



Center for Environmental Excellence

Traffic Noise Practitioner's Summit

June 27-28, 2018

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Introduction

The second AASHTO Noise Working Group Summit occurred June 27-28, 2018 at the National Academies of Science – Room 125, 2101 Constitution Ave. NW, Washington, DC. There were 33 attendees including 28 state DOT officials, one FHWA official, two AASHTO representatives, and two consultants who facilitated the meeting. This document summarizes the conference proceedings. Participant presentations, an attendee list, and the agenda are included in the appendices. The format of the report shows each session and associated topics followed by notes about each topic with associated questions and comments.

Session One: Analyses

Moderator: Mariano Berrios, Florida DOT

Time Slot	Topic	Speaker
2:05 pm - 2:30 pm	Measurement and Validation	Panel Discussion: Ken Polcak, <i>Maryland DOT</i> Adam Alexander, <i>Gannett Fleming</i> Noel Alcala, <i>Ohio DOT</i>
2:30 pm - 2:45 pm	Time Saving Workflows in TNM 2.5 and 3.0	Ivan Racic, <i>Arizona DOT</i>
2:45 pm - 3:00 pm	Noise Impact Analysis Where There Are Existing Noise Walls	Mariano Berrios, <i>Florida DOT</i> Jim Ponticello, <i>Virginia DOT</i>
3:00 pm - 3:15 pm	Activity Category C Analysis	Mariano Berrios, <i>Florida DOT</i>
3:15 pm - 3:25 pm	Optimum Wall Height	Noel Alcala, <i>Ohio DOT</i>
3:25 pm - 3:35 pm	Absorptive vs Reflective Walls	Noel Alcala, <i>Ohio DOT</i>
3:35pm - 3:45 pm	Q & A	Group
3:45pm - 4:00 pm	Break	

Measurement and Validation

Noel Alcala, Adam Alexander, and Ken Polcak

Noel Alcala presented on an approach by Ohio DOT to establish measurement times of 10 minutes based on comparing 10-minute and 15-minute Leq's from 200 measurements and finding a difference of 0.26 dB for arterials and interstates. Ohio DOT believes that this will allow them to be more efficient and take measurements at additional sites.

Adam Alexander discussed the thought process behind the validation requirement in 23 CFR 772 and cautioned against using fixed approaches to taking noise measurements on projects. Adam referenced a table in FHWA's

“Measurement of Highway Related Noise” that advises adjustments to measurement duration based on traffic flow.

Ken Polcak agreed with Adam’s concerns about measurement duration and said that Maryland DOT takes traffic flow into account when considering duration. He also discussed using a more limited approach to measurements and, at times, eliminating validation on projects with mixed development and little chance for noise abatement.

Questions and Comments

1. How do you select sites for noise measurements?

A key issue with site selection is to consider all factors of the site including the pavement type. Maryland DOT uses the existing pavement in the model rather than TNM average. There are no perfect sites. We need to pick sites that are representative of the project but may need to validate sites. Even for sites that are not validated, FHWA guidance includes recommendations to explain why a site can not be validated rather than continue trying to validate a site. This approach acknowledges that TNM cannot account for everything in the project environment. Try to select representative sites and avoid locations where the pavement is not failing because the site is unlikely to be validated. Jay Waldschmidt pointed out that even if a site is not validated the guidance allows for users to explain why the model does not validate the site.

2. Has any state ever had a model not be validated by the measurements and discovered an error in the model?

Jay indicated that he thinks validation is a complete waste of time because noise analysts will know if the numbers are right. Carole indicated that she finds validation to be important to do up front because it helps identify problems early in the process and avoids finding problems late in the process. Mariano said that validation also helps with citizens and public involvement. Rose raised the issue that validation is something that the public does not understand because they do not understand the purpose of it. Adam discussed the thinking on why FHWA added the validation requirement in the regulation. It was to ensure field views happened and that analysts had the opportunity to identify other sources.

3. Ken raised the point that the most common issues they find are meteorological issues. The specific issue is with distant measurements during upwind or downwind conditions.

4. What was the process Maryland DOT used to get permission to not take validation measurements for some projects? What advice do you have for other states who want to pursue this?

Ken said Maryland DOT worked through the division office and provided technical reasons why some projects did not need validation. The key factors were projects where abatement was unlikely and would be difficult to validate and projects where the difference between existing and build were so great that validation would be irrelevant. Related more to the proposed changes rather than the class of action. Advice: based it on traffic operations and physical changes.

5. Under what circumstances is it appropriate to conduct long-term monitoring?

- a. A project with a rail component where it was necessary to capture rail activity or when there is other unusual background noise
 - b. Controversial projects
 - c. Maryland DOT uses a diurnal spreadsheet to determine loudest hour based on hourly traffic volumes looking at differences in noise level from hour to hour. Uses long-term for assessing Type II program
6. Adam discussed FHWA research to help states identify the loudest noise hour on any roadway segment.

Time Saving Workflows in TNM 2.5 and 3.0

Ivan Racic

Ivan discussed using TNM 3.0 to perform screening-level analysis for public involvement, LPA projects, and to get initial assessment of potential noise impacts, including Tier 1 level of analyses. The GIS functionality in TNM 3.0 facilitates this approach and has resulted in a much faster analysis process. The model thereby established in TNM 3.0 can be exported to TNM 2.5 so that the final noise studies are done in TNM 2.5. Its visual representation of the project area has a potential to significantly streamline the noise analysis process. The module also discussed including median barriers in TNM 3.0 screening analysis. The recommendation is: if you use a median barrier, you also account for single-barrier reflections since the single-barrier reflections calculation is built into the software.

Noise Impact Analysis Where There Are Existing Noise Walls

Mariano Berrios and Jim Ponticello

Mariano outlined the Florida DOT process for consideration of existing noise barriers on new projects. The presentation provides a summary of the process.

Jim discussed Virginia DOT's approach, which is consistent with Florida DOT's. Two scenarios are evaluated:

1. When an existing barrier is not physically impacted by the project – evaluate the existing barrier to make sure it is still feasible and reasonable. If it is, the evaluation is complete. If it is not feasible and reasonable, Virginia DOT would only test feasibility and reasonability on any additional barrier/benefited receptors assessed with the project.
2. When an existing barrier is impacted by the project – the replacement barrier must provide the same amount of protection as the original barrier. Feasibility and reasonability evaluation is for any new barrier/receptors. At a minimum, Virginia DOT will reconstruct the barrier that was torn down.

