

Jeffco Public Shooting Range Sound Measurements

Community Meeting

May 31, 2016

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Sound Study Objective

- Produce technical materials for project stakeholders to use in understanding the potential noise impacts from a shooting range located near the southeast corner of the of the Highway 93 and West 82nd Avenue intersection
 - Direct measurements of unmitigated sound produced from various firearms at representative receptors used as the study backbone
 - Direct measurements can be used to:
 - Compare to standards
 - Predict noise levels at local locations from various levels of activity
 - Predict noise levels with mitigation measures in place
 - The focus of today's presentation are the preliminary results of the measurement program

Existing Noise Policy/Statutes

Residential Maximums (dB(A))

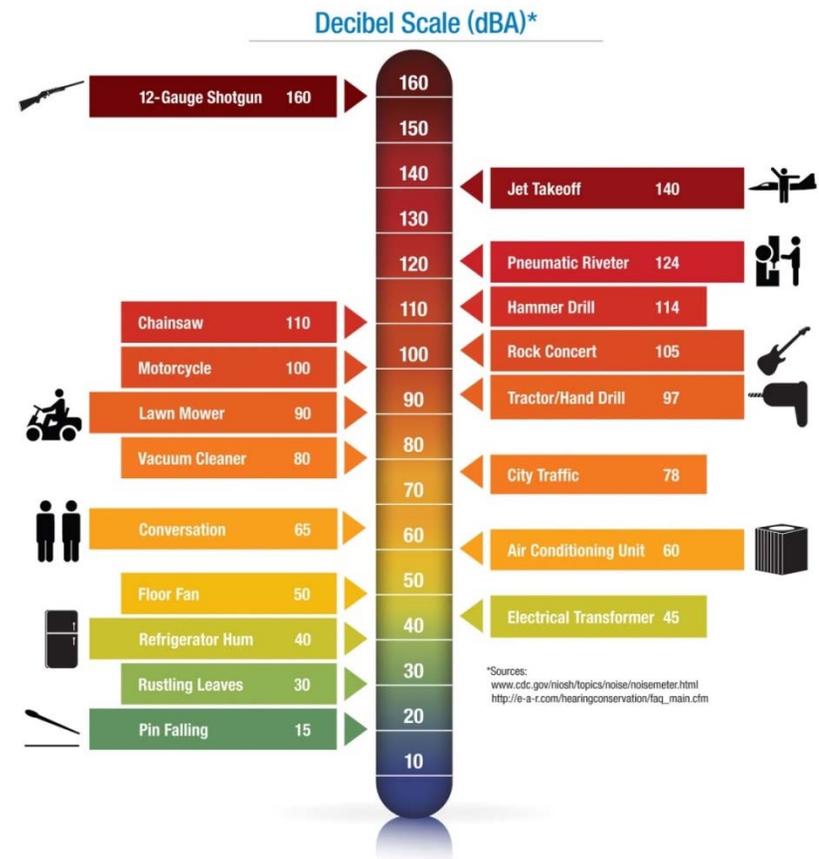
Sound levels of noise radiating from a property line at a distance of twenty-five feet or more

Sound Type	7:00 am to next 7:00 pm	7:00 pm to next 7:00 am
Impulsive	50	45
Continuous	55	50
[Jeffco Regulatory Policy and Colorado Noise Statute]		

Impulse noise can be defined as a noise of short duration (generally less than one second), especially of high intensity, abrupt onset and rapid decay, and often rapidly changing spectral composition.

