

Tiger and Athletics Operations

Princeton Planning Board

January 21, 2021

TIGER Sound Levels

Existing Site Ambient Noise Levels
(no activity, 12:30 - 4:30pm):

45-50 dBA

Existing Site Ambient Noise Levels
(early evening levels, 7:00 - 7:30pm):

40-45 dBA

Existing Site Ambient Noise Levels
(discrete events - i.e. cars):

60-65 dBA

New Jersey Noise Code:

7:00am - 10:00pm: **max 65 dBA**

10:00pm - 7:00am: **max 50 dBA**

Predicted Noise Levels from TIGER
(all equipment running):

Location 1: **50-55 dBA**

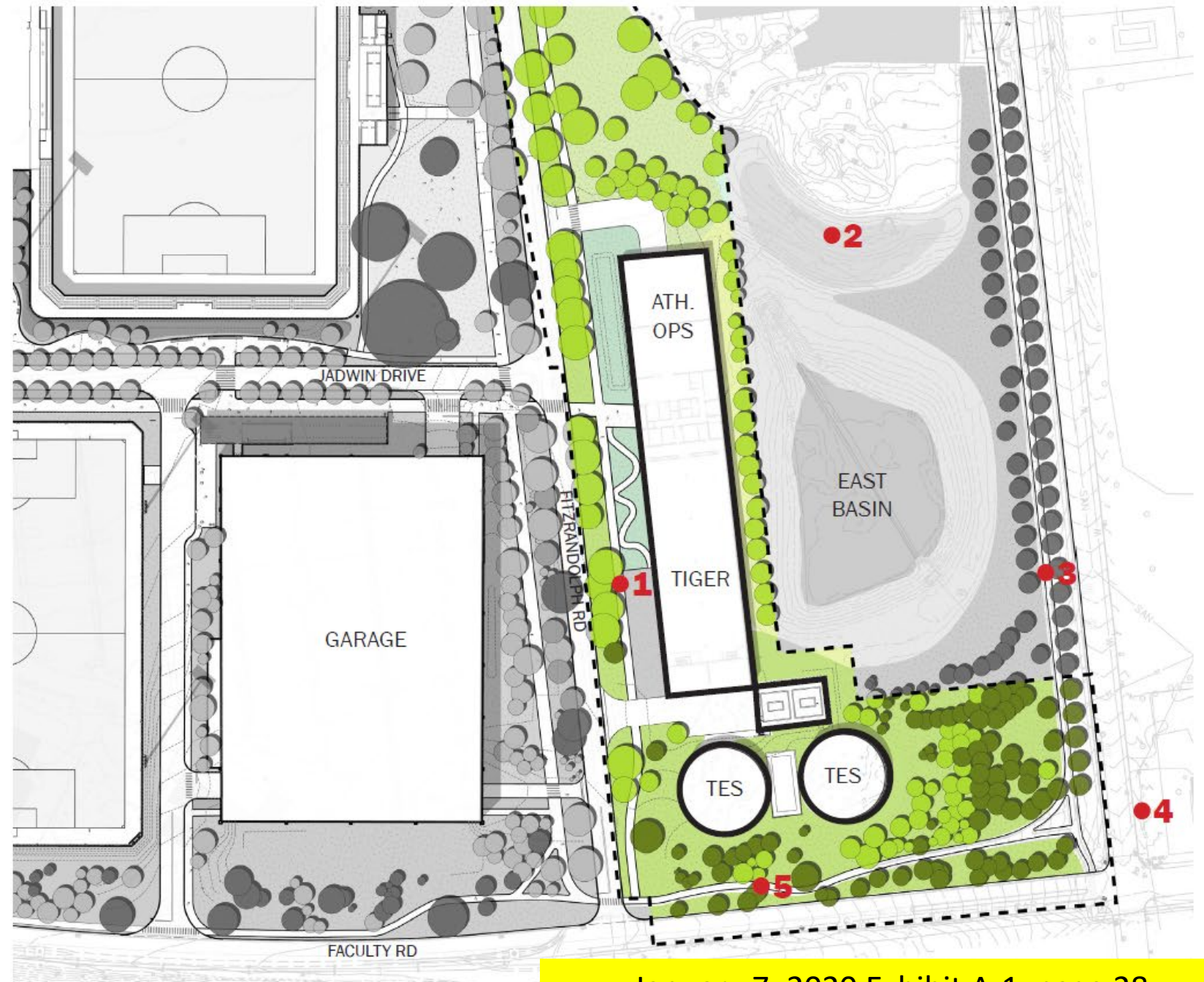
Location 2: **45-50 dBA**

Location 3: **45-50 dBA**

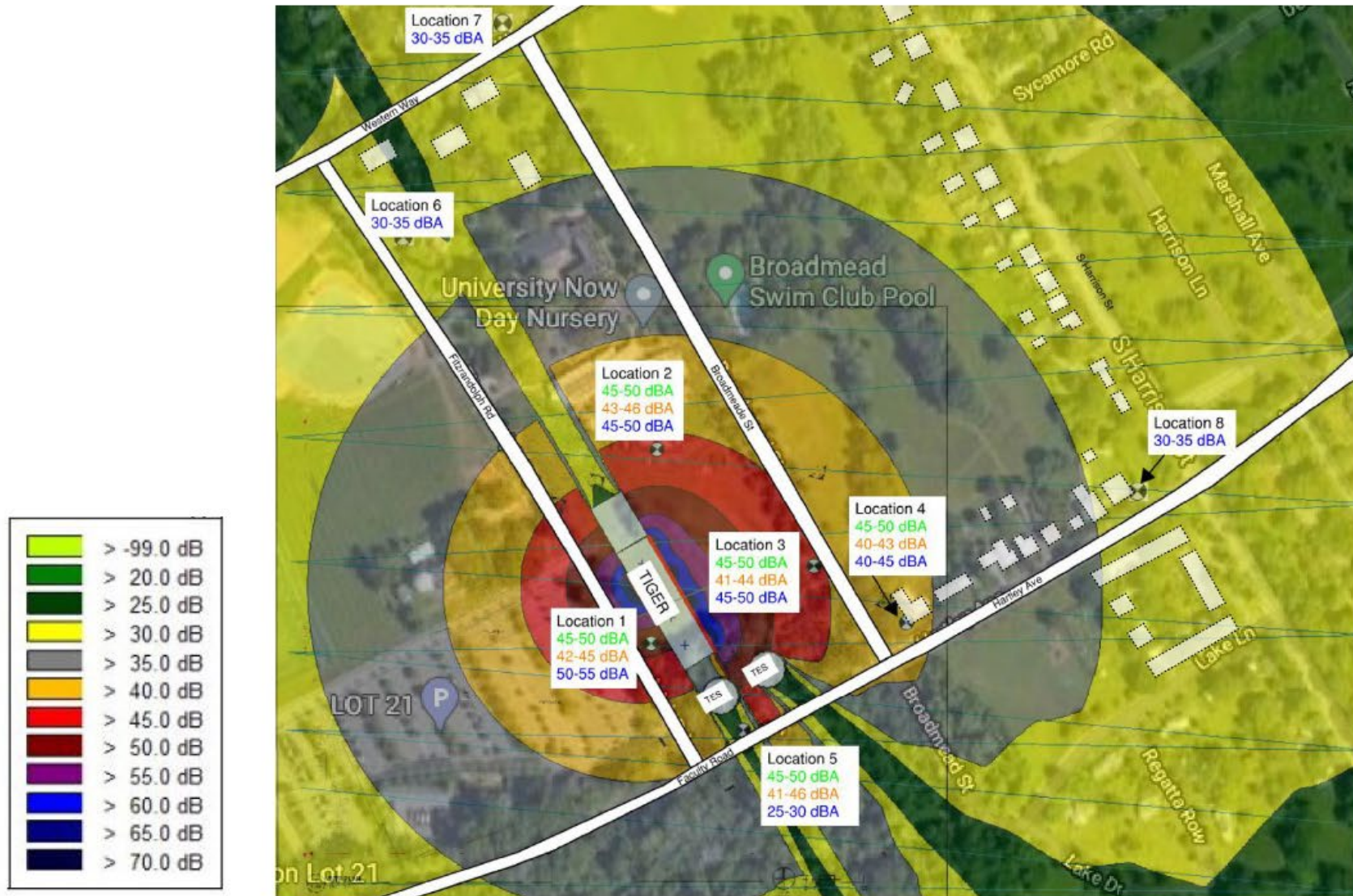
Location 4: **40-45 dBA**

Location 5: **25-30 dBA**

In areas where mechanical equipment noise is below ambient noise, ambient noise levels will dominate in this location (Location 5).

