

June 25, 2023

TO: Carrie Richter  
FROM: Cottrell Community Planning Organization

RE: 2023 Current Sound Measurements on Proposed Filtration Site

Carrie,

This memo includes sound measurements of current conditions taken on the proposed filtration site at SE Carpenter Lane. We also describe the current noise profile and compare our noise measurements to the anticipated noises generated from construction and operation of the proposed facility.

### *Methods*

We used the Decibel X application on an iPhone 12. Three measurements were gathered at each data collection location (see Figure 1) in the morning and evenings between Saturday, June 10 through Monday, June 12. Each measurement ranged between 7 seconds and 20 seconds. We present the average of the three replicate measurements at each measurement location. The locations of the measurements were similar to what is described in Multnomah County Exhibit A.175 of Portland Water Bureau's assessment that occurred in 2022, except we did not measure at Portland Water Bureau's Site 1 (PWB 1)

### *Results*

- Natural sounds (e.g. wind, birds) were the primary sounds detected during all measurements. The natural sound noises were somewhat continuous but varied in intensity throughout the recordings.
- During morning measurements, agricultural operations were detected. These sounds were episodic in nature. The sounds reflected irrigation (pumping and spraying in the distance), ag workers whistling and talking.
- Occasional road noise occurred during morning and evening measurements CPO Site 5 (Figure 6).
- Measurements ranged from 30 to 55 dB, with the highest observation detected at CPO Site 1 (Figure 2) at approximately 55 dB. The sound detected during the highest observation was primarily attributed to irrigation operations (water pumping and spraying) on Surface Nursery property directly to the south of the two Pleasant Home water towers. Irrigation was completed before 19:00 that day.
- The most varied measurements were observed in the evening – at CPO Site 1 (Figure 2) and Site 3 (Figure 4). The sounds at CPO Site 3 were attributed to wind. CPO Site 3 is the windiest location on the proposed facility site.
- The least amount of noise with the least amount of variability was observed at CPO Site 2 (Figure 3).

*Discussion*

- Noise across the construction period can be anticipated to range 80 dBA to 86 dBA at or near the property lines of the proposed site, based on what the Federal Highway Administration has reported on similar heavy equipment to be used at the proposed site (Table 1; data from Knauer et al 2006). These measurements capture the sound 50 feet from its source. These measurements represent one noise source, not multiple.

**Table 1.** Noise level of heavy construction equipment from 50 feet away (Knauer et al 2006).

Noise Source	Measured Noise Level (dBA) at 50 ft. from Source
Caterpillar D8 Dozer	86
Caterpillar D6 Dozer	85
Caterpillar 966 Loader	81
Water Truck	84
Backhoe	78

- Construction noise is anticipated to be continuous throughout each work day for the anticipated 5 years of construction. It is reasonable to assume that the sound generated from more than one piece of heavy equipment will generate increased noise than what was reported in the FHWA (2010), see Table 1.
- According to a study by the National Institute for Occupational Safety and Health, a single bulldozer continuously emits approximately 104-109 dBA during operation (Spencer & Kolvalchik 2007). While idling, a single bulldozer emits 96 dBA.
- The noise contour map (Figure 7) for the facility (Multnomah County Exhibit A.49), excluding the emergency generators and fire pumps anticipated to be at least 75 dBA, shows that during normal operations, numerous buildings will exceed the highest current ambient levels detected at the measurement locations (i.e. > 50-55 dBA, Figure 2).

**Conclusion**

Current noise conditions reported here are similar to the observations reported by the Portland Water Bureau. Noises currently detected at the proposed filtration site primarily consists of varied natural sounds such as wind and birds. Occasional road and agricultural noises occur but are never continuous.

Construction noises will be continuous in nature throughout the work day. These noises will be unnatural and will significantly exceed the natural baseline sound profile.

The operational noises will be significantly exceed current ambient noise levels, which is primarily natural sounds with the occasional episodic agricultural and road sounds. Facility operations will be continuous throughout the day and night, all year long, in perpetuity. Facility operations will not be comprised of natural sounds. Sounds generated from facility operations will drown out many of the naturally occurring sound from the wind, birds, trees, etc. Sound mitigation options are proposed by PWB to comply with Multnomah and Clackamas County code compliance of staying below 60 dBA in day and 50 dBA at night. However, both of these sound thresholds, are not a consistent with the existing conditions of the property, surrounding properties, and the community. Current conditions fall well below these thresholds and noises approaching those thresholds are only episodic in nature.

