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17 May 2022

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Project Manager, Design
Mister Car Wash
222 E. 5th Street
Tucson, AZ 85705

Re: Acoustical Analysis & Recommendations Memorandum
Mister Car Wash - Spring Lake Park, Minnesota

1. INTRODUCTION

This Technical Memorandum presents the results of our sound level measurements and analysis to document and quantify expected exterior noise levels associated with the proposed Mister Car Wash in Spring Lake Park, Minnesota. The project site is shown in **Exhibit 1**.

Results are presented here of existing background sound level measurements and analysis, predicted sound levels associated with the proposed car wash, and recommendations to comply with the Minnesota daytime noise standards.

2. BACKGROUND SOUND LEVEL MONITORING

Background sound level measurements associated primarily with traffic on Highway 65 past the project site were taken at the location shown in **Exhibit 2** over a two-hour period from 2:30 to 4:30 pm on Wednesday May 1, 2022. This should represent typical background levels when the facility is operating between 7:30 am and 7:00 pm. As can be seen from the sound level time history in **Exhibit 3**, the level varies between 50 and 60 dBA with a median value of 55 dBA. Periods when traffic is stopped by the signal at 81st Avenue NE, the level drops down to 48 dBA. Weather conditions were ideal for monitoring with temperature 63 degrees, 38 percent relative humidity, winds variable to zero to SSE at 9 mph.

3. SOUND LEVELS ASSOCIATED WITH THE CAR WASH

A data base of source sound levels from car wash equipment taken at a facility in Houston by SLR International (similar to the proposed car wash in Spring Lake Park) was provided for use in this study by Mister Car Wash staff. Mister Car Wash is also proposing to use the *Stealth Quiet Drying System* from International Drying Corporation of Prairie Grove, Illinois. A brochure on this new system is included as an attachment to this report.

The octave band sound level data for the Exit source was obtained from the manufacturer. The Entry and Vacuum motor source levels were extracted from the SRL International data. Source levels are presented graphically in **Exhibit 4**.

4. SOUND LEVEL CRITERIA

The proposed Car Wash must comply with Minnesota noise standards shown in the table below.

Noise Area Classification	Daytime (0700-2200)		Nighttime (2200-0700)	
	L ₅₀	L ₁₀	L ₅₀	L ₁₀
NAC-1 (residential and sensitive areas)	60	65	50	55
NAC-2 (commercial)	65	70	65	70
NAC-3 (industrial)	75	80	75	80

Since proposed operating hours for the car wash are 7:30 am to 7:00 pm, the daytime standards outlined in red above must be met. The L₅₀ daytime standard is used here for determination of compliance with the state noise standards.

5. NOISE RECEPTOR SITES

The closest noise receptor sites governed by Minnesota rules are identified in **Exhibit 5**. This includes the closest units in the adjacent multi-family buildings to the west of the site as well as the closest “commercial” land uses to the north and south.

One receptor site per building is sufficient to determine compliance since if the closest unit is in compliance, the remainder are also in compliance.

6. PREDICTED SOUND LEVELS

Predicted L₅₀ level for each of the residential (NAC-1) and commercial (NAC-2) receptors are presented in the table below.

Receptor		Noise Classification	L ₅₀ Standard	No Walls	With Walls
R1	Residence	NAC-1	60	63	54
R2	Residence	NAC-1	60	66	55
R3	Residence	NAC-1	60	63	46
R4	Residence	NAC-1	60	63	46
C1	Pizza Hut	NAC-2	65	66	65
C2	Church HQ	NAC-2	65	63	49

The levels at receptors R1, R2 and C1 are determined by noise from the car wash entrance while the levels at receptors R3, R4 and C2 are determined by noise from the car wash exit. It can be seen from the table that, without mitigation, the four residential receptors are above the 60 dBA standard. While Pizza Hut will comply with the 65 dBA commercial standard, the level at the Church Headquarters is one dBA above the standards. Therefore, mitigation is needed for all receptors except Pizza Hut.

7. MITIGATION MEASURES TO REDUCE NOISE

Because the entrance and exit are the primary contributing sources, the construction of sound walls extending from the building as part of the architecture is recommended. These are shown on the building plan in **Exhibit 6** and on an aerial photograph in **Exhibit 7**

Suggested wall locations are shown on the building sections in **Exhibit 8**.

A photograph of a similar wall at another location is shown in **Exhibit 9**.

The benefits of these walls are shown in the table in Section 6 of this report.

