



Site report; Manchester-by-the-sea, Sweeney Park

Updated Jan 9, 2024

Introduction

USA Pickleball offered to assist Manchester-by-the sea (MTBS) authorities in further analysis of the soundscape and possible solutions for the pickleball facility in Sweeney Park. Note – USA Pickleball recommends a thorough acoustic analysis be done early in the planning process of any facility to ensure compliance with existing ordinances and zoning laws, also factoring ambient conditions to ensure a ‘good neighbor’ approach.

This information is intended to augment that of a) the report written remotely by PSM LLC, more accurately characterizing the area and not intended to replace initial estimates of acoustic propagation; and b) tests conducted by the Massachusetts Department of Environmental Protection in 2022. This additional information, research, and on-site testing of the soundscape and new mitigation technologies is intended to assist Manchester by the Sea in its decision making.

Summary Findings

A considerable amount of analysis of the location has taken place, including ambient soundscape readings, assessment of several solutions that include architectural mitigation, equipment solutions, as well as the application of appropriate usage policies. Given the application of this research, USA Pickleball’s recommendation is that the pickleball facility within Sweeney Park located on MR 127 should meet overall city leadership and general neighborhood expectations for acoustic propagation at a park used for recreational activities at this location.

Location

The location of the pickleball courts at Sweeney Park, 127 Summer Street is at the convergence of several significant contributors to an existing neighborhood soundscape that consists of:

a) The intersections of Massachusetts Route 127 (Summer Street), Forest Street, and Harold Street ; MR127 is a highly recommended scenic route¹, with medium to high traffic rates, and is considered the major route through MBTS. The USDOT’s numbers² for this route report a 24hr AVERAGE of 55-60 dBA Leq – this includes lower traffic periods overnight. Note - imagery from every mapping app reviewed captures light to heavy commercial traffic on this route. The MassDEP’s readings of the area in 2022 indicated a maximum of 4dBA between the lowest non-pickleball period and the greatest with pickleball, although there were readings WITH pickleball that were less than those without during rush hour. Readings on Sunday September 24 and Monday September 25 revealed traffic on average passing by every :05-:10 seconds, yielding higher readings than the courts, and completely masking impulsive noise even without mitigation.

b) MBTA Newburyport/Rockport route line³; this commuter rail passes 28x per weekday (from 0526 to 0041) and 36x per weekend, with two points of minimal dissipation – at 900’ distance from the rail

overpass east of the intersection through MR127's hardscape, and at 700', with half the distance across Brickyard Pond – each of those direct paths minimally dispersing each passing train's acoustic energy.

c) Sweeney Park; In addition to the pickleball courts, this park hosts a soccer field, two baseball /softball diamonds, and two basketball courts.

i) the turf fields are used daily during the Spring by the high school, and receive consistent Summer programming by the city. They are flood lit, and use public address systems for HS and Little League games for announcements and music, which in addition to crowd noise and official's whistles, already contribute to the soundscape.

ii) the basketball courts, directly across MR127 from addresses 114, 116, 118, and 120 Summer Street, are both programmed by the City and also receive casual use by the community. Basketball bounces have been categorized as both impulsive and generate an acoustic impact of >95 dBA at 2m – again an accepted and preexisting contributor to the neighborhood soundscape

iii) the original two tennis courts used for the pickleball facility conversion in 2022 were built during that tennis' boom in the seventies. Following declining use, approximately 20 years ago the courts were converted to a skatepark, ultimately closed after approximately 7 years. It's important to note that both sports have been categorized as significant contributors to neighborhood acoustic environments, including as an impulsive and intrusive noise^{4,5}, again setting precedent for the area.

Acoustic solutions

Five panel solutions including one mature technology and four newly introduced solutions were tested in place at the facility on September 25, 2023. An emitter was used as a consistent reference source at 2m inside the facility, and instrumentation used identical to that of PSM LLC's test fixtures and configuration 2m outside the facility. In addition, a first order ambisonic, multi-capsule microphone was used to initiate research consistent with that of a NASA study on auditory localization which will assist in site studies in the future. Measurements were also taken at points consistent with PSM LLC's analyses, with and without the mitigation solutions.