Figure 1. Sound measurement locations by the Portland Water Bureau and the Cottrell CPO on the proposed filtration site. Black rectangles with pink site numbers are PWB locations. Cottrell CPO measurement location numbering are as follows:  
CPO 1 = PWB 4; CPO 2 = PWB 3; CPO 3 = PWB 2; CPO 4 = PWB 6; CPO 5 = PWB 5

**Bull Run Filtration Projects | Bull Run Filtration Facility Exterior Noise Analysis**

**[Exhibit A.49, E.3 Exterior Noise Analysis, Pg. 8]**

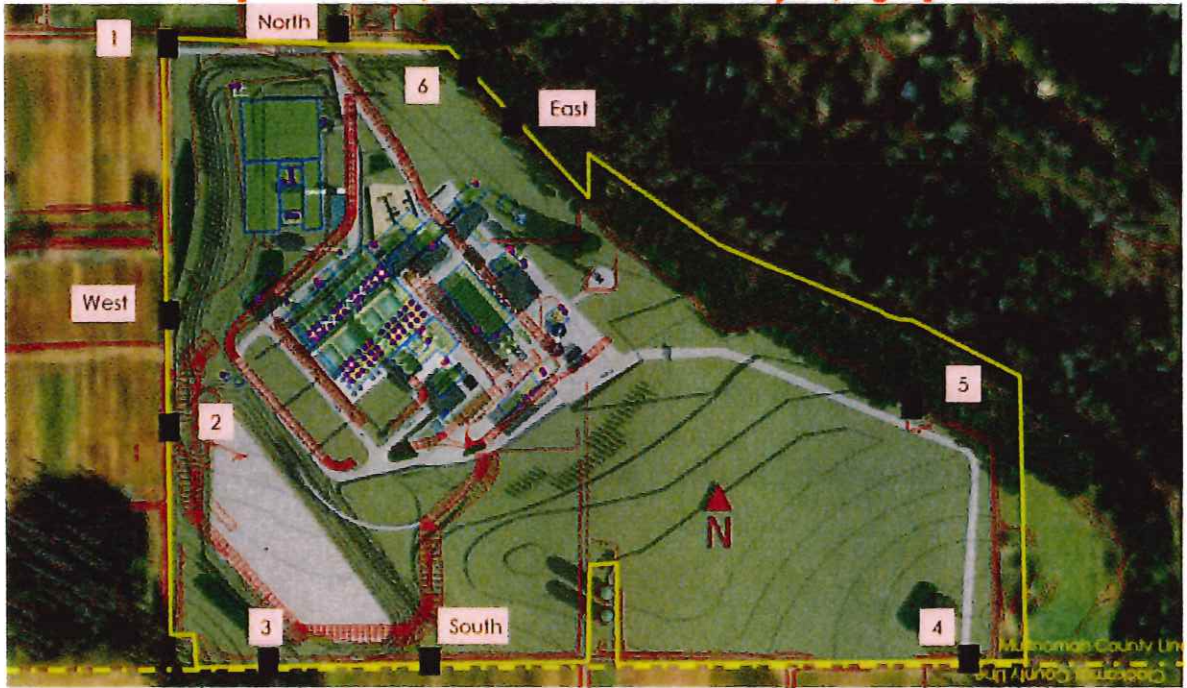


Figure 3. Bull Run Filtration Facility Receiver Locations (indicated in Black Rectangles).

Figure 2. Average sound measurements collected at CPO Site 1 (PWB Site 4) in June 2023. Gold = daytime hours; Blue = nighttime hours. Standard deviation of the means across three replicate measurements.

