3.10 Noise and Vibration

This section provides an assessment of potential impacts related to noise and vibration that could result from implementation of the proposed project. Potential impacts addressed in this section are related to exposure to excessive noise levels, excessive ground-borne vibration, a permanent or temporary increase in ambient noise levels, and exposure to excessive noise levels due to public or private airstrips. The analysis in this section is based on the Noise and Vibration Study Technical Report (ESA 2017) that was prepared for the proposed project, which is included in Appendix E of this EIR.

3.10.1 Environmental Setting

Noise Principles and Descriptors

The decibel (dB) is a conventional unit for measuring the amplitude of sound, as it accounts for the large variations in sound pressure amplitude, and reflects the way people perceive changes in sound. When describing sound and its effect on humans, A-weighted (dBA) sound levels are typically used to account for the response of the human ear. The term "A-weighted" refers to a filtering of the noise signal in a manner corresponding to the way the human ear perceives sound.

Noise Exposure and Community Noise

The following noise descriptors are used to characterize environmental noise levels over time, and are used in this section to evaluate noised generated by the proposed project:

L_{eq}: The equivalent sound level over a specified period of time, typically, 1 hour (i.e., $L_{eq(1)}$). The L_{eq} is also referred to as the average sound level.

CNEL: The Community Noise Equivalent Level (CNEL) is the equivalent A-weighted noise level during a 24-hour day, that includes an addition of a 5 dB penalty to noise levels between the hours of 7:00 a.m. to 10:00 p.m., and an addition of 10 dB to noise levels between the hours of 10:00 p.m. to 7:00 a.m., to account for noise sensitivity in the evening and nighttime, respectively.

Effects of Noise on People

People judge the relative magnitude of sound sensation by subjective terms such as "loudness" or "noisiness." A change in sound level of 3 dB is considered just perceptible, a change in sound level of 5 dB is considered clearly noticeable, and a change of 10 dB is perceived as twice as loud.

Because decibels are logarithmic values, they cannot be combined by normal algebraic addition. For example, when the decibel values of two sources differ by 0 to 1 dB, combining them would add 3 dB to the higher level for the combined sound level. When the decibel levels of two sources differ by more than 1 dB, combining them would add between 0 to 3 dBA to the higher level, depending on the relative difference. At a difference of 10 dB or more, the higher noise source

dominates, and there is no addition to the higher level source (i.e., there is no effective change in the overall decibel value with or without the addition of the lower noise level source).

Noise Attenuation

When noise propagates through space, the noise level reduces (i.e., attenuates) with distance. The degree to which it attenuates depends on the type of noise source and the propagation path. Noise from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern, referred to as "spherical spreading." Stationary point sources of noise, including stationary mobile sources, such as idling vehicles, attenuate at a rate of 6 dBA for acoustically "hard" sites and 7.5 dBA for acoustically "soft" sites, for each doubling of distance from the reference measurement, as their energy is continuously spread out over a spherical surface. Hard sites are those with a reflective surface between the source and the receiver, such as asphalt or concrete surfaces or smooth bodies of water. No attenuation from the ground surface is assumed for hard sites, and the 6 dBA reduction in noise levels with doubling of distance is only from the geometric spreading of the noise from the source (e.g., for hard sites, 80 dBA at 50 feet attenuates to 74 at 100 feet, 68 dBA at 200 feet). Soft sites are those with an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees; in addition to the 6 dBA reduction from geometric spreading, soft sites provide additional attenuation of up to 1.5 dBA per doubling distance from the surface. In a typical analysis, the given ground surface is somewhere between a hard and a soft site; therefore, for a conservative estimate, the hard site attenuation rate of 6 dBA for point sources is used, rather than attempt to determine the exact surface conditions between each source and receptor.

Roadways and highways consist of several localized noise sources on a defined path, and hence are treated as "line" sources, which approximate the effect of several point sources. Noise from a line source propagates over a cylindrical surface, often referred to as "cylindrical spreading." Line sources attenuate at a rate of between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement. Therefore, noise from a line source attenuates less (about half) with distance than that of a point source.

Fundamentals of Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The response of humans, buildings, and equipment to vibration is more accurately described using velocity or acceleration. Vibration amplitudes are usually described in terms of peak levels, as in peak particle velocity (PPV). The peak level represents the maximum instantaneous peak of the vibration signal. In addition, vibrations can be measured in the vertical, horizontal longitudinal, or horizontal transverse directions. Ground vibrations are most often greatest, and can damage buildings, when they propagate in the vertical direction. Therefore, the analysis of ground-borne vibration associated with the proposed project was evaluated in the vertical direction. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Man-made vibration issues are, therefore, usually confined to short distances from the source (i.e., 50 feet or less). Vibration is notated in decibels. The abbreviation "VdB" is

used in this document for vibration decibels to reduce the potential for confusion with sound decibels.