Participants/suppliers in the study were;

-AcoustiBlok, with a mature, mass loaded PVC panel (A); and a new product featuring absorbent mineral wool backing mass loaded PVC (B);

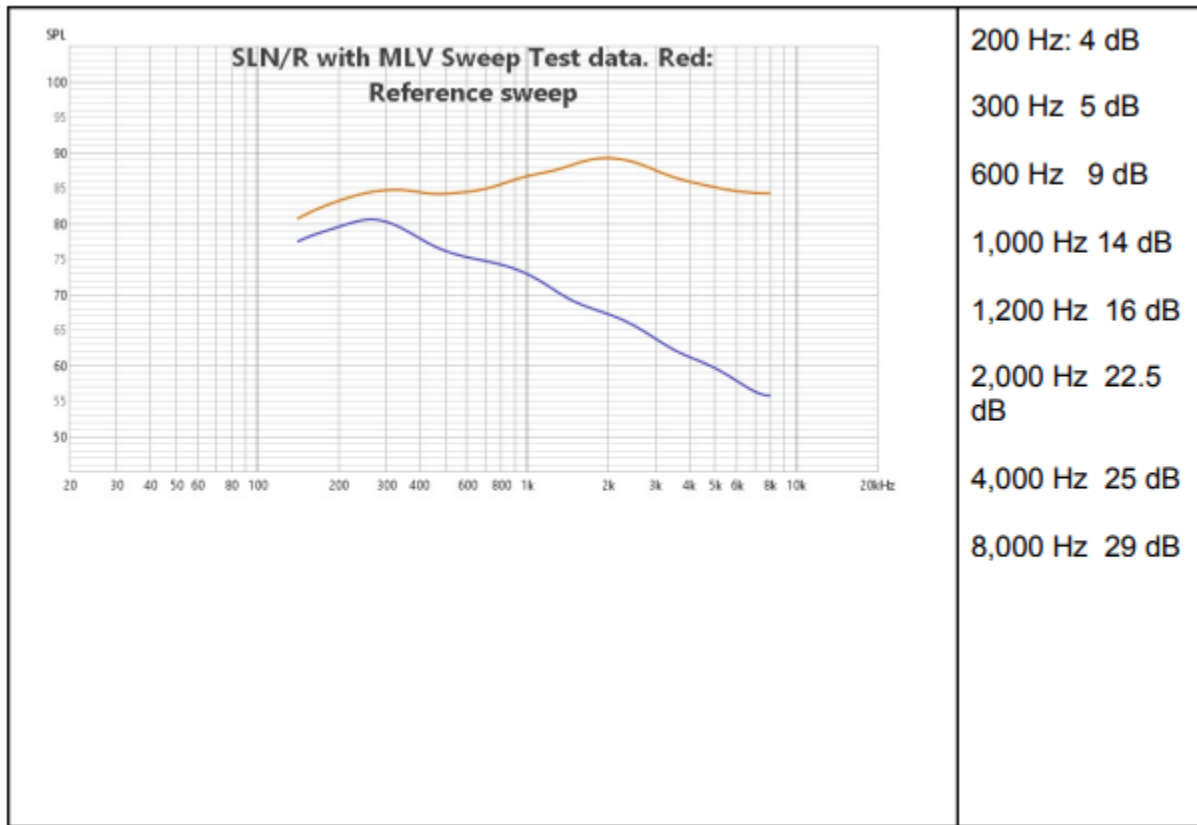
-SLN/CR, using a sound attenuating fabric (C)

-HushTec, with a trio of products included mass loaded PVC, acoustic foam backed by mass loaded PVC, and a clear, acoustic damping PVC enabling windows for security and safety (D)

-Pickleball United, with an acoustic foam panel (E)

A and B delivered a 17-20 dBA benefit in the critical 1000Hz to 1200Hz range, with B also reducing reflected sound back onto the courts. "B" was situated between the NE corner of the facility and 8 Forest, essentially eliminating all traces of impulsive noise of the emitter source. "A" was located between the NW corner of the facility and 142 Summer, eliminating the majority of impulsive noise. C delivered expected attenuation in the targeted frequencies of 11 dBA. Their next gen product will include a carbon-based fabric and/or mass loaded PVC to decrease overall SPL (dB) even further.

