



TH 100 Interchange & Auxiliary Lane from 36th Street to Cedar Lake Road

Noise Advisory Committee Meeting

Thursday October 27, 2011

6:00 – 7:30 p.m.

Saint Louis Park City Hall

5005 Minnetonka Boulevard

Saint Louis Park, Minnesota

Your Destination...Our Priority





Tonight's Agenda

- Proposed Project Overview
- NAC Goals and Objectives
- Traffic Noise
 - Noise Terminology
 - Minnesota Noise Rules
 - Traffic Noise Modeling
 - Noise Barrier Evaluation
- Noise Monitoring





NAC Goals and Objectives

- Provide two-way communication between community and project team
- Provide greater understanding of the noise evaluation process
- Review noise analysis methodology and results
- Provide feedback to City Council and communicate project information to neighborhood residents





NAC Meetings Anticipated Schedule

- October 2011
- December 2011
(preliminary results)
- Third meeting to be determined if needed





What is the project?





What is Noise?

- A vibration that causes pressure variations in air and water
- Unwanted sound
 - Your neighbor's dog
 - Your children's music
 - Your neighbor cutting the lawn at 7:00 am





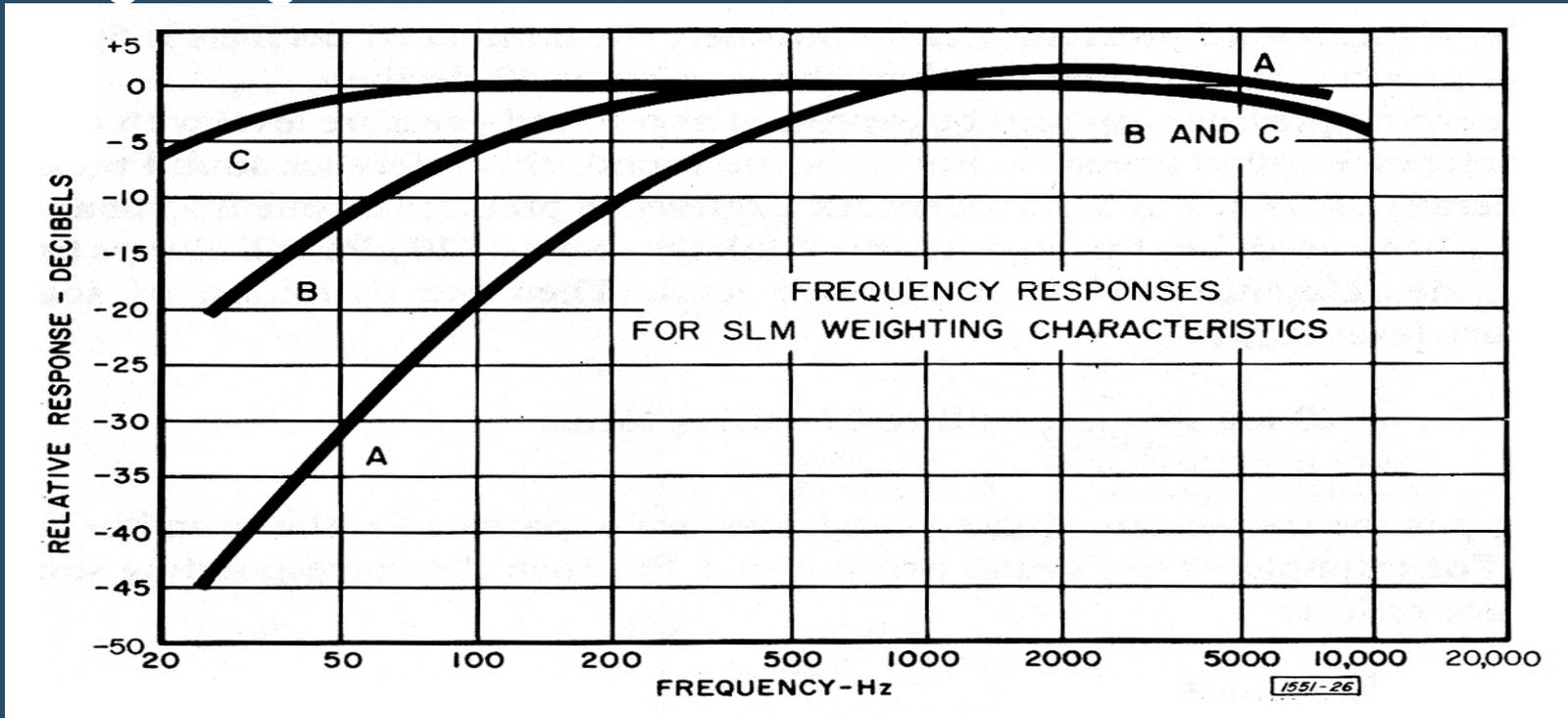
Sound Pressure Level and Decibels

- Sound pressure level (SPL) is used to measure the intensity of sounds
- SPL measured in units called decibels, or dB
- A-weighted decibels, or dBA
 - Gives a scale for noise levels as experienced or perceived by the human ear



dBA

- Weighting Curves



Addition and Subtraction of Sources

- A doubling of energy, or doubling of identical sources, results in an increase of 3 dBA