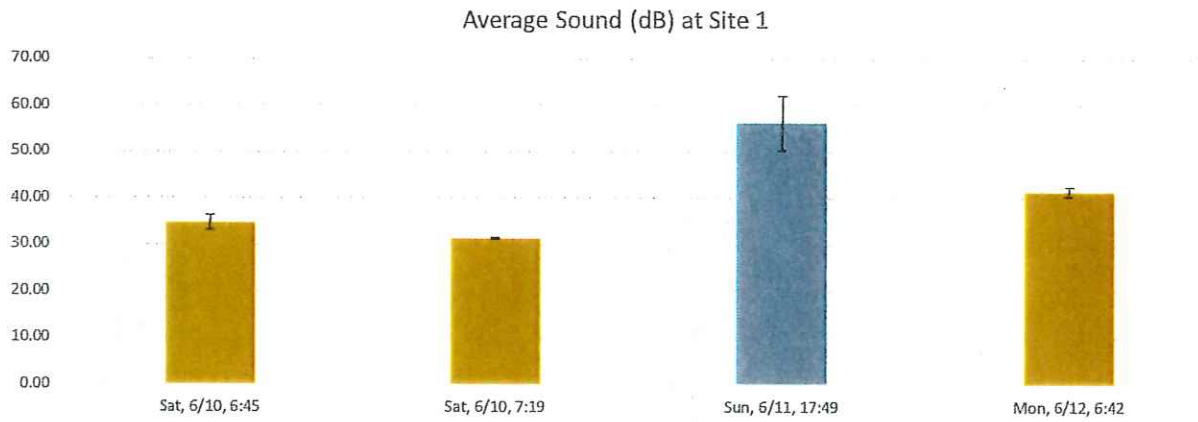


Figure 3. Average sound measurements collected at CPO Site 2 (PWB Site 3) in June 2023. Gold = daytime hours; Blue = nighttime hours. Standard deviation of the means across three replicate measurements.

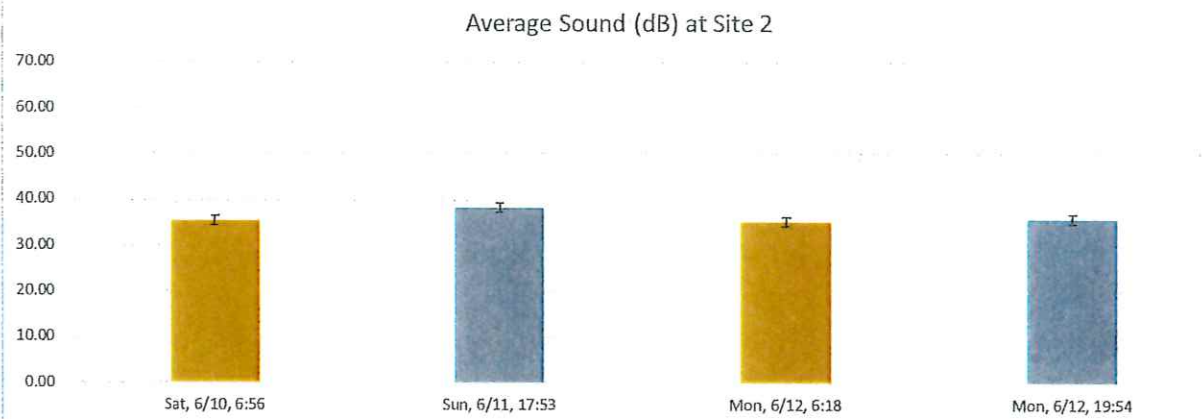


Figure 4. Average sound measurements collected at CPO Site 3 (PWB Site 2) in June 2023. Gold = daytime hours; Blue = nighttime hours. Standard deviation of the means across three replicate measurements.

