Gannett Fleming

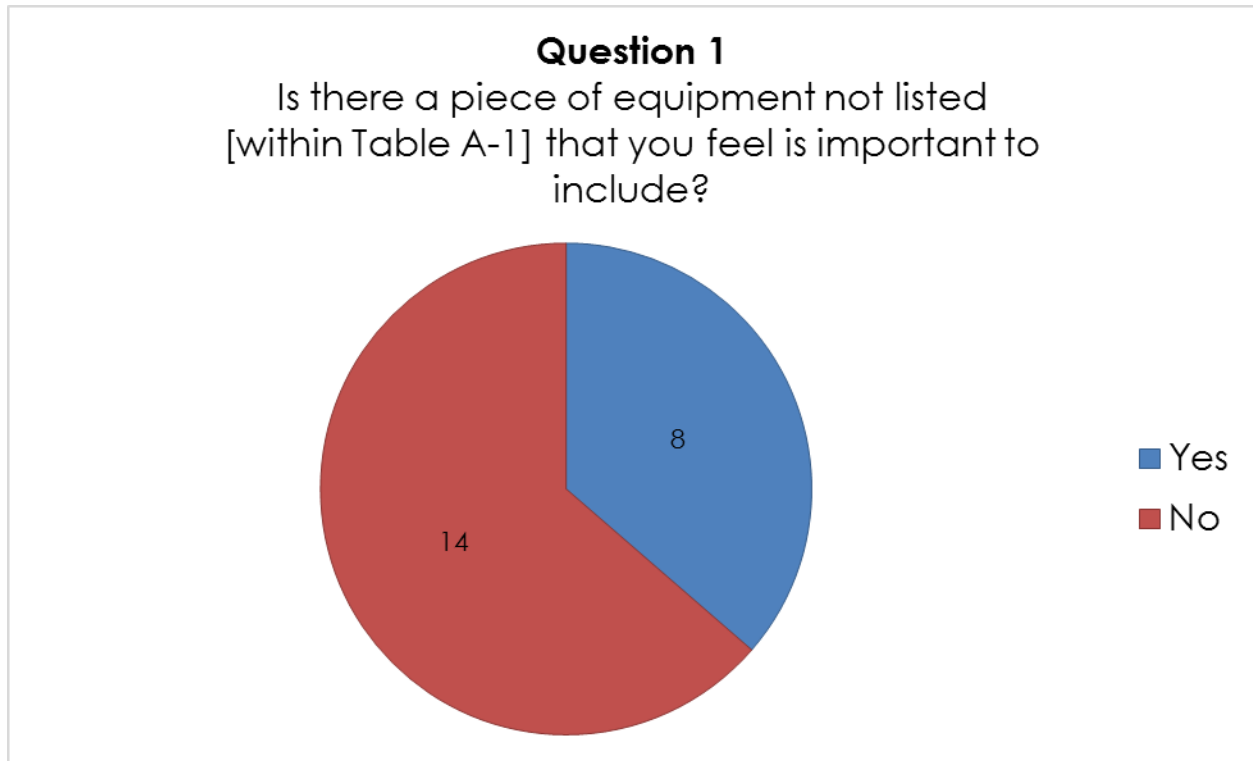*Figure 1- Responses to Question 1*

Question 1
Is there a piece of equipment not listed
[within Table A-1] that you feel is important to
include?

- Yes
- No

8

14

Table 1 - Requested Equipment Additions

Answer Timestamp	Please provide details about any piece(s) of equipment not listed that you feel is important to include.	Team Response
3/28/2016 11:19:39	Skid Steer Loader	Skid steer loader is merely a smaller 'Front End Loader' and noise source levels will be captured within the 'Loader' noise source database. No edit to Table A-1 necessary.
	Hydraulic Breaker (attachment)	Hydraulic Breaker (attachment) is synonymous with 'hoe ram'. Table A-1 revised to list 'hoe ram (hydraulic breaker)'.
	Road Reclaimer	Added to Table A-1. Literature Review and Research will be revised to include this piece of equipment.

Answer Timestamp	Please provide details about any piece(s) of equipment not listed that you feel is important to include.	Team Response
3/31/2016 15:52:37	Rumble Strip Grinder	Added to Table A-1. Literature Review and Research will be revised to include this piece of equipment.
4/7/2016 16:44:42	Back-up alarms. This is a consistent complaint from the public and an issue with construction and how this will impact residents near construction activities. Could be a check box next to truck equipment "with back-up alarm." One of the most dominating sounds during construction.	'Movement alarms' will be captured during mobile equipment monitoring. No edit to Table A-1 necessary.
4/7/2016 17:17	back-up alarms "smart" alarms	See above response.
4/8/2016 16:43	We in NC have been asked to consider possible noise reduction measures for nighttime use of hydrodemolition and vacuum equipment to remove the pavement surface from bridge decks in rehabilitation projects.

