



Draft Dulles Toll Road Highway Noise Policy

Public Workshop



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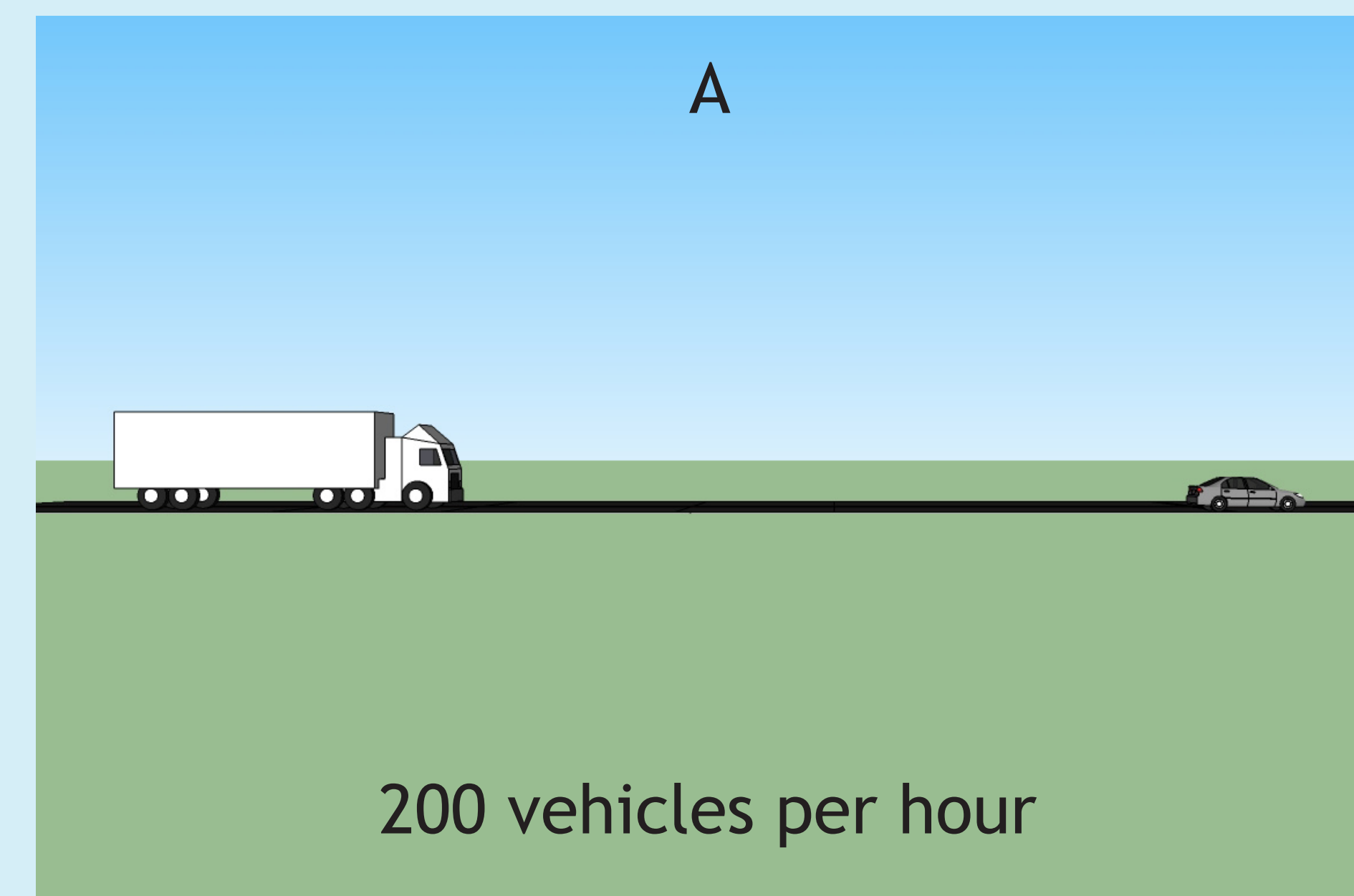
DULLES TOLL ROAD