8. POTENTIAL AUDIBILITY OF THE CAR WASH

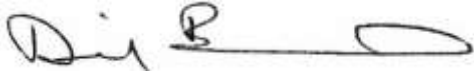
The level of audibility depends not on the dBA or A-weighted sound level but on the spectral content of the sound. The projected octave band L50 level spectra at the residential receptor sites are compared in **Exhibit 10** with the L50 spectrum determined from monitoring traffic noise at the location shown on **Exhibit 2**. Because noise occurs along the entire roadway, the level will be essentially the same at all of the evaluated receptor sites.

With mitigation, traffic noise levels at Receptors 3 and 4 are well below the traffic noise spectrum. The noise spectrum at Receptors 1 and 2 are also well below traffic noise at lower frequencies and almost the same level and shape as the traffic background. Therefore, noise from the proposed car wash is not expected to be audibly intrusive and should not differ greatly from existing daytime sound levels.

7. APPROXIMATE NOISE CONTOURS

While not accurate enough to establish non-compliance or compliance, theoretical L50 contours associated with the exit end of the car wash are shown in **Exhibit 11**. It must be emphasized that these are not intended to represent actual contours that would be shielded by buildings and vegetation. What they do show, however, is the substantial reduction in area that can be achieved with the inclusion of a barrier wall to shield areas to the west and northwest of the car wash.

