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November 15, 2019 BPF-02

Mr. Scott Roycroft
Better Place Forests
3717 Buchanan Street, Suite 400
San Francisco, CA 94123

Subject: Better Places Forests – Mariposa County Project Noise Assessment

Dear Mr. Roycroft:

HELIX Environmental Planning, Inc. (HELIX) has assessed the noise impacts associated with the construction and operation of the proposed Better Places Forests – Mariposa County Project (project). The analysis has been prepared to support a conditional use permit application to the County of Mariposa (County).

PROJECT DESCRIPTION AND ENVIRONMENTAL SETTING

The project is located at 10967 Stout Lane in the unincorporated Greeley Hill community area of Mariposa County. The project site is approximately 170 acres and comprises Assessor's Parcel Numbers (APNs) 003-010-034 and 003-010-035. The project site has a General Plan land use designation Natural Resource and is zoned Mountain General. Access to the site is provided via an existing driveway on Dexter Road.

The project would develop a memorial forest on approximately 100 acres of the 170-acre site with a total potential of approximately 5,000 trees available for memorial dedication by customers. Site improvements would include a visitor center building up to 1,500 square feet, including restroom facilities; a gravel-surface parking lot with approximately 18 parking spaces; a maintenance area with two approximately 120 square-foot storage sheds; an informal outdoor gathering area near the visitor center with picnic tables and benches; a memorial area with a gazebo and benches; a water tank for the visitor center and fire protection; a wastewater septic system/leachfield; compacted dirt paths for memorial tree access; and driveway improvements including widening and adding turnouts.

Project Construction

Project construction would commence between the fall of 2020 and spring of 2021 and would take between six months to one year to complete. Some grading would be required for creation of the visitor center pad, parking lot, and driveway improvements. Cut and fill of earth during grading would be

balanced on-site (no import or export of material). The project site is vacant, no demolition would be required.

Existing Noise Setting

The project site is located in the rural community area of Greeley Hill. No ambient noise measurements were conducted; however, noise levels are assumed to be low due to the project site's rural setting and distance from major roadways and airports. Nearby land uses include residences and undeveloped land.

Noise-sensitive land uses (NSLUs) are land uses that may be subject to stress and/or interference from excessive noise, including residences, schools, libraries, or similar facilities where quiet is an important attribute of the environment. Noise receptors are individual locations that may be affected by noise. The closest NSLUs to the project site are three single-family residences west of the project site (approximately 800 feet from the project drive way and 1,000 feet from the proposed visitor center), and one single-family residence northwest of the project site (approximately 1,100 feet from the proposed visitor center).

TERMINOLOGY

All noise level or sound level values presented herein are expressed in terms of decibels (dB), with A-weighting (dBA) to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ} and represent a period of one hour unless otherwise specified. The Community Noise Equivalent Level (CNEL) is a 24-hour weighted average, where noise levels during the evening hours of 7:00 p.m. to 10:00 p.m. have an added 5 dBA weighting, and sound levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dBA weighting.

Because decibels are logarithmic units, sound pressure level (SPL) cannot be added or subtracted through standard arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dBA increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than from one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dBA—rather, they would combine to produce 73 dBA. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dBA louder than one source.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dBA changes in sound levels, when exposed to steady, single-frequency ("pure-tone") signals in the mid-frequency (1,000 Hz–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dBA are generally not perceptible. It is widely accepted, however, that people begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dBA increase is generally perceived as a distinctly noticeable increase, and a 10-dBA increase is generally perceived as a doubling of loudness.

To place noise levels measured in dBA in context, typical noise levels for common outdoor and indoor noise sources are shown in Table 1, *Typical Noise Levels*.

Table 1
TYPICAL NOISE LEVELS

Common Outdoor Noise	Noise Level (dBA)	Common Indoor Noise
	110	Rock band
Jet flyover at 1000 feet		
	100	
Gas lawn mower at 3 feet		
Diesel truck at 50 feet at 50 mph	90	
		Food blender at 3 feet
Noisy urban area, daytime	80	Garbage disposal at 3 feet
Gas lawn mower at 100 feet	70	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban area, daytime	50	Dishwasher in next room
Quiet urban area, nighttime	40	Theater, large conference room (background)
Quiet suburban area, nighttime		
	30	Library
Quiet rural area, nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	

Source: Caltrans 2009

NOISE MODELING SOFTWARE

Modeling of construction noise was conducted using the Federal Highway Administration's Roadway Construction Noise Model (RCNM). RCNM utilizes measurements and estimates of sound levels from standard construction equipment (USDOT 2008).

REGULATORY FRAMEWORK

Mariposa County General Plan

The County General Plan Noise Element contains adopted goals, policies and implementation measures pertaining to noise. The General Plan does not provide specific target noise levels for land uses within the County. However, the Noise Element states that "the rural lifestyle found in Mariposa County results

in a noise environment which is typically well below 55 dBA CNEL" (County 2006). The applicable General Plan Noise Element goals, policies and implementation measures are:

Goal 15-1 - Preserve the quality of life in Mariposa County by controlling noise at its source

Implementation Measure 15.1a(2) - County development standards shall require means of controlling noise at its source as opposed to imposing mitigation as the means of offsetting noise impacts.

Goal 15-2 - Protect County residents from the harmful and annoying effects of exposure to excessive noise.

