State of California Business and Transportation Agency

Memorandum

To: **Kamran Mazhar, Chief**
Chief , Design Branch F

Date: August 14, 2014
File: 12-ORA-5
PM: 28.3/28.6
EA: 0M1201
EFIS: 1200020296

Subject: **Request for Traffic Noise Investigation at Tustin Rd on-ramp from 2 to 3 lanes at Northbound Interstate 5 (I-5).**

This is in response to your memo dated August 5, 2014.

According to Traffic Noise Analysis Protocol, which contains Caltrans noise policies and our evaluation, this project is not considered a Type I project. Therefore, no further noise analysis is necessary and no traffic noise abatement is required for this project. However, the following paragraphs have been prepared to address construction noise and should be included in the PR.

Two types of short-term noise impacts would occur during project construction. The first type would be from construction crew commutes and the transport of construction equipment and materials to the project site and would incrementally raise noise levels on access roads leading to the site. The pieces of heavy equipment for grading and construction activities that will be moved on site, will remain for the duration of each construction phase, and will not add to the daily traffic volume in the project vicinity. A high single event noise exposure potential at a maximum level of 87 dBA L_{max} at a distance of 50 ft will exist from trucks passing in the vicinity. However, the projected construction traffic will be minimal when compared to the existing traffic volumes in this project and other affected streets, and its associated long term noise level change will not be perceptible. Therefore, short-term construction related worker commutes and equipment transport noise impacts would be less than substantial.

The second type of short-term noise impact is related to noise generated during roadway construction. Construction is performed in discrete steps, each of which has its own mix of equipment and consequently its own noise characteristics. These various sequential phases would change the

character of the noise generated and the noise levels along the project alignment as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction related noise ranges to be categorized by work phase. Table 1 lists typical construction equipment noise levels (L_{max}) recommended for noise impact assessments, based on a distance of 50 ft between the equipment and a noise receptor.

Typical noise levels at 50 ft from an active construction area range up to 91 dBA L_{max} during the noisiest construction phases. The site preparation phase, which includes grading and paving, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as back fillers, bulldozers, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 or 4 minutes at lower power settings.

Construction of the proposed project is expected to require the use of earthmovers, bulldozers, water trucks, and pickup trucks. Noise associated with the use of construction equipment is estimated between 79 and 89 dBA L_{max} at a distance of 50 ft from the active construction area for the grading phase. As seen in Table 1, the maximum noise level generated by each earthmover is assumed to be approximately 86 dBA L_{max} at 50 ft from the earthmover in operation. Each bulldozer would generate approximately 85 dBA L_{max} at 50 ft. The maximum noise level generated by water trucks and pickup trucks is approximately 86 dBA L_{max} at 50 ft from these vehicles. Each doubling of the sound source with equal strength increases the noise level by 3 dBA. Each piece of construction equipment operates as an individual point source. The worst-case composite noise level at nearby residences during this phase of construction would be 91 dBA L_{max} (at a distance of 50 ft from an active construction area).

Table 1.

Type of Equipment	**Range of Maximum Sound Levels (dBA L_{max} at 50 ft)**	***Suggested Maximum Sound Levels for Analysis (dBA L_{max} at 50 ft)***
Pile drivers	81–96	*93*
Rock drills	83–99	*96*
Jackhammers	75–85	*82*
Pneumatic tools	78–88	*85*
Pumps	74–84	*80*
Scrapers	83–91	*87*
Haul trucks	83–94	*88*
Cranes	79–86	*82*
Portable generators	71–87	*80*
Rollers	75–82	*80*
Dozers	77–90	*85*
Tractors	77–82	*80*
Front-end loaders	77–90	*86*
Hydraulic backhoe	81–90	*86*
Hydraulic excavators	81–90	*86*
Graders	79–89	*86*
Air compressors	76–89	*86*
Trucks	81–87	86

Source: *Noise Control for Buildings and Manufacturing Plants* (Bolt, Beranek & Newman, 1987).
dBA = A-weighted decibels
ft = feet
L_{max} = maximum instantaneous sound level

Therefore, nearby receptor locations may be subject to short-term noise reaching 85 dBA L_{max} generated by construction activities along the project alignment. Construction noise is regulated by the Department's Standard Specifications in Section 14-8.02, "Noise Control,", the Contractor shall equip all internal combustion engines with the manufacturer-recommended muffler and shall not operate any internal combustion engine on the job site without the appropriate muffler.

If you have any questions please contact Tara Ziaeian at extension 4956.

R. Aurasteh

Reza Aurasteh, Ph.D., PE
Branch Chief
D12- Environmental Engineering

C: Alma Olguin, Design Branch F