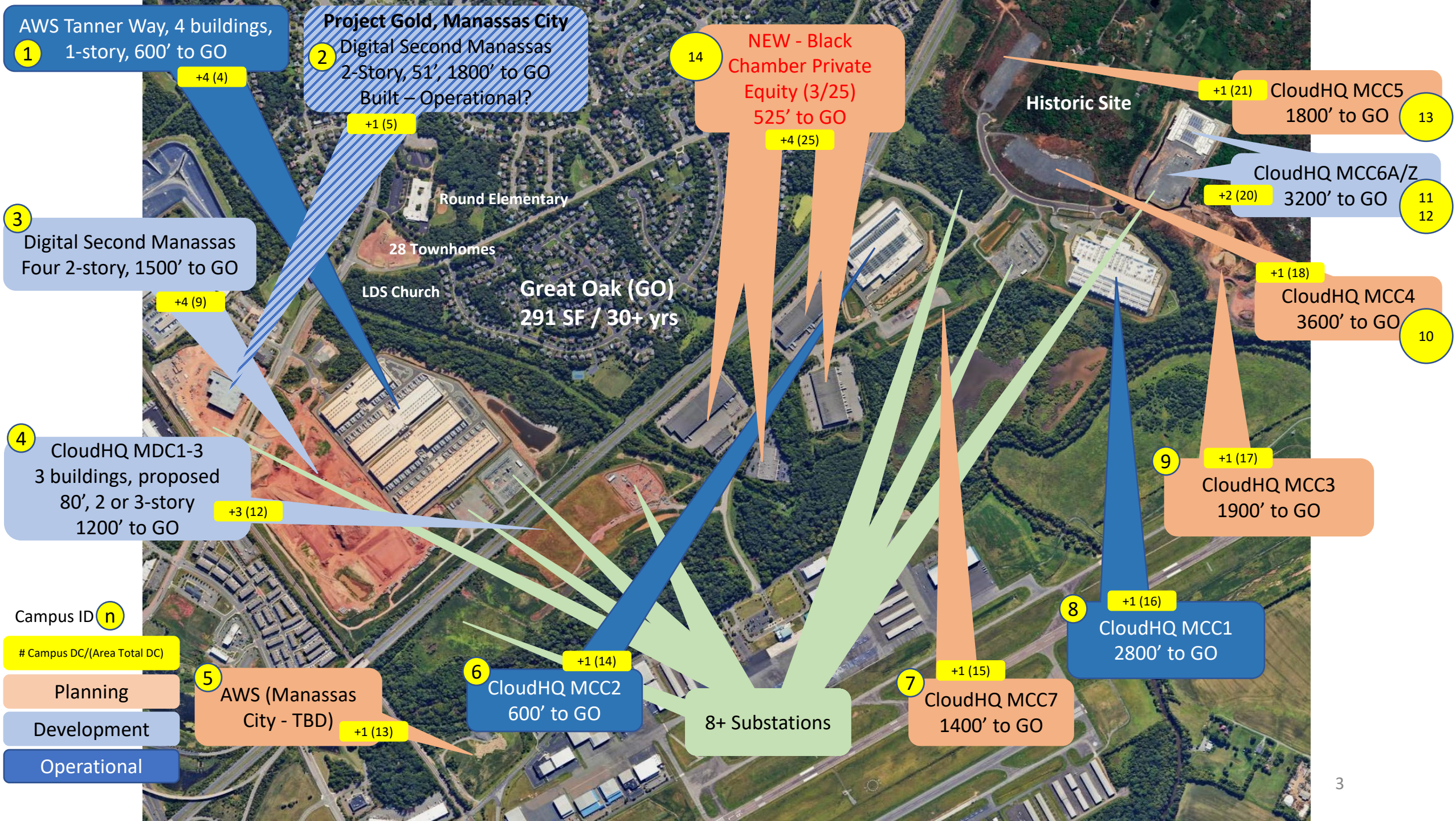
Great Oak Status - DCOAG Proposed Ordinance Levels 19 March 2025