UPDATED The revised product now delivers >17 dBA of attenuation at the critical 1000Hz frequency and above.

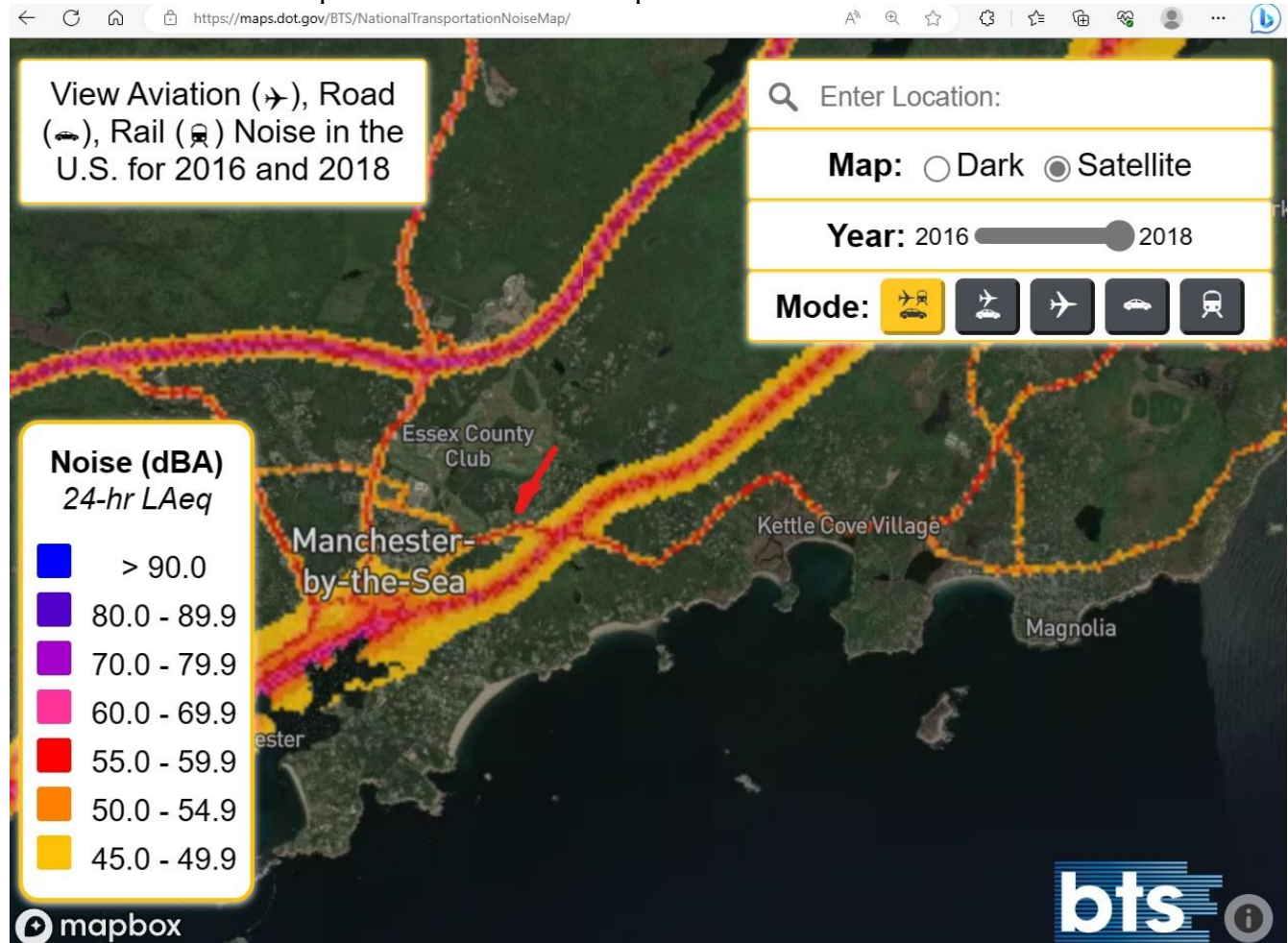


D – although the samples received were too small to conduct the field test, this solution will be installed soon in Beverly, where onsite testing can be done