Questions and Comments

1. **How do you explain the procedure and show NSAs on Public maps and how do you show noise barrier?**
Still working to develop the process
2. **Do you include the demolition cost of the noise wall in the reasonableness calculation?**
 - a. Mariano – Florida DOT is still working this out
 - b. Jim – Virginia DOT has removed consideration of a demolition factor from the policy.
3. **Has Virginia had many projects where they've had to deal with existing noise barriers?**
Yes

Activity Category C Analysis

Mariano Berrios

The presentation provides an overview of Florida DOT's Activity Category C analysis process. The processes resemble approaches provided in fact sheets by FHWA.

Questions and Comments

1. Jay is concerned about using a pool as an example because of how it could be counted.
2. Ken said that Maryland DOT uses a similar approach to what Mariano described, but wanted to explain that when there are usage assumptions they want to use general numbers rather than trying to get detailed use from the owner. The goal is to give a realistic, yet conservative (i.e. more generous) accounting of usage intensity and/or duration, thereby minimizing the likelihood of the data numbers being challenged.
3. Mariano explained that Florida DOT contacts the facility owner for usage data, but that the owners often do not have this information.

Optimum Wall Height

Noel Alcala

The presentation provides an overview of Ohio DOT's approach to barrier design selection. The approach is based on a preference for barriers in the height range of 14 to 16 feet.

Questions and Comments

1. Which barrier design do you pick?

- Mariano indicated that Florida DOT chooses the feasible/reasonable barrier design with the highest average insertion loss.
2. Carole noted that Oregon DOT is concerned with barriers that are close to adjacent homes and may dominate the back yards.
 3. Adam pointed out that Ohio DOT's approach seems arbitrary since Ohio DOT has no guidance on barrier optimization and design.

Absorptive vs Reflective Walls

Noel Alcala

The presentation summarizes Ohio DOT's approach to selecting surface type.

In general, Ohio DOT uses reflective barriers.

Questions and Comments

1. Does Ohio DOT use reflective barriers in all circumstances when the opposite side of the highway is undeveloped?

No. Ohio DOT will use absorptive barriers if the opposite side of the highway has a building permit for a noise sensitive area and in accordance with absorptive barrier criteria in ODOT's Noise Manual.

2. Jim noted that Virginia DOT specifies use of absorptive barriers for all projects.

3. Carole noted that Oregon DOT has concerns about maintenance and cost of absorptive barriers.

4. Ivan noted that according to the 2010 FHWA Noise Barrier Inventory concrete barriers cost approximately \$2 more per square foot than absorptive barriers.

Session Two: After Impact and Abatement Analyses

Time Slot	Topic	Speaker
4:00 pm - 4:30 pm	Report Templates	Rose Waldman, <i>Colorado DOT</i> Jay Waldschmidt, <i>Wisconsin DOT</i>
4:30 pm - 4:50 pm	Citizen Education: What Walls Can Do/Not Do	Adam Alexander, <i>Gannett Fleming</i>
4:50 pm - 5:00 pm	Timing of Benefited Receptor Surveys	Carole Newwine, <i>Oregon DOT</i>
5:00 pm - 5:10 pm	Noise Consultant Qualifications	Carole Newwine, <i>Oregon DOT</i>
5:10 pm - 5:30 pm	Improving Tech Transfer, Training, Recruiting	Carole Newwine, <i>Oregon DOT</i>
5:30pm - 6:00 pm	Q&A	Group
7:00 pm	Dinner - State Street Plaza Hotel: Diplomat Room	

Report Templates

Rose Waldman and Jay Waldschmidt

See the [Traffic Noise Summit](#) website for details. Rose stated that this is a new process that the Colorado DOT are in the process of implementing. Templates at Wisconsin DOT are a longstanding approach for all disciplines. The templates allow them to provide the appropriate level of analysis for the class of action with narrative analysis only happening for EIS projects. Jay also noted that Wisconsin does not allow for context-sensitive solutions unless there is another law mandating it.

Comments and Questions

1. For Jay, what about historic bridges?

Historic bridges are covered under Context Sensitive Solutions because they are covered under another law.

2. Ahmed El-Assar (Gannett Fleming) noted that there is an unpublished FHWA document that includes templates for noise reports.

Citizen Education: What Walls Can Do/Not Do

Adam Alexander

See the [Traffic Noise Summit](#) website for details. Note that this presentation includes a simple audio demo of highway noise with and without a barrier to show a simplified approach to public involvement demonstrations. The presentation also includes a demonstration of the Interactive Sound Expert (ISE), which replaced the Interactive Sound Information System (ISIS).

Questions and Comments

1. Jay noted that citizens complain that noise barriers can hide the side walk and especially kids walking back from school.

Timing of Benefited Receptors Survey/Noise Consultant Qualifications/Improving Tech Transfer, Training, and Recruiting

Carole Newvine

Surveys

Carole cautioned that the timing of voting is critical. Voting early is a problem because there may be changes in design and in property ownership. Voting late may affect flexibility and result in threats to project schedule; and may also negatively impact the public involvement process. Carole also discussed the statement of likelihood and the potential for reversals of decisions in NEPA. She said it is unlikely to happen.

Carole provided a case study for the public involvement process, outlining how to talk to the public about who benefits from abatement and who gets to vote.

Consultant Prequal

Carole discussed the requirements for prequalification and stressed that the person who signs the report must be a PE with Oregon and work full

time for the same firm as the noise analyst. Consultants must have a QA/QC process, senior reviewers, discuss whether they have a mentoring program, and discuss a documented QA/QC program.

Tech Transfer

Carole discussed the need for technology and information sharing among states.

Questions and Comments

1. Ken discussed his process to transfer information and maintain institutional knowledge in advance of his retirement. The process includes digital scanning and archiving of tech noise reports and environmental documents and assembling a summary of report of 40 years of noise analysis, abatement and Policy activity in Maryland.