4000 vehicles per hour is 3dB louder than



2000 vehicles per hour





Noise Level Changes in an Outdoor Environment

- 1 dBA (increase or decrease) = not noticeable
- 3 dBA (increase or decrease) = threshold of perception
- 5 dBA (increase or decrease) = clearly noticeable
- 10 dBA (increase or decrease) = perceived as twice as loud (or half as loud)

Source: Minnesota Pollution Control Agency. 2008. *A Guide to Noise Control in Minnesota*





Distance Attenuation

- Beyond approximately 50 feet from a sound source such as a highway, doubling of distance will yield:
 - Sound level decrease by 3 dBA over hard ground (pavement, water)
 - 50 feet = 70 dBA
 - 100 feet = 67 dBA
 - Sound level decrease by 4.5 dBA over soft ground (vegetation)
 - 50 feet = 70 dBA
 - 100 feet = 65.5 dBA

Source: Minnesota Pollution Control Agency. 2008. *A Guide to Noise Control in Minnesota*





FHWA Noise Abatement Criteria

Hourly A-Weighted Sound Level in Decibels (dBA)

Activity Category	L ₁₀ (h) dBA	Evaluation Location	Description of Activity Category
A	60	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	70	Exterior	Residential





FHWA Noise Abatement Criteria

(continued)

Hourly A-Weighted Sound Level in Decibels (dBA)

Activity Category	L ₁₀ (h) dBA	Evaluation Location	Description of Activity Category
C	70	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public nonprofit institutional structures, radio studios, recording studios, schools and television studios
D	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public nonprofit institutional structures, radio studios, recording studios, schools, and television studios





FHWA Noise Abatement Criteria

(continued)

Hourly A-Weighted Sound Level in Decibels (dBA)

Activity Category	L ₁₀ (h) dBA	Evaluation Location	Description of Activity Category
E	75	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.





Minnesota Noise Rules

- Minnesota Rules Chapter 7030, defines the allowable receiver-based noise limits and source-based motor vehicle noise limits for trucks, motorcycles, and automobiles
- Minnesota Statute 116.07, empowers the MPCA to enforce the limits defined in the state rule





Minnesota Noise Rules

(continued)

- Noise Area Classifications (NAC) based on land use activities
 - NAC-1: Residential
 - NAC-2: Commercial
 - NAC-3: Industrial





Minnesota Noise Rules (continued)

- Noise limits apply to outdoor atmosphere only
- Noise limits are established for daytime and nighttime (Minnesota Rules 7030.0020)
 - “Daytime” is defined as the hours from 7:00 a.m. to 10:00 p.m.
 - “Nighttime” is defined as the hours from 10:00 p.m. to 7:00 a.m.



Minnesota Noise Rules

(continued)

- Receiver Based Noise Limits (dBA)

	Daytime		Nighttime		
	NAC	L10	L50	L10	L50
1 (Residential)	65	60	55	50	
2 (Commercial)	70	65	70	65	
3 (Industrial)	80	75	80	75	

Minnesota's noise pollution rules are based on statistical calculations that quantify noise levels according to duration over a one-hour monitoring period. The L10 calculation is the noise level that is exceeded for 10%, or 6 minutes, of the hour, and the L50 calculation is the noise level exceeded for 50%, or 30 minutes, of the hour.





How do We Evaluate Traffic Noise?

- Noise Monitoring
 - Document existing noise levels
 - Comparison to model results
- Noise Modeling
 - Receptor sites affected by construction of project
 - Loudest hour of daytime and nighttime periods
 - Existing conditions
 - Future No-Build and Build conditions (generally a 20-year traffic projection)





How is Traffic Noise Modeled?

- Noise prediction program “MINNOISE”
 - Traffic volumes
 - Traffic speeds
 - Vehicle types (cars, medium trucks, heavy trucks)
 - Characteristics of roadway (horizontal and vertical alignments)
 - Receptor sites (outdoor place where frequent human use occurs
 - represent residences or businesses)
 - Elevations (receptors, ground lines, noise barriers, berms)





Is there a Traffic Noise Impact?

- Do noise levels exceed Minnesota daytime and/or nighttime noise standards?
- Receiver Based Noise Limits (dBA)

NAC	Daytime		Nighttime	
	L10	L50	L10	L50
1 (Residential)	65	60	55	50
2 (Commercial)	70	65	70	65
3 (Industrial)	80	75	80	75



What if there is a Traffic Noise Impact?

- Consideration of mitigation measures, which includes evaluating noise barriers (i.e., noise walls)
- Noise barrier construction decisions are based on a study of feasibility and reasonableness





How Does Mn/DOT Determine if a Noise Wall is Feasible and Reasonable?