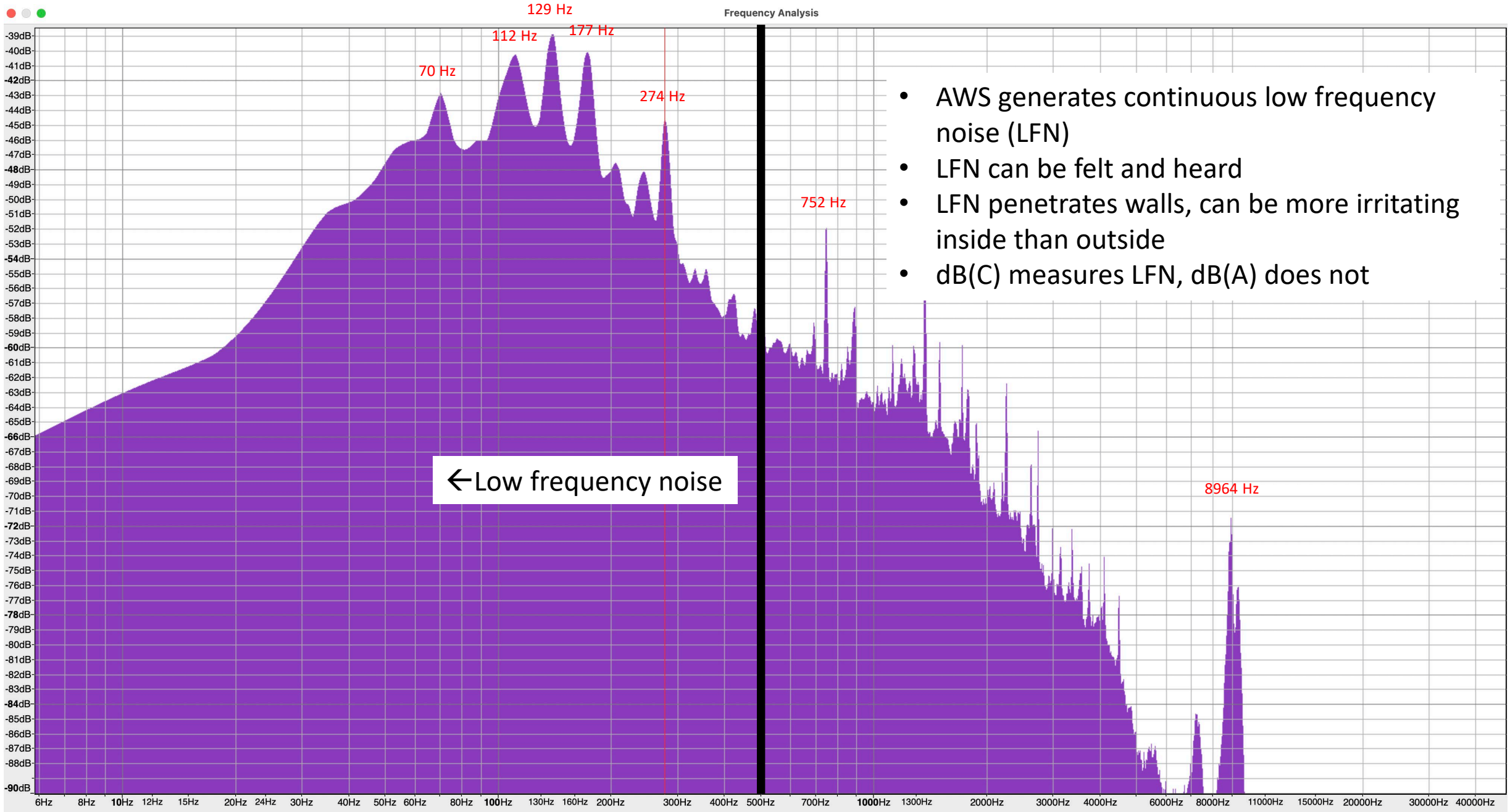
Great Oak Subdivision

Dale Browne (Great Oak)

BOCS Meeting Notable Moments

- Discussion on octaves, focused on dBA levels, not dB(C) (see slide 5)
- Great Oak data discounted as ”not having octave bands”. True but misrepresents 3 years of dBA and 5 months of dB(C)
  - PWC (Wade and Nelson) tests were at best instantaneous and CANNOT accurately reflect the 24x7 lived experience
- Great Oak measurements were masked by traffic noise. This is the result of testing from 4:30 AM to 5:00
  - Commuters have always been early from PWC to DC
  - Trash trucks also stage at community entrances at 5 AM
  - Construction (dirt) trucks are also out early, note Sup. Gordy’s Jake Break worry
- There is no solution for multiple data centers, aside from a discussion on needing a noise budget
  - A noise budget will require a significant reduction in levels. 60/65 db has to come down by up to 9 decibels for the area surrounding Great Oak.


AWS Tanner Way, 4 buildings, 1-story, 600’ to GO
1
+4 (4)
Project Gold, Manassas City
Digital Second Manassas
2-Story, 51’, 1800’ to GO
Built – Operational?
2
+1 (5)
14
NEW - Black Chamber Private Equity (3/25)
525’ to GO
+4 (25)
Historic Site
+1 (21)
CloudHQ MCC5
1800’ to GO
13
CloudHQ MCC6A/Z
3200’ to GO
+2 (20)
11
12
Round Elementary
28 Townhomes
LDS Church
Great Oak (GO)
291 SF / 30+ yrs
3
Digital Second Manassas
Four 2-story, 1500’ to GO
+4 (9)
+1 (18)
CloudHQ MCC4
3600’ to GO
10
4
CloudHQ MDC1-3
3 buildings, proposed
80’, 2 or 3-story
1200’ to GO
+3 (12)
9
+1 (17)
CloudHQ MCC3
1900’ to GO
Campus ID n
Campus DC/(Area Total DC)
Planning
Development
Operational
5
AWS (Manassas City - TBD)
+1 (13)
6
+1 (14)
CloudHQ MCC2
600’ to GO
8+ Substations
7
+1 (15)
CloudHQ MCC7
1400’ to GO
8
+1 (16)
CloudHQ MCC1
2800’ to GO



AWS Tanner Way Noise Signature – After louver changes (10/20/24)

Sec. 14-4. Industrial, Construction and Commercial Noise

14-4.1 - Maximum permissible sound levels generally.