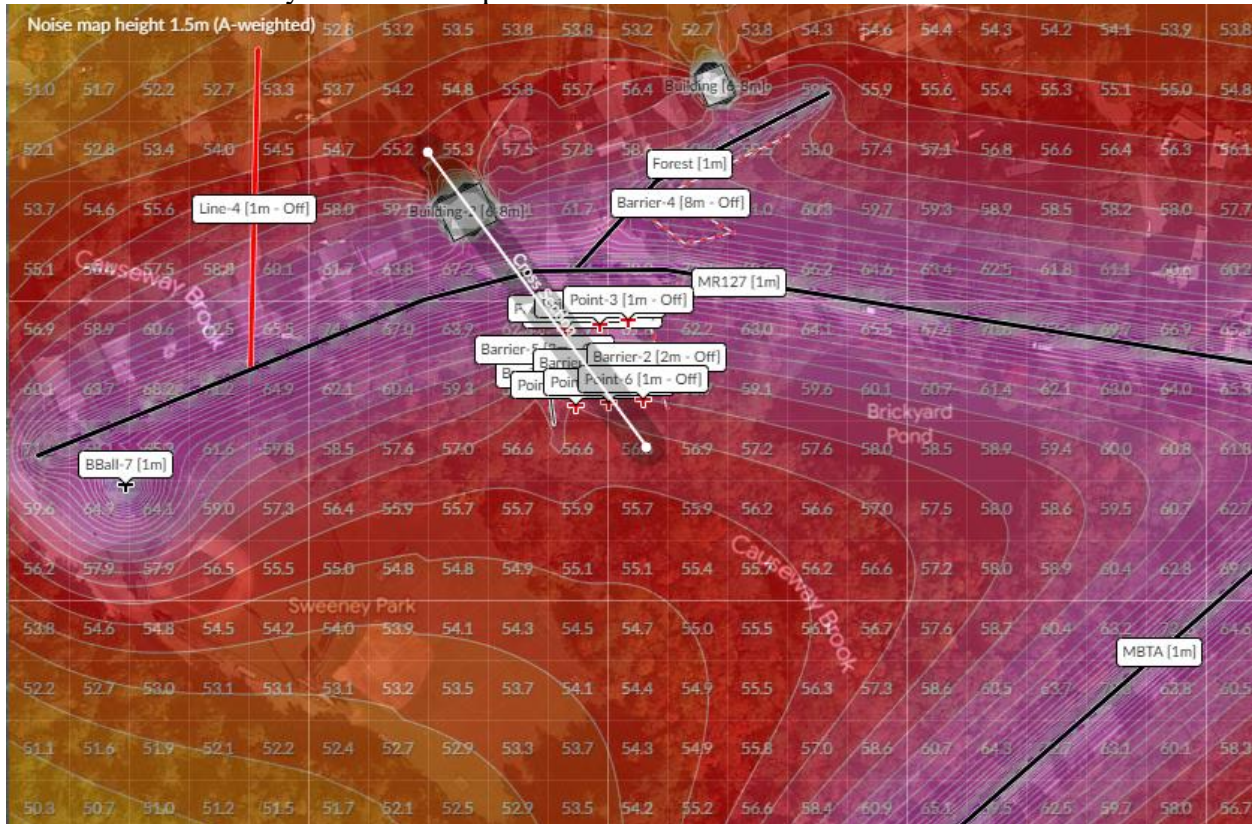
E – samples arrived after the onsite visit was completed, current installation currently being measured and lab output pending. Note – this is a material designed for purpose, used in anechoic chambers, music studios, etc to absorb acoustic energy. **UPDATE – this product is going through an update – more data shortly.**

Streetside measurements conducted Sunday , as well as Monday at critical abutter locations were conducted with and without barrier solutions in place. The results were consistent with the following simulations, and reinforced previous MassDEP measurements that the ambient soundscape is between 1-4 dBA Leq of the area when pickleball is being played.