2. Mariano noted that the potential employment pool is very small, and experts will be attracted by consultants for more pay. He suggested that states hire young talent and train them. Cost of living and hiring to work for DOT.
3. Rose discussed her hiring experience in Colorado DOT and how she had no noise-related experience, but her recommendation is to have as many templates to help new hires.
4. Dan said he had no direct experience, so it was important to have peer exchange. Kate had a similar experience at Pennsylvania DOT but did have help from her predecessor who gave her examples of good and bad reports.

Session Three: Process and Efficiency

Moderator: Charles Bernhard, Iowa DOT

Time Slot	Topic	Speaker
7:30 am - 8:30 am	Breakfast in Meeting Room	
8:00 am - 8:20 am	Screening Criteria Policy	Charles Bernhard, <i>Iowa DOT</i> Ivan Racic, <i>Arizona DOT</i>
8:20 am - 8:35 am	FHWA Low Volume Road Tool Demo and Policy Implications	Adam Alexander, <i>Gannett Fleming</i>
8:35 am - 8:50 am	Federal Type II Programs	Noel Alcala, <i>Ohio DOT</i> Ken Polcak, <i>Maryland DOT</i>
8:50 am - 9:10 am	Part-time Shoulder Use	Panel Discussion: Adam Alexander, <i>Gannett Fleming</i> Jim Laughlin, <i>Washington DOT</i> (via conference line) Rose Waldman, <i>Colorado DOT</i> Martin Dougherty, <i>West Virginia DOT</i>
9:10 am - 9:30 am	Proposed Regulation Changes	Panel Discussion: Charles Bernhard, <i>Iowa DOT</i> Carole Newvine, <i>Oregon DOT</i>
9:30 am - 9:45 am	Q & A	Group
9:45 am - 10:00 am	Break	

Screening Criteria Policy

Charles Bernhard and Ivan Racic

The [Traffic Noise Summit](#) website provides an overview of Charles's presentation. The key issues are that the screening procedure must be in the approved policy and that it identifies impacts. The presentation provides the details of the Idaho screening procedure as an example.

Ivan discussed using TNM 3.0 as a screening tool. It is easy to use and allows you to build a quick model of the project environment.

Questions and Comments

1. What you consider lower volume?

A project that causes no impacts.

FHWA Low Volume Road Tool Demo and Policy Implications

Adam Alexander

See the presentation on the [Traffic Noise Summit](#) website for a PowerPoint version of the live demonstration of the FHWA Low Volume Noise Calculation Tool.

Questions and Comments

1. Can you change the 5 dB?

No, you cannot, but you can manually do it depending on each state criteria.

2. Is there a print function or print screen?

Print screen.

3. Is the tool final?

Aileen said it is not final yet.

4. What is low volume?

The idea is to do them as a type 3 list, there is no limit on volume.

5. How is conversion done from Hourly to 24-hour?

Check with Volpe.

6. Can TNM 3.0 be used for screening since tool is related to TNM 3.0?

Check with FHWA.

Federal Type II Programs

Noel Alcalá and Ken Polcak

The presentation provides detailed information about the Ohio DOT Type II program.

Ken discussed the origin of the Maryland DOT Type II program. At the height of the program they spent \$8-10M per year on barriers. Projects were subject to availability of funding. Projects, as a matter of official policy, have always been subject to available funding.” The next-to-last sentence should read; “Voting occurs immediately prior to initiating design for the project; there is a local cost share requirement of 20%, and eligible jurisdictions and counties must have noise compatible land use regulations in effect. All projects on the original list are complete and they have done about a dozen additional projects. Voting occurs immediately prior to initiating engineering for the project; there is a local cost share of 20% and noise compatible land use legislation. Five counties meet the requirements.

Noel Alcalá presented Ohio DOT’s Type II Program and process.

Questions and Comments

1. Do you ballot?

We get signature from first couple of rows.

2. Is the analysis the same as Type I?

Yes.

3. How do you do first come first serve?

We dropped ranking program and prioritize analysis.

4. Do you look at all land use categories in the project area?

Yes.

5. Where is funding for Type II?

It is allocated from the state.

6. How do you want if you approached by the City and not the community?

We prefer community to be fair to everyone.

7. Does 772 has language?

We didn’t do the analysis to get a ranking list.

Part-time Shoulder Use

Adam Alexander, Jim Laughlin (via conference line), Rose Waldman, and Martin Dougherty

Adam presented the background information on the FHWA “Part-Time Shoulder Use Guidance.” Parts of the guidance are consistent with the regulation, but the guidance also discusses qualitative analysis, which is not defined in the noise regulation or noise guidance. He also provided some examples of projects in North Carolina, Atlanta, and northern Virginia. A strategy to consider is to focus on activities that occur outside the loudest hour to reduce the need for analysis.

Jim discussed how Washington State DOT came to include part-time shoulder use in the state noise policy, and the details of the policy. There are three tiers for static shoulder use, dynamic shoulder use, and transit-bus-only shoulder use. The first two tiers are Type I if on the right shoulder, and Type III if on the left shoulder. Transit bus use requires a qualitative analysis.

Rose discussed two Colorado DOT projects that do or will use the shoulder on dynamically-tolled, managed roads. Originally, the eastbound project allowed use of the shoulder a maximum of 3.5% of the time, but the limit was gradually increased to a maximum of 100 days per year. The eastbound shoulder is on the inside and the westbound shoulder will be on the inside. The westbound project has an existing noise wall that might be demolished and replaced. The eastbound project was determined to be Type III. Despite increasing the use constraints, the westbound project was also determined to be Type III.

Martin indicated that West Virginia DOT emphasizes widening to the inside on an interstate. They do not have partial shoulder use because the shoulders are narrow.

Proposed Regulation Changes

Charles Bernhard and Carole Newwine

Carole suggested the following changes to the regulation:

1. FHWA guidance on consideration of existing noise barriers: FHWA guidance suggests analysis of existing noise barriers on projects because the improvements with the new abatement design may not be perceptible. She is concerned that they may tear down effective noise barriers and replace them with barriers that are not much better.

2. Give consideration for property owners who are impacted, but do not benefit from abatement, to vote.
3. Eliminate the requirement that if part of a project is Type I the entire project is Type I.