Science of Noise

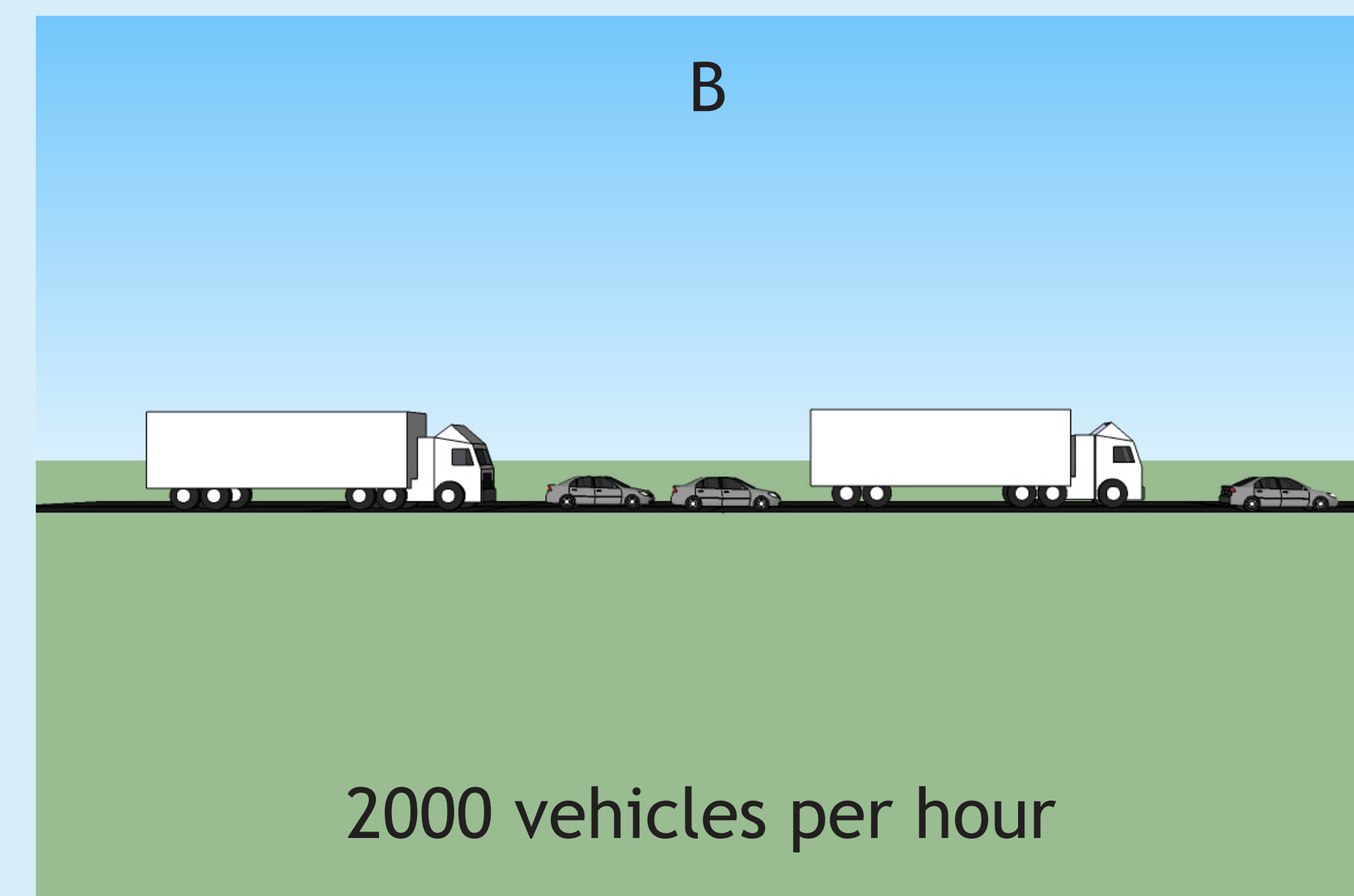
Station 1

Causes of Traffic Noise

How Traffic Volume Affects Noise



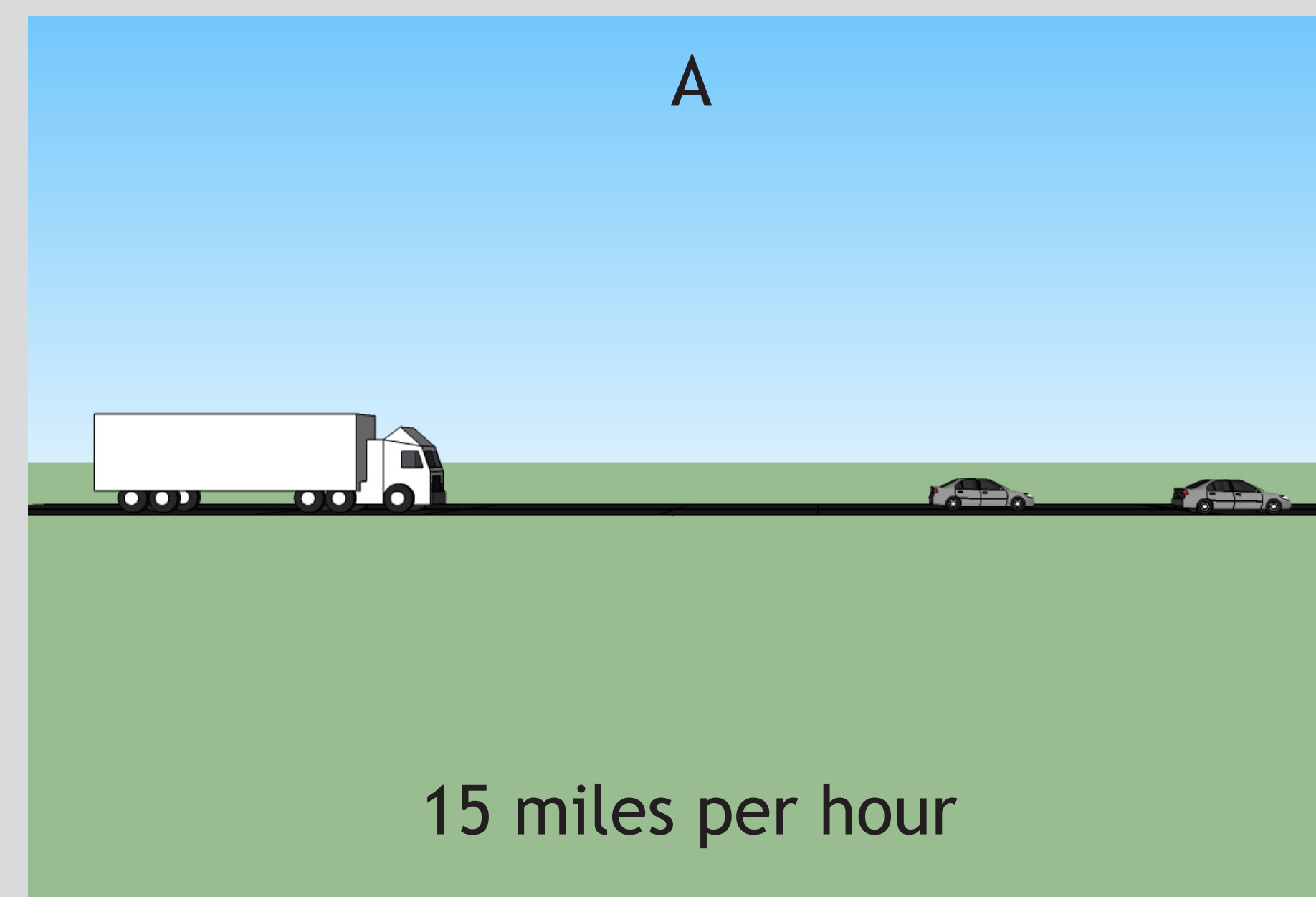
200 vehicles per hour