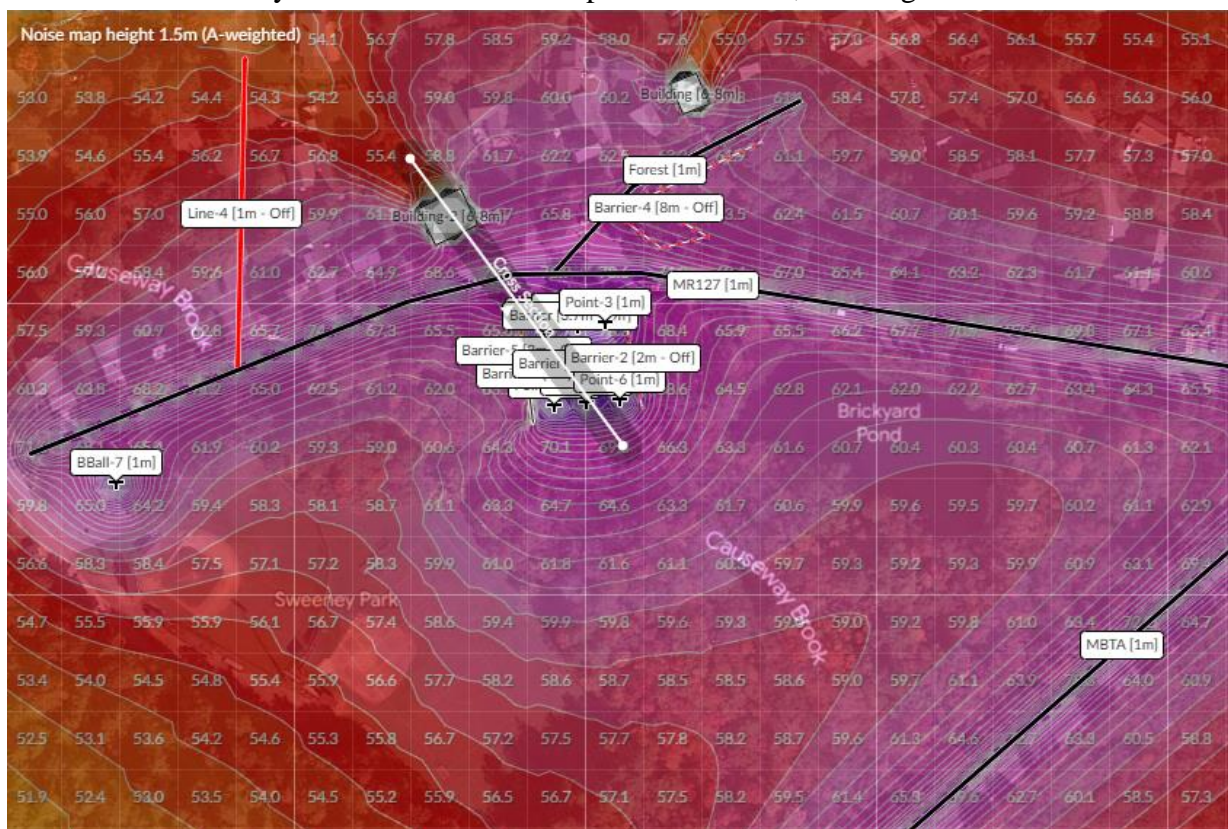
Reference - DOT heatmap – 55-60 dBA over 24hr period.



