



DAVID L. ADAMS ASSOCIATES, INC.

Consultants in Acoustics and Performing Arts Technologies

September 26, 2002

Ms. Cheryl Dobie
Aerodry Systems, LLC
P.O. Box 907
Broomfield, Colorado 80038

Re: Aerodry - Spectral Sound Measurements (DLAA Reference No. 6595)

Dear Ms. Dobie:

The following is a summary of the blower sound level measurements taken at the site on September 19, 2002. Attached, please find the printed results of the measurements.

Measurement Conditions

While at the site, spectral sound pressure levels were measured for the Aerodry Systems 15 horsepower blowers, using 4 motors. It is my understanding that the 4 motor configuration we measured is typical for this model. For our measurements, the following motor configuration was used: 1 for the left blower, 1 for the right blower, and 2 used in the overhead (top of vehicle) blower.

Measurements were taken in ANSI-standard 1/3-octave bands between 25 Hertz (Hz) and 20,000 Hz, as well as a 200-line FFT (narrow-band analysis, to better show if discrete tones are present) between 0 Hz and 10,000 Hz. The blowers were located in the center of the warehouse, approximately 20' from the garage door, which was open. The warehouse dimensions were approximately 70' x 100', and had a 14' ceiling. The warehouse contained a lay-in acoustical tile ceiling, a vinyl floor covering, and painted gypsum board walls. I have determined that background noise, which was comprised mainly of Hwy-36 traffic noise, did not effect the results of the sound level measurements.

As shown in Figure No. 1, attached, the blowers were centered in the warehouse. Measurements were taken at various positions within the warehouse, however, we are providing data from measurements taken on the "exit" side of the blowers, as this is the side of the blowers that will be closest to the outside of a car wash building. Measurements were taken at approximately 5-feet and 20-feet from the blower outlets. All measurements were taken 90 degrees off-axis, shown in Figure No. 1, as any measurements taken on-axis with the blowers would be effected by the high velocity airflow. The height of the microphone during all measurements was approximately 5-feet above the floor. We have **not** attempted to adjust the measured data for the effect of reverberant noise within the warehouse, but we believe the measurement location 5' away is in the blower's direct sound field and relatively unaffected by the warehouse.

Measurement Results

The results of all measurements, in the form of print-outs directly from the sound level meter, can be found following this report. All measurements were taken as 15-second averages. For clarity, the results of the 1/3-octave band measurements are listed below. For comparison, I have included the test results from our measurements taken on your original blower (1 motor configuration) in 1998.

1/3-Octave Band Sound Pressure Levels, in decibels (dB)

<u>Center Frequency</u> <u>(Hz)</u>	<u>5 Feet from Blowers</u> <u>(4 motor system)</u>	<u>20 Feet from Blowers</u> <u>(4 motor system)</u>	<u>5 Feet from Blower</u> <u>(1 motor - 1998 test)</u>
25	76.1	70.2	67.3
31.5	76.6	71.9	71.4
40	76.8	72.0	75.5
50	78.4	74.2	79.3
63	77.8	72.8	85.3
80	77.3	74.8	81.9
100	78.1	74.0	83.7
125	80.0	73.7	83.3
160	75.9	73.8	86.4
200	77.0	73.9	85.9
250	81.7	73.7	88.5
315	79.3	75.0	90.5
400	83.6	80.5	97.0
500	76.9	73.7	96.2
630	67.0	70.8	96.5
800	67.1	63.7	89.7
1,000	66.4	64.9	88.5
1,250	64.5	64.5	84.7
1,600	65.8	63.7	82.4
2,000	64.5	61.5	83.0
2,500	61.4	59.4	80.3
3,150	61.5	58.3	78.5
4,000	59.5	56.8	76.4
5,000	57.9	54.1	74.0
6,300	54.5	49.9	72.5
8,000	51.3	48.8	70.6
10,000	49.6	44.5	68.9
12,500	47.2	42.2	67.1
16,000	44.9	38.4	64.3
20,000	38.9	32.8	59.9
Overall (sum):	90.5 dB	86.4 dB	103.0 dB
A-Weighted:	82.5 dBA	79.4 dBA	99.8 dBA

Please note that even though the data are listed to the nearest 0.1 decibel, accuracy beyond the nearest whole decibel should not be expected.

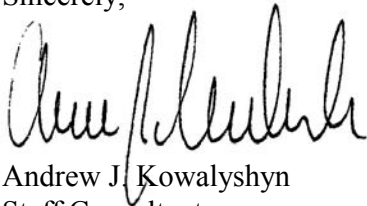
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Measurement Equipment

Measurements were taken with a Larson Davis model 2900 Type 1 sound level meter and a Brüel and Kjaer model 4165 condenser microphone. Immediately prior to measuring, the sound level meter was calibrated with a Larson Davis model CAL250 acoustic calibrator. Calibration was again verified at the conclusion of the measurements. All of our test equipment has been calibrated within the recommended time period set by the manufacturer. Documentation verifying measurement equipment calibration is available upon request.

