

June 28, 2021

Planning Board
Town Hall
Pembroke, MA 02359

RE: 715 Washington Street – Assessors Map Site Plan
Applicant: George Thibeault

Dear Board Members:

On behalf of the applicant, we hereby submit this Sound survey for the above referenced project.

Sound Level Survey of #715 Washington Street, Pembroke, MA

The following sound survey was prepared in response to the Planning Boards request at the public hearing on Monday June 14, 2021. The Planning Board requested additional information on sound levels at the property. Based on the request we have taken sound measurements at Key points around the property as well as measurements at a similar facility to simulate sounds generation from the proposed facility.

The property #715 Washington Street was surveyed on June 23rd, 2021. The survey took place from 8am-9:30am and from 4pm-5:30pm. 3 points were selected from the property layout to gauge the noise level at the property. The first point was selected by the road to measure the general sound level of traffic in the area at the front of the property. The second point was located on the abutting property #737 Washington Street- 178 ft. off of the street in the parking lot. This point was selected because it is approximately 178 ft. from traffic, a similar distance from the street as #697, and was not in the woods where the sound from the road may have been blocked or muffled. Point 3 was located on the North lot line abutting #697 Washington Street. This point was selected as it is adjacent to the neighbor's property. This point is located approximately 220 ft. from the road, and approximately 335 ft. from the proposed site for the fire processor and saw mill.

A second sound survey was completed at a similar Firewood Processing Facility to provide sound data that simulates the proposed facility. Measurements were taken at 3 points (Points #4 - #6).

	Average dB (morning/afternoon)	Minimum dB (morning/afternoon)	Maximum dB (morning/afternoon)
Point #1	65.6/65.1	43.7/43.7	87.7/82.9
Point #2	50.9/50.4	41.0/41.4	65.0/69.7
Point #3	50.9/49.2	46.8/45.1	63.8/68.1
Point #4	80.7	78.2	86.0
Point #5	53.3	50.6	57.5
Point #6	56.5	53.9	60.3

Point #1 description: On the side of the roadway on Washington Street

Point #2 description: 178ft. off the street in the parking lot of #737 Washington Street

Point #3 description: Next to locus's property line abutting #697 Washington Street

Point #4 description: 50' from firewood processor

Point #5 description: 400' from firewood processor

Point #6 description: 170' from firewood processor within an enclosure

Analysis

- **Point #1 Vs Point #4** - Point #1 resulted in a max sound level of 87.7 dB. This level is higher than the max sound level of 86.0 dB generated at point #4 by the proposed wood processor at a distance of 50 ft. The peak sound generated by the traffic on Route 53 is higher than the noise generated by the Wood processor.
- The low and average sound in the comparison of these two points was distorted by other equipment being utilized on the property at the time of the survey. The processor was being loaded by a large tree clearing type excavator that will not be utilized at the proposed site. The excavator was running constantly was the noise producer for the average and low sound generation.
- **Point #3 Vs Point #5** – Point#3 resulted in a max sound level of 68.1 dB and an average of 50.9. Point #3 sound level represents the current ambient and peak levels at the property line adjacent to the house at #697 Washington Street. Point#5 resulted in a max sound level of 57.5 dB (proposed 57.5 vs existing 68.1). The sound expected to be produced by a wood processor 400 ft away is lower than the existing sound currently at the property of #697 Washington Street. The average sound levels of 50.9 dB existing and 53.3 dB proposed are approximately equivalent. The 400 ft between the measurement location and the wood processor was void of any obstructions including vegetation.
- **Point #3 Vs Point #6** – Point#3 resulted in a max sound level of 68.1 dB and an average of 50.9. The sound level represents the current decibel level at the property line adjacent to the house at #697 Washington Street. Point #6 resulted in a max sound of 60.3 dB (proposed 60.3 vs existing 68.1). The max sound level of 60.3 is lower than the existing

sound level #697 Washington Street. The average sound levels of 50.9 dB existing and 56.5 dB proposed. The sounds are substantially equivalent. Point #6 was located 170 ft from the processor within an enclosure that is similar to the enclosure that the applicant is proposing.

Based on the above analysis it is our opinion that the sound emitted from the proposed use will not increase the sound levels in the vicinity above the sound levels produced by traffic on Route 53 and that the proposed use meets the standard of Protection of the abutting properties, the neighborhood, and the community, to minimize any detrimental or offensive use of the site.

If you have any questions please do not hesitate to call.

Sincerely,

GRADY CONSULTING, L.L.C.



