2.12 Noise

The project would include drainage improvements, shoulder widening (to include bicycle lanes), utility undergrounding, and the safety improvement (which was approved as part of the 2017 IS/MND/CE) that includes lane extension along State Route 133 (SR-133). The proposed project is classified as a Type I project, as determined by the California Department of Transportation (Caltrans) *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (Protocol, May 2011), because the safety component would use federal aid to restripe existing pavement for the purpose of adding (extending) a traffic lane. A noise analysis is required for all Type I projects. For the reasons stated above, the regulatory setting under Section 2.12.1 is provided for information purposes.

2.12.1 Regulatory Setting

The National Environmental Policy Act (NEPA) of 1969 and the California Environmental Quality Act (CEQA) provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment. The requirements for noise analysis and consideration of noise abatement and/or mitigation, however, differ between NEPA and CEQA.

2.12.1.1 California Environmental Quality Act

CEQA requires a strictly baseline versus build analysis to assess whether a proposed project will have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless those measures are not feasible. The rest of this section will focus on the NEPA/23 Code of Federal Regulations Part 772 (23 CFR 772) noise analysis; please see Chapter 3 of this document for further information on noise analysis under CEQA.

2.12.1.2 National Environmental Policy Act and 23 CFR 772

For highway transportation projects with Federal Highway Administration (FHWA) involvement (and Caltrans, as assigned), the Federal-Aid Highway Act of 1970 and its implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations include noise abatement criteria (NAC) that are used to

determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 A-weighted decibels [dBA]) is lower than the NAC for commercial areas (72 dBA). Table 2.12.1 lists the noise abatement criteria for use in the NEPA 23 CFR 772 analysis.

Table 2.12.1 Noise Abatement Criteria

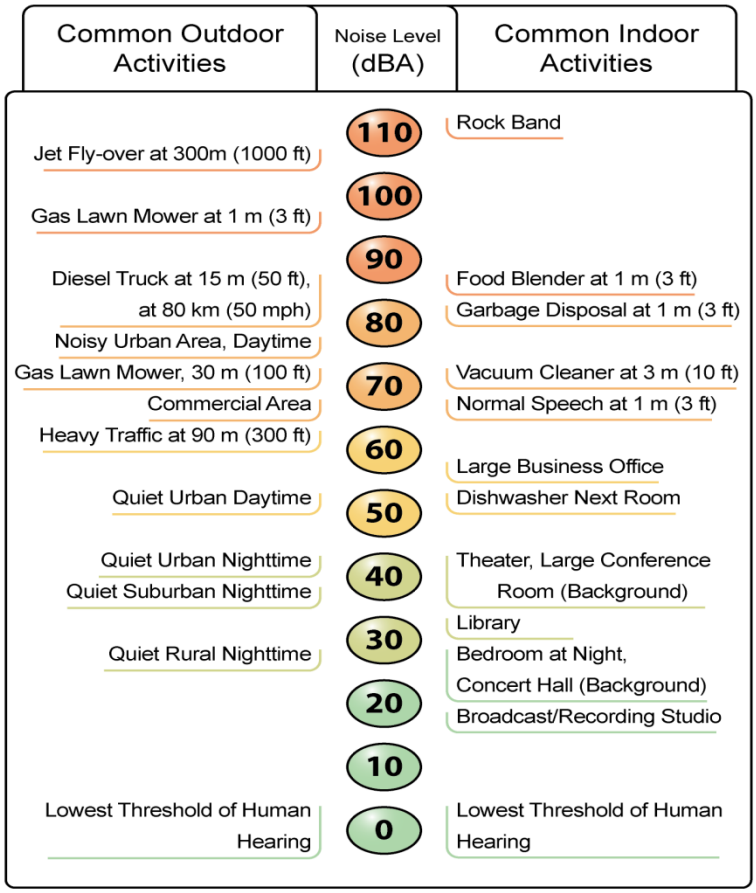
Activity Category	NAC, Hourly A-Weighted Noise Level, dBA $L_{eq}(h)$	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[1]	67 (Exterior)	Residential.
C[1]	67 (Exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (Interior)	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A–D or F.
F	No NAC—reporting only	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical, etc.), and warehousing.
G	No NAC—reporting only	Undeveloped lands that are not permitted.