David Braslau, President



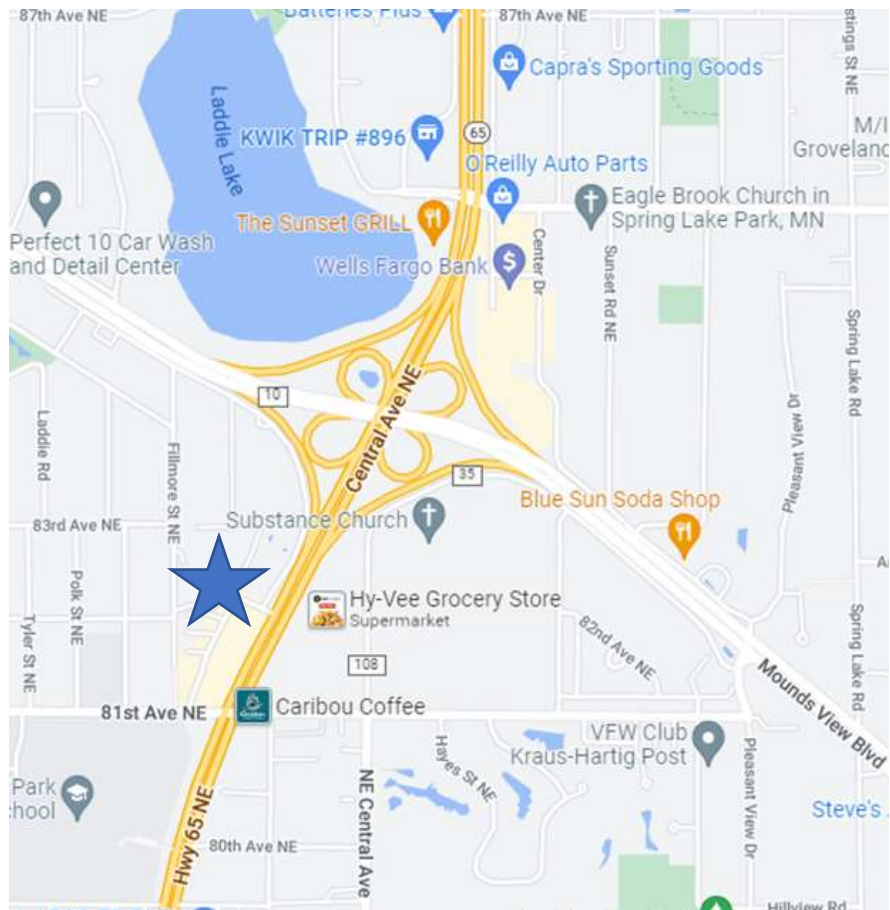


EXHIBIT 1 PROJECT LOCATION



EXHIBIT 2 NOISE MONITORING LOCATION

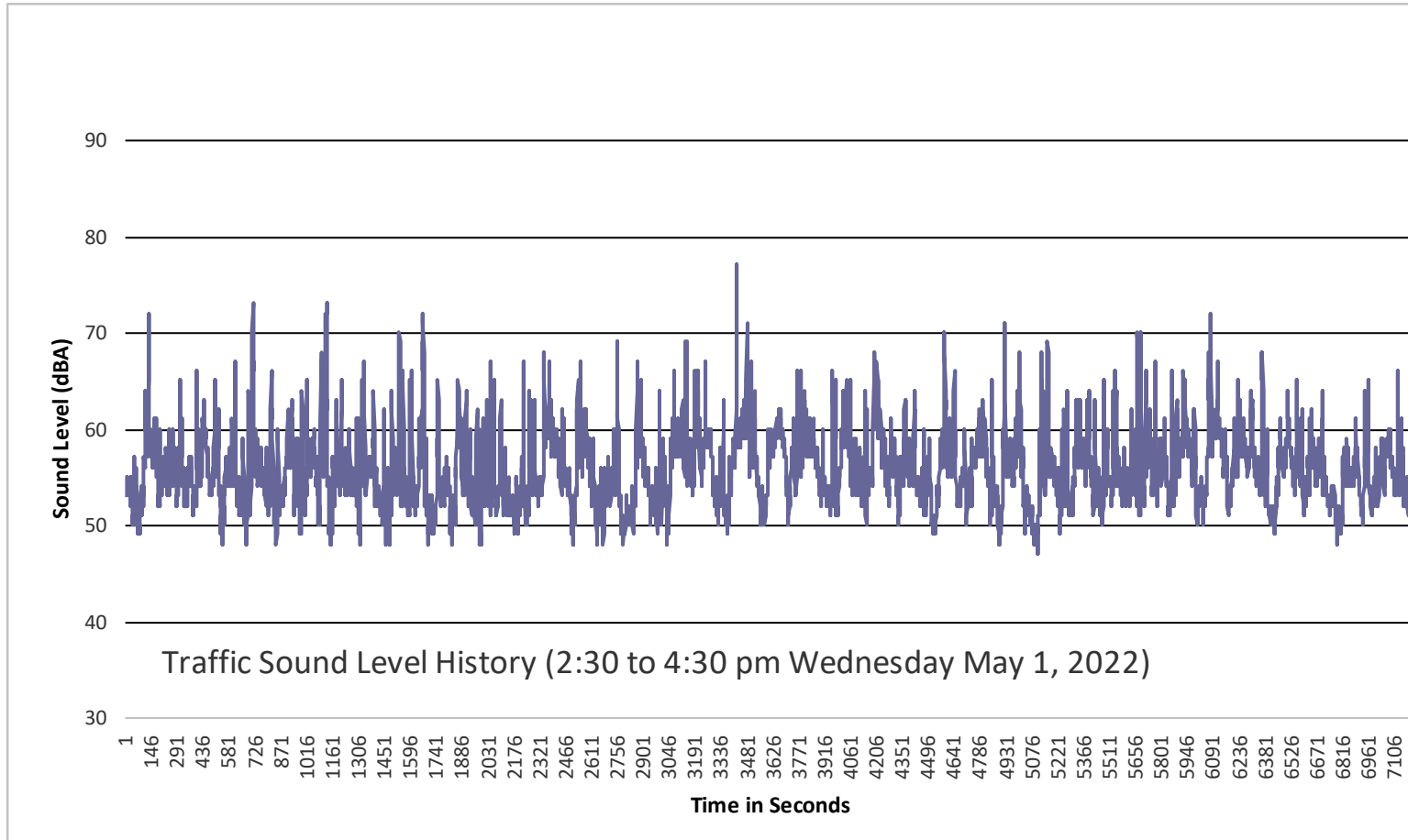


EXHIBIT 3 TRAFFIC NOISE HISTORY

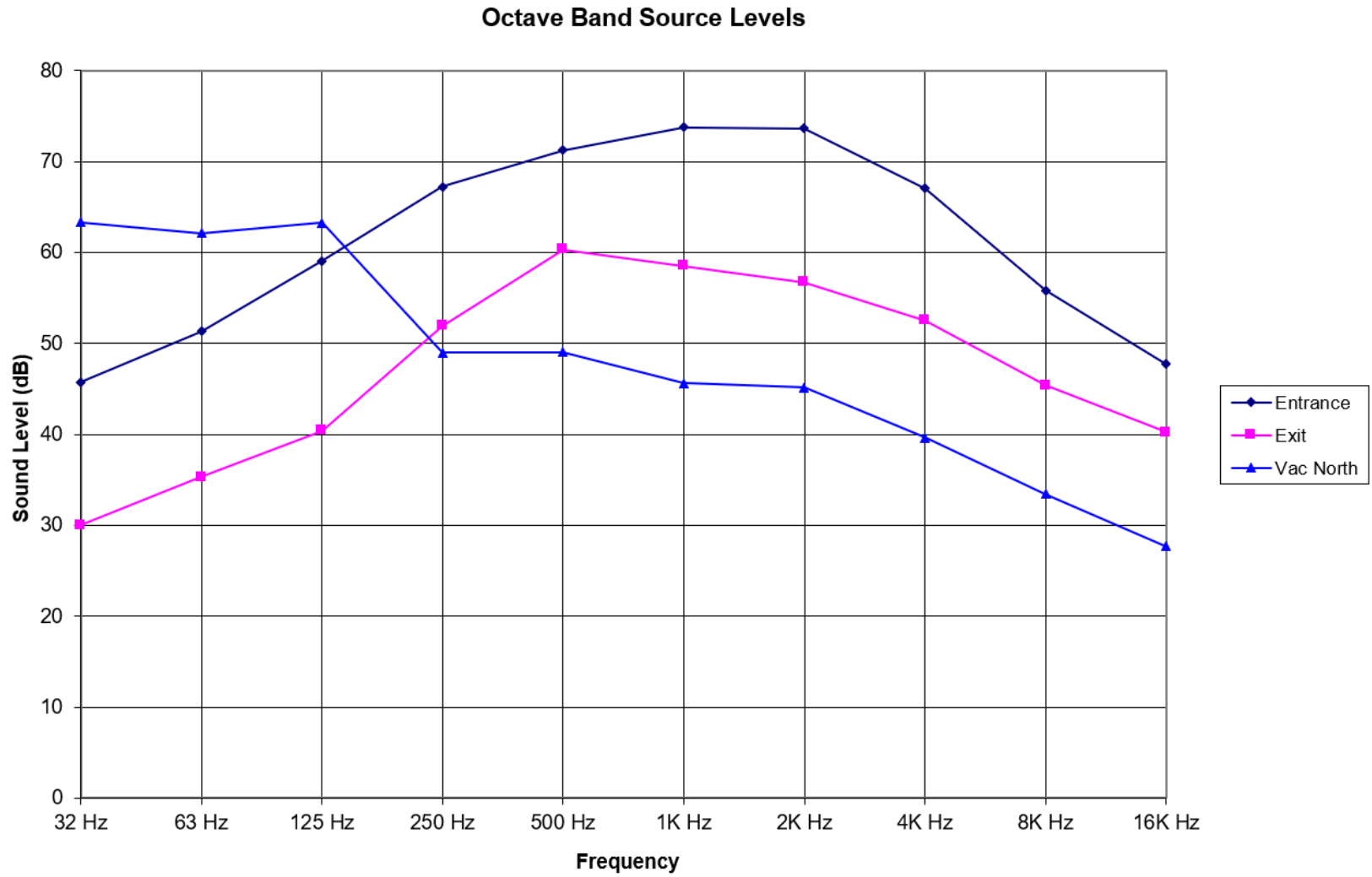