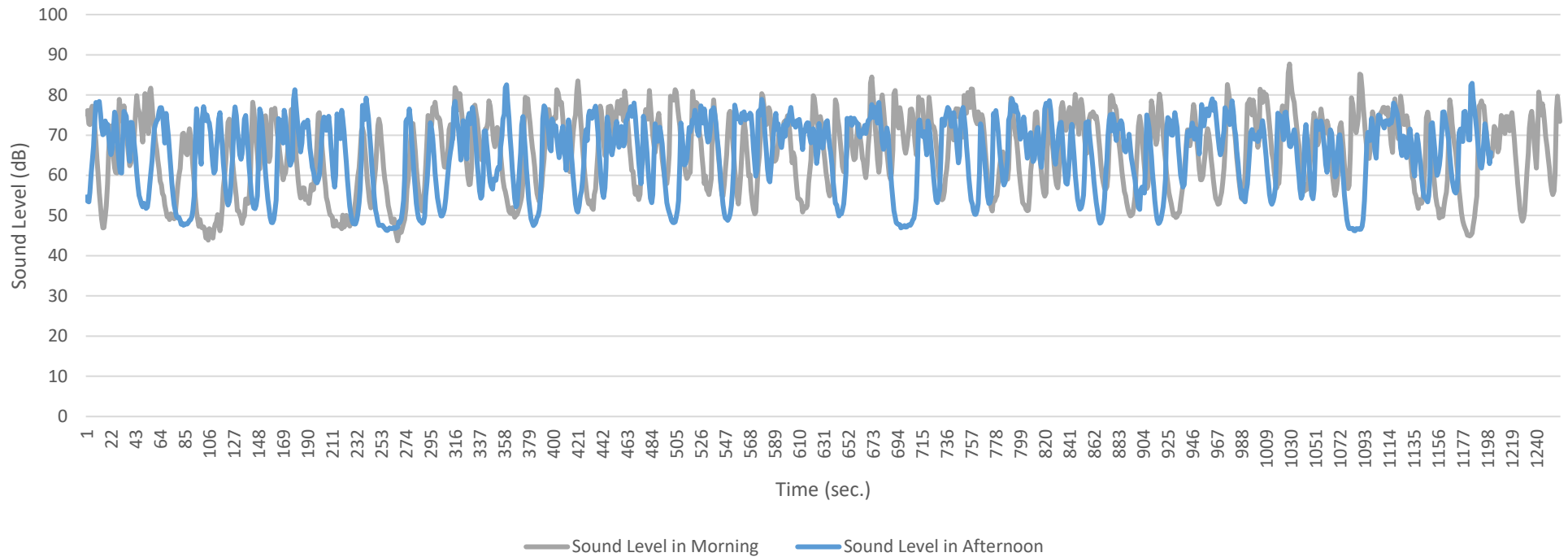
Kevin Grady, P.E.

Principal

Cc: Jeff De Lisi, George Thibeault



Sound Level (dB) over Time (sec.) at Point 1 at #715 Washington Street, Pembroke, MA



- POINT #1 SOUND LEVEL SURVEY (MORNING)

MAX: 87.7 dB @ 8:21.08 AM

MIN: 43.7 dB @ 8:08.26 AM

AVG: 65.6 dB

TRAFFIC LEVEL: STEADY

- POINT #1 SOUND LEVEL SURVEY (AFTERNOON)