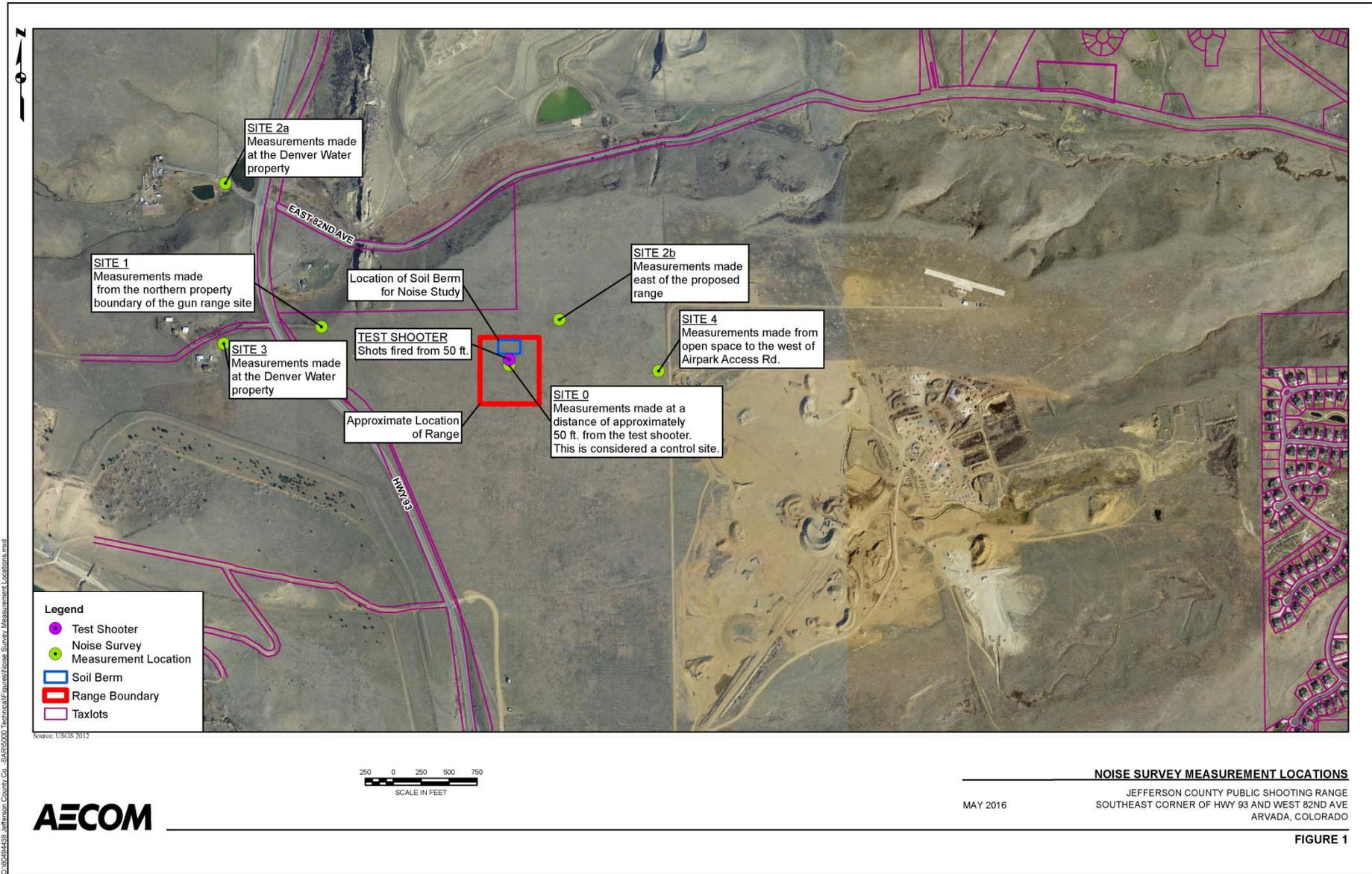
Noise attenuation factors

- Distance
- Topography
- Wind speed/direction
- Competing noise
- Buildings and natural barriers



Technical Approach - Overview

- 4 Representative receptor measurement locations and 1 control location
 - Site 2 relocated after first round of measurements
 - Topographic features were inhibiting sound propagation and excessive background noise lead us to identify a site with more value
- 3 Firearm types
 - SPA Operator 45ACP (0.45 caliber handgun)
 - Colt M4 556 NATO (5.56 mm rifle)
 - SPA SOCOM 308 (0.308 caliber rifle)
- 1 second measurement periods collected continuously with octave band at control location
- Meteorological measurements collected continuously
 - 3 meter tower (Ws, Wd, T)
- Vertical atmospheric structure from BAO Tower and Stapleton
- Routine calibration checks



Technical Approach – Overview (cont.)

- 3 sets of measurements on May 11, 2016 (Sites 0, 1, 2a, 2b, 3, and 4)
 - 0900, 1200, and 1530
 - Incomplete measurements on 1200 and 1530 at sites 2a, 2b, and 3
 - 5 shots per firearm per measurement set
 - Winds generally light, <3 m/s (7 mph)
 - Considerable background noise
- 2 sets of measurements on May 13, 2016 (Sites 0, 1, 2b, 3, and 4)
 - 1200 and 1500
 - 5 shots per firearm per measurement set
 - Winds moderate (8 to 10 mph)
 - Did not impact measurements
 - Considerable background noise