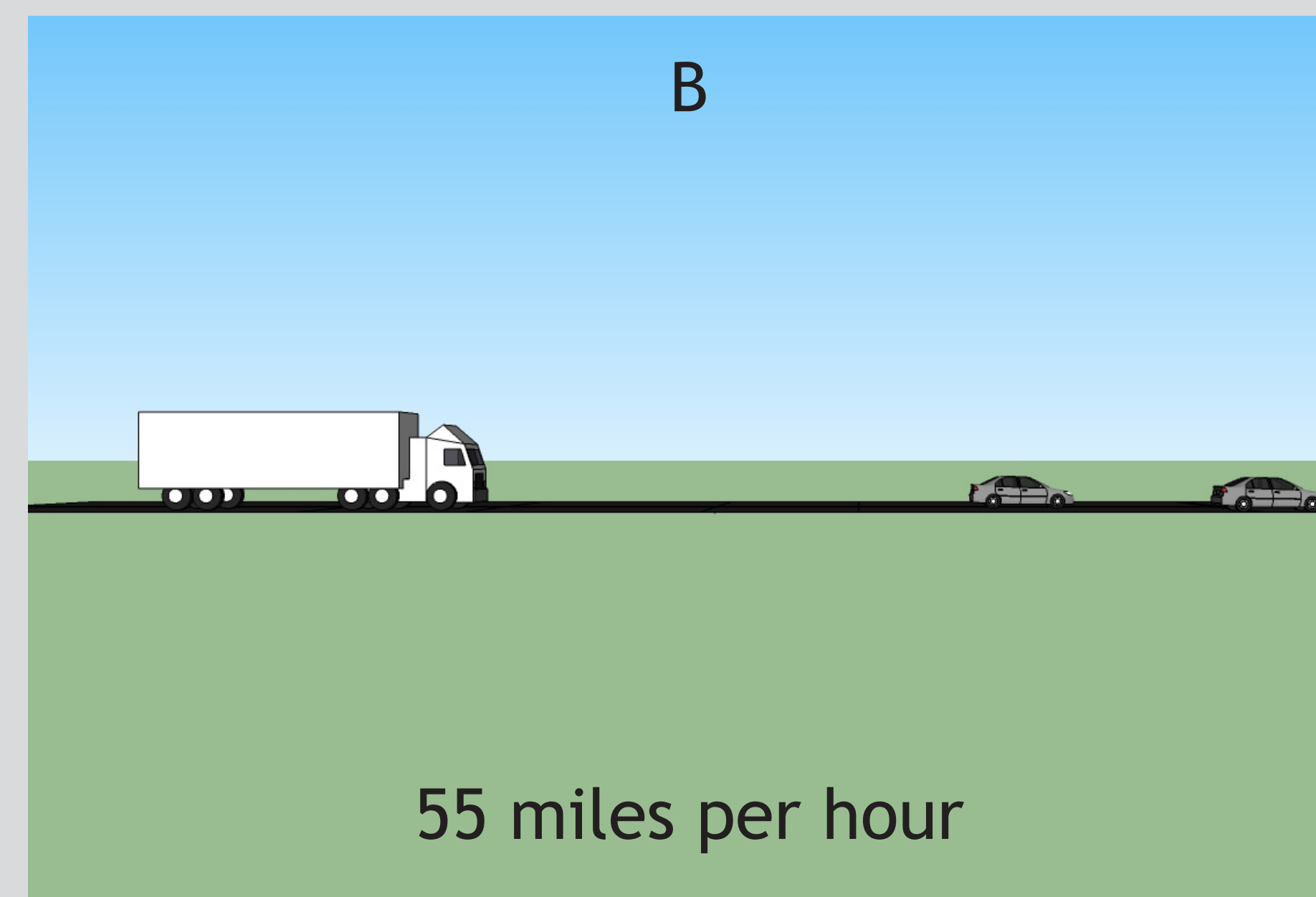
2000 vehicles per hour

A sounds half as loud as B

How Speed Affects Traffic Noise



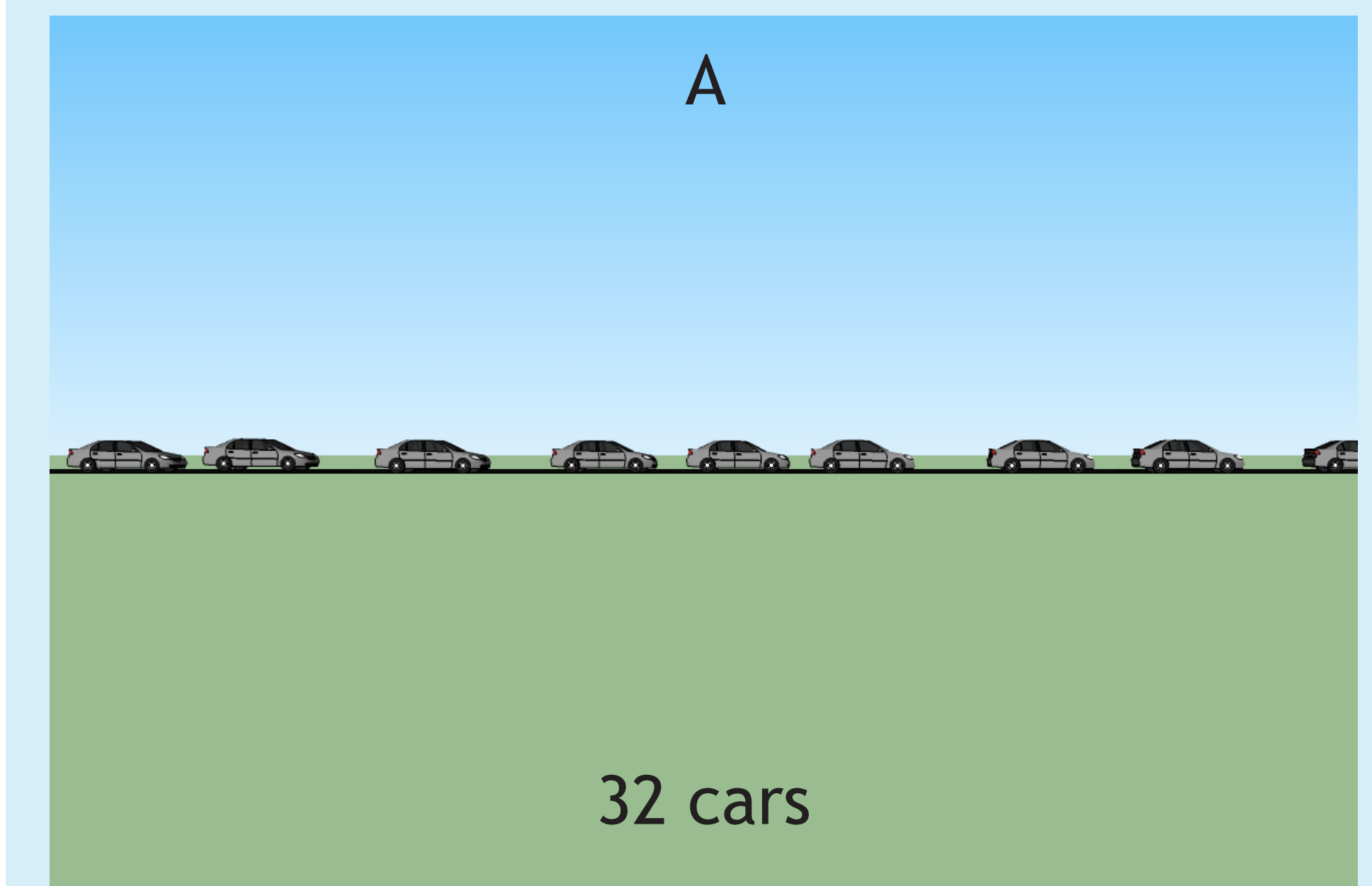
15 miles per hour



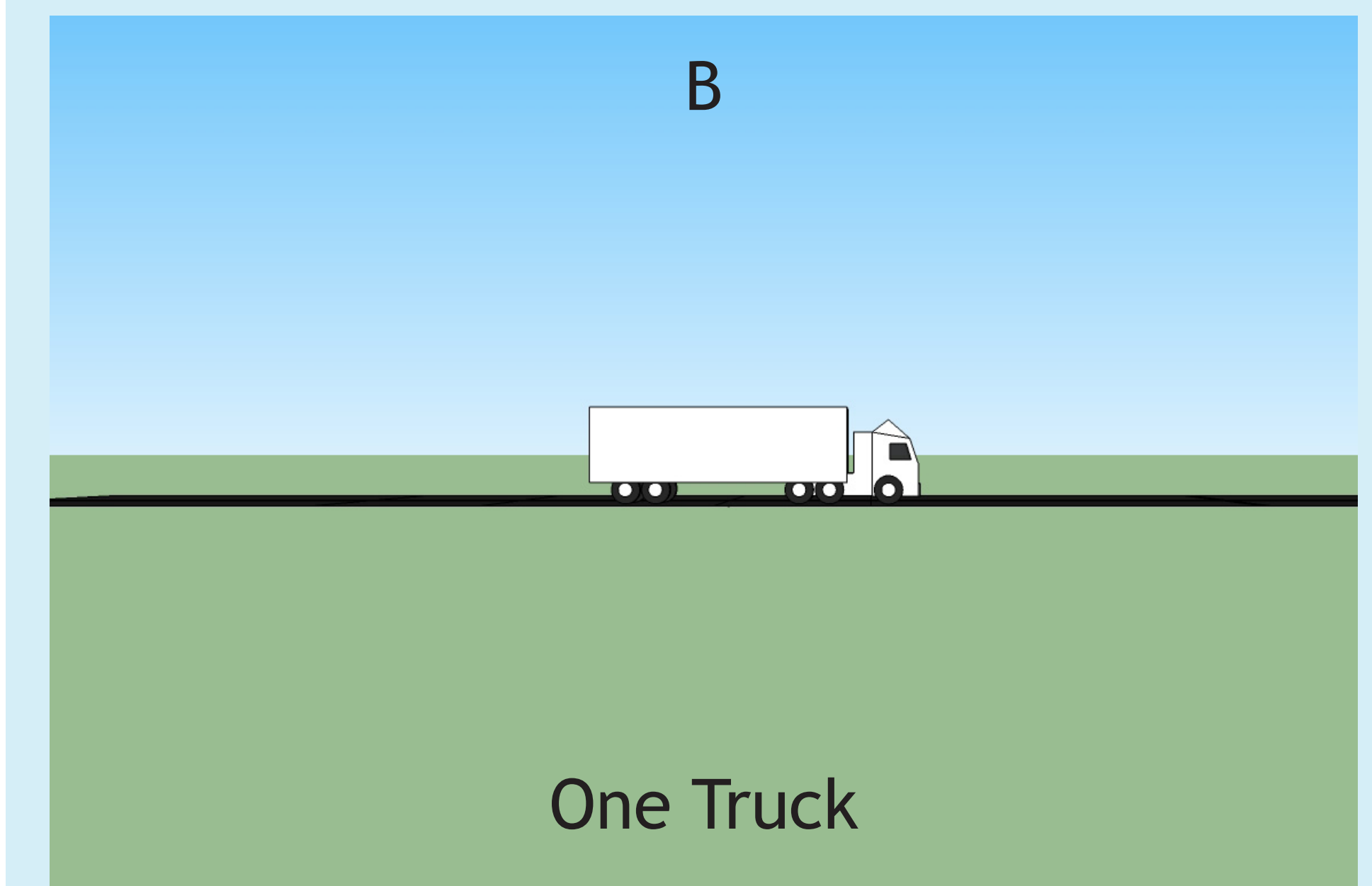