MAX: 82.9 dB @ 4:26.44 AM

MIN: 43.7 dB @ 4:25.04 AM

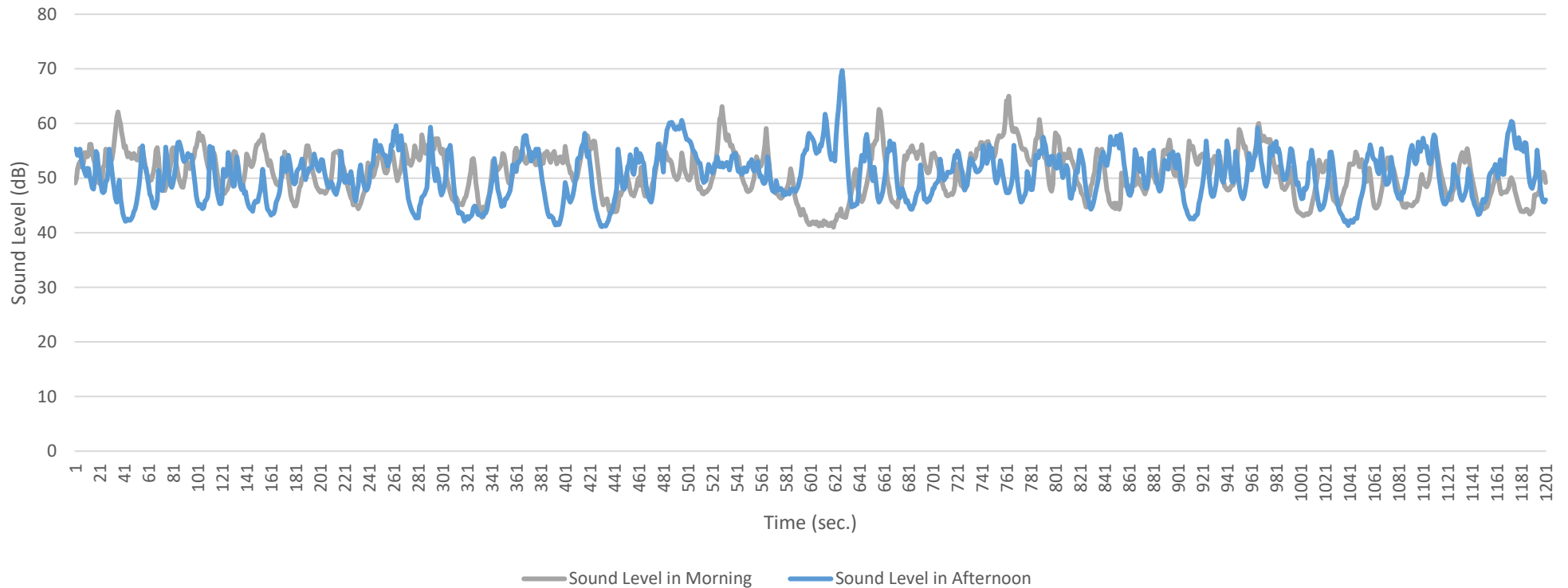
AVG: 65.1 dB

TRAFFIC LEVEL: STEADY, LESS BIG TRUCKS THAN THE MORNING

The table below notes what the spikes in the graph for point 1 are.

Time on Graph (sec)	Real Time (hr:min.sec)	Sound Level (dB)	Notes
1	08:04.00	75.3	Lots of cars going by
56	08:04.55	81.7	Big Truck going by
143	08:06.22	78.2	Big Truck going by
179	16:09.58	81.3	Motorcycle
316	08:09.15	81.8	Motorcycle going by
316	16:12.15	78.4	Lots of cars passing at once
360	16:12.59	82.5	Motorcycle going by
403	08:10.42	81.3	Lots of cars passing at once
421	08:11.00	83.5	Big Truck going by
519	08:12.38	80.9	Big Truck going by
537	16:15.56	76.8	Big Truck going by
578	16:16.40	78.9	Lots of cars passing at once
692	08:15.31	81.1	Big Truck going by
757	08:16.36	81.5	Lots of cars passing at once
792	16:20.11	79.0	Noisy car went by
918	08:19.17	80.2	Big Truck going by
976	08:20.15	82.6	Lots of cars passing at once
1004	08:20.43	81.4	Big Truck going by
1029	08:21.08	87.7	Big Truck going by
1185	16:26.45	82.9	Motorcycle
1089	08:22.08	85.2	Big Truck going by

Sound Level (dB) over Time (sec.) at Point 2 at #715 Washington Street, Pembroke, MA



- POINT #2 SOUND LEVEL SURVEY (MORNING)

MAX: 65.0 dB @ 8:45.42 AM

MIN: 41.0 dB @ 8:43.19 AM

AVG: 50.9 dB

TRAFFIC LEVEL: STEADY

- POINT #2 SOUND LEVEL SURVEY (AFTERNOON)