A. Location, Type of Noise and Measurement

Except as otherwise provided, any noise which emanates from any operation, activity or source and which exceeds the maximum permissible sound pressure levels established in Tables 14.4.1 and 14.4.2 below is hereby prohibited. The location of the measurement shall determine the applicable zoning district classification noise limit. At property boundaries between dissimilar zoning district classifications, the limits of the more restrictive classification shall apply.

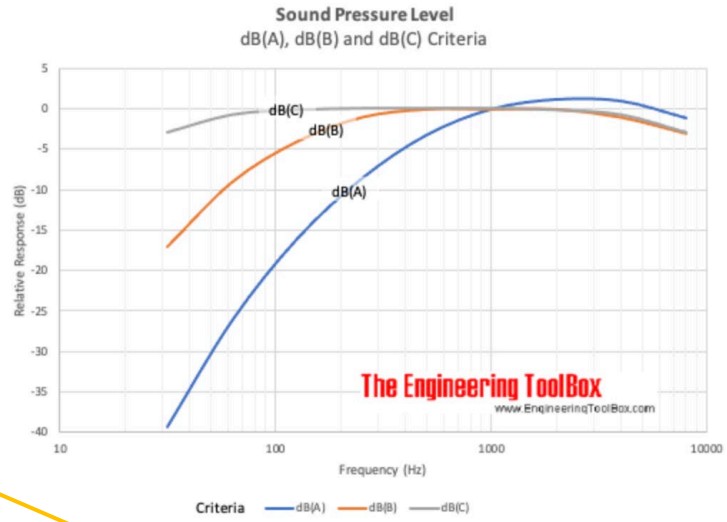
These numbers include a +5 dB increase to help mitigate the impact on other noise emitting entities. The DCOAG has not agreed to this. The resident team has proposed that continuous emitters be separately addressed at lower levels (w/o +5 dB at a minimum).

Table 14-4.1 MAXIMUM PERMISSIBLE EQUIVALENT CONTINUOUS SOUND PRESSURE LEVELS (Leq)

Zoning District Classification	Maximum dBA Daytime	Maximum dBA Nighttime	Maximum dBC Daytime	Maximum dBC Nighttime
Residential	52	47	65	60
Mixed Use	62	57	70	65
Commercial	65	60	75	75
Industrial	79	72	80	80

Table 14-4.2 MAXIMUM PERMISSIBLE MEDIAN SOUND PRESSURE LEVELS (L_{50}) FOR RESIDENTIAL ZONING DISTRICTS

OCTAVE BAND (Hz)	DAYTIME	NIGHTTIME
31.5	65	60
63	60	55
125	55	50
250	50	45
500	45	40
1,000	41	36
2,000	38	33
4,000	36	31
8,000	35	30