55 miles per hour

A sounds half as loud as B

How Trucks Affect Traffic Noise



32 cars



One Truck

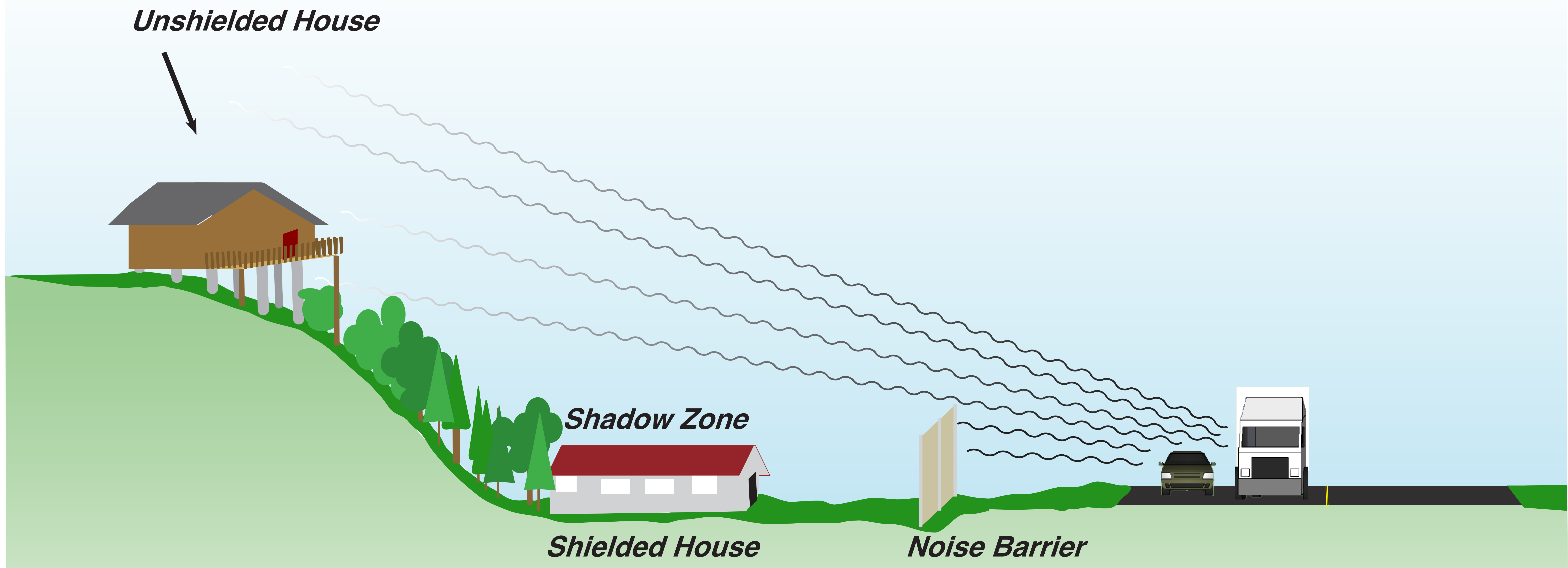
A sounds as loud as B

Source: VHB, based on an illustration in FHWA's Highway Noise Introduction brochure.



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Noise Barrier Effect



Shadow Effect of Noise Barrier

The lower house is protected by the barrier, but the upper one is not.