MAX: 69.7 dB @ 4:40.26 PM

MIN: 41.4 dB @ 4:37.10 PM

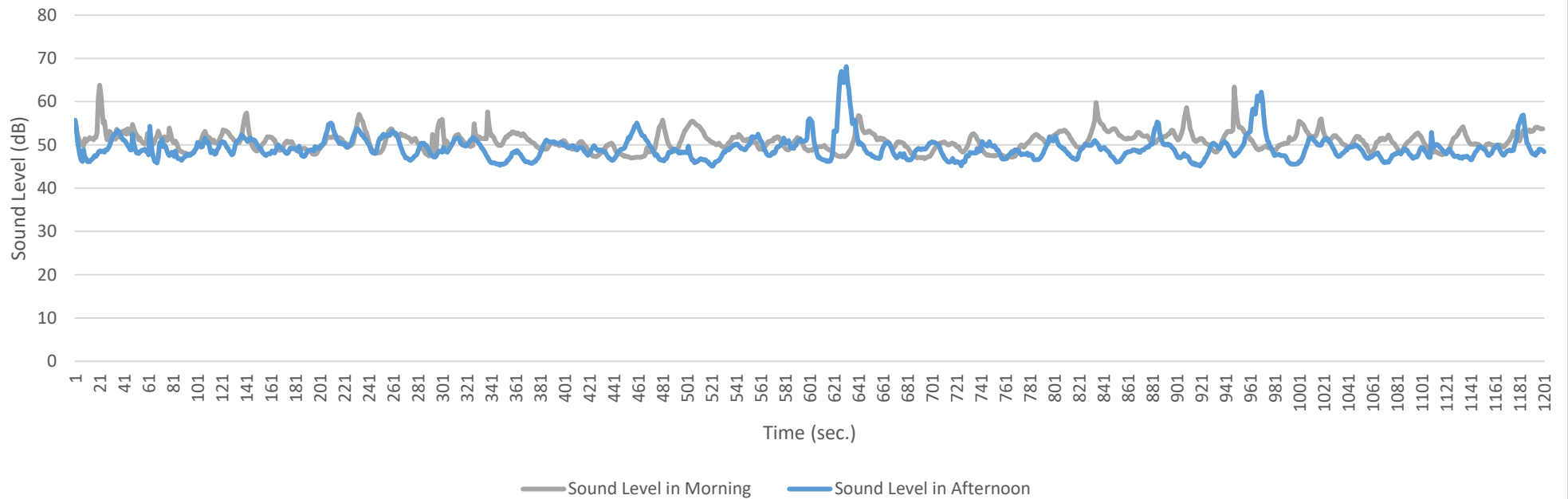
AVG: 50.4 dB

TRAFFIC LEVEL: STEADY, LESS BIG TRUCKS THAN THE MORNING

The table below notes what the spikes in the graph for point 2 are.

Time on Graph (sec)	Real Time (hr:min.sec)	Sound Level (dB)	Notes
36	08:33.35	62.1	Big Truck going by
172	08:35.51	54.8	Big Truck going by
250	16:34.09	56.0	Lots of cars at the once
278	08:37.37	55.9	Noisy Car going by
284	08:37.43	57.9	Noisy Car going by
291	16:34.50	59.3	Loud car going by
417	16:36.56	58.2	Loud car going by
488	16:38.07	60.2	Big Truck started across street
529	08:41.48	63.1	Big Truck going by
613	16:40.12	61.7	Big Truck going by
627	16:40.26	69.7	Loud Truck going by
657	08:43.56	62.6	Big Truck going by
702	08:44.41	54.6	Big Truck going by
763	08:45.42	65.0	Big Truck going by
951	08:48.50	58.9	Big Truck going by
966	16:46.05	59.2	Big Truck going by
967	08:49.06	60.0	Big Truck going by
1173	16:49.32	60.4	Loud Truck across the street

Sound Level (dB) over Time (sec.) at Point 3 at #715 Washington Street, Pembroke, MA



- POINT #3 SOUND LEVEL SURVEY (MORNING)

MAX: 63.8 dB @ 9:10.20 AM

MIN: 46.8 dB @ 9:21.34 AM

AVG: 50.9 dB

TRAFFIC LEVEL: STEADY

- POINT #3 SOUND LEVEL SURVEY (AFTERNOON)

