy
• Adding length
• Adding height will require total replacement – For now, not including demo cost of $15/ft^2
Analysis of Existing Noise Barriers for Type 1 Projects

Analyze entire common noise environment without existing barrier to determine impacts.

- Analyze entire new common noise environments with existing noise barrier
  - Yes: New impacted receptors since previous study?
    - Yes: Do all new impacted receptors benefit from existing barrier?
      - Yes: Leave existing barrier in place
      - No: Leave existing barrier in place
    - No: Compare the results of the "no barrier" with "existing barrier"
  - No: Leave existing barrier in place

- Analyze a retrofit or replacement barrier
*A minimum reduction of 5 dB(A)*

1. A new common noise environment includes activity categories existing at the time of the original noise study plus new one permitted/constructed since.

2. Lengthening the existing barrier:
   a. Feasibility — consider only impacted receptors behind the length extension.
   b. Reasonableness — consider only benefited receptors behind the length extension.
   c. For cost reasonableness calculation — use only the square footage being added (considering only the benefited receptors behind the extension).

3. Increasing the height (if only an increase in height is required, consider total replacement of the barrier)
   a. Feasibility and Reasonableness — consider the barrier as a whole for reasonableness and feasibility determination. Consider all benefited receptors for the entire noise barrier.
   b. For cost reasonableness calculation — use the total square footage of the replacement barrier and all benefited receptors.

4. Lengthening and increasing the height — Use the same considerations as for (3) above.
• Evolving process, will change over time
• Likely to encounter situations not yet addressed
• No final decision on inclusion of demo cost
Thank You!

Questions?