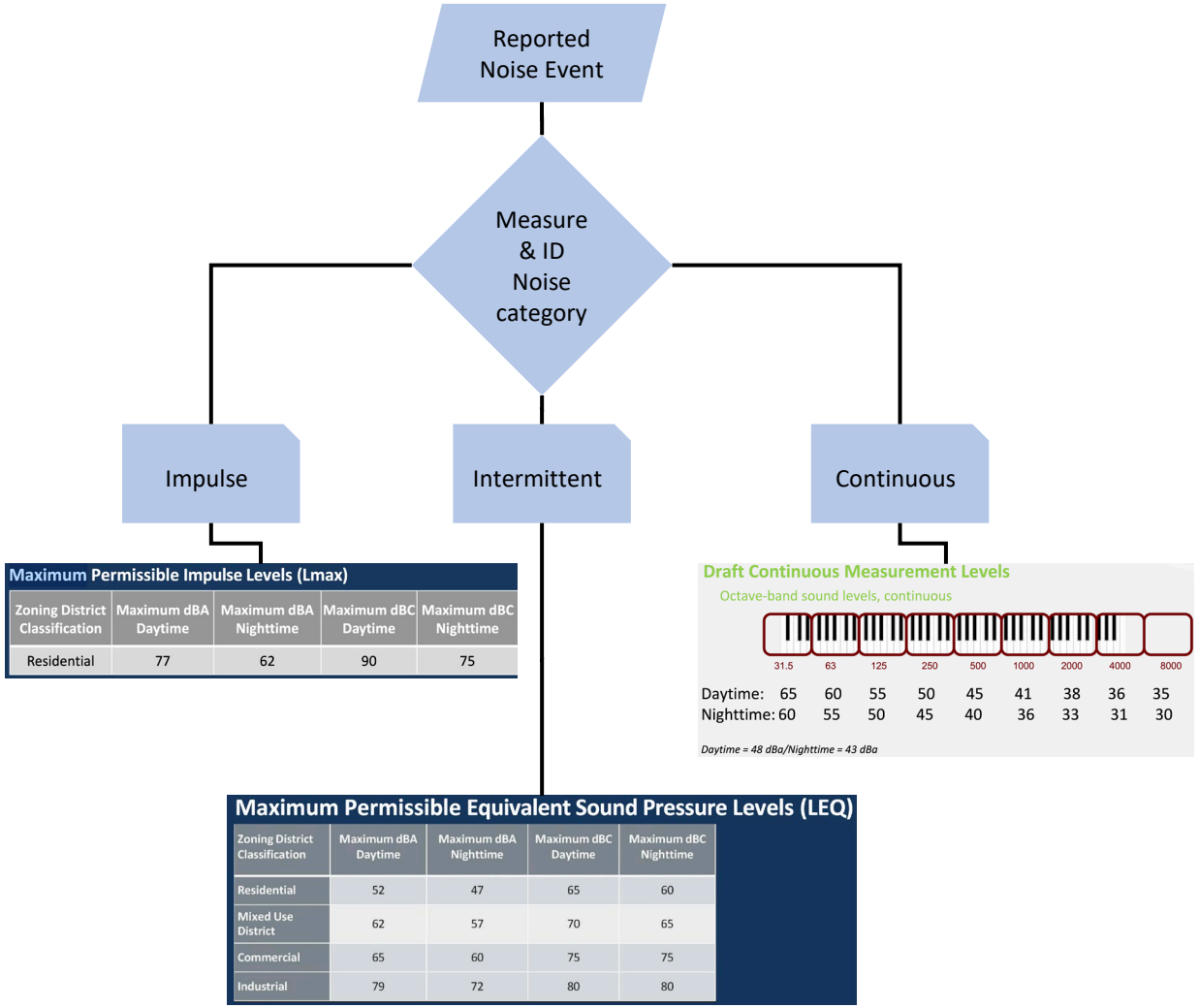


Higher than Leq Table for dBC?

dB Calculator

	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB	dB(A)
Nighttime	60	55	50	45	40	36	33	31	30	61.7	43.3
Daytime	65	60	55	50	45	41	38	36	35	66.7	48.3

How does the new ordinance determine violations?



14-4.2(4) Ongoing operations or activities shall be measured over a minimum 10-minute duration.

a. This requirement shall not prohibit county staff or law enforcement from collecting shorter-duration observations subject to nuisance complaints regarding short-term activities or operations. Such observations shall consist of a minimum of three instantaneous readings, or a minimum 60-second duration reading. The geometric mean of these readings will be used as the average sound level and compared to the levels set forth in section 14-4 above.

b. If the background noise is equal to the levels set forth in section 14-4 above, three dB shall be subtracted out of the average sound level.

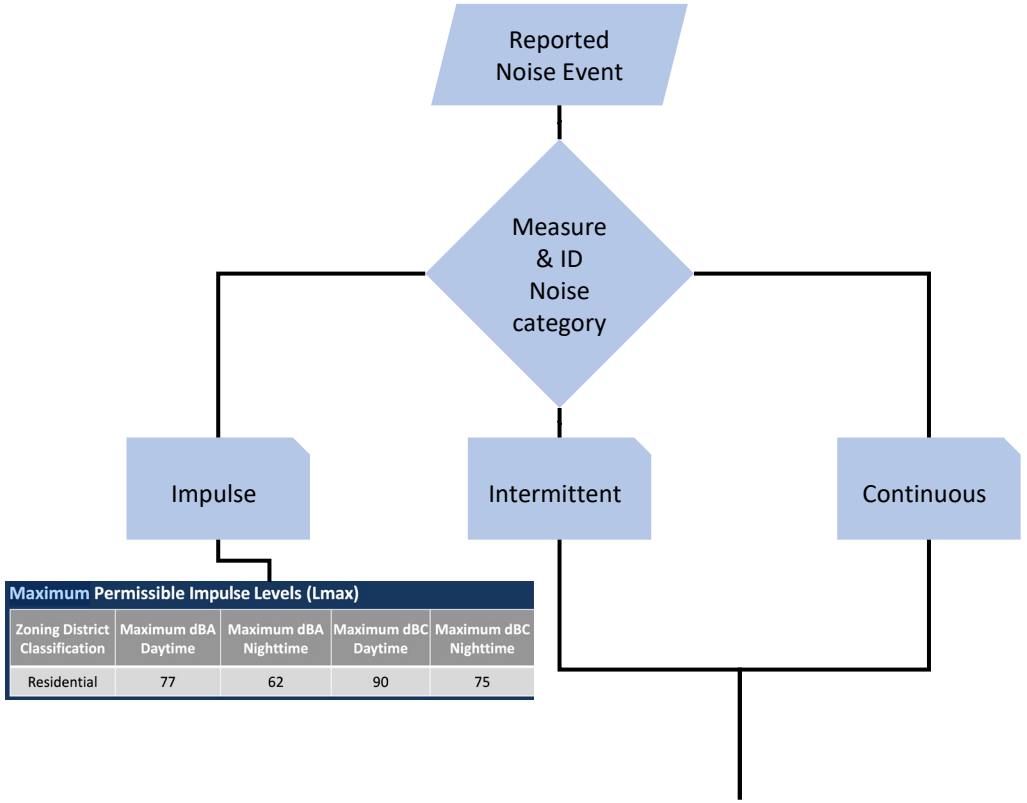
c. Impulse sound sources observed to have Lmax exceeding Leq by 25 dB during daytime hours, or by 15 dB during nighttime hours, shall have 5 dB added to the measured Leq for purposes of comparison to Table 14-4.1.