MAX: 68.1 dB @ 9:10.20 AM

MIN: 45.1 dB @ 9:21.34 AM

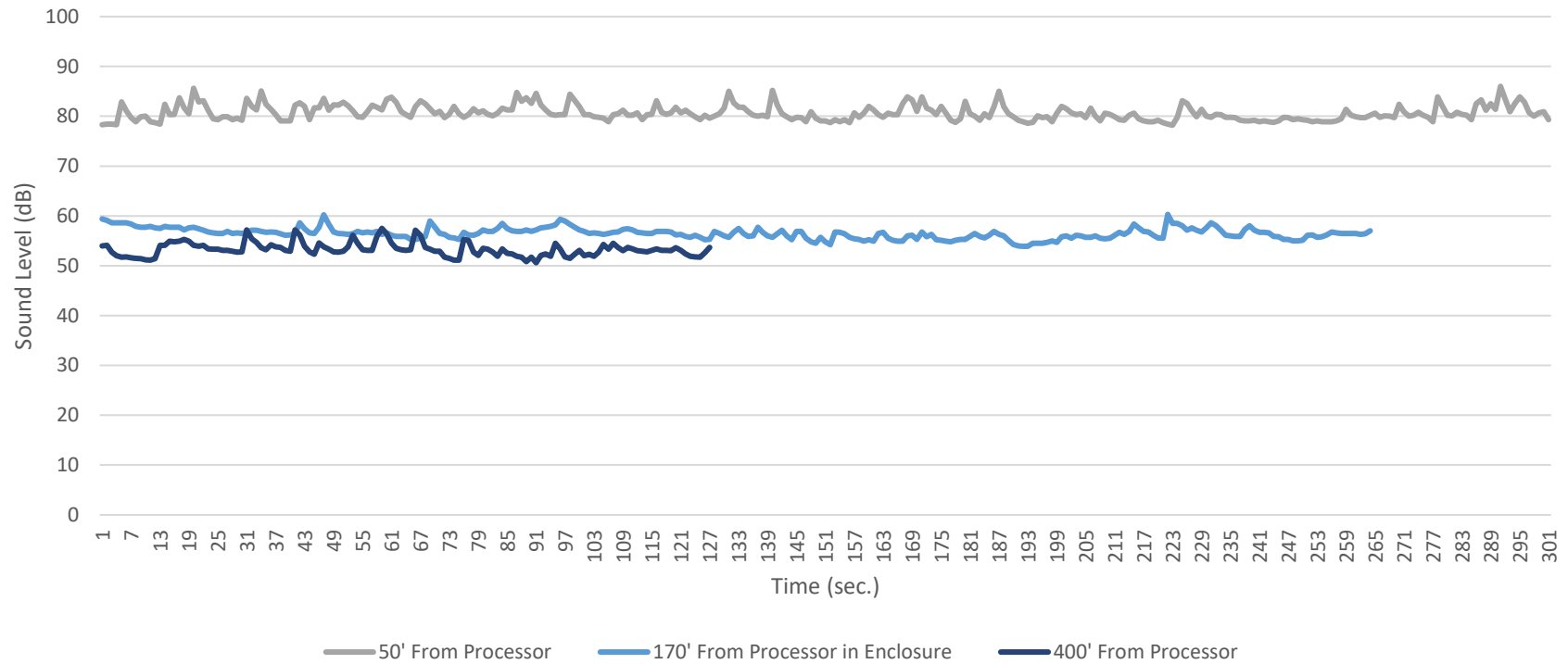
AVG: 49.2 dB

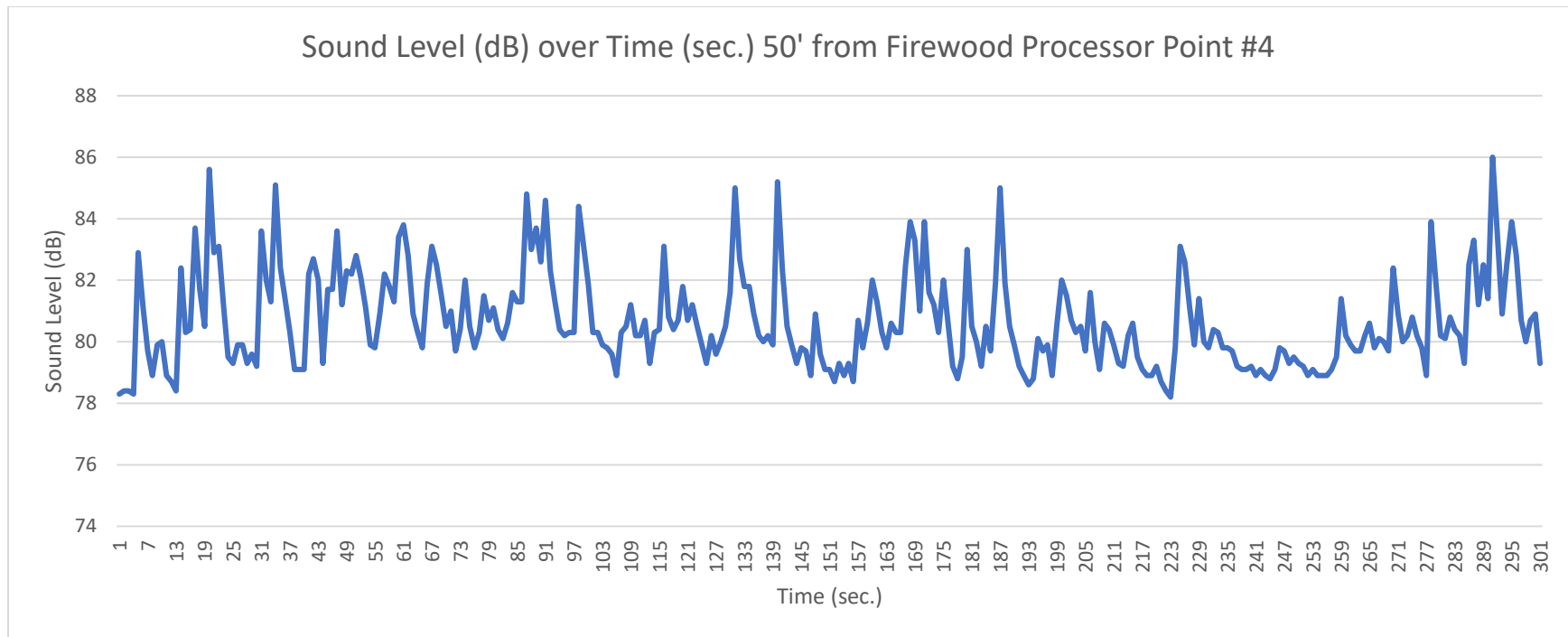
TRAFFIC LEVEL: STEADY, LESS BIG TRUCKS THAN THE MORNING

The table below notes what the spikes in the graph for point 3 are.

Time on Graph (sec)	Real Time (hr:min.sec)	Sound Level (dB)	Notes
142	09:12.20	57.4	Big Truck going by
210	17:05.29	55.1	Big Truck going by
233	09:13.52	57.1	Big Truck going by
259	09:14.18	53.7	Big Truck going by
481	09:18.00	55.7	Big Truck going by
505	09:18.24	55.5	Loud car going by
593	17:11.52	51.3	Motorcycle
601	17:12.00	56.1	Big Truck going by
627	17:12.26	67.0	Motorcycle
835	09:23.54	59.8	Motorcycle
885	17:16.44	55.3	Big Truck going by
909	09:25.08	58.6	Big Truck going by
1019	09:26.58	56.0	Noisy Bird nearby