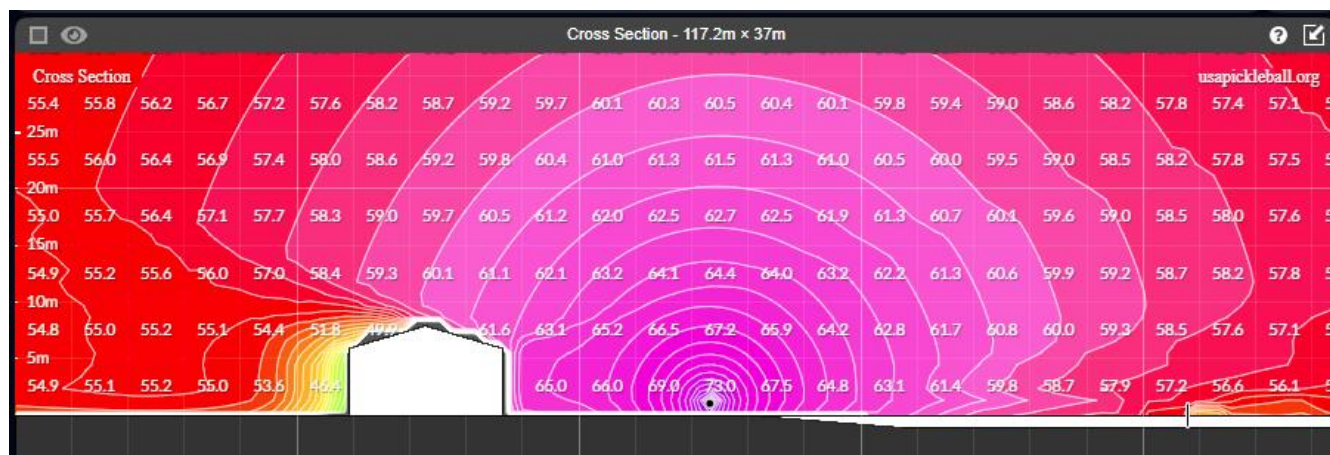
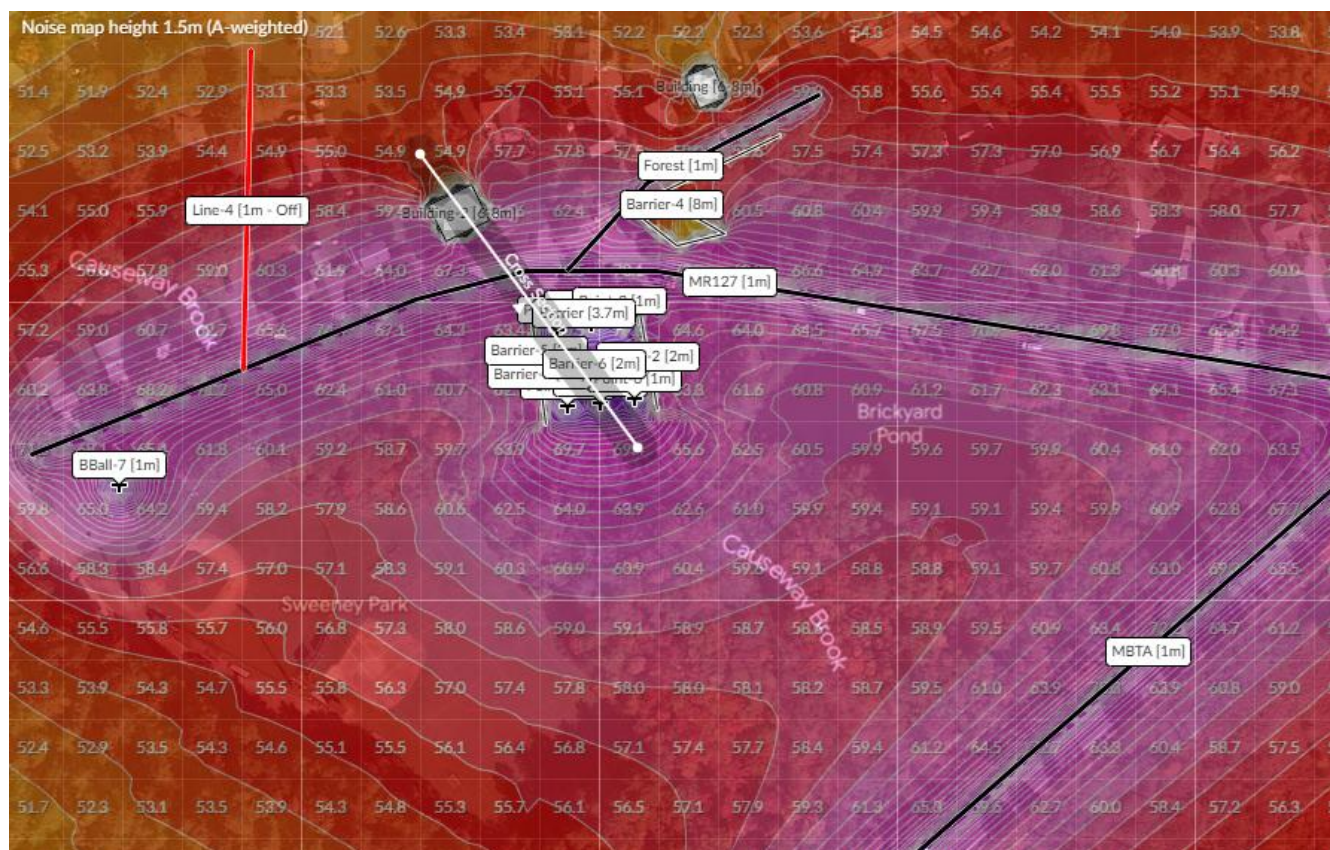
Overview of Sweeney Park without pickleball