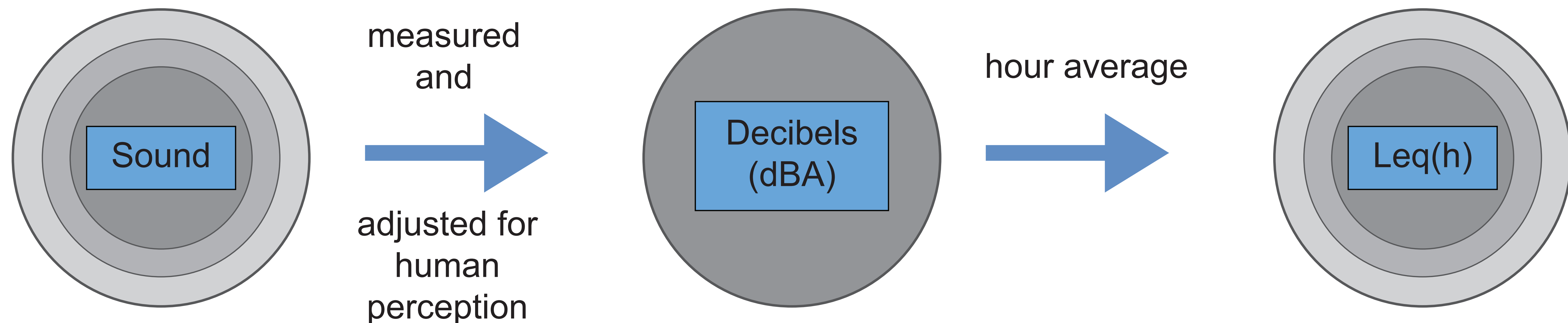
Source: VHB, based on *Highway Traffic Noise Analysis And Abatement Policy And Guidance*, U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch, Washington, D.C. June 1995



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Sound and Noise

- ❖ Sound, created when an object moves air, is comprised of a spectrum of frequencies.
- ❖ Sound is quantified by a meter which measures units called decibels (dB).
- ❖ Humans are sensitive to certain frequencies and insensitive to others.
- ❖ Decibels adjusted for an average person's hearing are called "A-weighted levels" (dBA).
- ❖ $Leq(h)$ is the constant, average sound level, over a one hour period used in the U.S. as the preferred highway noise metric.



Relative Noise

NOISE PERCEPTION

SOUND LEVEL CHANGE

RELATIVE LOUDNESS CHANGE

+30 dBA	8 TIMES AS LOUD
+20 dBA	4 TIMES AS LOUD
+10 dBA	TWICE AS LOUD
+5 dBA	READILY PERCEPTIBLE INCREASE
+3 dBA	BARELY PERCEPTIBLE INCREASE
0 dBA	REFERENCE
-3 dBA	BARELY PERCEPTIBLE DECREASE
-5 dBA	READILY PERCEPTIBLE DECREASE
-10 dBA	HALF AS LOUD
-20 dBA	1/4 AS LOUD
-30 dBA	1/8 AS LOUD

Source: VHB, based on *Highway Traffic Noise Analysis And Abatement Policy And Guidance*, U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch, Washington, D.C. June 1995





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Noise Policy

Station 2

Reference Documents Used to Prepare Highway Noise Abatement Policy

- ❖ 23 CFR Part 772 – Procedures for the Abatement of Highway Traffic Noise
- ❖ FHWA – Highway Traffic Noise Analysis and Abatement Policy Guidelines
- ❖ Traffic Noise Model (TNM) Version 2.5
- ❖ Virginia Department of Transportation - State Noise Abatement Policy (January 1, 1997)
- ❖ Fairfax County Noise Ordinance



Noise Abatement Criteria

Activity Category	Leq(h)	L10(h)	Description of Activity Category
A	57 (Exterior)	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	67 (Exterior)	70 (Exterior)	Residences, picnic areas, recreation areas, playgrounds, active sports areas, parks, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	--	Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: 23 CFR Part 772 – Procedures for the Abatement of Highway Traffic Noise