Source: California Department of Transportation *Standard Environmental Reference* (August 2017).
[1] Includes undeveloped lands permitted for this activity category.
dBA = A-weighted decibels
$L_{eq}(h)$ = one-hour A-weighted equivalent continuous noise level
NAC = Noise Abatement Criteria

Table 2.12.2 lists the noise levels of common activities to enable readers to compare the actual and predicted highway noise levels discussed in this section with common activities.

Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects, May 2011, a noise impact occurs when the predicted future noise level with the project substantially exceeds the existing noise level (defined as a 12 dBA or more increase) or when the future noise level with the project approaches or exceeds the NAC. Approaching the NAC is defined as coming within 1 dBA of the NAC.

Table 2.12.2 Noise Levels of Common Activities



Source: California Department of Transportation *Standard Environmental Reference* (August 2017).
dBA = A-weighted decibels
ft = foot/feet
m = meter(s)
mph = miles per hour

If it is determined that the project will have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications. This document discusses noise abatement measures that would likely be incorporated in the project.

The Department's Traffic Noise Analysis Protocol sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. A minimum 5 dBA reduction for all impacted receptors in the future noise levels must be achieved for an abatement to be considered feasible. Other considerations include topography, access requirements,

other noise sources, and safety considerations. Additionally, a noise reduction of at least 7 dBA must be achieved at one or more benefited receptors for an abatement measure to be considered reasonable. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include residents' acceptance and the cost per benefited residence.

2.12.2 Affected Environment

2.12.2.1 Surrounding Land Use and Receptors

Land uses within the project area include the Anneliese School and undeveloped vacant land, which includes the Laguna Coast Wilderness Park. The Anneliese School is located 45 feet (ft) east of the proposed project. The exterior areas of the school were evaluated under Activity Category C, which has an exterior NAC of 67 dBA L_{eq}. The interior areas of the school were evaluated under Activity Category D, which has an interior NAC of 52 dBA L_{eq}. There are no land uses classified under Activity Categories B or E that have areas of frequent human use in the immediate vicinity of the SR-133 roadway.

2.12.3 Environmental Consequences

2.12.3.1 Temporary Impacts

Alternative 1 (Build Alternative)

Two types of short-term noise effects would occur during construction of the proposed project. The first type would be from construction crew commutes and the transport of construction equipment and materials to the study area and would incrementally raise noise levels on access roads leading to the site. The pieces of heavy equipment for grading and construction activities would be moved on site, would remain for the duration of each construction phase, and would not add to the daily traffic volume in the project vicinity. A high single-event noise exposure potential would exist at a maximum level of 84 dBA maximum instantaneous sound level (L_{max}) from trucks passing at 50 ft would exist. However, the projected construction traffic would be minimal when compared to existing traffic volumes on SR-133 and other affected streets. 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 project construction. Construction is performed in discrete steps, each having its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases will change the character of the noise generated, as well as the

noise levels in the study area, 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 2.12.3 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.

Table 2.12.3 Typical Construction Equipment Noise Levels

Equipment Description	Maximum Noise Level (L_{max}) at 50 Feet[1]
Backhoes	80
Compactor (ground)	80
Cranes	85
Dozers	85
Dump Trucks	84
Excavators	85
Flat Bed Trucks	84
Front-end Loaders	80
Graders	85
Impact Pile Drivers	95
Jackhammers	85
Pick-up Truck	55
Pneumatic Tools	85
Pumps	77
Rock Drills	85
Rollers	85
Scrapers	85
Tractors	84

Source: Federal Highway Administration. *Roadway Construction Noise Model* (January 2006).
Note: Noise levels reported in this table are rounded to the nearest whole number.
[1] Maximum noise levels were developed based on Spec 721.560 from the Central Artery/Tunnel (CA/T) program to be consistent with the City of Boston's Noise Code for the "Big Dig" project.
L_{max} = maximum instantaneous sound level

Normal construction operations, specifically during the site preparation phase, which includes excavation and grading, may generate high noise levels from an active construction area. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, and front-end loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders.