EXHIBIT 4 ASSUMED SOURCE SOUND LEVEL SPECTRA

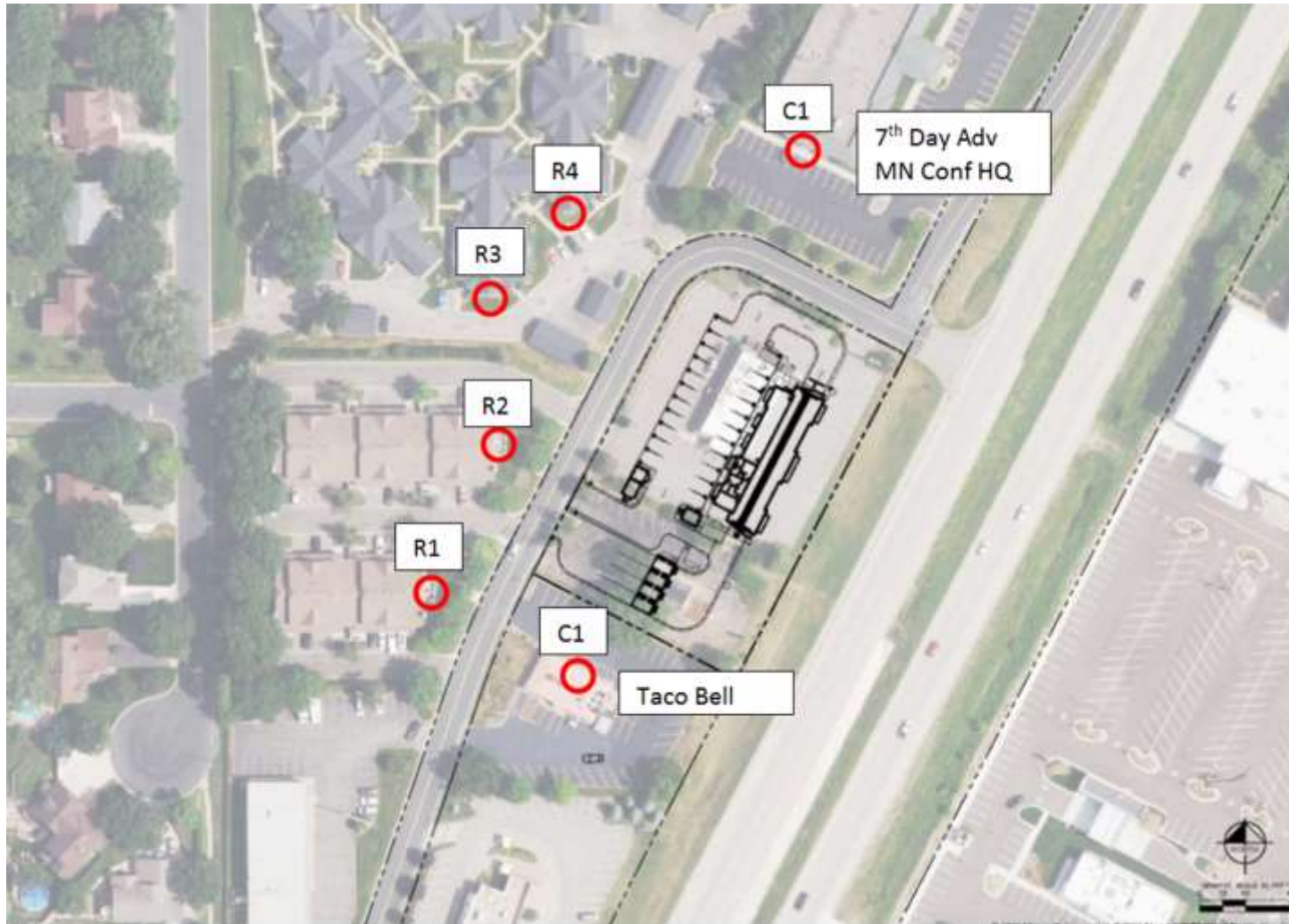


EXHIBIT 5 NOISE RECEPTOR SITES

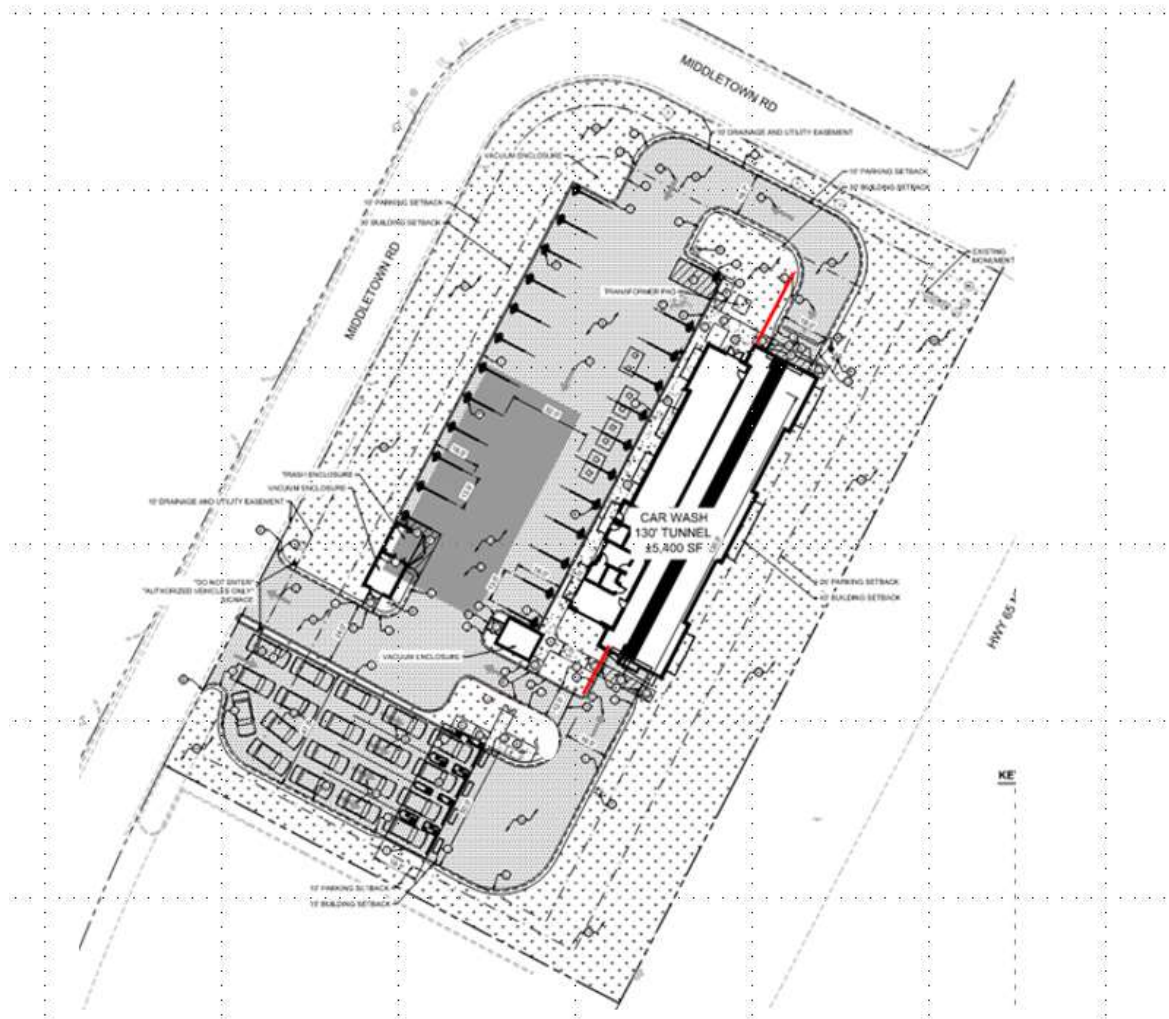


EXHIBIT 6 PROPOSED NOISE WALLS ON SITE PLAN