Sound Level (dB) over Time (sec.) at Different Distances from Firewood Processor



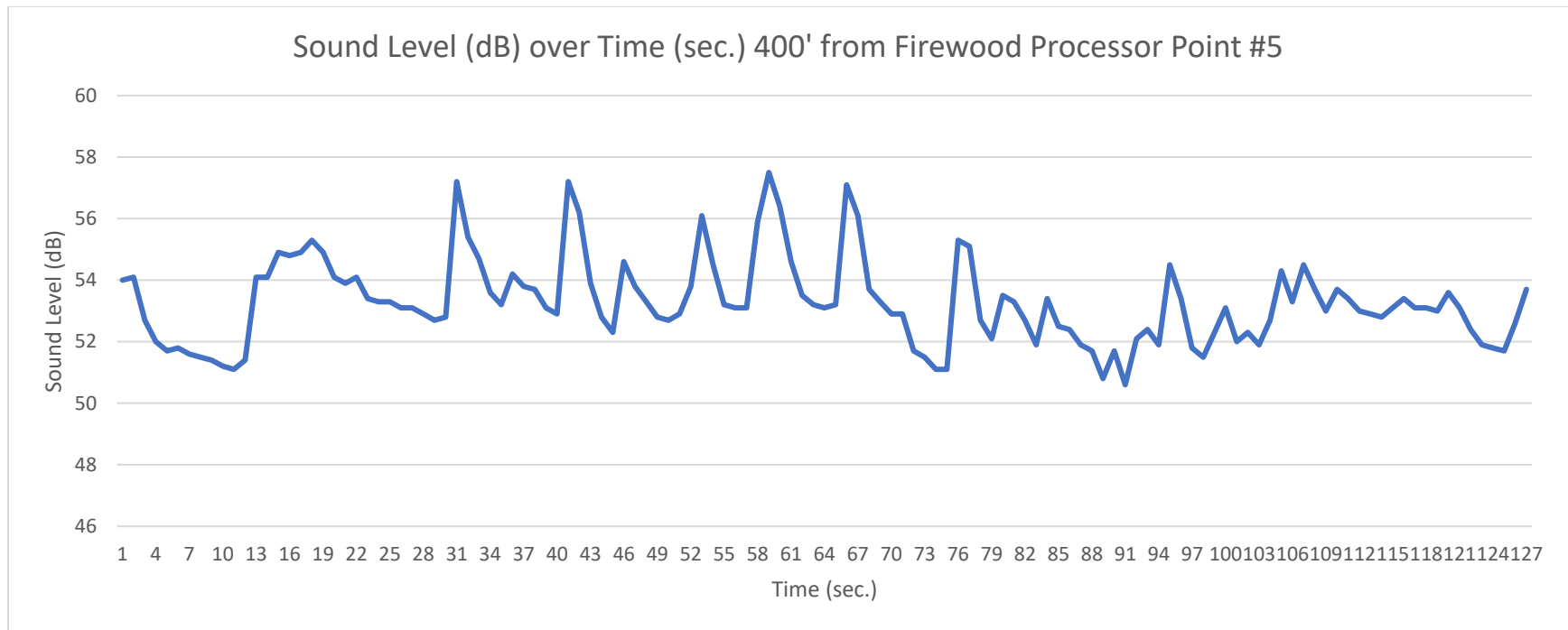


- 50' FROM FIREWOOD PROCESSOR

MAX: 86.0 dB

MIN: 78.2 dB

AVG: 80.7 dB

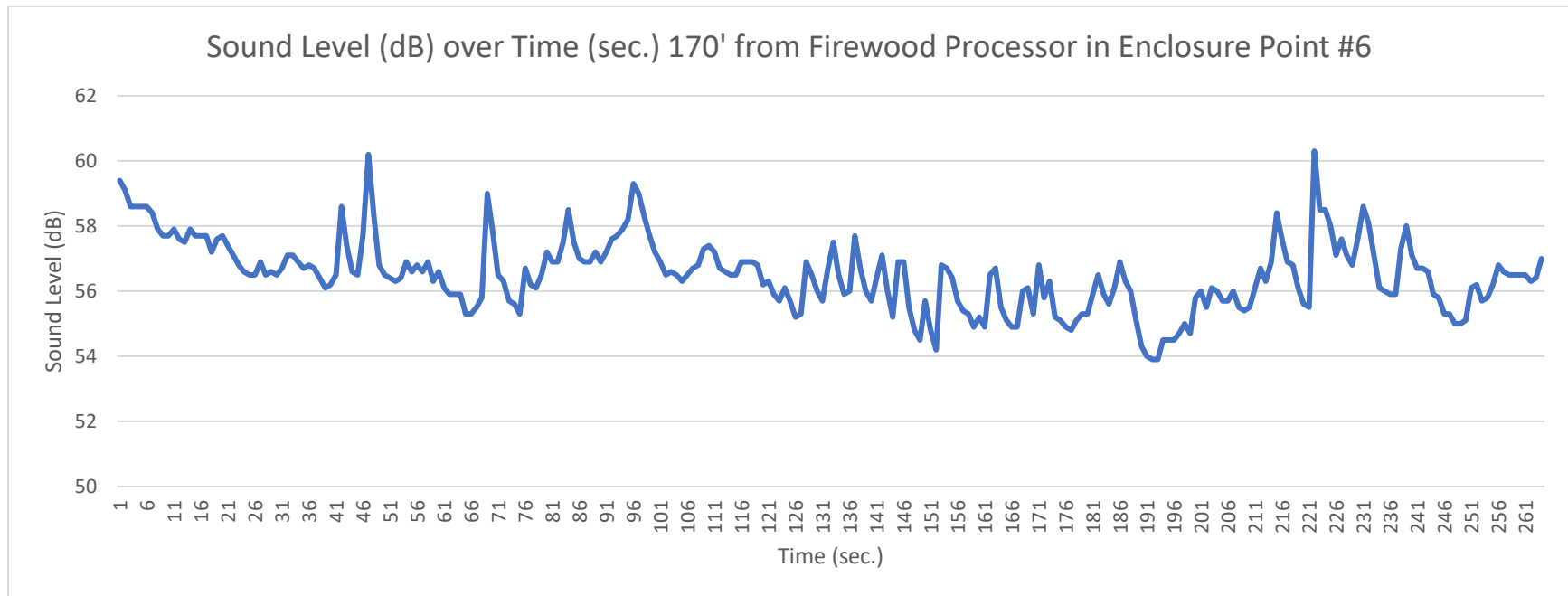


- 400' FROM FIREWOOD PROCESSOR

MAX: 57.5 dB

MIN: 50.6 dB

AVG: 53.3 dB



- 170' FROM FIREWOOD PROCESSOR IN ENCLOSURE

MAX: 60.3 dB

MIN: 53.9 dB

AVG: 56.5 dB

Common Outdoor and Indoor Noises

Outdoor Noises	Sound Pressures (uPa)	Sound Pressure Levels (dB)	Indoor Noises
Jet Flyover at 300 m	6,324,555	110	Rock Band at 5 m
Gas Lawn Mower at 1 m	2,000,000	100	Inside Subway Train (New York)
Diesel Truck at 15	632,456	90	Food Blender at 1 m
Noisy Urban Daytime	200,000	80	Garbage Disposal at 1 m Shouting at 1 m
Gas Lawn Mower at 30 m	63,246	70	Vacuum Cleaner at 3 m Normal Speech at 1 m
Commercial Area	20,000	60	Large Business Office
Quiet Urban Daytime	6,325	50	Dishwasher Next Room
Quiet Urban Nighttime	2,000	40	Small Theatre, Large Conference Room (Background)
Quiet Suburban Nighttime	632	30	Library
Quiet Rural Nighttime	200	20	Bedroom at Night Concert Hall (Background)
	63	10	Broadcast and Recording Studio
	20	0	Threshold of Hearing