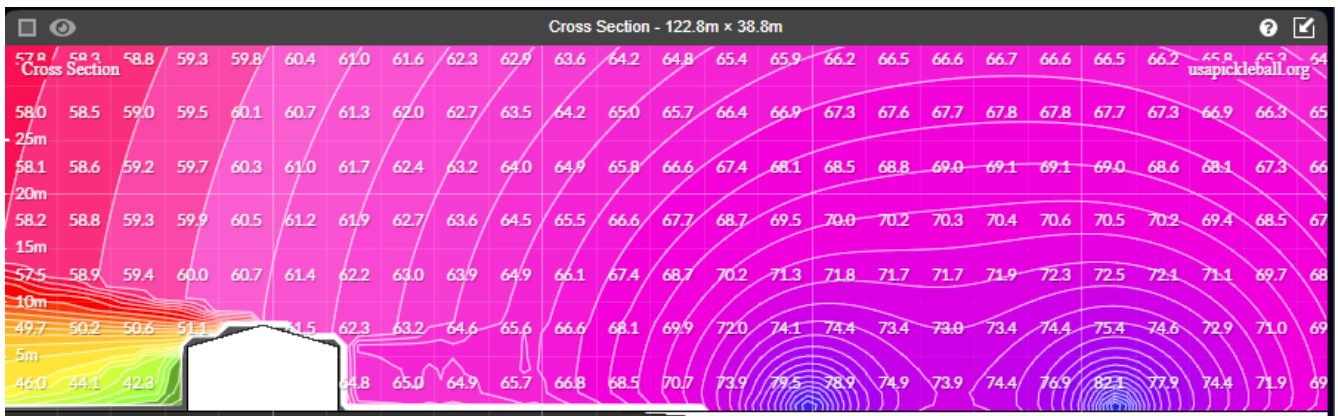


Overview of Sweeney Park with all soundscape contributions, no mitigation

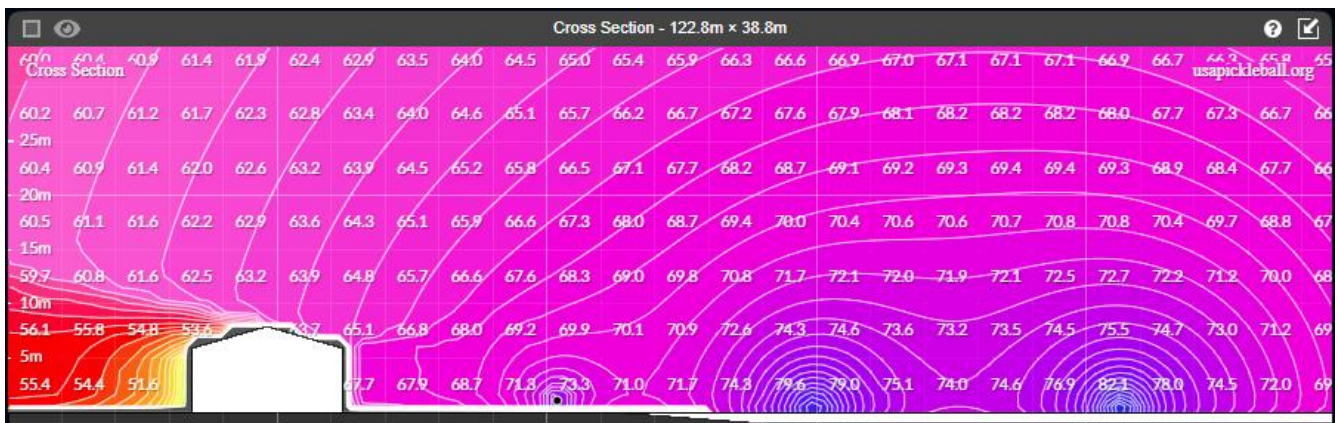


Overview of Sweeney Park with all soundscape contributions, WITH mitigation

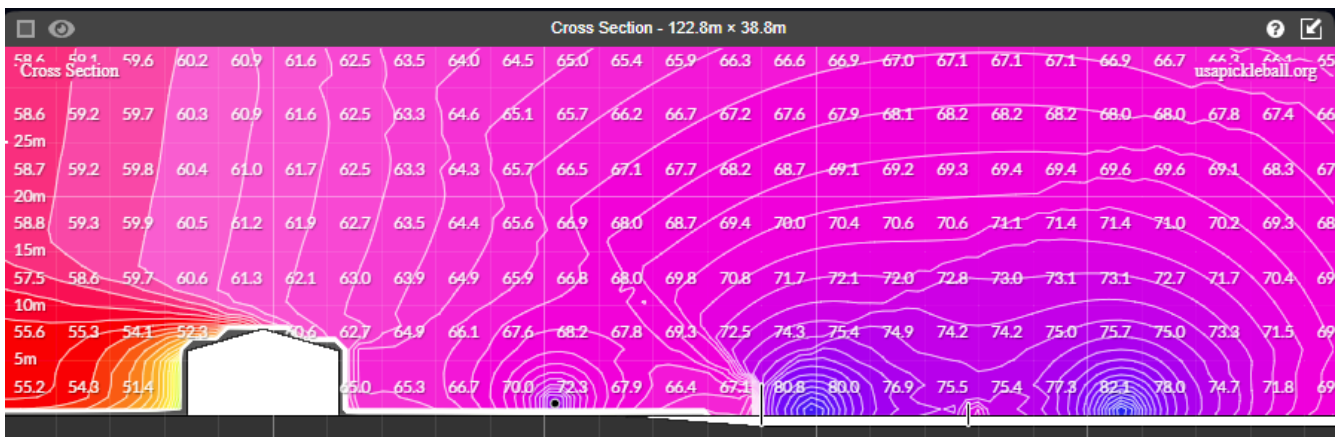




142 Summer Street – no MR127 – only pickleball, no mitigation



142 Summer Street – MR127 + 6 courts pickleball – no mitigation



142 Summer Street – with MR127 , 6 pickleball courts, 12' North side fence+mitigation as described

Recommendations

MTBS' Parks department updated the fencing around the facility during the construction process, increasing the fencing height to 10' on the northern edge facing residents across MR127. We recommend increases to the fence height to 10' on the East and West sides of the facility, from the NE and NW corners extending South to a point even with the center dividing fence, with consideration to an additional 2' on the North end, bringing that to 12' total. The modifications would enable 12' and 10'

panel placement in key line-of-sight areas across East, North, and West fencing. In addition, we recommend acoustic panels be placed on the 6' fence dividing North and South banks of courts – this will better contain acoustic propagation from the three Southern courts.