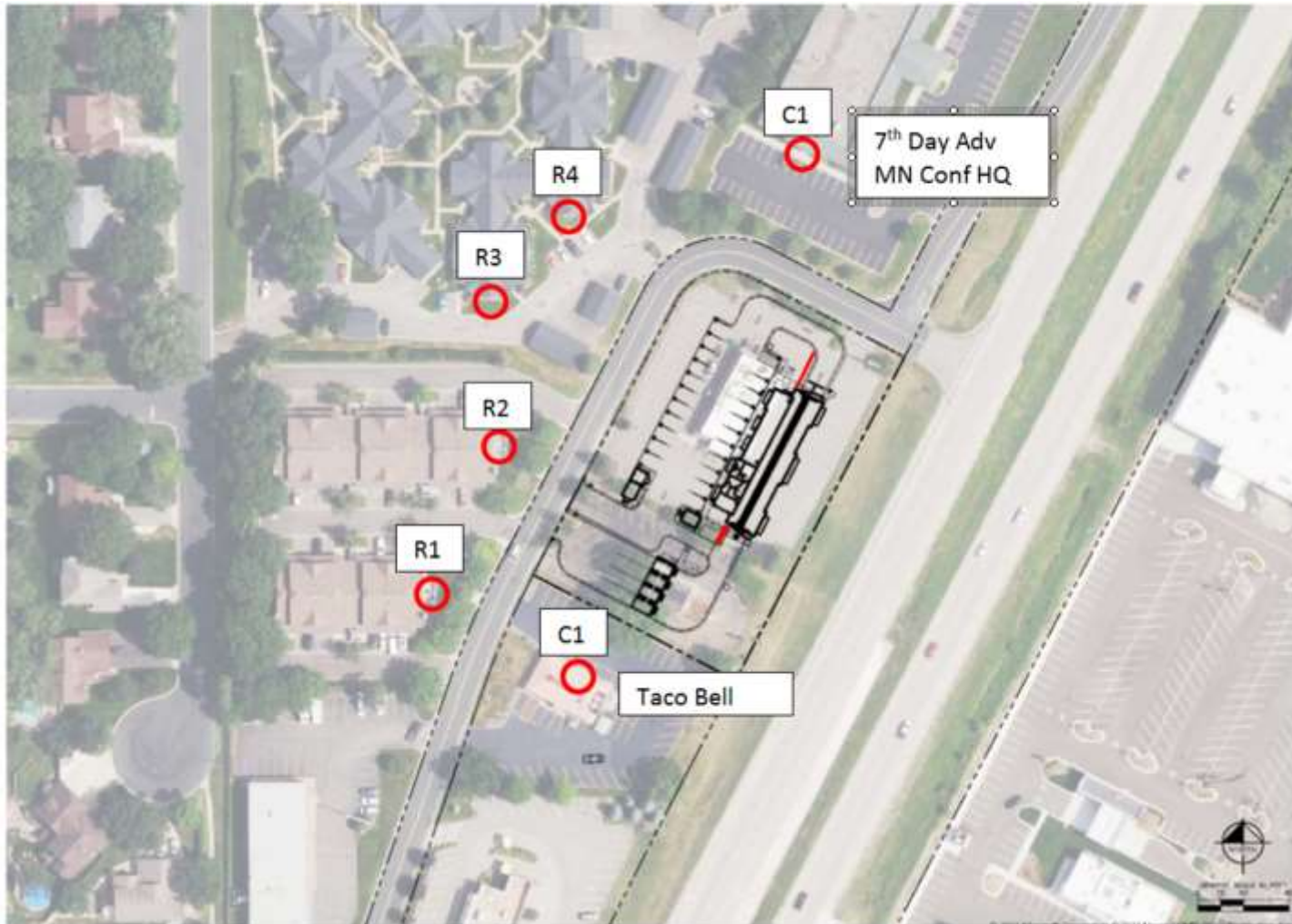


EXHIBIT 7 PROPOSED NOISE WALLS RELATIVE TO RECEPTOR SITES



EXHIBIT 8 SUGGESTED WALL LOCATIONS



EXHIBIT 9 PHOTO OF SIMILAR WALLS AT EXISTING SITE

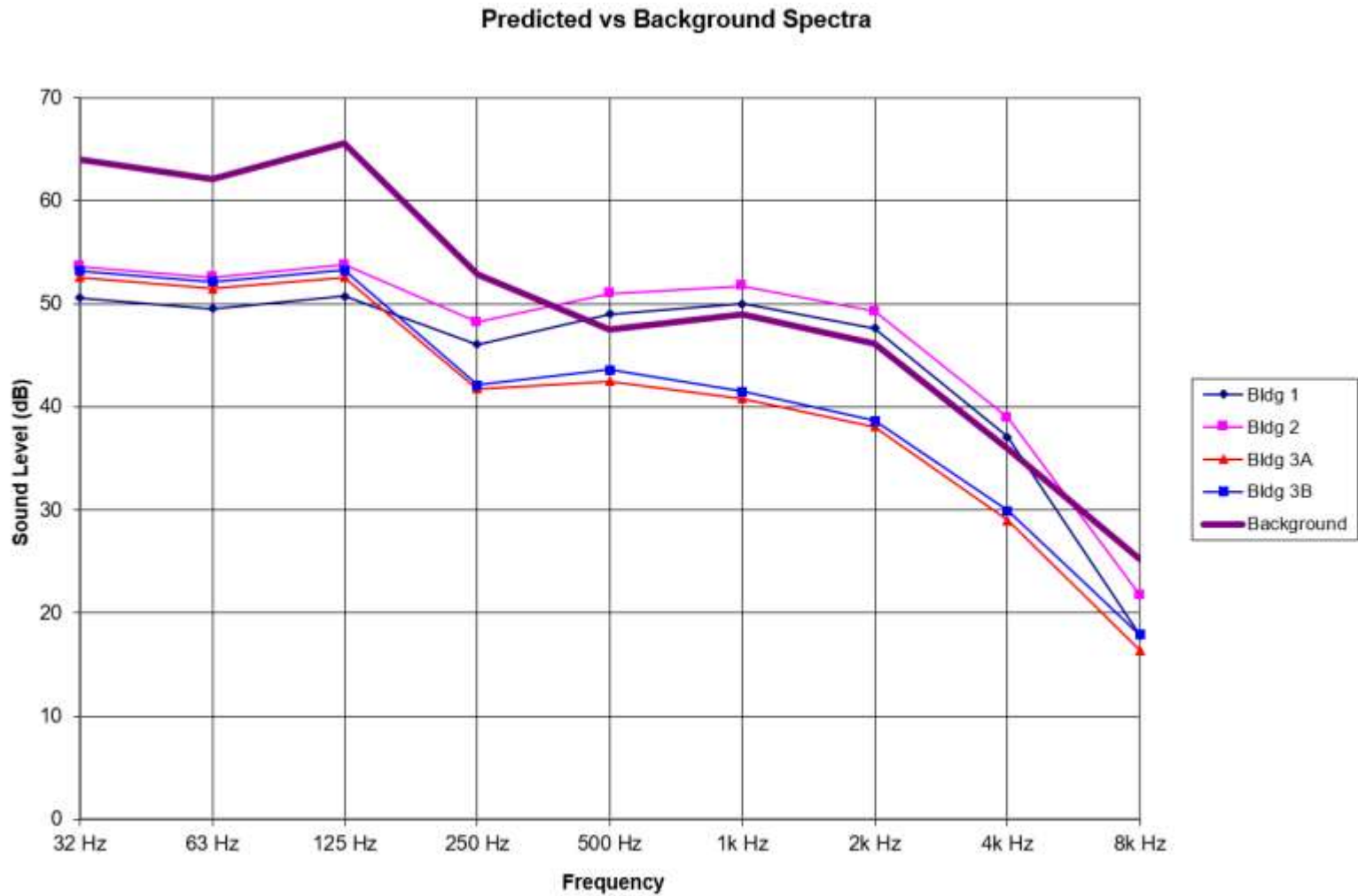


EXHIBIT 10 PREDICTED SOUND LEVEL SPECTRA RE AUDIBILITY



STEALTH QUIET DRYING SYSTEM



"THE MOST POWERFUL QUIET DRYING SYSTEM EVER BUILT"

- ✓ Quiet Smooth Air Technology (SAT) with Patent Pending Low Turbulence Engineered Design
- ✓ Producers Constructed from 304 Surgical Stainless Steel
- ✓ Meets or Exceeds Most US or International Sound Regulations
- ✓ Independent Sound and Performance Studies were Performed in a AMCA 300 Reverberant Sound Room
- ✓ Over 10,300 Cubic Feet Per Minute (CFM) Per 10HP Motor!