Questions

1. [b. above] What is background noise in Great Oak (already has noise) so how can one determine that 3 db should be subtracted?
2. [c. above] Impulse is determined by Lmax not Leq, so what does +5 to Leq do for enforcement?

How could the new ordinance be better?

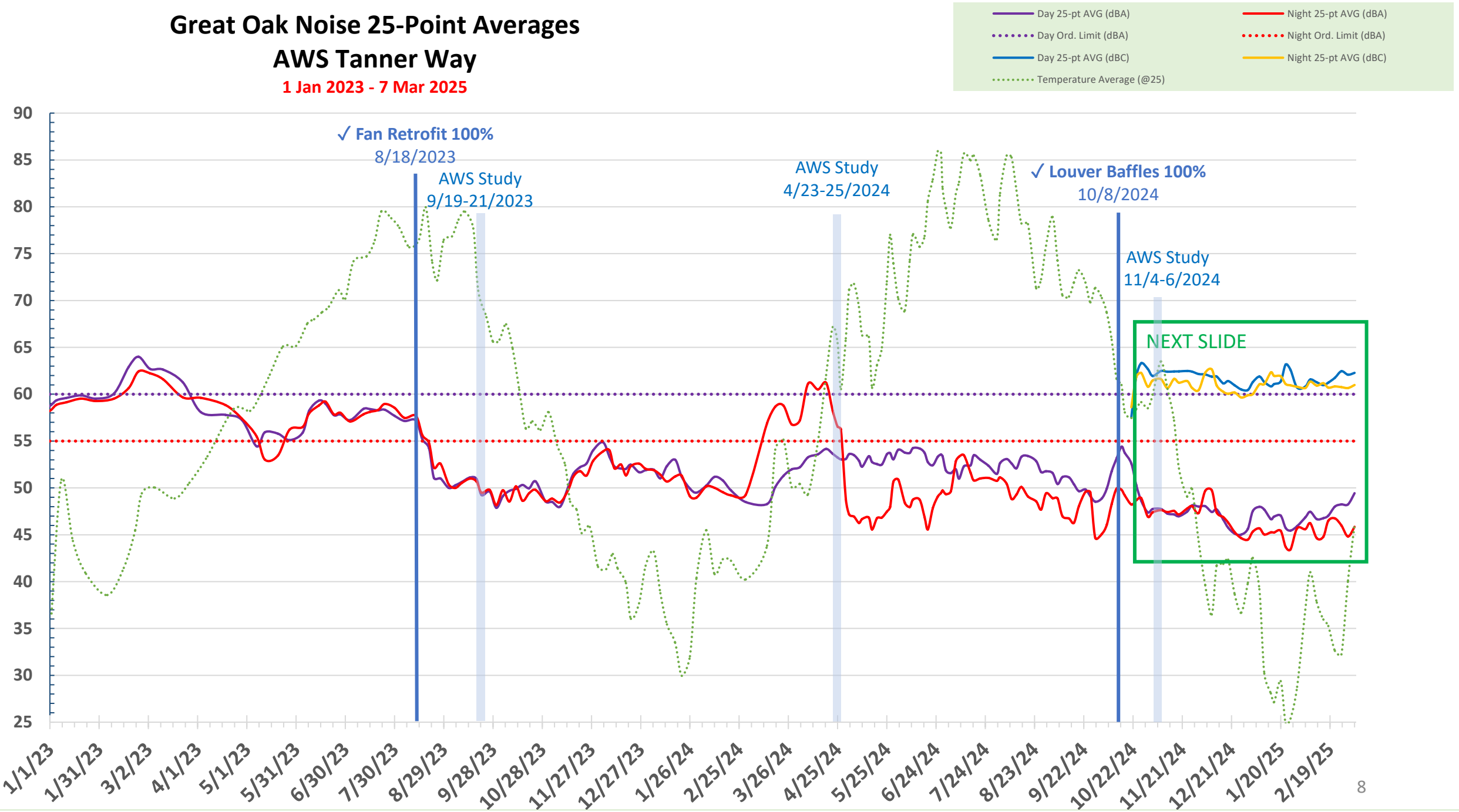
- Issues
  - Complicated process for PWC PD, requires calculation of geometric mean
  - Impulse (defined) and intermittent (not defined) are close in nature, but have different limits and methods (Lmax/Leq)
    - may be challenged in court by ”type of noise” since Impulse levels are more lenient.
  - Continuous (defined as “essentially constant”) uses octave bands requiring further measurement analysis/calculations
    - Requires 10 minutes of Leq to catagorize as Continuous
  - Added octave bands levels for CONTINUOUS noise results in higher dBC noise limits than the Intermittent table
    - Complicated measurement requiring special training and mathematical analysis
    - Legal challenges will be complicated and costly to PWC
- Change needed
  - Consider dropping octave bands
  - Apply table 14-4.2 to consistently to both Intermittent and Continuous noise
  - Reduce the Residential levels per this slide
    - Removes +5db buffer added by staff
    - Better supports “noise budgets” to address additive noise from N+x centers
    - Supported by 3 years of data recorded in Great Oak
    - Consider specific exemptions for non-industrial Intermittent noise, in the intermittent category, to manage concerns for hospitals and otherpublic entities