Questions and Comments

1. Most of the discussion was about item 3 above.

There is consensus among the group that it would be best to change the regulation to only conduct noise analysis for the Type I portion of the project. There was discussion that you can separate the project into the Type I portions and Type III portions, and others if you can demonstrate independent utility. It was acknowledged that this approach does not work in all cases.

2. What is the history of the 7dB design criteria?

This came about due to comments in the Notice of Proposed Rulemaking (NPRM) for 23 CFR 772 that a 5dB reduction for feasibility was not a substantial decrease. The recommendation was to use a higher value. This comment in combination with others requesting that the final rule make it easier to get abatement than the NPRM lead to the idea of the higher reduction requirement for benefited receptors, but that it could apply to as few as one receptor.

Session Four: Mitigation and Items Beyond 772

Moderator: Noel Alcala, Ohio DOT

Time Slot	Topic	Speaker
10:00 am - 10:15 am	Processes DOTs Use for Noise Wall Final Design	Noel Alcala, <i>Ohio DOT</i> Carole Newwine, <i>Oregon DOT</i>
10:10 am - 10:45 am	Design Build Noise Studies – Implementation and Challenges	Panel Discussion: Mariano Berrios, <i>Florida DOT</i> Noel Alcala, <i>Ohio DOT</i> Jim Ponticello, <i>Virginia DOT</i> Matt Burcham, <i>Missouri DOT</i>
10:45 am - 11:00 am	Innovative Highway Noise Mitigation Techniques	Panel Discussion: Bruce Rymer, <i>CalTrans</i> Ken Polcak, <i>Maryland DOT</i> Adam Alexander, <i>Gannett Fleming</i> Charles Bernhard, <i>Iowa DOT</i>
11:00 am - 11:30 am	Barrier Maintenance and Inventories; Noise Wall Inspection Procedures	Panel Discussion: Noel Alcala, <i>Ohio DOT</i> Ken Polcak, <i>Maryland DOT</i> Adam Alexander, <i>Gannett Fleming</i>
10:00 am - 10:15 am	Q&A	Group

Questions and Comments

1. **Are overlaps the typical method Ohio DOT uses for access (see slide 11)?**
Ohio DOT uses doors. The overlap is for drainage rather than access.
2. **Does Oregon DOT count receptors that are benefited but not impacted in the cost benefit analysis?**
Yes.

Design Build Noise Studies — Implementation and Challenges

Mariano Berrios, Noel Alcalá, Jim Ponticello, and Matt Burcham

Noel gave a presentation on Ohio DOT's experience with design build. The last design build barrier in Ohio was in 2015. Noel covered lessons learned in his presentation.

Jim said that Virginia DOT typically completes NEPA prior to giving the documents to the Design Build Team (DBT).

Jim also discussed how their approach differs somewhat from the requirements in 772 that the final design be based on noise preliminary analysis. They base noise abatement on final plans design for the project. DB contractors tend to make changes not to build a wall. Another issue to look out for is when the DBT goes with minimum reductions rather than optimizing the barrier. The DBT relies on preliminary analysis and sometimes it is done quickly during NEPA. This may not leave time for adequate review. The contractors will be reimbursed for the additional noise barrier costs. DBTs try to sneak in costs related to engineering.

Mariano said that DBTs try to make engineering changes that try to eliminate noise barriers. Florida DOT sees conflict of interested in the DBTs performing noise studies, but Florida DOT changed their mind. Florida DOT and FHWA have agreed to a memo: if re-evaluation results in identification of additional receptors, DB will build it as long it is feasible and reasonable. If changes result in less noise, Florida DOT will build the wall based on preliminary changes based on interpretation of the regulation.

Matt said that Missouri DOT relies on a risk assessment, the NEPA documents, and statement of likelihood.

1. **Who has specifications for DB?**
Maryland DOT provides information about the barrier design requirements.
2. **Missy said that North Carolina DOT does the design noise report (DNR) and gives it to the DBT, and the DBT will do final analysis.**
North Carolina DOT process changes to only do DNR by DBT (no duplication), DBT will reply on TNR. North Carolina DOT might change policy to be like Virginia DOT (more or less).
3. Adam discussed that design build is a good approach for standalone noise barriers such as Type II, but it is critical that you provide as much information as you can to the DBT, such as soil data along ROW.
4. **Jim said that Virginia DOT usually finishes NEPA prior to handing things over the DBT and they provide them with the preliminary design.**
Even with the provision to pay for additional barriers the contractor is incentivized to reduce noise walls if possible because the additional payments do not cover all costs of noise barriers.

Innovative Highway Noise Mitigation Techniques

Bruce Rymer, Ken Polcak, Adam Alexander, and Charles Bernhard

Questions and Comments

1. **Adam said that real innovation will require regulatory change because the abatement alternatives are not able to achieve 7 dB.**
Maybe the use of quiet pavement if you have marginal impacts and target reductions that eliminate impacts rather than trying to get a substantial decrease. The present approach to noise abatement focuses on mitigation rather than minimization and avoidance.
2. **Ken suggests impact avoidance by making engineering changes (i.e. traffic barrier instead of guard rail) that could reduce/avoid impacts by lowering below 66 dB.**
Design builders would like to use innovative approaches to avoidance. Jay indicated that Wisconsin DOT used excessive waste to build berms to reduce sound levels below impact thresholds to avoid impacts.

3. **Bruce suggested using quieter pavement to minimize sound level mitigation and Caltrans has conducted longevity testing, but it is still performing the same.**

Adam said that pavement is a concern because states said they do not want to replace pavement because of noise increases in federal register comments. The pavement type is an environmental commitment that states may not want to maintain.

4. Bruce is discussing Beamforming and discussed the NCHRP study related to the sources from HT, showing noise is related to lower portion of the truck and not the stack as modeled in TNM.

5. **Bruce discussed the road map for quieter pavement that was developed by Caltrans.**

Caltrans has also completed a lot of research into quieter pavements and other methods to reduce noise on projects. Examples include quieter bridge joints and use of transverse PCC on bridge decks. Bruce also plans to do noise mapping to identify noise hot spots.

6. **Ahmed reminded everyone that there are regional differences in the US that limit use of quiet pavements.**

Marie said that New Jersey tried quieter pavements and it was a bust.