These modifications will reduce acoustic propagation, both of SPL as well as of impulsive noise, to levels below recent samples and DOT measurements of the area surrounding MR127 (<55-60 dBA Leq). These will also be consistent within 1-3 dBA of other contributors to the environment referenced previously. These estimates are driven by on site results of samples as well as through simulations.

Cost estimates for paneling fall between \$30,000 to \$40,000, not including installation. All suppliers have expressed interest in collaboration with MBTS for consideration in this project. USA Pickleball will work with all suppliers to reduce or consider donation of materials to this location as a test site.

References

1. https://en.wikipedia.org/wiki/Massachusetts_Route_127
2. <https://maps.dot.gov/BTS/NationalTransportationNoiseMap/>
3. https://cdn.mbtta.com/sites/default/files/media/route_pdfs/batch_6697/2023-10-02-cr-fall-winter-newburyport-rockport-line.pdf.pdf
4. <https://mediatum.ub.tum.de/doc/1244917/953952.pdf>
5. <https://skateboard.lifetips.com/tip/104327/finding-skate-parks/skate-park-tips/misperceptions-of-skate-park-noise-levels.html#:~:text=One%20of%20the%20most%20common%20misperceptions%20about%20skate,levels%20averaged%2070%20decibels%20from%2050%20feet%20away.>