Source: FHWA



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To whom it may concern,

The values below are the results of a noise level test performed at Bell's Machining using 6000C, 8000C firewood processors at operating rpm at given distances.

0'	110db
50'	85db
100'	77db
150'	70db

Gage Arsineault
Mechanical Design Technician
Bell's Machining, Welding, and Hydraulics

TECHNICAL DATA



Features

- High accuracy of ± 1.4 dB meets Type 2 standards
- Triple range measurement (60dB dynamic range)
- A & C frequency weighting
- Fast & Slow time weighting
- Record up to 64,000 datapoints and keep track with internal time and date stamp
- User selectable sampling rate from 1 to 60 seconds
- Large, easy-to-read backlit LCD display
- Digital analog bargraph
- Min/Max hold and auto shut off
- Tripod mount for long-term monitoring
- Low battery indicator
- Includes windshield ball, USB cable, PC software, hard carrying case and batteries

Specifications

Measuring Ranges:	30 to 130 dB Low: 30 to 90 dB Med: 50 to 110 dB High: 70 to 130 dB Full: 30 to 130 dB
Dynamic Range:	60 dB (in each range)
Accuracy:	± 1.4 dB
Resolution:	Digital: 0.1 dB
Analog:	2 dB
Response Time:	Digital: 500ms Analog: 50ms
Frequency Range:	20Hz to 8kHz
Frequency Weighting:	A, C
Time Weighting:	Fast/Slow (125ms and 1s)
Microphone:	0.5" (12.7mm) electret condenser
Digital Analog Bargraph:	Yes (30 segment)
Display:	4-digit LCD
Backlit Display:	Yes
Min:	Yes
Max:	Yes
Alarm Indicators:	Under and Over (visual on-screen)
Datalogging Capabilities:	Yes
Real-Time Clock	
and Date Stamp:	Yes
Selectable Sampling Rate:	Yes (between 1s and 60s)
Internal Memory:	1mb (64,000 datapoints)
Auto Shut-off:	Yes (after 30 mins/off)
Tripod Mountable:	Yes
Low Battery Indicator:	Yes
Power Supply:	4 x AAA Batteries
Output:	Yes (AC/DC)
Battery Life:	Approx 50 hours
PC Connectivity:	USB
Software OS Compatibility:	Windows XP/Vista/7/8/10
Product Certifications:	CE, IEC 61672-1 Class 2, ANSI S1.4 Type 2
Operating Temperature:	32 to 104°F (0 to 40°C)
Storage Temperature:	14 to 140°F (-10 to 60°C)
Operating Humidity:	10 to 90%
Dimensions:	10.4 x 2.5 x 1" (264 x 63 x 29mm)
Weight:	8.8oz (245g)

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TECHNICAL DATA

R8080-KIT

Data Logging Sound Level Meter
& Calibrator Kit

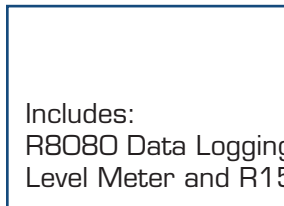


Includes:
R8080 Data Logging Sound Level
Meter, R8090 Sound Calibrator,
and R8888 Hard Carrying Case
with custom foam insert



R8080-KIT2

Data Logging Sound Meter
with Tripod Kit



Includes:
R8080 Data Logging Sound
Level Meter and R1500 Tripod



Model	Description
R8080	Data Logging Sound Level Meter
R8090	Sound Calibrator
REED-WB	Windshield Ball
R1500	Lightweight Tripod
CA-05A	Soft Carrying Case
R8888	Hard Carrying Case
R8080-KIT	Data Logging Sound Level Meter & Calibrator Kit
R8080-KIT2	Data Logging Sound Meter with Tripod Kit
R8080-NIST	Data Logging Sound Level Meter & NIST
R8080-KIT-NIST	Data Logging Sound Level Meter & Calibrator Kit & NIST