7. Bruce mentioned Florida DOT using Open Graded Asphalt that can be super absorptive and provides 6-7 dBA roadside.

8. Ivan mentioned an Arizona DOT report that stated that the quiet pavements lose approximately 0.5dB reduction/year and provide the most reduction in lower frequencies.

Barrier Maintenance and Inventories; Noise Wall Inspection Procedures

Noel Alcala, Ken Polcak, and Adam Alexander

Noel gave a presentation covering the Ohio DOT maintenance and inspection process. Ohio DOT has an inventory application. The presentation includes images of several damaged noise barriers from vehicle strikes, trees, and surface degradation.

Ken talked about how the Maryland DOT noise team is divided into two teams and one of them takes care of post construction issues. The Highway Design Division oversees noise barrier inspection and maintenance..

Adam discussed how to do inventory and inspection at the same time using technology such as ArcGIS Collector and similar tools.

Questions and Comments

1. Who does the inspection?

- Noel and office of maintenance and concrete inspectors
- 2. William said that Maryland DOT ties inspection to noise study technical reports.
- 3. Mariano said that Florida DOT created a GIS database of noise barrier locations.
- 4. Bruce said that Caltrans are updating their inventory tool.

Session 5: Traffic Noise Research Roadmap

Facilitator: Adam Alexander

Adam presented on current research. The presentation shows current national work that is ongoing or recently completed. Research projects that are not listed in the presentation are:

- 1. NCHRP 25-25 Task 106 National Synthesis of Highway Noise Effects on Historic Properties and Effective Mitigation Practices
- 2. NCHRP 15-68 on rumble strips

Questions and Comments

1. The group discussed possible research.

- Melissa discussed the AASHTO contract for the Center for Environmental Excellence and indicated that the Center may be able to add some of the projects such as the practitioner handbook to the Center workplan.
- 2. **Adam, what is the process for AASHTO ware?**
Melissa, the AASHTO ware committee determine which product to maintain and if it is possible to host RCNM 2.0.

3. Jay, Wisconsin DOT is doing very little research. What about opportunity for a pool fund?
4. **Missy, has been looking for a computer tool to manage noise balloting.** Is it possible to automatically collect balloting? Florida DOT has talked about doing it electronically. No one is doing electronic balloting. Potential for manipulation. Florida DOT suggested a synthesis for how each state performs balloting. Chris was wondered if email is good for the environmental justice community. Michelle suggested development of an app.
5. Bruce suggested hydro-acoustics and additional research to change threshold for noise and if anyone is interested, so far, no interest.
6. Jay wants to know if there is a de minimis impact threshold on aquatic life.
7. **Ken suggested taking a synthesis approach to bring together the many various studies that exist involving impacts to both freshwater and saltwater species, and including test equipment usage.**
There is a Transportation Pooled Fund and synthesis by Washington State DOT. Discussion about trying to use equipment (i.e. type of hammer) and conduct a study to determine SEL and take distance into account. Jon says Maine DOT (Eric Hamp) might develop something. Michelle said a Programmatic Agreement (PA) between North Carolina DOT, South Carolina DOT and Georgia DOT with NOAA Marine Fisheries Service to develop minimum and high level from pile driving impact.
8. Volunteers will be determined by Noel at the next workgroup meeting for hydro acoustics.
9. **Will, Nebraska DOT inquired about a noise canceling technique Caltrans did research on a few years ago.**
Adam and Bruce doubt the feasibility of such technology. Pennsylvania DOT experience has been that the technology is expensive and ineffective.
10. **William is asked about electric cars and conducting noise measurements.**
NHITSA worked with Volpe to determine the minimum sound level not to affect blind. It was determined that 16 mph is the lower threshold where indistinguishable. Platoons and automated of HT effect on noise levels.

- 11. Missy asked about how to model engine compression braking.**
Montana had it for a year and rescinded it. Jay is suggested the possibility of checking operation of engine compression braking but Wisconsin DOT didn't like it. Jon said that in New Hampshire mufflers are heavily modified, it is an enforcement issue. It should be enforced by FMCA.
- 12. Jay raised the issue of working with people with limited language proficiency and how we do a better job communicating to people who do not speak English during public involvement.**
Missy said that North Carolina DOT includes Spanish contact information. Marie said that New Jersey DOT provides translators for the appropriate language groups. They provide a phone number for people to call. Jay is concerned that the people speaking a foreign language will not understand the noise jargon. Marie made the point that there shouldn't be any jargon because even native speakers won't understand it. Michelle (SC FHWA) discussed federal requirements for public involvement and South Carolina DOT's tools for outreach. Making reports OCR text recognizable is critical to ensuring the reports can be translated into other languages. An issue is that our terms of art have specific meaning to noise practitioners that may be open to interpretation to laypersons.
- 13. Jim is interested low noise pavement but said Virginia DOT cannot do 10-year program.**
He suggested a synthesis for literature review on low noise pavement. Volpe has two reports out and there is plenty of material available. It could be another study to collected how the public and private sectors collect data and assess by climate and region. Jim suggests FHWA take this approach and lead on quiet pavement. Synthesis of low noise pavement effectiveness and evaluation.
- 14. Jay asked whether other states do hot spot CO analysis.**
Virginia DOT and Colorado DOT, do it for conformity.
- 15. Noel said that the three rejected problem statements were resubmitted for the new cycle.**
Martin encouraged everyone to get to know the research coordinators at their state and to participate on NCHRP panels. Missy said that their office of research reaches out to staff about panel participation. Ahmed recommended that anyone who is interested should sign up for the TRB Newsletter and the information is also in there.

- 16. Charles said that Iowa DOT is interested in developing a Type II program but needs to do a cost analysis to get an idea of the cost impact. Also wanted advice on developing a prioritization program.**

Ken said that these issues have been a continuing concern at Maryland DOT. Adam suggested contacting Tennessee DOT to get information about development of a Type II program. Jon said that they used a similar approach to what Tennessee DOT used for their Type II program to use Date of Development as a reasonableness criterion. Wisconsin also investigated starting a Type II program and developed ranking criteria weighted to most strongly consider the noise level; also considered date of development and other factors. The program eventually lost funding.

