Report on 1st Weeks Noise Testing

RAMBOLL ENVIRON

ENVIRONMENT & HEALTH

December 13, 2016

Mr. Blake Araki
Raging River Quarry LLC
6101 Preston Fall City Road SE
Fall City, WA 98024

Re: Monthly Provisional Operations
Compliance Noise Monitoring - Week 1 Results

Dear Blake,

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As you requested, Ramboll Environ US Corporation (Ramboll Environ) measured sound levels of operations at the Raging River Quarry on December 9, 2016. This measurement is the first of four weekly measurement events required by King County DDES during one month of provisional operations. Details and results of the sound level measurement follow.

Applicable Noise Limits
The quarry was in operation during daytime hours (i.e., between 7 AM and 10 PM), so the hourly noise limits at the nearby rural-residential properties are an L_{eq} of 57 dBA and an L_{max} of 72 dBA.

Sound Level Equipment
Ramboll Environ conducted the sound level measurements using two Larson Davis LxT (Class 1) sound level meters and a Brüel & Kjær 2250 (B&K2250) Class 1 sound level meter. All of the meters recorded 1-second histories, and the B&K2250 also recorded audio. The meters were field calibrated immediately prior to the measurement and calibrated at the factory within the previous year. The microphone was mounted on a tripod at a height of approximately 5 feet above ground.

Measurement Locations
Sound levels were measured at the following three locations representing the adjacent properties to the quarry site:

- **Location 1** – on the southeast boundary of the McClain property and the Raging River Quarry property
- **Location 2** – on the northern boundary of the Shimmel property (formerly known as the Johnson property), near the log pile on the Trisko property
- **Location 3** – on the northern boundary of the Shimmel property (formerly known as the Johnson property), east of Location 2.

Measurement Details
The sound level measurements at all three locations were taken between 7 AM and 5 PM on December 9, 2016, with hourly L_{eq}s and L_{max}s calculated from the 1-second data.

The temperatures during the measurement period were in the 30s °F, with overnight snow remaining on the ground, and rain and wind at times during the day.

In addition to quarry-related activities, noise sources captured on the audio included weather-related noises (wind and/or rain), birds, and distant traffic.

Equipment in Operation
During the sound level measurement period, the following equipment was in operation:

7 to 8 AM: Minimal activity included thawing out crushing plant, loader and excavators in preparation for operation.

8 to 10 AM: All elements of the crushing plant and associated equipment were running. The powder crew was loading holes for the blast.

10 AM to 3:30 PM: Activity included changing screens and doing maintenance on equipment and the crushing plant. No significant equipment was active.

3:30 to 4 PM: This period included warning horns (three) and a blast.

4 to 5 PM: No activity in quarry.

Activity at the quarry was limited due to the cold and snowy conditions. No trucks were loaded on Friday as a result of the weather.

Sound Level Measurement Results
The sound level measurement results for each SLM location are presented in the following tables. For hours where compliance with the limits is not initially demonstrated, we reviewed the audio recordings to identify the noise source that caused the elevated levels. If the elevated sound level is from a source that is exempt from the noise limits, we then provide the estimated sound level after removal of the exempt source.

Table 1. SLM1 – McClain Property Sound Levels (dBA)

Time	Leq	Lmax	Major Noise Sources
7 – 8 AM	56	73 [(a)]	Wind/Rain
	56	<72	After removal of loudest wind/rain noise
8 – 9 AM	52	64	
9 – 10 AM	50	64	
10 – 11 AM	47	58	
11 AM – Noon	47	68	
Noon – 1 PM	45	55	
1 – 2 PM	50	64	
2 – 3 PM	48	63	
3 – 4 PM	51	78	Warning horns (3), blast
	47	64	After removal of warning horns and blast
4 – 5 PM	46	54	

(a) There were 3 seconds with an Lmax exceeding 72 dBA: 72.7, 72.5, and 72.3 dBA. These three Lmax levels would be considered to be in compliance with the limit of 72 dBA given the range of error of a Class 1 sound level meter, which is +/- 1 dBA. Regardless, we are identifying them in this report.

Table 2. SLM2 – Shimmel Property Sound Levels (dBA)

Time	Leq	Lmax	Major Noise Sources
7 – 8 AM	56	77 [(a)]	Wind/Rain
	56	<72	After removal of loudest wind/rain noise
8 – 9 AM	52	69	
9 – 10 AM	51	63	
10 – 11 AM	48	59	
11 AM – Noon	47	68	
Noon – 1 PM	45	54	
1 – 2 PM	48	65	
2 – 3 PM	48	60	
3 – 4 PM	54	79	Warning horns (3), blast
	49	65	After removal of warning horns and blast
4 – 5 PM	46	53	

(a) There were 9 seconds exceeding 72 dBA, ranging from 72.3 to 77.4 dBA. All wind/rain induced.

Table 3. SLM3 – Shimmel Property (East of SLM2) Sound Levels (dBA)

Time	Leq	Lmax	Major Noise Sources
7 – 8 AM	52	63	
8 – 9 AM	51	60	
9 – 10 AM	52	63	
10 – 11 AM	52	66	
11 AM – Noon	47	64	
Noon – 1 PM	45	54	
1 – 2 PM	47	60	
2 – 3 PM	47	60	
3 – 4 PM	64	90	Warning horns (3), blast, backup alarm
	45	<72	After removal of warning horns, blast, and loudest backup alarms
4 – 5 PM	45	60	

(a) After the warning horns and blast, there was a mix of engine and backup alarm noise from the quarry for approximately 12 minutes. During this period, the sound levels generally ranged from 50 to 70 dBA. Review of the audio indicates the loudest Lmax levels (3 seconds with levels of 73.7, 73.9, and 74.5 dBA) were from a tonal backup alarm, likely when the alarm was pointing directly at SLM3. Although we removed these loudest backup levels, it was not feasible to remove every instance of backup alarm from the data.

Conclusion

After removal of non-quarry related noise sources and/or exempt noise sources (i.e., warning horns, blasts, and backup alarms), the resulting measured sound levels demonstrate compliance with the County noise limits during RRQ's first week of provisional operations. It is noted that inclement weather during the measurement period resulted in less than full operations. We hope to conduct the next round of monitoring during better weather conditions and full quarry operations.

Please call me (425-412-1807) if you have any questions regarding the above material.

Yours sincerely,

Kristen L Wallace

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