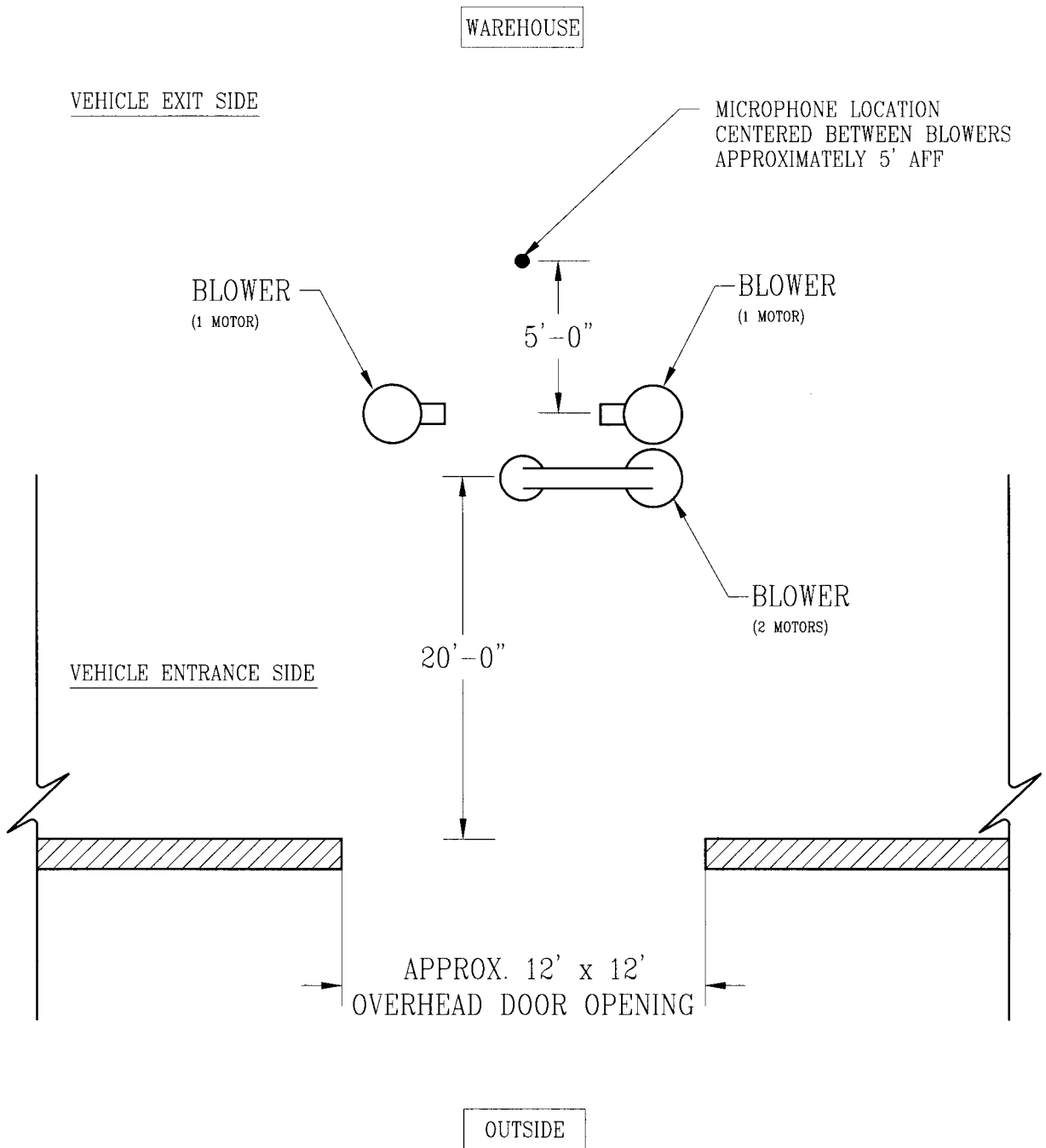
If you have any questions please feel free to contact me.


Sincerely,

A handwritten signature in black ink, appearing to read "Andrew J. Kowalyshyn". The signature is fluid and cursive, with the first name being the most prominent.

Andrew J. Kowalyshyn
Staff Consultant

Encl: Figure No. 1
Measurement Data



 <p>DAVID L. ADAMS ASSOCIATES, INC. 1701 BOULDER STREET DENVER, COLORADO 80211 303/455-1900 FAX 303/455-9187</p>	Measurement Configuration			Figure No. 1
	AeroDry Systems, LLC			
	Not to Scale			
	Date 26 September 2002	Project No. 6595	Drawn By DMP	