- 17. Charles asked whether FHWA has a technical person or have plans to hire a technical person.**

Adam explained the current FHWA staffing among headquarters and resource center staff. He explained that he does not know when FHWA plans to fill the noise lead position or the skillset they are targeting for that hire.

Ideas

- 1. Missy suggested a tool for barrier inventory, seconded by Pennsylvania DOT.**

Jay recommended a literature review on how states have been doing their inventory to provide examples for other states to choose.

- 2. Missy also suggested a picture library of the noise practitioners, so they can all remember who is who next time.**

Appendix A

Submitted Questions

Participants had the opportunity to submit questions for group response. The questions and associated answers are provided on the table below.

Question	Response
Session One: Analyses	
Has VIRGINIA DOT replaced barriers impacted by a project that did not meet its current policy? If so, did you use federal funds?	Jim said they will replace the barrier even if it does not meet F&R because they are required to maintain the barrier in perpetuity. He noted that there have been cases where the land use changed behind the wall and it was no longer necessary, so they did not rebuild the wall.
Is there any experience when common noise environment change the cost benefit determination of a wall?	Yes, this has happened in Wisconsin and Maryland. Maryland is considering removing it or modifying it in the policy. Other states have mixed experience and it requires buy in from senior managers. Jim (VIRGINIA DOT) noted that they will look at partial mitigation to see if they can optimize the barrier for a portion of a NSA.
For Jay: Do you have a template for EA language and for EIS language?	Yes. There are basic sheets for use with documented CE's and EA's. For EIS reports they use a lot of standard language in the narrative report.
Validation: should it go more with the number of cars? Just high vs. low? How many categories/slots?	Maryland DOT counts all five categories of TNM vehicles and considers traffic flow with respect to duration. Determining a valid average speed is probably the most difficult variable to determine. Ohio DOT only counts vehicle categories A, B and C and uses the posted speed for validation
Validation: How many locations need to be measured? What is the range?	The number of measurements is project specific and depends on the density of development in the project corridor. Would skew to have more measurements in locations where noise abatement is likely.
Validation: how often should one location be measured; once, twice, usually one or the other?	One repetition per site but, may repeat if the results do not look right.
How many validation measurements will be enough for a 1 to 2-mile-long project in an urban area?	ODOT divides the project into Noise Study Areas (NSAs) and takes 3 measurements per NSA with one or two in the front row. Maryland DOT takes a similar approach
Do you show your validation results in the report?	Yes
With respect to equivalent receptors, some playground, ball fields, etc., sometimes want visual exposure to the road. Has anyone just asked the owner to see if they want abatement before doing an analysis to save time and then documenting their decision with a letter, agreement, MOU, etc.?	States reported that they have used this approach and got prior concurrence that the owner of the facility did not want a noise barrier. Ken cautioned that you better be prepared to build a barrier if you do ask the owner if they are interested in getting a barrier. Will (Maryland DOT) said that some owners decline barriers as part of initial discussions. Mariano cautioned about getting inflated use data from owners who want abatement. This can result in conflicts among those who do or do not get abatement.
Are there special requirements to mitigate EJ communities?	The presence of EJ communities may result in focused public involvement activities such as additional languages and meeting location, but the abatement determination process remains the same. The key issue is that everyone can make an informed decision.
See Response Column	General Comment: In MnDOT we are now requiring noise consultants to conduct a QA/QC checklist to prevent errors in modeling/reporting thus reducing the need for extensive noise model and project review. Also, this provides us with a means to hold person/staff accountable (two people review the model/report).

Question	Response
Is a realignment where the new alignment is not contiguous to the original alignment considered a new road (thus Type I project)? (includes a diagram that looks like a capital letter D on its side.	The example does not look like a new alignment project. This is something that can be project specific.
Is the validation process separate from noise screening?	Yes

Session Two: After Impact and Abatement Analyses

Where are appropriate places to advertise nationally for a noise position? TRB? AASHTO? Air & Waste Management? Others?	Women in Transportation, ADC40, INCE, Acoustical Society of America, university planning programs, LinkedIn, talk to consultants you know, get interns
Regarding voting; this happened in NC: the number of benefited receptors as disclosed in a Design Noise Report was reduced by the time we were ready to go to ballot because two mobile homes had been removed from two parcels. This changed the cost effectiveness math and the wall no longer met the criteria. Have other states had this experience? Did they use the design noise report numbers or the actual number at the time of balloting?	In this case, the owners had moved their trailers from the property. This was an unusual situation with multiple trailers on a single-family lot. Rose raised the issue that this could be a factor with the tiny house movement. For trailer parks, the consensus was to treat the lots as occupied.
Who gets to vote for Category C?	The owner of the facility
Are sites on Activity Category D if it a Category C but does not have a frequent outdoor human use area? Would you only not consider insulation at a school with a playground or would only consider insulation if it is not possible to build a feasible/reasonable wall?	You would only consider the interior if it is not possible to build a feasible/ reasonable wall.
How many states have set cost-effectiveness criteria for Cat C/E land use that differs from A/B?	None

Session Three: Process and Efficiency

Can you skip measurements and assume impacts to skip to feasible/reasonable criteria? (most instances reasonableness and feasibility will not be met, and a wall/barrier would not be required)	Possibly, but you must quantify impacts from the project
What is the difference between a screening process and a programmatic agreement like GF is working on for NC?	A screening procedure looks at each project while a PA provides a finding that if a project falls within parameters defined in the agreement the project does not require any analysis. There was additional discussion about the specifics of the analysis and the potential for a PA to be shared by other states. There was an explanation of the analysis. The FHWA maintains a programmatic agreement clearing house, so a PA will be posted there for other states to access and use as appropriate. There was interest in using a lower degree of conservatism than 5dB, which is the common approach, but further studies show that 3dB is appropriate.

