

Residential Heat Pump and A/C installations

Listed below are some common problems and potential solutions regarding compliance with the City of Seattle's Noise Ordinance.

If your particular situation is not addressed here. Please contact one of the Noise Abatement Coordinators for guidance.



Common problems and potential solutions

Excessive noise levels are generally caused by one or more of the following:

- The equipments sound rating (per ARI 270) is too high for the selected location.
- The distance from the neighbor's property line to the unit is insufficient for compliance.
- Lack of sound attenuating barrier (unit can be seen and heard from the upper floors of neighboring property).



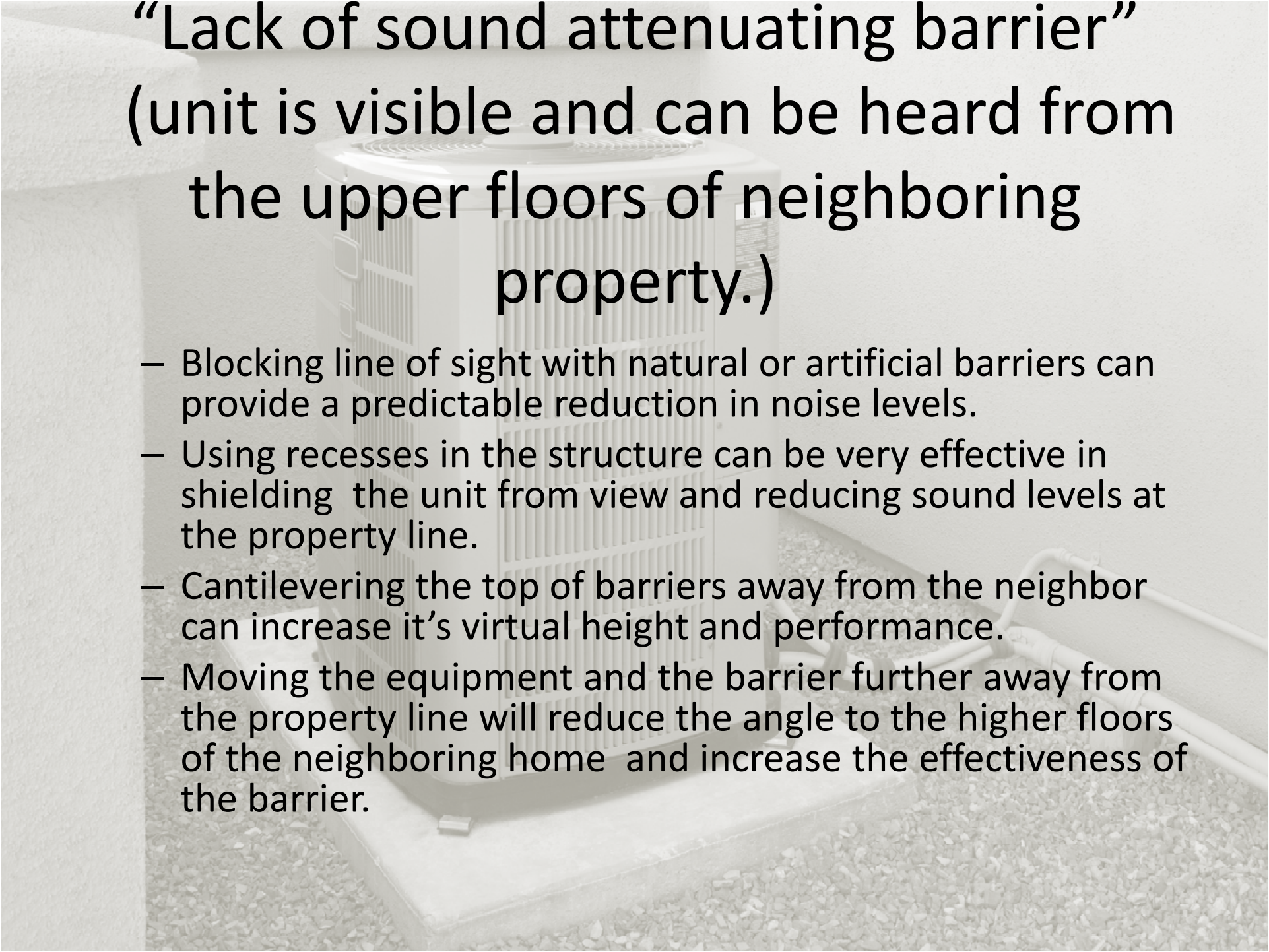
“The equipments sound rating is too high for the selected location”

- Change the equipment to a quieter model or install a “Quiet Package”.
(Quiet Packages provide insulation for the condenser and quieter fan blades.)
- Locating the equipment further away from the property line will reduce the noise level.