We received noise level information from Rampart Hydro Services, a vendor of this process. A copy of the noise data information will be sent electronically to Sharon Carpenter and Dayna Sherwood. | Added to Table A-1. Literature Review and Research will be revised to include this piece of equipment. |
| 4/13/2016 15:17 | Pile extractor unit attachment | Added to Table A-1. Literature Review and Research will be revised to include this piece of equipment. |
| 4/15/2016 16:03 | It would be good to be able to add a custom piece of machinery with appropriate sound levels. | Currently not an available option within TNM3.0. |

Answer Timestamp	Please provide details about any piece(s) of equipment not listed that you feel is important to include.	Team Response
4/20/2016 13:37	Concrete chain saws.	'Concrete chain saw' is merely a 'chain saw' and noise source levels will be captured within the 'chain saw' noise source database. No edit to Table A-1 necessary.
	Powder actuated tools.	Powder-actuated tool is merely a high velocity 'nail gun' and noise source levels will be captured within the 'Nail Gun' noise source database. No edit to Table A-1 necessary.
	Water blasting/Pressure washing.	'Hydrodemolition' has been added to Table A-1. Literature Review and Research will be revised to include this piece of equipment.
	Impact Pile Driver/Pile Driving Equipment- Open-end diesel hammers, closed-end diesel hammers, air hammers, steam hammers, etc.	'Open-end diesel hammers', 'closed-end diesel hammers, air hammers, steam hammers' are all attachments and will be captured within the 'Impact Pile Driver' noise source database. No edit to Table A-1 necessary.
	Roller Compactor is listed, but a vibratory roller compactor should be evaluated. When the vibratory action is activated, the noise increases.	'Vibratory roller compactor' is included within 'Roller Compactor' category and will be captured within the 'Roller Compactor' noise source database. No edit to Table A-1 necessary.
4/25/2016 10:28	-Dump truck tail gate banging -Back up alarms (large source of complaints) -Dumping into truck beds -Emptying of dump truck	All extraneous sources listed will be captured during mobile-source monitoring. No edit to Table A-1 necessary.

Question 2

Survey recipients were then asked what types of construction activities and resultant noise levels do they typically predict or would like to be predicted for their application. Their responses are shown in Table 3.

Table 2 - Responses to Question 2

Answer Timestamp	For your application, what types of construction activities and resultant noise levels do you typically predict or would like to be predicted?
3/24/2016 16:27:15	pile driving blasting bulldozer excavator
3/24/2016 16:38:26	Pile drivers/vibratory hammers
3/25/2016 13:01:50	usually any complaints occur during night construction which is limited to concrete pavement saw cutting or demo
3/28/2016 11:19	Rotomill overlay, soft spot, shoulder paving, lane widening and additions
3/28/2016 17:00	Construction activity noise levels not typically predicted.
3/29/2016 9:12	Pile driving, vibrator roller
3/29/2016 9:27	We do not typically predict sound levels for construction noise activities.
3/31/2016 15:52	rumble strip grinding, pile driving, chip sealing, paving
4/5/2016 9:17	Underwater work/construction would be a beneficial modeling function. NDDOT primary issue has been in dealing with Endangered Species and the effect caused by construction noise. Certain species live are aquatic and therefore we would be responsible for determination of potential impact.
4/7/2016 16:44	Grinding and paving is the most common construction activity and we typically look at the Leq and Lmax at nearest residence/receiver. It would be nice to have a tool within RCNM to use with a google earth type application for measurements and levels that was built in. Not sure it can be expanded that much however it would be useful to save those files so we had verification/validation for where measurements were taken and to identify nearest receivers.