Maximum Permissible Impulse Levels (Lmax)

Zoning District Classification	Maximum dBA Daytime	Maximum dBA Nighttime	Maximum dBC Daytime	Maximum dBC Nighttime
Residential	77	62	90	75

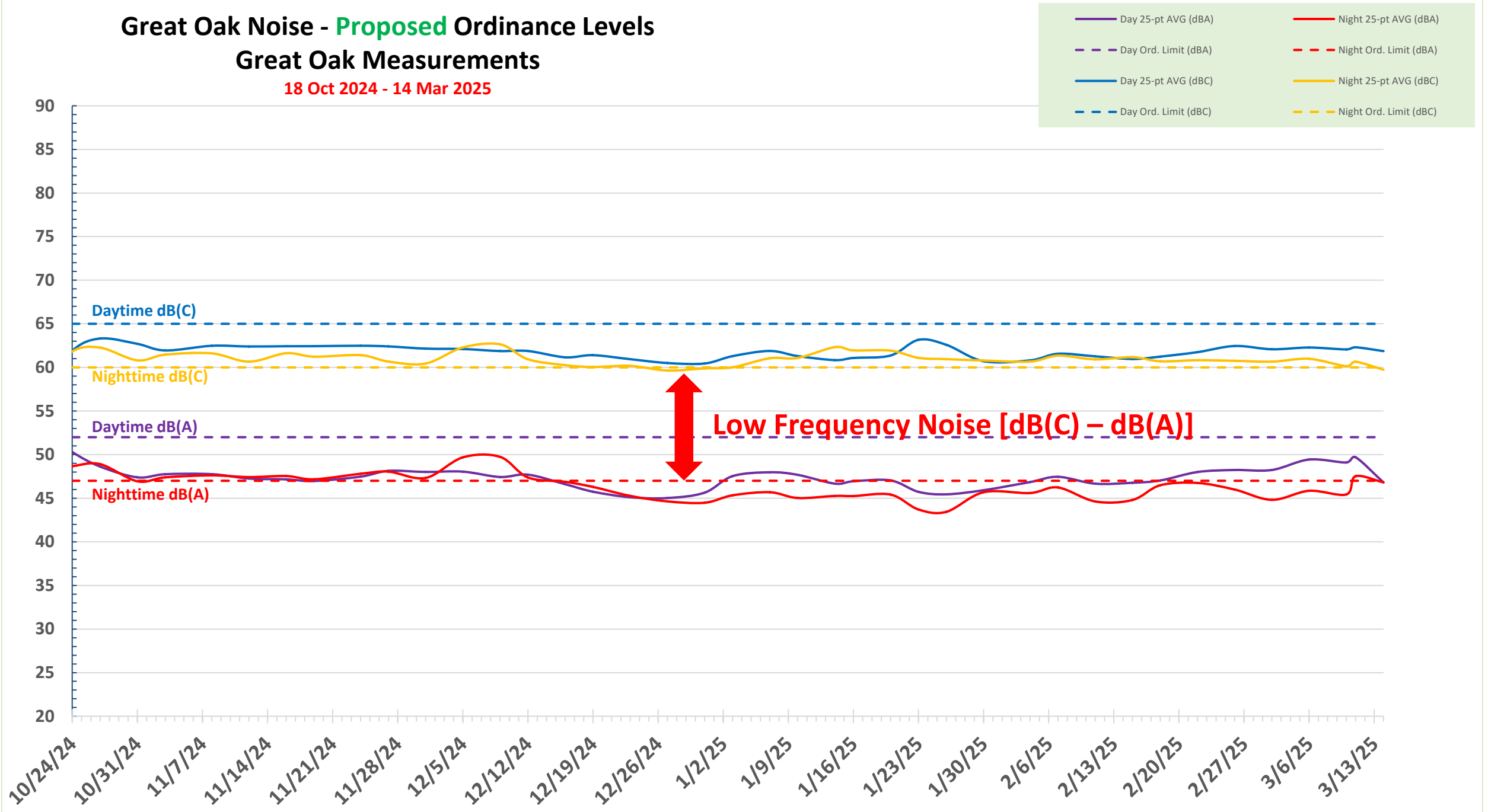
Great Oak Noise 25-Point Averages
AWS Tanner Way
1 Jan 2023 - 7 Mar 2025



Great Oak Noise - Proposed Ordinance Levels

Great Oak Measurements

18 Oct 2024 - 14 Mar 2025



Resident testing design

Technical Requirements

- Two locations (which TBD)
  - 3-5 days w/weekend, outside
  - 3-5 days w/weekend, inside
  - Alternate inside on one, outside on the other for simultaneous
- Collect dB(C) and octave measurements
- Measurements set/agreed under consultation with Mr. Nelson
- Raw data shared with Dale to augment data set

Human Perception Requirements

- Log perceived disturbance during measurement periods, both inside and outside
- Perception questionnaire, taken prior to using the meter, an example
  - Scale 1-10, Noise intensity
  - Scale 1-10, Noise annoyance
  - Multiply then divide by 10, Plot against dBC and time of day
  - [db – needs thought and test]

Low Frequency Noise (LFN) Health Concerns

LFN is emitted within the range of 20 to 500* Hz by a variety of sources such as heating, cooling, and ventilation systems for buildings

In exposure to LFN, significant problems such as depression and mental dysfunction are seen in 3% to 5% more than prevalence in general population. Other problems observed following exposure to low-frequency sound include an increase in heart rate and potentially related problems.