Maximum Firearm-Produced Noise Measurements

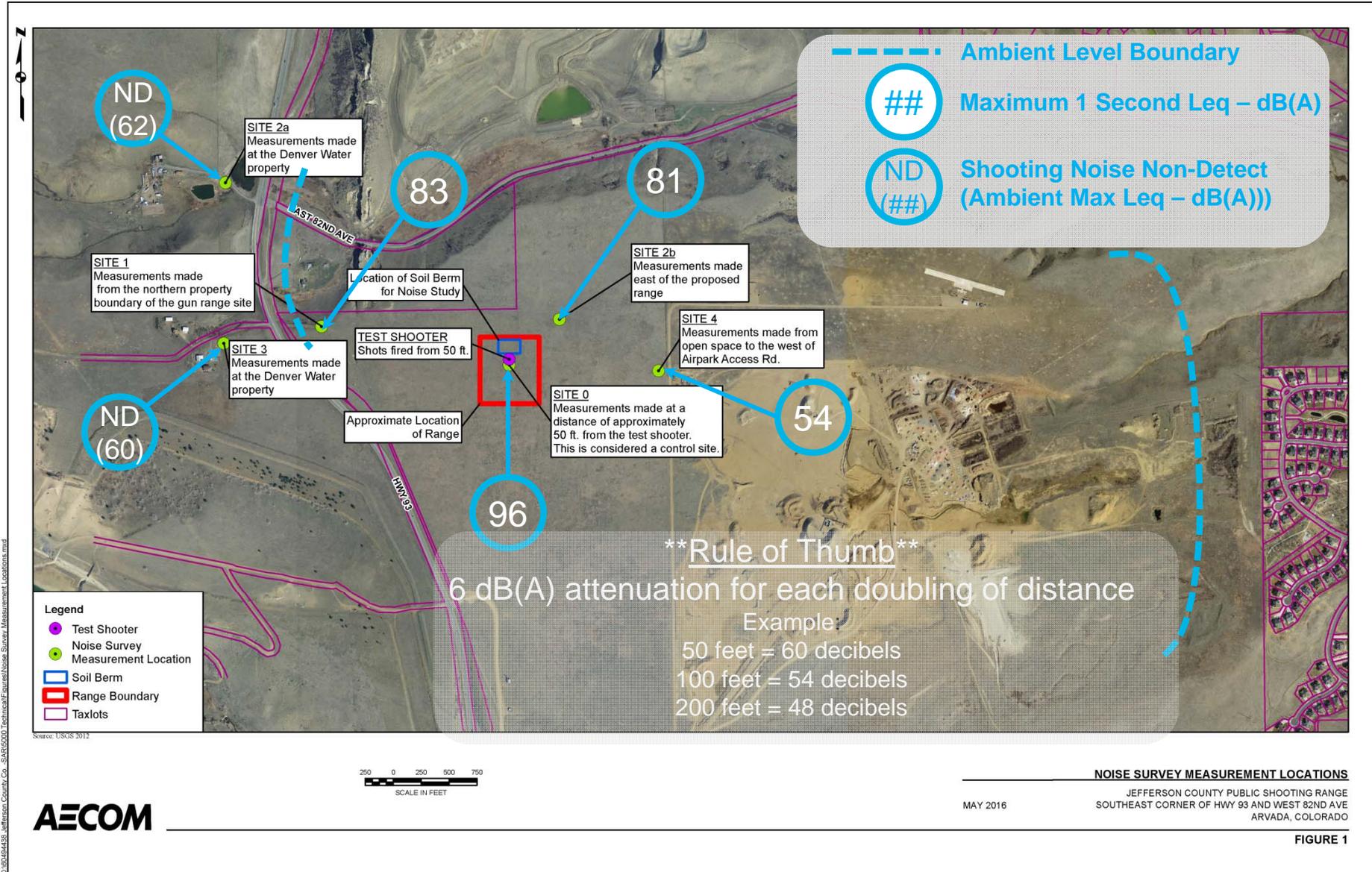
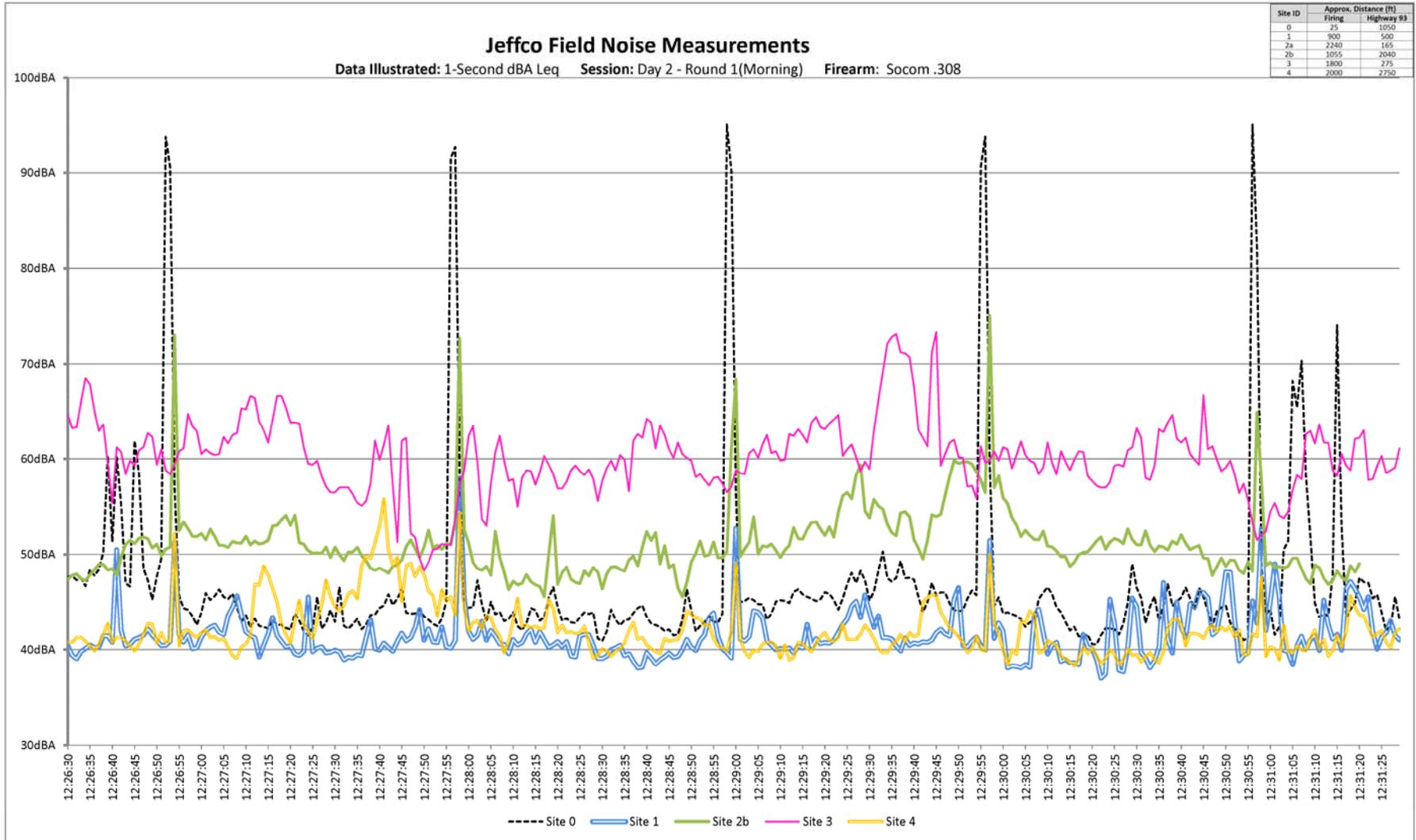