Answer Timestamp	For your application, what types of construction activities and resultant noise levels do you typically predict or would like to be predicted?
4/7/2016 17:17	paving pile driving sign placement, repair (bridge, cantilever sidewalk; ADA ramps stormwater drainage traffic signal replacement storm water treatment ponds striping bridge deck rehabilitation saw cutting abrasive blasting rock blasting
4/8/2016 16:43	We generally are asked to provide anticipated noise levels and noise reduction strategies for standard roadway and bridge construction equipment (dump trucks, loaders, pavers, etc.) when work is to occur in close proximity to noise-sensitive areas, particularly when nighttime work is planned. We typically use the FHWA online Construction Noise resources as our guide in construction noise considerations.
4/11/2016 8:01	No construction noise levels are typically predicted. The work is considered a temporary impact and operational measures are taken to reduce any noise effects. We would like to have a protocol for addressing noise from concrete batch and crushing plants.
4/11/2016 12:30	Pavement milling, paving, and pile driving
4/13/2016 15:17	Bridge demolition (loudest), pile driving (loudest), steel erection (mid-level loud), earth moving (mid-level loud), concrete placement (least loud), paving - concrete & asphalt (least loud)
4/14/2016 10:01	We would like to see Pile driving predicted.
4/14/2016 10:11	JACK HAMMERING LOADING/DUMPING BROKEN CONCRETE PIECES INTO HAUL TRUCKS
4/15/2016 16:03	Pile driving, jack hammering, dump truck unloading (with door banging), and blasting are the most common.
4/20/2016 13:37	Pile impact and vibratory driving, vibratory compaction, concrete demolition are candidates for prediction.
4/25/2016 10:28	Typical – none Like to predict i. Haul road ii. Temporary noise barriers and shields iii. Pile driving iv. Bridge demolition; pavement demolition

Question 3

Survey recipients were asked what L_{Aeq} averaging periods would be beneficial to their existing or future applications. Their responses are shown in Table 3.

Table 3 - Responses to Question 3

Answer Timestamp	What L_{Aeq} averaging periods would be beneficial to your existing or future applications? (10-min, 1-hour, 8-hour, 24-hour, etc.)?
3/24/2016 16:01:52	8-hour
3/24/2016 16:27:15	depends on application or equipment- I can see the need for all of the referenced L_{Aeq}.
3/24/2016 16:38:26	1 hour, 8 hour, 24 hours
3/24/2016 16:39	None
3/25/2016 13:01	I would say 10 min and 1 hour. It might be helpful to include the 8 hour
3/28/2016 11:19	1-hour and 24-hour would be most beneficial, but ability to assess all would be great.
3/28/2016 17:00	1-hour
3/29/2016 9:12	1-hour
3/29/2016 9:27	We don't have a specific averaging period to request.
3/31/2016 15:52	1 hr, 10 min and 8 hr
4/5/2016 9:17	10-min, 1-hour would be NDDOT preference.
4/7/2016 16:44	1-hour and 24-hr
4/7/2016 17:17	1 hr 10 min instant. Lmax
4/8/2016 16:43	Most beneficial would be 1-hour and 8-hour periods.
4/11/2016 8:01	1 hour and 24 hour
4/11/2016 12:30	1-hour
4/13/2016 15:17	1 hour, 8 hour
4/14/2016 10:01	We would benefit from a future application of 1-hour.
4/14/2016 10:11	ALL
4/15/2016 16:03	We would prefer to be able to choose the time averaging period that fits our needs/application, offering maximum flexibility, which could range from Lmax to L 24 hr.
4/20/2016 13:37	All of them would be beneficial to allow the user to select the one applicable to requirements of local ordinances.
4/25/2016 10:28	1-hour and 8-hour. Would also like Lmax of multiple combined sources.