Question	Response
<p>For WashDOT: If we add a general-purpose lane to the inside shoulder we categorize this as a Type I project. Why is use of an inside shoulder not Type I, but an outside shoulder is? What is the reasoning?</p>	<p>Putting traffic on the outside shoulder may move travel lanes closest to the nearest receptor; it depends on the if the alignment of the road is shifting. If the alignment doesn't shift and traffic is simply now going to be able to drive on the outside shoulder, traffic is being moved closer to the nearest receptors on that side of the road.</p>
<p>What states present have Type II policies? Which of them have funding?</p>	<p>A few states present have Type II programs. At present only Ohio DOT has funding.</p>
<p>Session Four: Mitigation and Items Beyond 772</p>	
<p>How are you showing NSAs on public hearing maps for areas where there are existing noise walls? How do you explain to the public how to address existing noise walls?</p>	<p>Through designations on the map and explaining the policy at the public meetings.</p>
<p>Do states detail explicitly in their policy how they select the optional height?</p>	<p>There is a mix on this issue. Some states provide details and others do not. It is recommended that states include this in their policy to avoid the appearance that they are acting in an arbitrary or capricious manner.</p>
<p>TNM incorrectly assumes 60% of HT sub-source energy is at 12'. NCHRP studies show most HT energy is lower than 3.3'. Experienced noise analysts are finding that walls cannot meet 7dB design criteria and are failing, the public is demanding to know why they can't get a 12' sound wall. What do you suggest?</p>	<p>There are conflicting views on whether TNM is incorrect.</p>
<p>I've been hearing a lot of negatives about design/build. What is the benefit of doing this?</p>	<p>In general, you get a shorter schedule and lower costs, but it requires a significant investment and time. Jay commented that the concern about DB is that NEPA suffers because of the accelerated process.</p>
<p>Has Ohio DOT ever relaxed its smooth top of barrier requirements when not doing so would have made the barrier exceed cost reasonableness?</p>	<p>ODOT does not include any additional cost attributed to smoothing in the cost reasonableness calculation. Mariano said that FLORIDA DOT uses the same approach.</p>
<p>The picture of the truck with noise mapping the picture was for 1600 Hz. Is the stack noise present, but just at a different frequency?</p>	<p>Nothing shows up except on less than 0.5% of the trucks.</p>
<p>When considering cost of abatement at final design if the policy cost is \$40/sf and the real cost is \$25/sf can we use the real cost in the cost benefit analysis? If the real cost is \$50/sf does the abatement no longer meet the reasonableness criteria? What about when drainage/utility costs are high? Can or should we change the reasonableness determination?</p>	<p>There are differing views on this topic. Most states treat unit cost as a program level decision and do not look at it again post-NEPA. Including extra costs depends on what is in the noise policy.</p>

Appendix B

Attendee List

Center for Environmental Excellence Traffic Noise Practitioner's Summit Attendee List

Last Name	First Name	Job Title	Organization	Phone Number	Email Address
Albury	Elisa	Environmental Program Manager	Utah DOT	801-834-5284	ealbury@utah.gov
Alcala	Noel	Noise and Air Quality Coordinator	Ohio DOT	614-466-5222	noel.alcala@dot.ohio.gov
Alexander	Adam	Senior Noise and Air Quality Analyst	Gannett-Fleming	703-277-9501	aalexander@gfnet.com
Bernhard	Charles	Physical Resources Specialist	Iowa DOT	515-239-1410	charles.bernhard@iowaDOT.us
Berrios	Mariano	Project Delivery Coordinator	Florida DOT	850-414-5250	mariano.berrios@dot.state.fl.us
Bistodeau	Lucas	Transportation Specialist 3	Minnesota DOT	651-366-5811	lucas.bistodeau@state.mn.us
Bonds	Bob	Natural Resources Supervisor	Wyoming DOT	307-777- 4364	bob.bonds@wyo.gov
Burcham	Matt	Senior Environmental Specialist	Missouri DOT	573-526-6679	Matthew.burcham@modot.mo.gov
Burgin	Daniel	Environmental Scientist III	Kentucky Transportation Cabinet	502-782-5038	daniel.burgin@ky.gov
Casey	Austina	Environmental Program Coordinator	District DOT	202-671-0494	austina.casey@dc.gov
Dougherty	Martin	Noise Specialist	West Virginia Division of Highways	304-558-9751	Martin.E.Dougherty@wv.gov
El-Aassar	Ahmed	Noise, Vibration and Air Quality Manager	Gannett-Fleming	703-277-9501	aelaassar@gfnet.com
Evans	Jonathan	Air & Noise Program Manager	New Hampshire DOT	(603)271-4048	Jonathan.Evans@dot.nh.gov
Herrell	Michelle	Environmental Protection Specialist	FHWA SC Division Office	803-765-5460	michelle.herrell@dot.gov
Kayisavera	Dolha	Assistant State Enviro. Admin.	Alabama DOT	334-242-6147	kayisaverad@dot.state.al.us
Kelly	David	NEPA Coordinator	South Carolina DOT	803-737-1645	kellydp@scdot.org
Kieltyka	Caroline	Program Specialist for Policy	AASHTO	202-624-8489	ckieltyka@ashto.org

Last Name	First Name	Job Title	Organization	Phone Number	Email Address
Kolwaite	Douglas	Statewide NEPA Manager	Alaska DOT&PF	907-465-8413	douglas.kolwaite@alaska.gov
Limage	Marie	Environmental Specialist	NJDOT	609-530-3291	marie.limage@dot.nj.gov
McKelvey	Kathryn	Environmental Planner	PennDOT	717-346-7674	kmckelvey@pa.gov
Newvine	Carole	Noise Specialist/ Program Leader	Oregon DOT	503-986-3447	carole.newvine@odot.state.or.us
Packard	Will	Environmental Specialist	Nebraska DOT	402-479-4312	will.packard@nebraska.gov
Pair	Missy	Traffic Noise and Air Quality Group Leader	North Carolina DOT	919-707-6064	mpair@ncdot.gov
Polcak	Kenneth	Sr. Transportation Engineer	Maryland DOT State Highway Administration	410-545-8601	kpolcak@sha.state.md.us
Ponticello	Jim	Air & Noise Program Manager	Virginia DOT	804-371-6769	jim.ponticello@VDOT.virginia.gov
Racic	Ivan	Air and Noise Planner II	Arizona DOT	602-712-6161	iracic@azdot.gov
Rymer	Bruce	Senior Engineer	Caltrans	916-653-6073	bruce_rymer@dot.ca.gov
Savage	Melissa	Director	AASHTO	202-624-3638	msavage@ashto.otg
Sperry	Kristen	Environmental Scientist	North Dakota DOT	701-328-3704	ksperry@nd.gov
Tardy	William	Environmental Manager	Maryland DOT State Highway Administration	410-545-8565	wtardy@sha.state.md.us
Umscheid	Ray	Traffic Noise Specialist	Texas DOT	512-416-3025	ray.umscheid@txdot.gov
Waldman	Rose	Air Quality and Noise Program Manager	Colorado DOT	303-757-9016	rose.waldman@state.co.us
Waldschmidt	Jay	Section Chief	Wisconsin DOT	608-267-9806	jay.waldschmidt@dot.wi.gov