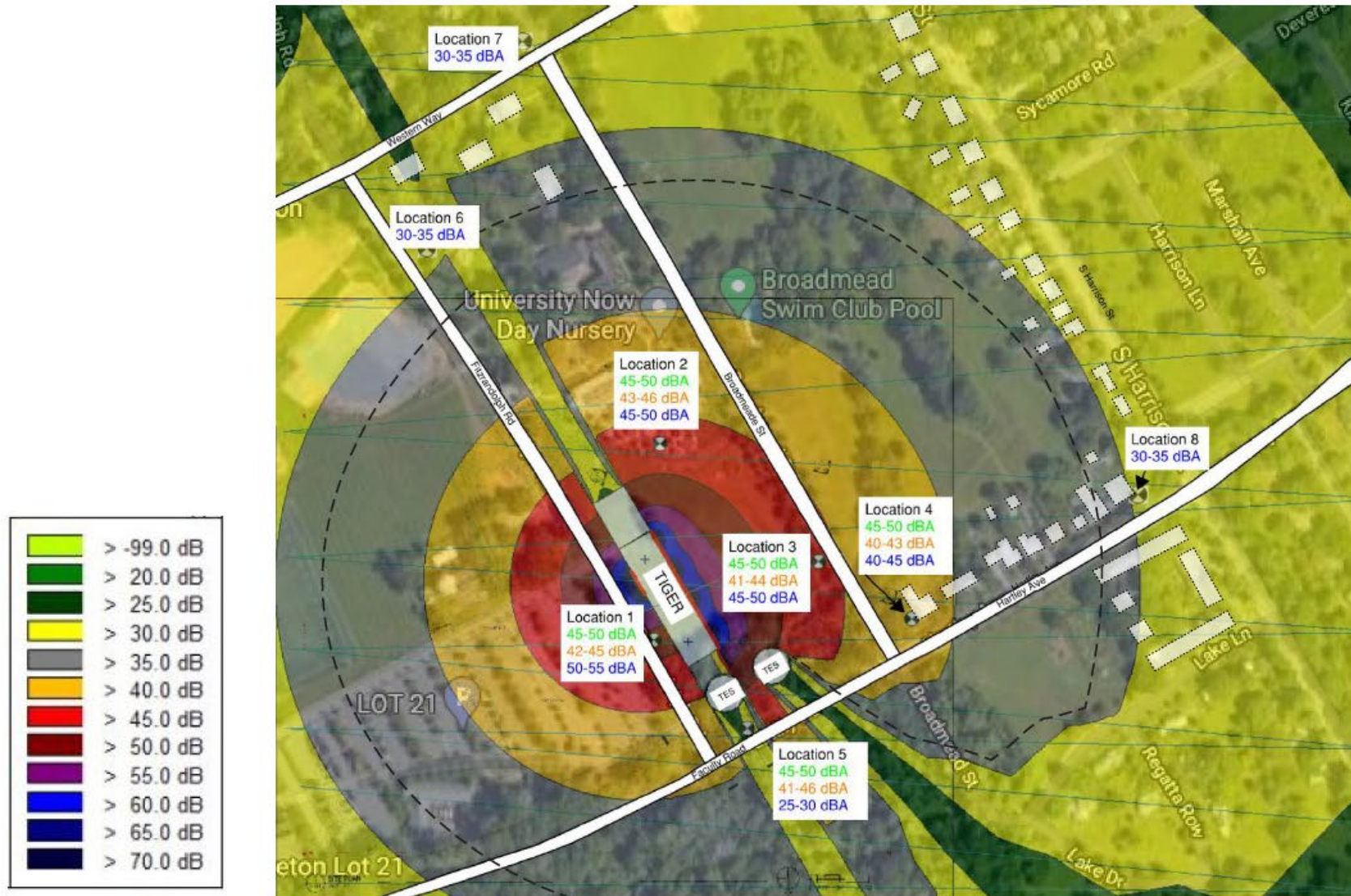


Sound Levels - Day One



Green Values: Ambient Sound Levels
Orange Values: Ambient Sound Levels - Early Evening
Blue Values: Predicted Sound Levels from all Equipment Operating Simultaneously