“The distance from unit to the property line is insufficient for compliance”

- This is typically a problem for H/P’s installed in “minimum” side yards
- Front or rear yards are a better choice for H/P installation.
- Installing the unit facing the street or alley typically will provide the required distance to neighboring property line.

A grayscale photograph of an air conditioning unit mounted on a rooftop. The unit is partially enclosed by a concrete barrier that has a recessed section in front of it. The background shows a clear sky and a distant horizon.

“Lack of sound attenuating barrier” (unit is visible and can be heard from the upper floors of neighboring property.)

- Blocking line of sight with natural or artificial barriers can provide a predictable reduction in noise levels.
- Using recesses in the structure can be very effective in shielding the unit from view and reducing sound levels at the property line.
- Cantilevering the top of barriers away from the neighbor can increase it's virtual height and performance.
- Moving the equipment and the barrier further away from the property line will reduce the angle to the higher floors of the neighboring home and increase the effectiveness of the barrier.

Failed Noise Review

ft.	[m]	Factor Value (dB)
4	1.2	9.5
5	1.5	11.5
6	1.8	13.0
7	2.1	14.5
8	2.4	15.5
9	2.7	16.5
10	3.0	17.5
15	4.6	21.0
20	6.1	23.5
25	7.6	25.5
30	9.1	27.0
40	12.2	29.5
50	15.2	31.0
60	18.3	33.0
70	21.3	34.5
80	24.4	35.5
90	27.4	36.5
100	30.5	37.5
125	38.1	39.5
150	45.7	41.0
175	53.3	42.5
200	61.0	43.5
400	122.0	49.5

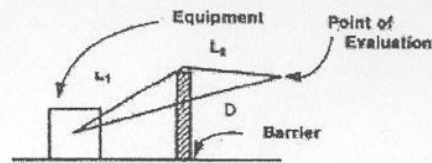
4.2. Procedure for Estimating Sound Pressure Levels - Single Unit Installation. The basic procedure for estimating A-Weighted sound pressure levels at a given point of evaluation consists of combining the sum of the application and evaluation factors with the Sound Rating Level for the equipment:

Sound Rating Level from ARI 270	72 dB
+ Equipment Location Factor	+ 6 dB
- Barrier Shielding Factor	- 0 dB
- Distance Factor	- 12 dB

Estimated A-Weighted Sound Pressure Level 66 dB

Must be 55 or less for AC (daytime use)