FIGURE 1

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Noise Measurement Example



Measurement Summary

Maximum 1 Second Leq During Shooting - dB(A)						
Site	Distance	11-May			13-May	
		am	Noon	pm	Noon	pm
0	25	94	96	96	96	96
1	900	66	65	83	58	57
2a	2240	ND	-	-	-	-
2b	1055	-	-	-	81	78
3	1800	ND	-	-	ND	ND
4	2000	47	48	48	54	50

Average Background - dB(A)						
Site	Distance	11-May			13-May	
		am	Noon	pm	Noon	pm
0	25	48	46	54	47	45
1	900	52	50	55	42	43
2a	2240	62	-	-	-	-
2b	1055	-	-	-	51	49
3	1800	55	-	-	60	60
4	2000	44	40	40	42	42

Preliminary Results (HIDDEN SLIDE – Voice Over Only)

- Evidence of the shooting cannot be observed in the measurements from locations west or northwest across highway 93 (Site 2a and 3)
 - Not to imply that shooting is not audible
- Background measurements closer to highway 93 are considerably higher compared to those east of the location
 - Background exceeds permissible levels at Sites 2a and 3
 - Site 3 ambient measurements 15-20 dBA higher than Site 4
- 900 ft east-northeast of the shooting (Site 2b), measured impulsive levels while shooting are approximately 75+ dB(A)
- 2000 ft east of the shooting (Site 4), measured impulsive levels while shooting are below about 55 dB(A)
 - They will be considerably less than that at the nearest residences to the east which are a lot further away.
- Unknown periodic, impulsive noise above standards measured
 - May 11th, Site 1 and Site 4
 - May 13th, Site 1 and Site 3