Special Conditions, Cost Reasonableness and Feasibility

Special Conditions

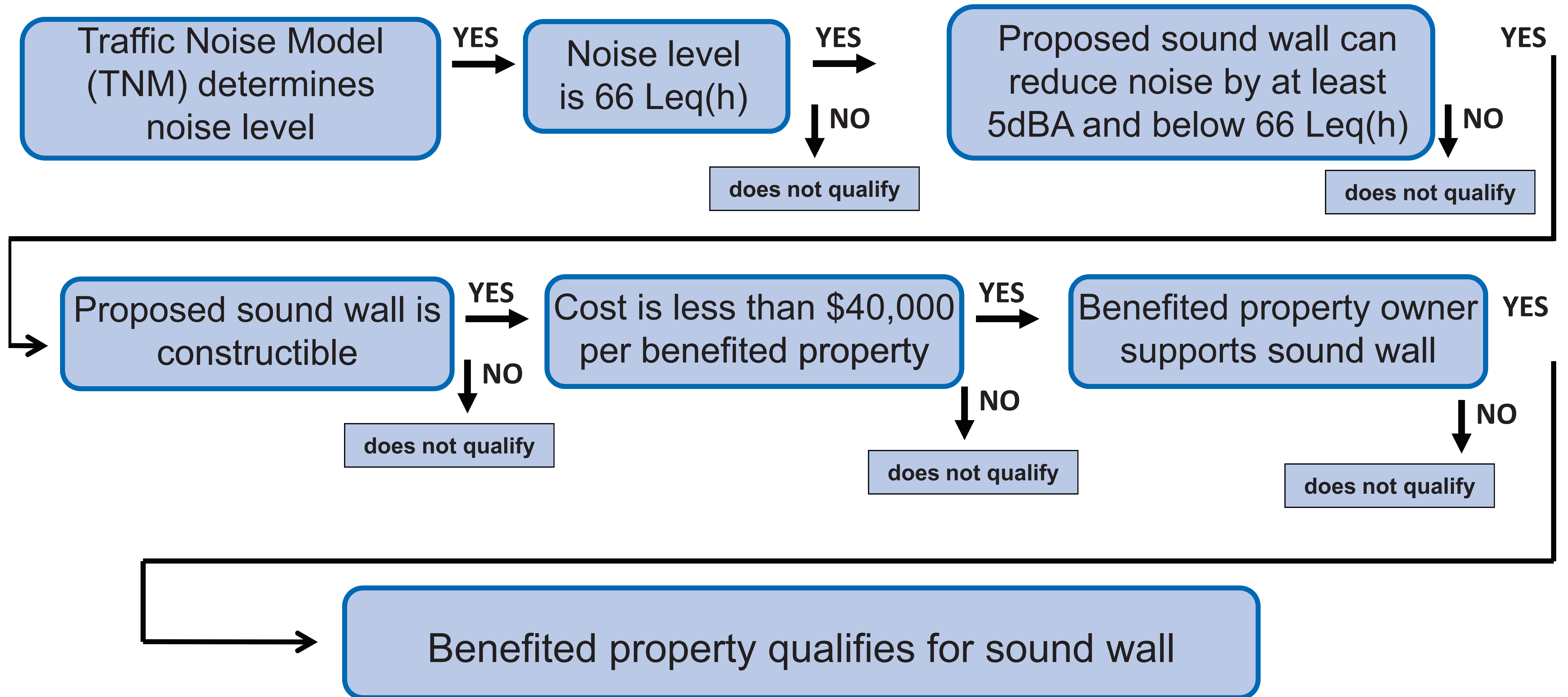
- ❖ **Pre-existing Conditions:** Only consider impact for properties with active land use categories that predate this policy
- ❖ **Retrofitting:** Repair or replace existing noise walls in kind
- ❖ **Ranking:** Abatement projects are ranked by total cost, effectiveness, sound levels in area

Cost Reasonableness and Feasibility

- ❖ Noise reduction of 5 decibels is achievable
- ❖ Predicted noise reduction meets Noise Abatement Criteria
- ❖ Total cost per benefited property is less than \$40,000
- ❖ Right-of-way, if required, is donated to the Authority



Noise Abatement Process for New Residential Sound Wall Development





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Next Steps

Station 3

Next Steps

- ❖ **June:** Begin development of Traffic Noise Model
- ❖ **July/August:** Board approves Noise Policy
- ❖ **November:** Complete condition assessment of existing sound walls and plan for sound wall remediation
- ❖ **December:** Complete design standard for sound walls
- ❖ **1st Quarter 2011:** Complete Traffic Noise Model and project eligibility