Sound Levels - Future



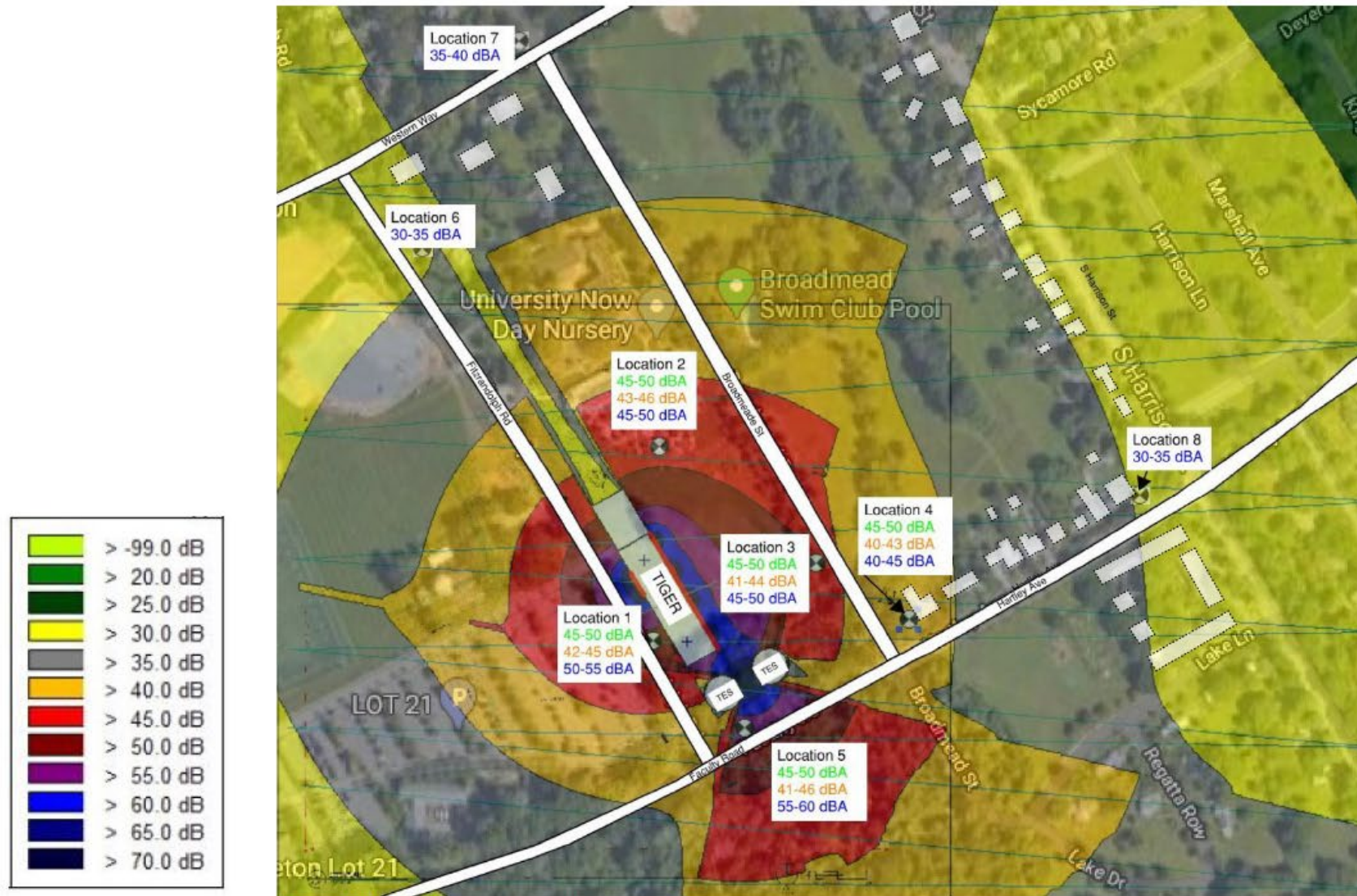
--- Sound levels - Day One for >35 dB

Green Values: Ambient Sound Levels

Orange Values: Ambient Sound Levels - Early Evening

Blue Values: Predicted Sound Levels from all Equipment Operating Simultaneously

Sound Levels - Future Emergency Generator



Green Values: Ambient Sound Levels
Orange Values: Ambient Sound Levels - Early Evening
Blue Values: Predicted Sound Levels from all Equipment Operating Simultaneously

TIGER and Athletic Operations

- **Why have acoustic reports evolved?**

- March 13, 2020 Site Acoustic Report: Submitted with TIGER/Athletic Operations site plan application.
 - October 14, 2020 SPRAB: Presented revised sound level predictions
- December 15, 2020 Site Acoustic Report: submitted December 23, 2020; *provided updated information and sound level predictions based on final equipment and building design as part of normal design evolution for facility.*
- March, 2020 and December, 2020 Site Acoustical Reports are available to the public on the Municipal website and at the University's public project page:
 - <https://facilities.princeton.edu/projects/tiger-and-athletic-operations>

- **Neighborhood Meetings**

- Information about the project shared and discussed at meetings hosted by University: January 7, 2020, June 23, 2020 and November 10, 2020
- Written responses to questions posed by the neighbors at these meetings were provided to the neighbors and posted on the same project webpage.

TIGER and Athletic Operations

- **How does the Acoustic Model work?**

- Sound data for the individual pieces of mechanical equipment is received from the mechanical engineer. This information includes sound data that is determined per national testing standards in a laboratory environment. It typically takes the form of octave band sound power or pressure data. This data is a measure of noise across different frequencies.