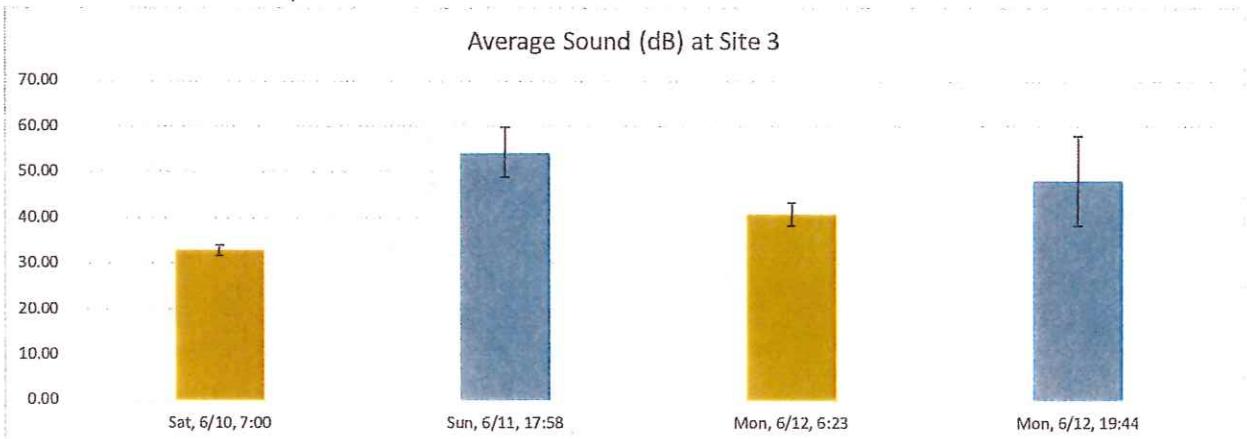


Figure 5. Average sound measurements collected at CPO Site 4 (PWB Site 6) in June 2023. Gold = daytime hours; Blue = nighttime hours. Standard deviation of the means across three replicate measurements.

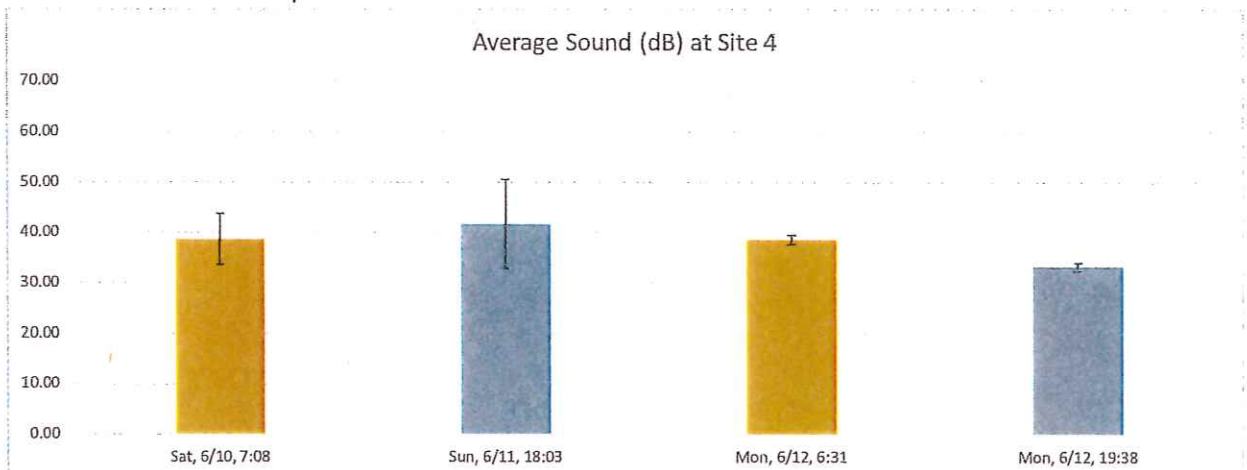


Figure 6. Average sound measurements collected at CPO Site 5 (PWB Site 5) in June 2023. Gold = daytime hours; Blue = nighttime hours. Standard deviation of the means across three replicate measurements.

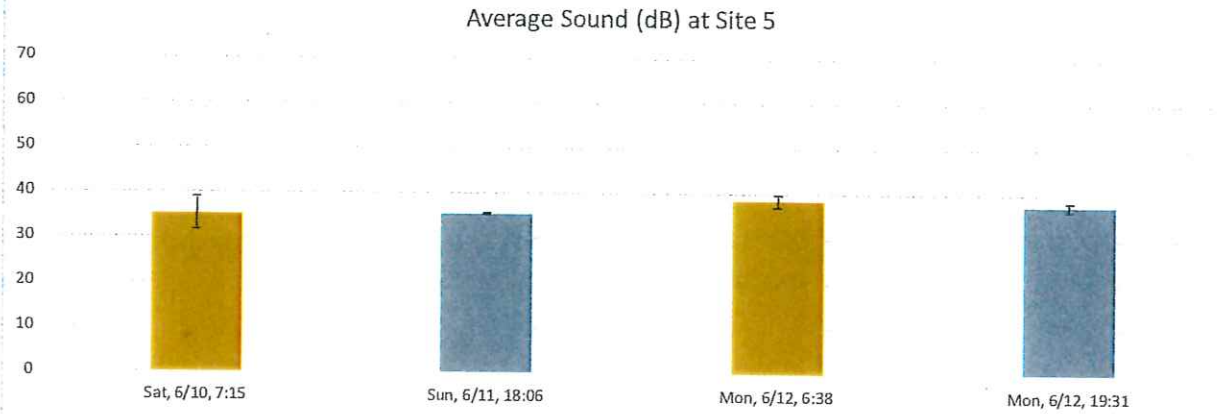


Figure 7. Noise contour map depicting anticipated noise levels (dBA) during operation of the proposed water filtration facility (Multnomah County Exhibit A.49).