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International Drying Corporation
2510 IL RTE 176, Suite G
Prairie Grove, IL 60012

Stealth High Powered Quiet Drying System Specifications

30 HP System - Total Sound

60 Hz 55 Hz

68.70 dBA 62.40 dBA at Q=1, 30 feet

65.10 dBA 58.80 dBA at Q=1, 45 feet

63.40 dBA 57.00 dBA at Q=1, 55 feet

80 HP System - Total Sound

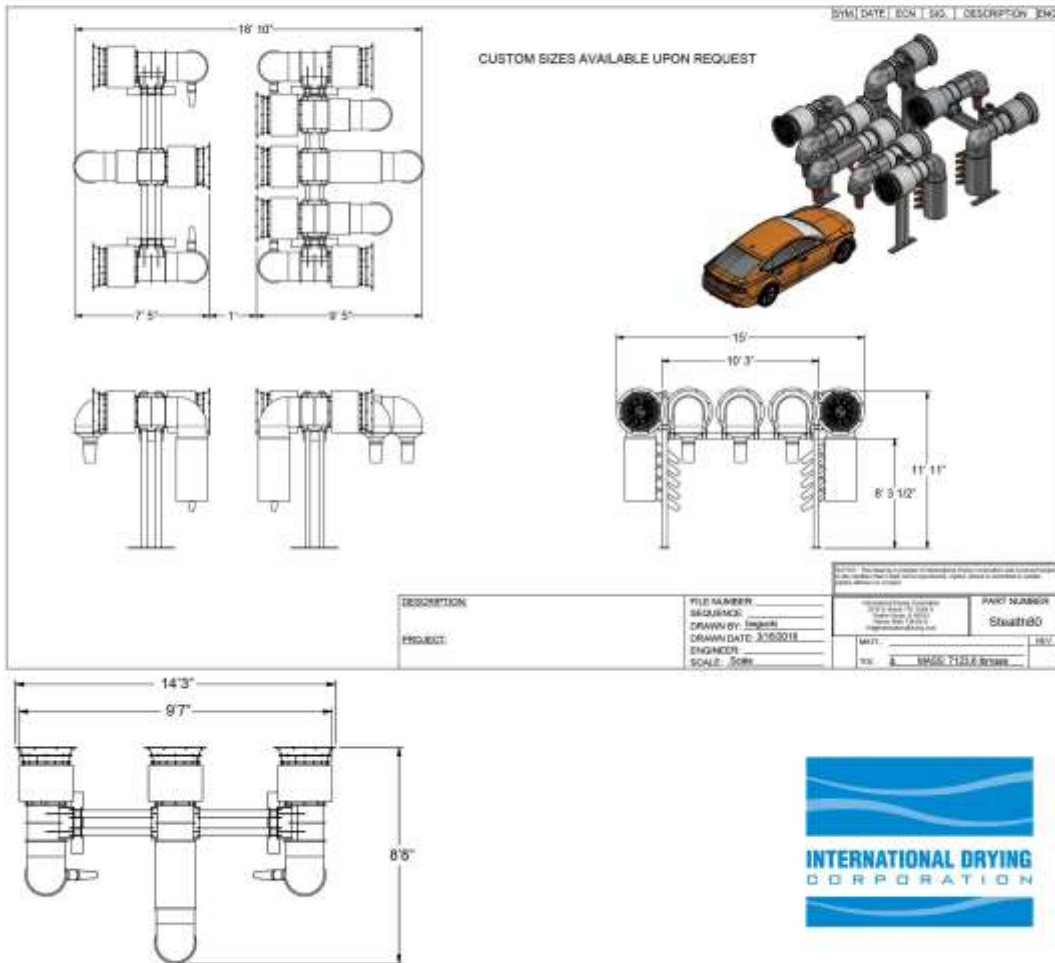
60 Hz 55 Hz

73.79 dBA 73.79 dBA at Q=1, 30 feet

70.27 dBA 61.27 dBA at Q=1, 45 feet

68.53 dBA 59.53 dBA at Q=1, 55 feet

Meets OSHA Sound Exposure Requirements



SPECIFICATIONS

30 HP Bare Fan Performance Results 30,390 CFM

80 HP Bare Fan Performance Results 81,040 CFM

*lab results available on request