- Sound data is input into the computer modelling software. The program used for the computer model is designed by a team of international experts in acoustics. It is not proprietary to NV5 / The Sextant Group and is used by many acoustical consulting companies.
- The computer model performs calculations per international standards (specifically from the International Organization for Standardization (ISO)) for noise propagation and then maps noise contours showing the propagation of noise across the site and adjoining areas. This is what was included in the TIGER presentation.

TIGER and Athletic Operations

- **What will staff and children at UNOW Nursery School hear?**
 - The predicted noise level due to the operations of the TIGER facility is 40-50 dBA at the playground and 40-45 dBA at the exterior façade of the building.
 - World Health Organization (WHO) recommendations for schools
 - 55 dBA outdoor playground
 - 35 dBA school classrooms (indoors with windows closed)
 - At the UNOW facility, sound levels resulting from operations at the TIGER and Athletic Operations facility will be less than sound levels permitted by NJ State regulations, as well as the WHO recommendations.

TIGER and Athletic Operations

Examples of noise levels:

- 60-70 dBA normal conversation
- 60-65 dBA business office
- 55 dBA household refrigerator
- 55 dBA quiet outdoor AHU (per Trane website)
- 40 dBA suburban area at night

Source: (<https://ehs.yale.edu/noise-hearing-conservation>)

Decibel Level Comparison Chart

Environmental Noise	dBA
Jet engine at 100'	140
Pain Begins	<i>125</i>
Pneumatic chipper at ear	120
Chain saw at 3'	110
Power mower	107
Subway train at 200'	95
Walkman on 5/10	94
<i>Level at which sustained exposure may result in hearing loss</i>	<i>80-90</i>
City Traffic	85
Telephone dial tone	80
Chamber music, in a small auditorium	75-85
Vacuum cleaner	75
Normal conversation	60-70
Business Office	60-65
Household refrigerator	55
Suburban area at night	40
Whisper	25
Quiet natural area with no wind	20
Threshold of hearing	0

Note: dBA = Decibels, A weighted