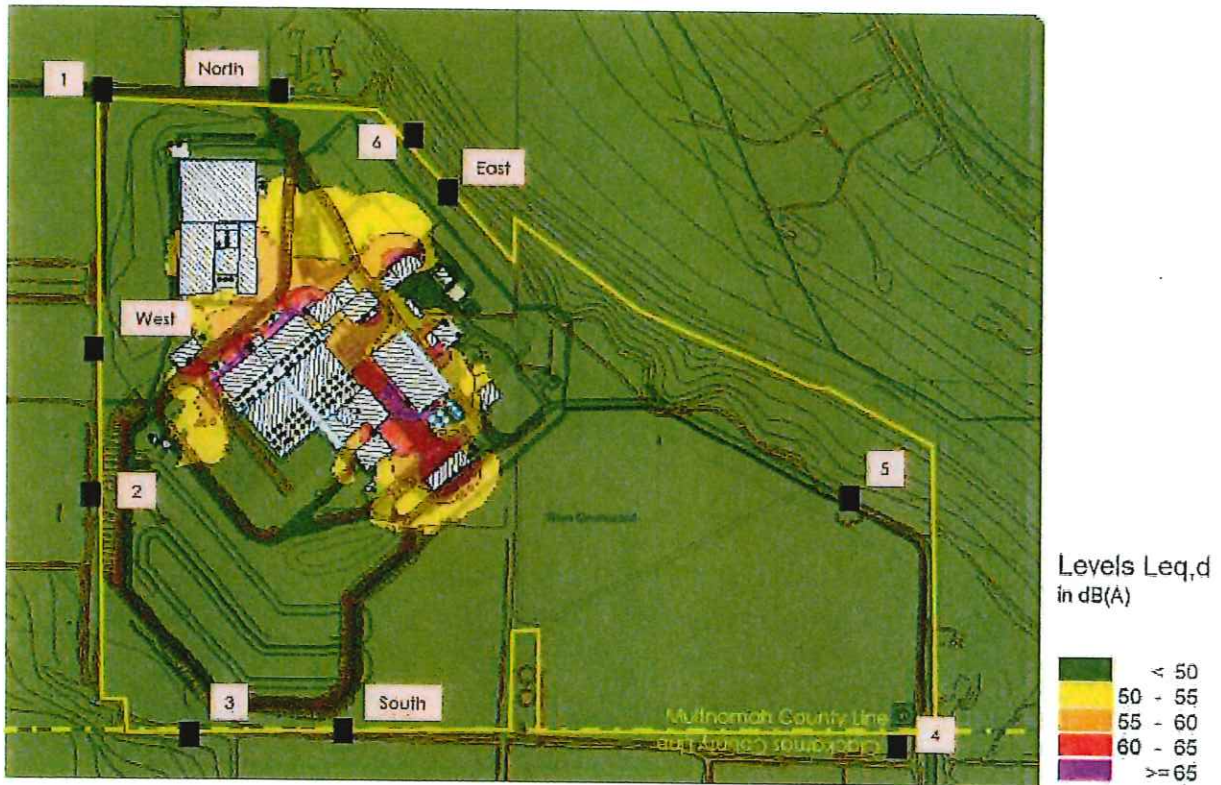


Figure 4. Noise Contours; Bull Run Filtration Facility-No Emergency Generators or Fire Pumps

## References

Exhibit A.49, Multnomah County. (2022) Bull Run Filtration Facility Exterior Noise Analysis. Bull Run Treatment Projects Technical Memorandum, 18 pp.

Exhibit A.175, Multnomah County. (2023) Pre-construction ambient sound level measurements. Bull Run Treatment Projects Technical Memorandum, 9 pp.

Knauer, HS., et al. (2006) *FHWA highway construction noise handbook*. No. DOT-VNTSC-FHWA-06-02; FHWA-HEP-06-015. United States. Federal Highway Administration, 185 pp.

Spencer, E. and Kovalchik, P. (2007) Heavy construction equipment noise study using dosimetry and time-motion studies. *Noise control engineering journal* 55.4: 408-416.