Question 4

Survey recipients were asked if there were any special scenarios or needs they would like RCNM 2.0 to address and if they answered "Yes", they were asked to provide details. Eight (8) out of 22 responded "Yes" (See Figure 2) and provided details in Table 4.
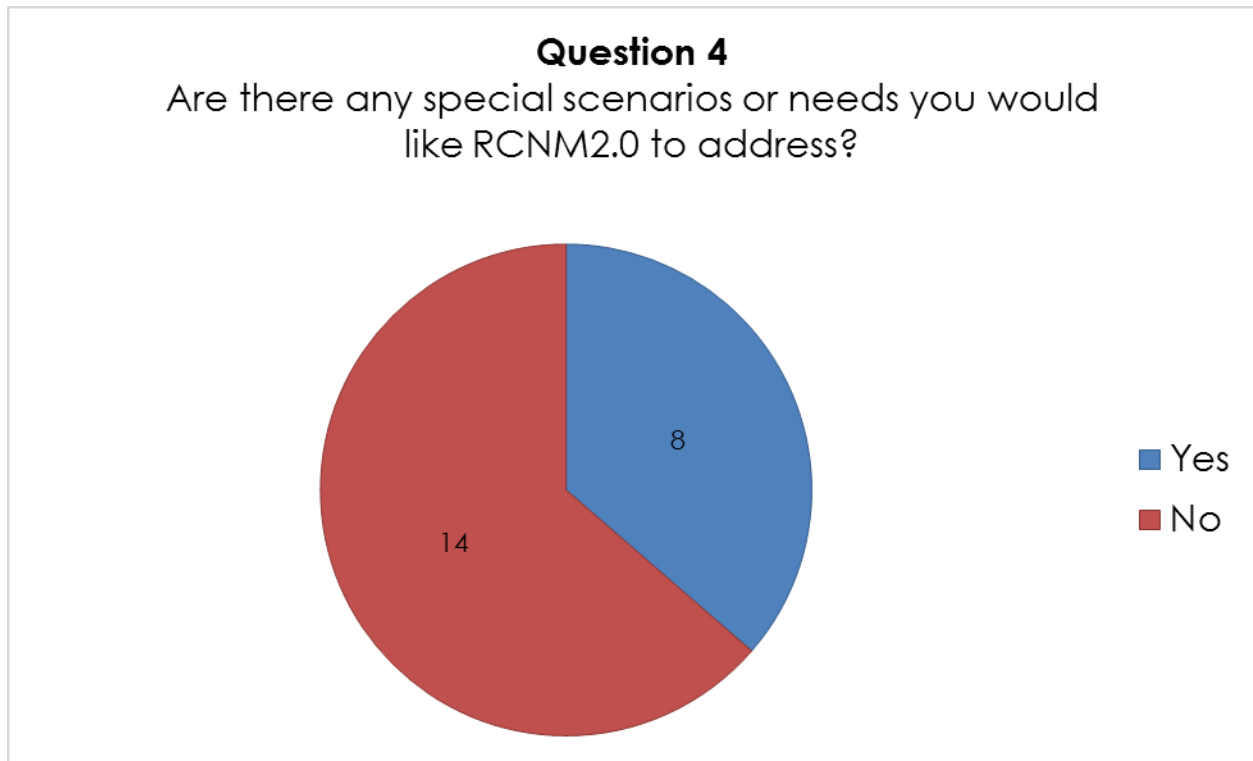
Figure 2 - Responses to Question 4

Question 4
Are there any special scenarios or needs you would like RCNM2.0 to address?

Table 4 - Responses to Question 4

Answer Timestamp	Please provide details about any special scenarios or needs you would like RCNM2.0 to address.
3/24/2016 16:38:26	In water and within 50 feet of a waterway.
3/31/2016 15:52:37	1. Noise metrics for wildlife - dBA isn't an appropriate metric for it. 2. Underwater noise and vibration for wildlife studies - noise levels relative to 1microPascal rather than 20 microPascal
4/7/2016 16:44	Contours or being able to draw a line of an area where the activities are taking place in time and space to the actual location of the resident to get a real life feel not just a straight line feel to a resident.
4/8/2016 16:43:01	Construction noise measurement standard(s), including the simultaneous use of multiple pieces/types of equipment. Construction noise reduction measures
4/11/2016 8:01	Back-up alarms
4/13/2016 15:17	New equipment vs. old equipment, not all equipment is muffled the same.

Answer Timestamp	Please provide details about any special scenarios or needs you would like RCNM2.0 to address.
4/15/2016 16:03	Graphing capabilities that show how sound levels drop as you move away from noise source, and having the ability to combine point sources of noise with line sources of noise. It would also be good to have the ability to generate or display sound levels by octave band.
4/25/2016 10:28	a. 3-d modeling of noise barriers and terrain shielding b. Point, line and area sources c. Possible octave band analysis where source data is available - for certain local noise ordinances and especially for tonal sources like back-up alarms.