Feelings of discomfort, agitation, and restlessness when exposed to LFN have been observed in other patients, which causes people to have difficulty in daily work and job performance.

National Institutes of Health: National Library of Medicine, National Center for Biotechnology Information

- *Health effects from low-frequency noise and infrasound in the general population: Is it time to listen? A systematic review of observational studies*

Christos Baliatsas [a], Irene van Kamp [b], Ric van Poll [b], Joris Yzermans [aa]Netherlands Institute for Health Services Research (NIVEL), Utrecht, The Netherlands[b]National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands, Epub 2016 Mar 17

Expectations

SOURCE: Prince William Times, Peter Cary, Feb 27.2023, *Some cities suffering from data center noise turn to tough limits*

"Data center noise is unique in that it is not so much its loudness that is an irritant as its constancy."

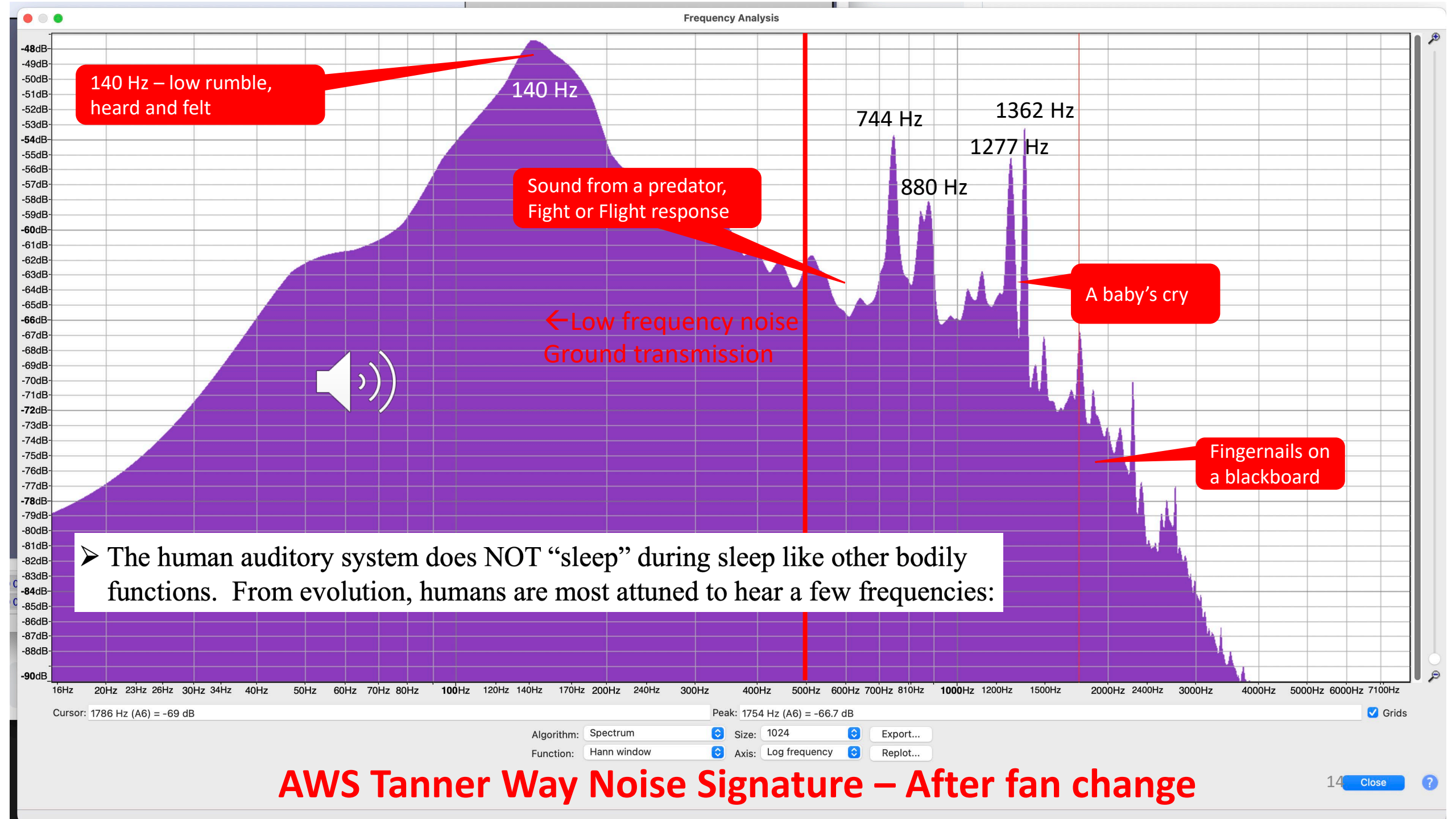
Les Blomberg, director of the Noise Pollution Clearinghouse *"Blomberg noted that typical noise limits are focused on transient noise and "not on the 24/7 drone that invades your house."* People say noise of 55 to 65 decibels (the range of Prince William's noise ordinance limit) is no louder than human conversation, he said, *"but it's like having a conversation with someone you don't want to have, all the time. That's the thing; there's no escaping it."*

"One solution could be to write an ordinance that penalizes the duration of noise. Alameda, California, regulates noise based not only on decibel level, but also its time length. The longer the noise continues, the quieter it must be. But Blomberg said such an ordinance requires a police officer to stay in place as long as an hour to measure noise duration. "It makes sense, but it's not enforceable" he said."