The construction of the proposed project is expected to require the use of scrapers, bulldozers, and water trucks/pickup trucks. Noise associated with the use of construction equipment is estimated between 55 and 85 dBA L_{max} at a distance of 50 ft from the active construction area for the grading phase. As seen in Table 2.12.3, the maximum noise level generated by each scraper is assumed to be 85 dBA L_{max} at

50 ft from the scraper in operation. Each bulldozer would generate approximately 85 dBA L_{max} at 50 ft. The maximum noise level generated by water trucks/pickup trucks is approximately 55 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 the nearest residence during this phase of construction would be 88 dBA L_{max} (at a distance of 50 ft from an active construction area).

The closest receptor is the Anneliese School, which is located 45 ft east of the project boundary. While no construction activities are proposed along northbound SR-133 directly in front of the Anneliese School, an indirect temporary effect may occur due to construction-related traffic delays. This location may be subject to a short-term noise level of 89 dBA L_{max} generated by construction activities within the project limits. As part of Project Feature PF-TR-1, Caltrans will coordinate closely with the school during final preparation of the Transportation Management Plan (TMP), as well as during the construction phase to minimize impacts. Access at the Willow Staging Area may be temporarily affected by construction activities associated with Component 2. However, Project Feature PF-TR-1 would require implementation of a TMP, which would ensure access is adequately and safely maintained through construction strategies (e.g., temporary driveways). Therefore, these effects would be temporary and would not result in permanent effects related to access to these properties or recreational opportunities.

Project Feature PF-N-1 as outlined below will ensure compliance with Caltrans' Standard Specifications Section 14-8.02 (Caltrans 2015) and will be required to minimize construction noise impacts on sensitive land uses adjacent to the project limits. In addition, with the incorporation of Measure N-1, which describes the sequencing of construction activities, construction-related noise impacts would be further minimized.

PF-N-1 The control of noise from construction activities will conform to the California Department of Transportation (Caltrans) Standard Specifications, Section 14-8.02, "Noise Control." The nighttime noise level from the contractor's operations, between the hours of 9:00 p.m. and 6:00 a.m., will not exceed 86 A-weighted decibels (dBA) at a distance of 50 feet.

Through implementation of this standard feature, short-term construction noise would be minimized.

Alternative 2 (No Build Alternative)

No construction activities would occur under the No Build Alternative. Therefore, no short-term construction noise impacts would result.

2.12.3.2 Permanent Impacts

Alternative 1 (Build Alternative)

As described above, the proposed project is classified as a Type I project because it would use federal aid to restripe existing pavement for the purpose of adding a through traffic lane or auxiliary lane. The proposed additional pavements along the northbound and southbound roadbed, approximately 1,200 ft and 900 ft, respectively, to provide one 12 ft travel lane near the intersection with El Toro Road, are categorized as auxiliary lane additions for the project. A noise study was completed for the Anneliese School's receptor on September 16, 2016, within the project area. No noise abatement is considered. This conclusion is based on a noise measurement reading of 61.8 dBA at an exterior area of the school, under existing conditions, which does not approach or exceed the specified NAC for Category C of 67 dBA L_{eq} (exterior). Assuming a 20 dBA exterior-to-interior noise level reduction for a light frame building with ordinary windows, the existing noise level of the interior areas of the school is 41.8 dBA, which would not approach or exceed the specified NAC for Category D of 52 dBA L_{eq} (interior). It is anticipated that the proposed project's predicted noise levels in the design year will not approach or exceed the NAC.

Alternative 2 (No Build Alternative)

No improvements to SR-133 would be made other than routine roadway maintenance. Based on existing noise levels at the Anneliese School, no traffic noise impacts would occur.

2.12.4 Avoidance, Minimization, and/or Mitigation Measures

In addition to Project Feature PF-N-1 described in Section 2.12.3 and other provisions outlined in the standard specifications, the following Measure N-1 will be implemented to avoid and minimize construction noise impacts. No additional avoidance and/or mitigation measures are necessary.

N-1 Noise from construction activities and equipment will be minimized by sequencing construction activities and staging construction equipment at appropriate locations depending on the current phase of construction.

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