Implementation Measure 15-2b(1) - Where proposed non-residential land uses are likely to produce excessive noise levels at existing or planned noise-sensitive uses, an acoustical analysis shall be required as part of the project review process.

Policy 15-2c: Ensure that new development does not produce noise levels that create an unacceptable noise environment in those existing areas of the County where the noise environment is deemed acceptable, and also in those locations deemed noise sensitive.

Mariposa County Municipal Code

The County Municipal Code does not provide numerical noise level standards for land uses or noise limits for noise-generating sources within the County.

NOISE ANALYSIS

Construction

Construction of the project would generate noise from the use of heavy construction equipment for site-preparation and grading. The equipment to be used for project construction had not been determined at the time of this analysis. Based on the construction equipment from the air quality emissions modeling for the project, heavy equipment used for the project construction would include: rubber-tired dozers; excavators; graders; and backhoes (HELIX 2019).

Construction equipment could be used sporadically throughout the project site but would be concentrated primarily in areas requiring substantial improvements (such as the driveway and the visitor center and parking lot). Multiple pieces of construction equipment would be rarely used simultaneously in close proximity to each other. The loudest equipment anticipated to be used in construction of the project would be a grader. Noise from the anticipated construction equipment would range from approximately 77 dBA L_{EQ} to 84 dBA L_{EQ}, measured at 50 feet (USDOT 2008). Because sound sources near the ground attenuate with distance at a rate of 6 dBA per doubling of distance, at the closest residence location (800 feet from the driveway construction) the noise levels from the anticipated combined use of heavy construction equipment would be approximately 60 dBA L_{EQ}. Additionally, noise from heavy duty construction equipment at this distance would occur during the site-preparation and grading phases which is anticipated to last a total of approximately nine work days (HELIX 2019). Due to the intermittent nature and short duration of heavy construction equipment use, and due to the distance

between the anticipated construction activity and the nearest residences, construction of the project would not result in a substantial temporary increase in ambient noise levels.

Operation

Long-term operation of the project would result in new and changed sources of noise in the community from customers visiting the project, maintenance activities, and the visitor center's heating, ventilation, and air conditioning (HVAC) system. Due to small size of the visitor center (1,500 square feet), the limited landscaped areas, and the distance from the visitor center to the nearest residences (approximately 1,000 feet), on-site noise sources from long-term operation of the project would not result in a substantial increase in ambient noise measured at the nearest residence.

Employees and visitors would contribute to traffic noise in the area. According to the project trip generation analysis, the peak hourly trips associated with the project would occur on Sundays on Dexter Road. During the Sunday peak hour, the project would contribute approximately 24 trips to the existing 48 trips on Dexter Road (Kimley-Horn 2019). The project contribution to traffic would consist primarily of cars and light trucks. A noticeable increase in traffic noise of 3 dBA would require a doubling of the traffic noise source (the traffic volume). Because the project would not double the peak hourly traffic on Dexter Road, the project would not result in a substantial or noticeable increase in traffic noise.

Vibration

Heavy construction equipment, particularly equipment such as large vibratory rollers and pile drivers, can be a source of vibrations which could affect vibration-sensitive land uses within 100 feet of construction activity. The use of large vibratory rollers and pile drivers is not anticipated to be required for construction of the project. Furthermore, heavy construction equipment would be used approximately 800 feet or more from the nearest residences. The project does not propose operational uses that would generate groundborne vibration. Therefore, the project would not result in the generation of groundborne vibration levels which would affect nearby residents or structures.

CONCLUSION

The County does not provide numerical thresholds for noise. The project would generate some noise during construction and operation; however, construction noise levels were modeled at approximately 60 dBA L_{EQ} (one hour) at the nearest residences and would be intermittent and short-term in nature. Operational noise would be very low due to the distance between project components and residences, and traffic noise levels would not generate noticeable increase above existing conditions. Furthermore, the project would not generate significant groundborne vibration.

Sincerely,

Martin Rolph
Noise Specialist

Joanne M. Dramko, AICP
Senior Noise Specialist

Attachments: Attachment A, RCNM Output

REFERENCES

California Department of Transportation (Caltrans). 2009. Technical Noise Supplement.

County of Mariposa (County). 2006. General Plan – Volume I Countywide General Plan. Adopted December 18. Available at: https://www.mariposacounty.org/1142/Volume-I---Mariposa-County-Wide-General-.

HELIX Environmental Planning. 2019. Better Places Forests – Mariposa County Project Air Quality and Greenhouse Gas Emissions Assessment.

Kimley-Horn. 2019. Better Place Forests Trip Generation Memo – Mariposa County. October 30.

U.S. Department of Transportation (USDOT) Federal Highway Administration (FHWA). 2008. Roadway Construction Noise Model (RCNM) Version 1.1. Available at: https://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/.

Attachment A

RCNM Output

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/14/2019
Case Description: BPF Mariposa

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residence	Residential	55	55	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	800	0
Dozer	No	40		81.7	800	0
Grader	No	40	85		800	0
Excavator	No	40		80.7	800	0

Results

Calculated (dBA)

Equipment	*Lmax	Leq
Backhoe	53.5	49.5
Dozer	57.6	53.6
Grader	60.9	56.9
Excavator	56.6	52.6
Total	60.9	60

*Calculated Lmax is the Loudest value.