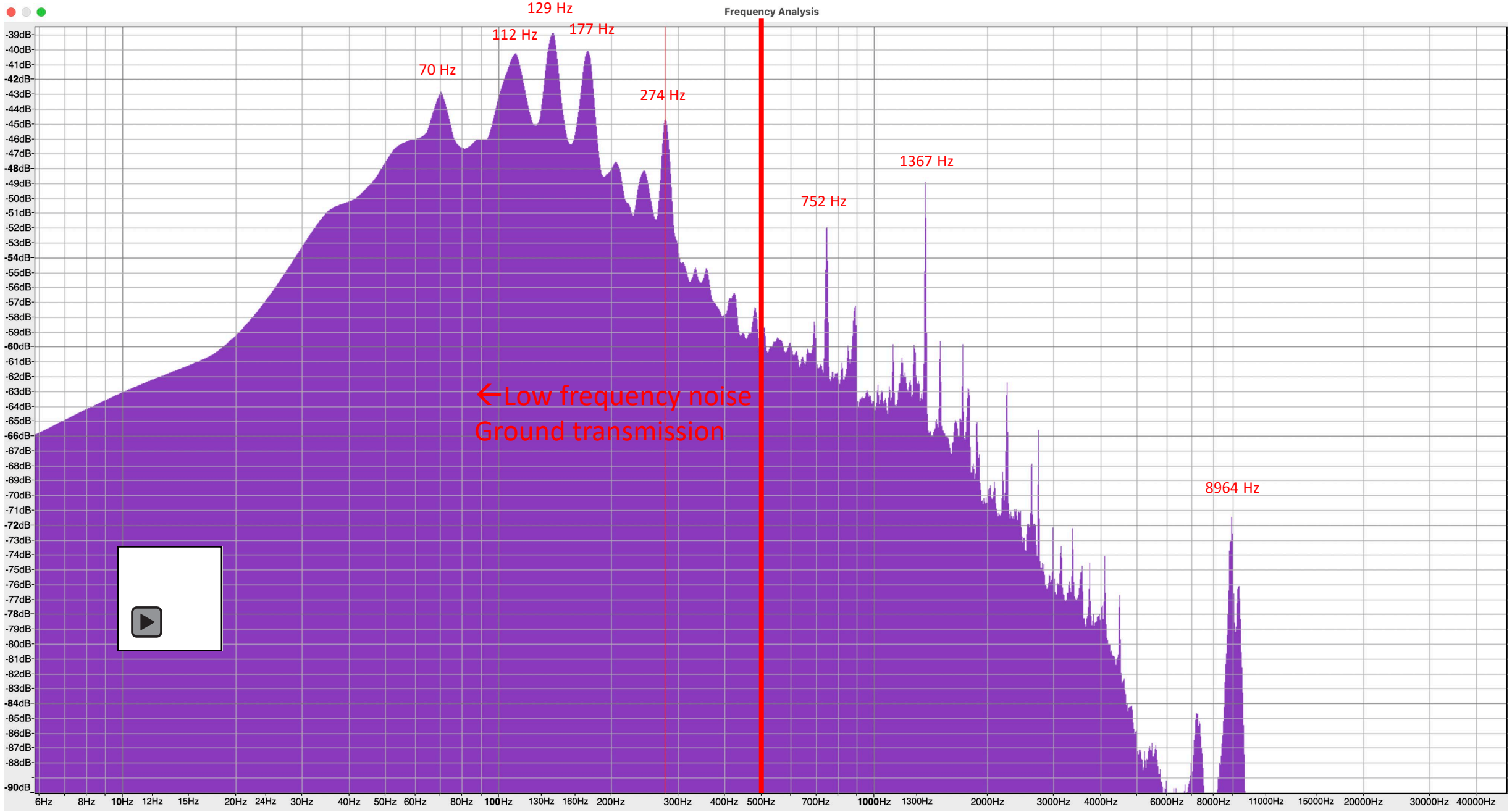
The better solution, he [Blomberg] said – as in Chandler and Niagara Falls – is to require emitters of nonstop noise to be especially quiet. "It's not unreasonable to choose a night level of 45 decibels," Blomberg said, "and a daytime limit of 50".

"Writing ordinances to deal with data center noise is relatively new", said Blomberg. But he and Eric Zwerling, who runs the Rutgers University Noise Technical Assistance Center, said "it can be done".

End of Presentation



AWS Tanner Way Noise Signature – After fan change



AWS Tanner Way Noise Signature – After louver changes (10/20/24)