

February 5, 2021

Mr. Jeff Hejl
Boston Scientific Corporation
14 Innovation Way
Arden Hills, Minnesota

Subject: Summary Report for
Building 14 Expansion – Chiller Noise Control
Boston Scientific – Arden Hills, Minnesota

Dear Mr. Hejl:

This letter is a summary on chiller noise control for the Building 14 Expansion project at Boston Scientific in Arden Hills, Minnesota. Air-cooled chillers will be on the roof of the addition and there are residential neighborhoods to the north and east of the building. Our work involved measuring the existing noise in the area and calculating future noise from the proposed chillers. The noise was compared to the State of Minnesota MPCA noise requirements.

Figure 1 shows a layout of the site with the new addition on the south side of Building 14.



Figure 1 – BSC site showing the Building 14 addition and measurement locations.

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The City of Arden Hills ordinances reference the State of Minnesota noise requirements. Minnesota Rule 7030: Noise Pollution, prepared by the MPCA, has requirements for maximum allowable sound levels by receiving land use evaluated at the point of the nearest receiver. Table 1 shows the Rule 7030 L10¹ and L50² noise limits per noise area classification (NAC). NAC 1 is residential and recreational land use, NAC 2 is commercial, and NAC 3 is industrial.

Table 1 – MPCA Code Requirements

Noise Area Classification	Receiver Type	Daytime (7AM - 10PM)		Nighttime (10PM - 7AM)	
		L10	L50	L10	L50
1	Residential	65 dBA	60 dBA	55 dBA	50 dBA
2	Commercial	70 dBA	65 dBA	70 dBA	65 dBA
3	Industrial	80 dBA	75 dBA	80 dBA	75 dBA

Boston Scientific is zoned as Industrial, but the nearest receiving property lines are Residential. Therefore, the requirements for noise are an L50 of 60 dBA and an L10 of 65 dBA during the daytime and an L50 of 50 dBA and an L10 of 55 dBA during the nighttime. All the requirements are to be evaluated over 1-hour periods and apply to the location of the nearest receiver, which is at the residences, not on the BSC property.

Since the chiller equipment will operate continuously during the day and night, the lower nighttime requirement of 50 dBA at the residential property line will be used as the design goal for chiller noise mitigation.

To determine the existing noise in the area around Building 14, 24-hour long noise measurements were made at locations A and B shown in Figure 1. The measurements results are in Attachment A. Table 2 summarizes the measurement results. There was a lot of traffic noise from Hwy 694 at the site and it was difficult to separate the existing BSC noise from the traffic sources. From the data, we estimate the BSC noise contribution is below 49 dBA, therefore we will combine that level with the new noise from the chillers to evaluate mitigation design in comparison with the 50 dBA design goal.

Table 2 – Summary of Noise Measurement Results

Metric	Location		Notes
	A	B	
L ₉₀	49 dBA	45 dBA	for 24 hour period
L ₅₀	49 dBA	45 dBA	lowest hourly level
L ₁₀	51 dBA	47 dBA	lowest hourly level

¹ L10 is the sound level that is exceeded 10% of the time during a measurement period.

² L50 is the sound level that is exceeded 50% of the time during a measurement period.

Chiller noise at a radius of 300' from chillers, which is within the BSC property line boundaries. The 300' radius is shown in Figure 1. There will be three chillers on the roof of the addition, although only two will operate simultaneously. Further, we have been told that the two chillers will only operate at 75% of full load capacity simultaneously. The manufacturer's sound data at 75% of full load was used in the calculations.

We propose to use a barrier wall to mitigate the chiller noise. Figure 2 shows an elevation sketch of the building addition and site that was used for calculations to determine the barrier wall design and predict chiller noise. Sample calculations are in Attachment B.

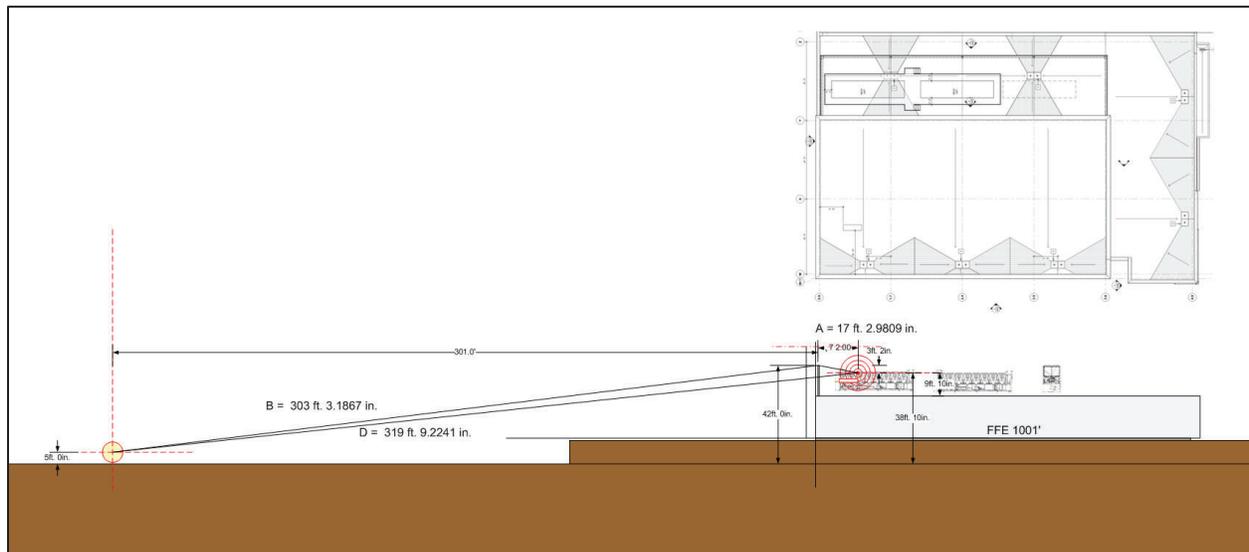


Figure 2 – Sketch showing the chillers and barrier wall arrangement used to evaluate noise for the Building 14 addition.

For a 13' high barrier, the noise level at 300' from the building was calculated to be 41.6 dBA. The total noise was 49.7 dBA when combined with the ambient noise level of 48.9 dBA. Raising the wall an additional 6' to match the penthouse roof elevation reduce chiller noise to 36.8 dBA, however when combined with the ambient noise of 48.9 dBA, the total noise was only reduced 0.5 dB to 49.2 dBA. It may not be good value to raise the barrier wall above 13'.

The objective of our engineering work was to determine mitigation necessary to control chiller noise at the residential property lines. We determined a barrier wall height that will attenuate chiller noise to a level that meets the MPCA requirements when combined with the other BSC noise in the environment. The calculation results show that the wall should be at least 13' high. We will work with RSP to evaluate the final wall details.

I appreciate the opportunity to work with you on this project and remain available to assist in the resolution of these and any other matters. Please let me know if you have any questions or need more information.

Sincerely,

A handwritten signature in black ink that reads "Anthony J. Baxter". The signature is written in a cursive style with a large, prominent initial "A".

Anthony J. Baxter, P.E.
Principal
ESI Engineering, Inc.

Attachments