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Aerial Photos

Station 4

Dulles Toll Road Existing Sound Walls



Legend
Existing Sound Wall

0 150 300 Feet

Aerial Source: I3 Imagery, September 15, 2007

Dulles Toll Road Existing Sound Walls



Dulles Toll Road Existing Sound Walls

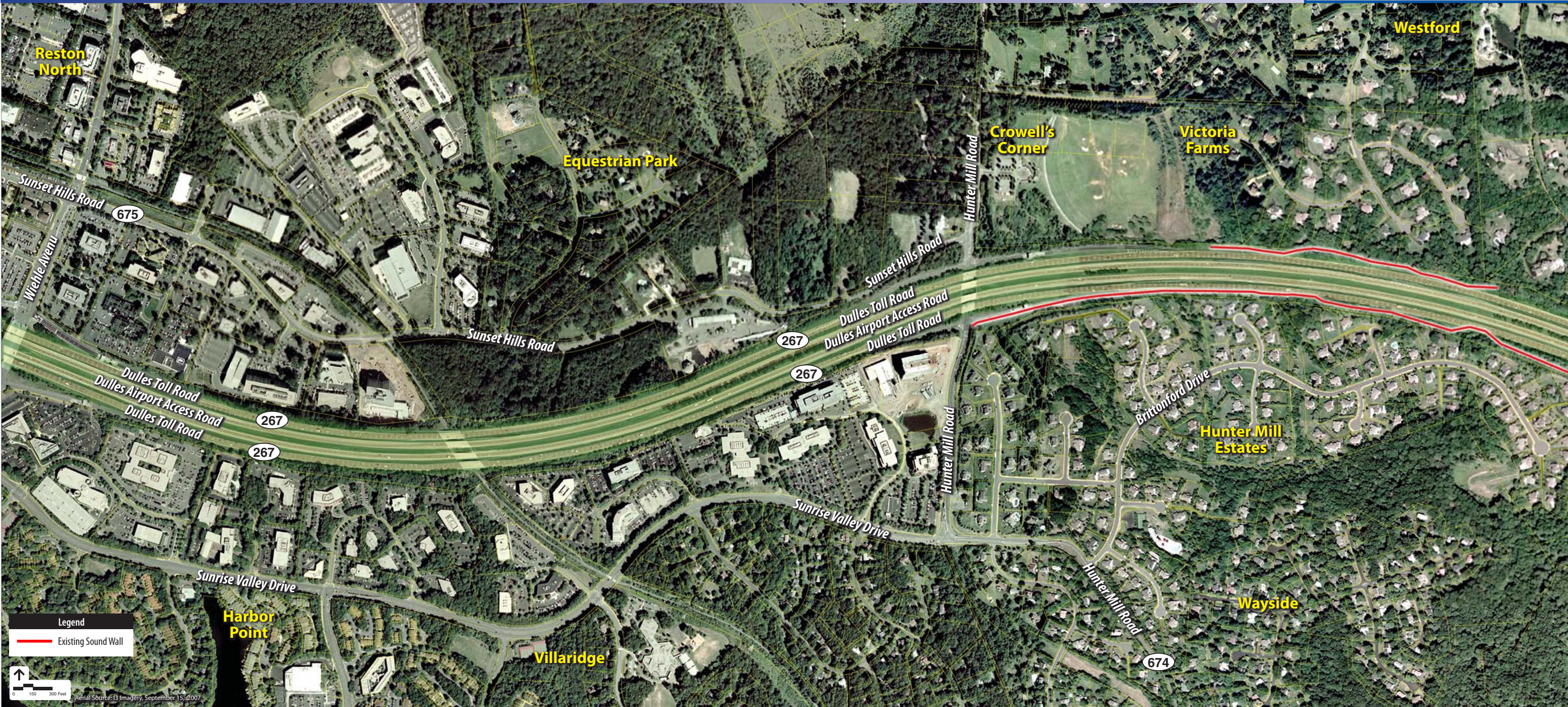


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Aerial Source: 13 Imagery, September 15, 2007

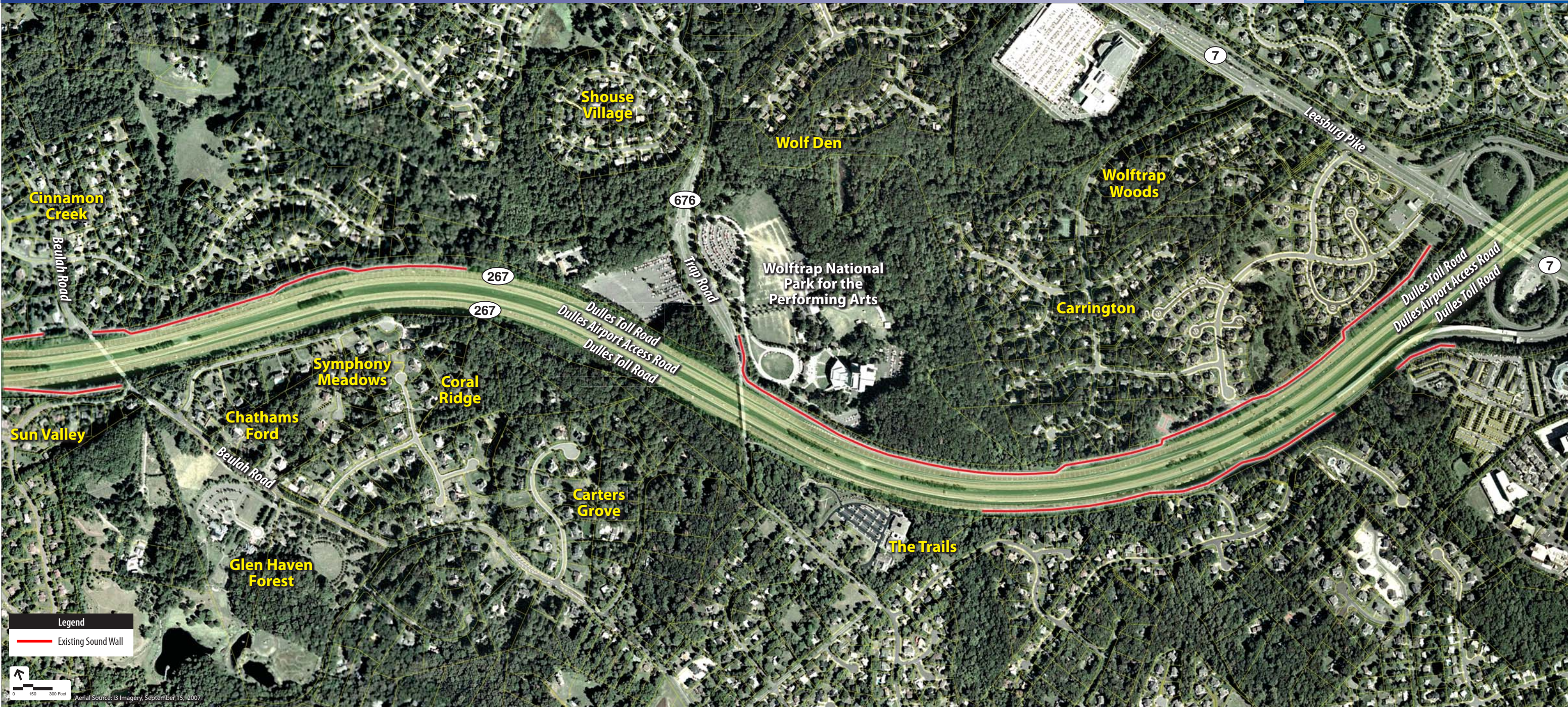
Dulles Toll Road Existing Sound Walls



Legend
Existing Sound Wall

0 150 300 Feet
Aerial Source: 13 Imagery, September 15, 2007

Dulles Toll Road Existing Sound Walls



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