Appendix C

Agenda

**Center for Environmental Excellence
Traffic Noise Practitioner's Summit
June 27-28, 2018**

**National Academies of Science – Room 125
2101 Constitution Ave NW, Washington, DC**

Day One: Wednesday, June 27, 2018

1:30 pm - 2:00 pm **Welcome & Introductions and Summit Objectives,
Format, and Logistics**

Session One: Analyses

Moderator: Mariano Berrios, Florida DOT

Time Slot	Topic	Speaker
2:05 pm - 2:30 pm	Measurement and Validation	Panel Discussion: Ken Polcak, <i>Maryland DOT</i> Adam Alexander, <i>Gannett Fleming</i> Noel Alcala, <i>Ohio DOT</i>
2:30 pm - 2:45 pm	Time Saving Workflows in TNM 2.5 and 3.0	Ivan Racic, <i>Arizona DOT</i>
2:45 pm - 3:00 pm	Noise Impact Analysis Where There Are Existing Noise Walls	Mariano Berrios, <i>Florida DOT</i> Jim Ponticello, <i>Virginia DOT</i>
3:00 pm - 3:15 pm	Activity Category C Analysis	Mariano Berrios, <i>Florida DOT</i>
3:15 pm - 3:25 pm	Optimum Wall Height	Noel Alcala, <i>Ohio DOT</i>
3:25 pm - 3:35 pm	Absorptive vs Reflective Walls	Noel Alcala, <i>Ohio DOT</i>
3:35pm - 3:45 pm	Q & A	Group
3:45pm - 4:00 pm	Break	

Session Two: After Impact and Abatement Analyses

Moderator: Carole Newline

Time Slot	Topic	Speaker
4:00 pm - 4:30 pm	Report Templates	Rose Waldman, <i>Colorado DOT</i> Jay Waldschmidt, <i>Wisconsin DOT</i>
4:30 pm - 4:50 pm	Citizen Education: What Walls Can Do/Not Do	Adam Alexander, <i>Gannett Fleming</i>
4:50 pm - 5:00 pm	Timing of Benefited Receptor Surveys	Carole Newvine, <i>Oregon DOT</i>
5:00 pm - 5:10 pm	Noise Consultant Qualifications	Carole Newvine, <i>Oregon DOT</i>
5:10 pm - 5:30 pm	Improving Tech Transfer, Training, Recruiting	Carole Newvine, <i>Oregon DOT</i>
5:30pm - 6:00 pm	Q&A	Group
7:00 pm	Dinner - State Street Plaza Hotel: Diplomat Room	

Day Two: Thursday, June 28, 2018

Session Three: Process and Efficiency

Moderator: Charles Bernhard, Iowa DOT

Time Slot	Topic	Speaker
7:30 am - 8:30 am	Breakfast in Meeting Room	
8:00 am - 8:20 am	Screening Criteria Policy	Charles Bernhard, <i>Iowa DOT</i> Ivan Racic, <i>Arizona DOT</i>
8:20 am - 8:35 am	FHWA Low Volume Road Tool Demo and Policy Implications	Adam Alexander, <i>Gannett Fleming</i>
8:35 am - 8:50 am	Federal Type II Programs	Noel Alcala, <i>Ohio DOT</i> Ken Polcak, <i>Maryland DOT</i>
8:50 am - 9:10 am	Part-time Shoulder Use	Panel Discussion: Adam Alexander, <i>Gannett Fleming</i> Jim Laughlin, <i>Washington DOT</i> (via conference line) Rose Waldman, <i>Colorado DOT</i> Martin Dougherty, <i>West Virginia DOT</i>
9:10 am - 9:30 am	Proposed Regulation Changes	Panel Discussion: Charles Bernhard, <i>Iowa DOT</i> Carole Newvine, <i>Oregon DOT</i>
9:30 am - 9:45 am	Q & A	Group
9:45 am - 10:00 am	Break	

Session Four: Mitigation and Items Beyond 772

Moderator: Noel Alcala, Ohio DOT

Time Slot	Topic	Speaker
10:00 am - 10:15 am	Processes DOTs Use for Noise Wall Final Design	Noel Alcala, <i>Ohio DOT</i> Carole Newvine, <i>Oregon DOT</i>
10:10 am - 10:45 am	Design Build Noise Studies – Implementation and Challenges	Panel Discussion: Mariano Berrios, <i>Florida DOT</i> Noel Alcala, <i>Ohio DOT</i> Jim Ponticello, <i>Virginia DOT</i> Matt Burcham, <i>Missouri DOT</i>
10:45 am - 11:00 am	Innovative Highway Noise Mitigation Techniques	Panel Discussion: Bruce Rymer, <i>CalTrans</i> Ken Polcak, <i>Maryland DOT</i> Adam Alexander, <i>Gannett Fleming</i> Charles Bernhard, <i>Iowa DOT</i>
11:00 am - 11:30 am	Barrier Maintenance and Inventories; Noise Wall Inspection Procedures	Panel Discussion: Noel Alcala, <i>Ohio DOT</i> Ken Polcak, <i>Maryland DOT</i> Adam Alexander, <i>Gannett Fleming</i>
10:00 am - 10:15 am	Q&A	Group



12:00 pm - 1:00 pm **Networking Lunch**

1:00 pm - 3:30 pm **Sessions 5: Traffic Noise Research Roadmap**

Facilitated discussion about current and future research needs.

Facilitator: Adam Alexander, Gannett Fleming

3:30 pm - 4:00 pm **Wrap-up; Action Items**

4:00 pm **Adjourn**