Feasibility and Reasonability Criteria

- “Feasibility” is determined by physical and/or engineering constraints
 - Could a noise barrier feasibly be constructed on the site
 - Acoustic feasibility (5 dBA reduction at impacted receptors for them to be considered benefited)
- “Reasonability” is based on several factors including:
 - Noise reduction design goals (7 dBA at one benefited receptor)
 - Mn/DOT’s cost-effectiveness criteria
 - Viewpoint of benefited residents and owners





Barrier Feasibility Considerations

- Does Mn/DOT have the required right of way to construct the wall?
- Safety concerns such as sight distances and clear zones
- Buried utilities or utility relocation needs
- Impacts to drainage or drainage features within right of way
- Soil types or wetland areas
- Each noise abatement measure must achieve a noise reduction of at least 5 dBA at impacted receptors in order for them to be considered benefited





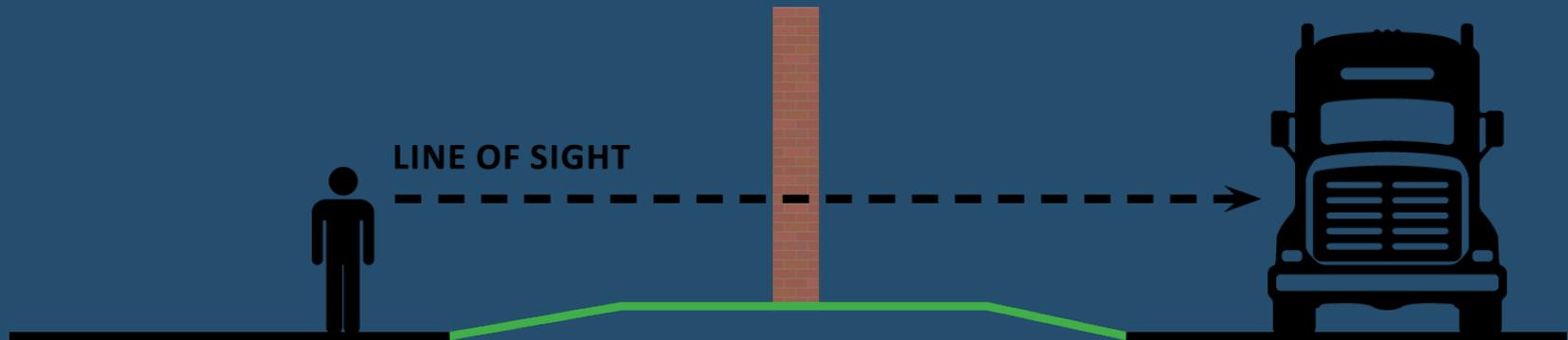
Mn/DOT Reasonability Criteria

- Noise Reduction Design Goals:
 - A noise reduction of at least 7 dBA must be achieved at a minimum of one benefited receptor for each proposed noise abatement measure
- Cost effectiveness:
 - Will the wall meet a cost effectiveness value of \$43,500 per individual benefited receptor
 - Based on wall costs of \$20/sq ft
 - Consideration of other costs such as guard rail, rub rail, utility relocation, etc.. Shall be added to the baseline unit costs



How Do Noise Walls Work?

- Block the direct path of sound waves from the highway to adjacent residences
- High enough and long enough to block line of sight between the highway and residences
- Will not block or eliminate all noise





Noise Barrier Effectiveness Considerations

- Distance between the listener and the noise source (most effective for the first one or two rows of adjacent residences, or approximately 400-500 feet from the barrier)
- Topography
- Existing features such as intervening structures and/or earthen berms





What is the Final Step in the Noise Barrier Decision Process?

- If a noise barrier meets the Mn/DOT cost-effectiveness criteria and is found to be feasible, then the viewpoints of the benefited residents and owners need to be solicited.





Viewpoints of Benefited Residents and Owners

- Several methods of public interaction are available:
 - Local public meetings
 - Direct mail (letters, flyers, door hangers, fact sheet, return mail ballots)
 - Project websites
 - Telephone





Viewpoints of Benefited Residents and Owners

- Weighted Vote
 - For benefited properties immediately abutting the highway ROW, the property owner will receive 4 points for each benefited receptor unit and residents will receive 2 points for each benefited receptor unit
 - An owner/resident would receive 6 points





Viewpoints of Benefited Residents and Owners

- Weighted Vote
 - For benefited properties not immediately abutting the highway ROW, the property owner will receive 2 points for each benefited receptor unit and the residents will receive 1 point for each benefited receptor unit.
 - An owner/resident would receive 3 points.





Viewpoints of Benefited Residents and Owners

- Weighted Vote
 - In the case of multi-family residential buildings (apartment buildings) only those individual units that are considered to be benefited receptors have a vote according to the same point system explained previously
 - Non-benefiting units do not receive points





Viewpoints of Benefited Residents and Owners

- Weighted Vote
 - A simple majority (greater than 50%) of all possible voting points (not just the ones that reply) for each potential noise abatement measure must vote “down” the abatement measure to remove it from further consideration.





Documentation

- Noise Study Analysis
 - All highway noise analysis studies must be documented in the noise section of the environmental document.
- Noise Standards Exemption Request
 - Process between Mn/DOT and MPCA
 - Final noise analysis
 - Exceed noise standards even though all reasonably available mitigation measures implemented





Contacts

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Questions?

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