Question 5

Lastly, survey recipients were asked if there were any special construction scenarios that are unique to their agency or geographic location and if they answered "Yes", they were asked to provide details. Five (5) out of 22 responded "Yes" (See Figure 5) and provided details in Table 5.
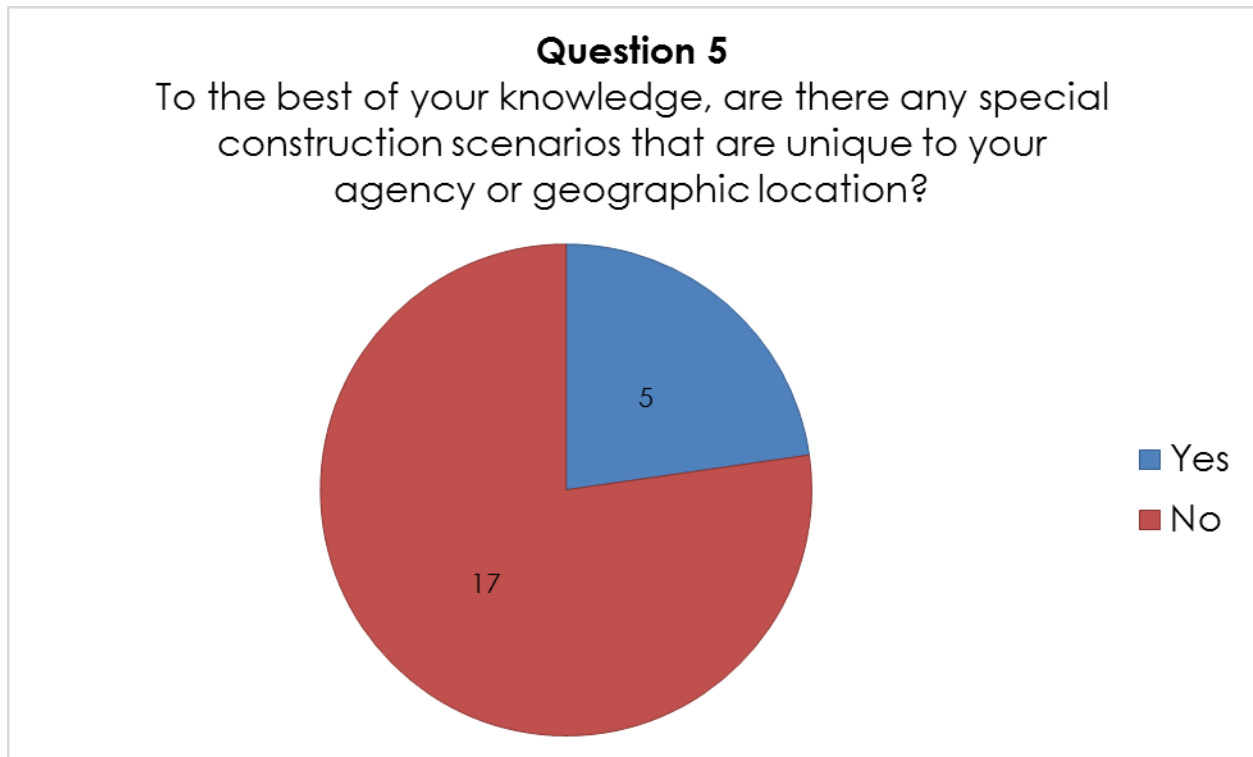
Figure 3 - Responses to Question 5

Table 5 - Responses to Question 5

Answer Timestamp	Please provide details about any special construction scenarios that are unique to your agency or geographic location.
3/28/2016 17:00:42	Construction noise and its effects on federally listed birds
3/31/2016 15:52:37	We have to do construction noise analyses when within a quarter mile of a Sage Grouse lek. These areas usually have extremely low ambient noise levels (20-25 dB), so any amount of construction noise forces us into timing restrictions. We have to make sure we get the modeling to be as realistic as possible.
4/5/2016 9:17	Non-urban areas where wildlife potential could be adjacent to a site. There would be use for modeling contours of the landscape to assist in determination of potential construction noise impacts to critters.
4/15/2016 16:03	Could this be used for hydro-acoustic applications such as for pile driving dolphins (to protect sturgeon), as we recently completed a study on this in Virginia.
4/25/2016 10:28	Rock drilling.

Follow-up Teleconferences

At the conclusion of the survey, respondents were asked to provide their name and contact information if they wished to discuss any of their survey responses further with the NCHRP 25-49 Research Team. Of the 22 respondents, two (2) requested to be contacted: Ms. Cora Helm of Montana DOT and Ms. Michele Fikel of Idaho DOT. Both teleconferences occurred on Thursday, May 5, 2016. Meeting minutes for each teleconference are included in Appendix D.

As a result of the teleconference with Ms. Cora Helm of Montana DOT, equipment related to chip sealing was added to Table A-1, as Ms. Helm identified this activity to be common in Montana. No additional pieces of equipment were requested to be added to Table A-1 by Ms. Fikel of Idaho DOT. Both state representatives raised the increasing need to evaluate impacts to wildlife, both terrestrial and aquatic, from construction activities in their states. While the NCHRP 25-49 Research Team considers this a critical topic, additional research is needed on appropriate metrics to evaluate noise impacts on wildlife and how noise affects different species. Further 23 CFR 772 is currently written to address impacts to humans; therefore, the team explained to both state representatives that currently, addressing construction noise impacts to wildlife is beyond the scope of this particular research task order. However, both representatives were pleased to know that with the collection of third octave band noise levels during Task 4a Data Collection Phase, future iterations of RCNM may be able to accommodate construction noise assessments for wildlife.