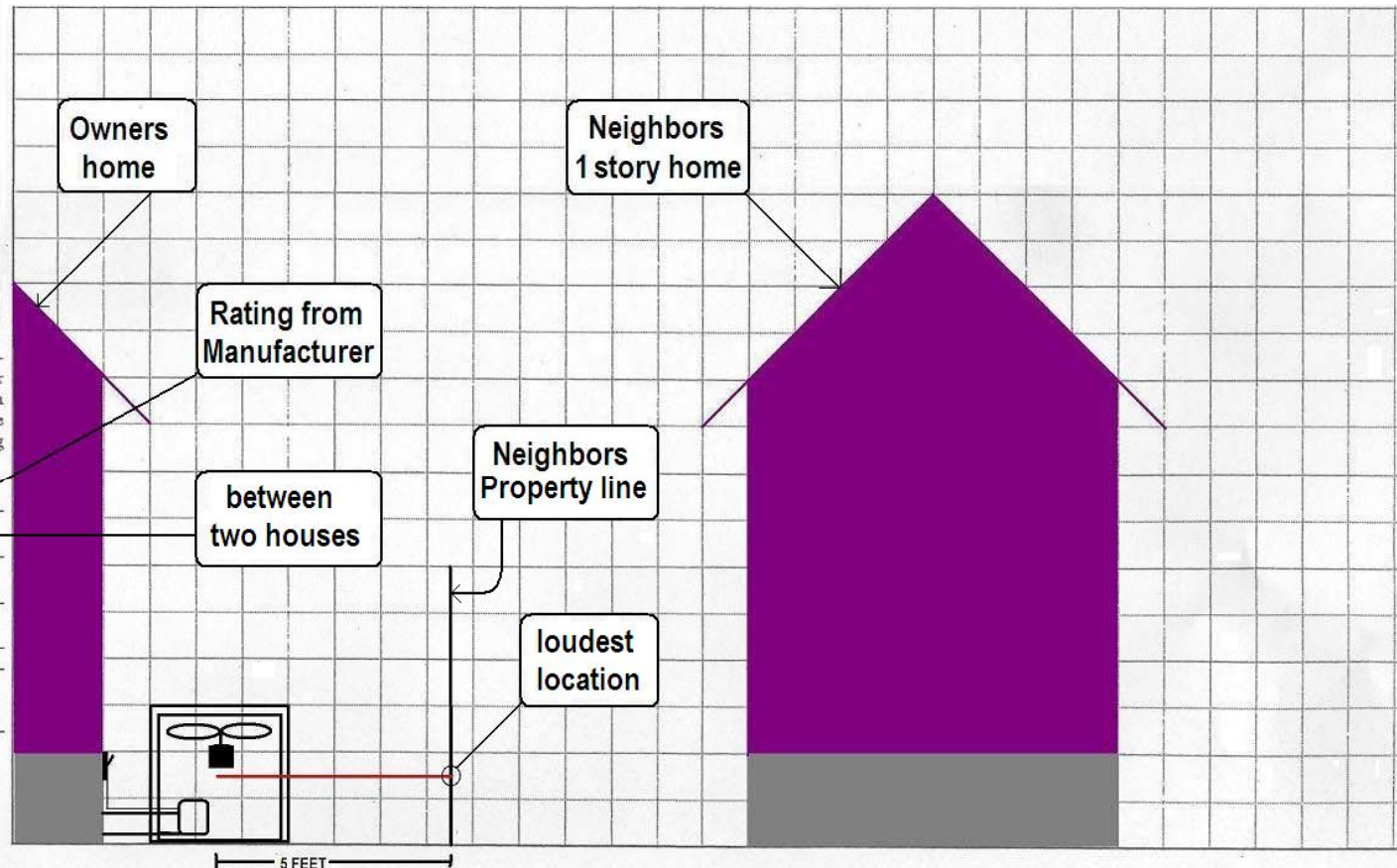
$L = L_1 + L_2 - D$, where:



$L_1 + L_2$ = Distance from equipment point of evaluation around barrier (Use minimum $L_1 + L_2$ value.)

D = Direct distance from equipment to point of evaluation with no barrier. Determine D by layout sketch.

L ft. [m]	Factor Value
0.5 [0.15]	4 dB
1 [0.3]	7 dB
2 [0.6]	10 dB
3 [0.9]	12 dB
6 [1.8]	15 dB
12 [3.7]	17 dB



Approved Noise Review

ft.	[m]	Factor Value (dB)
4	1.2	9.5
5	1.5	11.5
6	1.8	13.0
6.75	2.1	14.5
7	2.4	15.5
8	2.7	16.5
9	3.0	17.5
10	4.6	21.0
15	6.1	23.5
20	7.6	25.5
25	9.1	27.0
30	12.2	29.5
40	15.2	31.0
50	18.3	33.0
60	21.3	34.5
70	24.4	35.5
80	27.4	36.5
90	30.5	37.5
100	38.1	39.5
125	45.7	41.0
150	53.3	42.5
175	61.0	43.5
200	122.0	49.5

4.2 Procedure for Estimating Sound Pressure Levels - Single Unit Installation. The basic procedure for estimating A-Weighted sound pressure levels at a given point of evaluation consists of combining the sum of the application and evaluation factors with the Sound Rating Level for the equipment:

Sound Rating Level from ARI 270	69 dB
+ Equipment Location Factor	+ 6 dB
- Barrier Shielding Factor	- 7 dB
- Distance Factor	- 14 dB

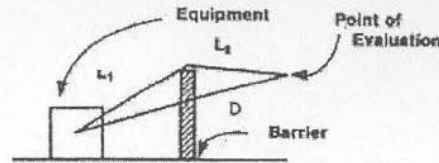
Estimated A-Weighted Sound Pressure Level

54 dB

Okay for daytime AC with signed agreement

Must be 45 or less for HP (nighttime use)

$L = L_1 + L_2 - D$, where:



$L_1 + L_2$ = Distance from equipment point of evaluation around barrier (Use minimum $L_1 + L_2$ value.)

D = Direct distance from equipment to point of evaluation with no barrier. Determine D by layout sketch.

$$5.25' (L_1) + 2.5' (L_2) - 6.75' (D) = 1'$$

L ft. [m]	Factor Value
0.5 [0.15]	4 dB
1 [0.3]	7 dB
2 [0.6]	10 dB
3 [0.9]	12 dB
6 [1.8]	15 dB
12 [3.7]	17 dB