Existing Conditions

The land uses in the project area include primarily commercial and some multi-family residential along Coast Highway, with adjacent neighborhoods of primarily single-family residential land uses. Some land uses are considered more sensitive to noise than others. Noise-sensitive receptors are typically defined as land uses that are considered more sensitive to intrusive noise than others, such as residences, schools, motels and hotels, libraries, and hospitals, due to the activities typically occurring at the receptor (i.e., sleeping, concentrating, and convalescing).

The City's General Plan Noise Element identifies that residences, schools, churches, libraries, hospitals, convalescent homes, and similar use buildings require specific consideration in the selection of locations and construction materials to maintain acceptable noise levels (City of Oceanside 2002). Existing noise-sensitive uses near the Complete Streets improvements project area (i.e., within approximately 500 feet) include residential uses, hotels and motels, a public library, seven churches, and two schools; no hospitals, nursing homes, or parks are currently located near the improvements corridor. Existing multi-family residences uses are located along the Coast Highway corridor and its cross streets with Neptune Way, Surfrider Way, Michigan Avenue, Washington Avenue, and Cassidy Street, as well as existing single- and multi-family residential uses located along the cross streets of Michigan Avenue and Kelly Street. The Oceanside Public Library is located adjacent to the corridor. Seven churches (St Mary Star of the Sea, Grace Chapel of the Coast, First Christian, Grace Christian, St. Anne Episcopal, Second Missionary Baptist, and Church of Christ) are located near the corridor, as close as approximately 290 feet from the corridor. The St. Mary Star of the Sea School and the Santa Margarita School are located approximately 270 feet and 255 feet from the corridor, respectively. The Turning Point Crisis Center (a residential drug and alcohol rehabilitation center) is located approximately 225 feet from the corridor.

Existing noise-sensitive uses within approximately 500 feet of the Incentive District boundary include the uses described for the Complete Streets improvements corridor as well as additional residential uses and hotels and motels; no additional schools, libraries, churches, hospitals, nursing homes, or parks are near the Incentive District beyond those mentioned previously. Existing single- and multi-family residences are located within and near to the entire Incentive District boundary.

All other noise-sensitive uses regulated by the City are located at greater distances from the project area Incentive District and, due to attenuation with distance, would experience lower noise levels from potential sources of construction noise in the project area.

Existing Ambient Daytime Noise Levels

The predominant existing noise source in the project area is roadway traffic noise from the Coast Highway corridor and its cross streets of Neptune Way, Surfrider Way, Michigan Avenue, Washington Avenue, Oceanside Boulevard, Cassidy Street, and Kelly Street. In addition,

intermittent but frequent train traffic occurs on the railway line located parallel to the Coast Highway project corridor, approximately 800 feet to the west, with the Oceanside Station located between Seagaze Drive and Michigan Avenue. The rail line and station are served by regional and commuter passenger rail (Amtrak and Metrolink/Coaster). Secondary noise sources include general commercial- and residential-related operational activities, such as loading dock/delivery truck activities, trash compaction, refuse service activities, and those specific to the commercial activity (e.g., tire and auto repair shops). In addition, aircraft flyovers occur randomly from commercial and military aircraft. The nearest commercial airport is the Oceanside Municipal Airport located approximately 1.8 miles east of the Coast Highway project corridor.

Ambient noise measurements were conducted at six representative locations along the Coast Highway project corridor, at the noise-sensitive land uses (i.e., residences) nearest to project intersections of the corridor, to establish conservative ambient noise levels. The measurement locations along with existing development and nearby future development are shown in **Figure 3.10-1**. Short-term (15-minute) noise measurements were conducted at locations ST-1 through ST-6. Ambient sound measurements were conducted on Thursday, August 18, 2016, from approximately 12 p.m. to 3 p.m. to establish ambient conditions in the project area.

Measurement Location ST-1: The SLM was placed at multi-family residential uses along Neptune Way west of Coast Highway.

Measurement Location ST-2: The SLM was placed at multi-family residential uses along Surfrider Way west of Coast Highway.

Measurement Location ST-3: The SLM was placed at single- and multi-family residential uses along Michigan Avenue east of Coast Highway.

Measurement Location ST-4: The SLM was placed at single- and multi-family residential uses along Washington Avenue east of Coast Highway.

Measurement Location ST-5: The SLM was placed at multi-family residential uses along Cassidy Street west of Coast Highway.

Measurement Location ST-6: The SLM was placed at single- and multi-family residential uses along Kelly Street west of Coast Highway.

A summary of noise measurement data is provided in **Table 3.10-1**. The existing ambient daytime noise levels range from the lowest at ST-6 at 59 dBA L_{eq} to the highest at ST-2 at 74 dBA L_{eq}.

SOURCE: City of Oceanside 2016

City of Oceanside Coast Highway Corridor Study. 130217

Figure 3.10-1

Project Area and Noise Measurement Locations

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TABLE 3.10-1
SUMMARY OF AMBIENT NOISE MEASUREMENTS

Location, Existing Land Uses, Date, and Duration of Measurements	Daytime (7 A.M. to 10 P.M.) Hourly L_{eq}
ST-1 – Multi-family Residential Uses 8/18/16 (12:14 P.M. to 12:30 P.M.)/Thursday	63 dBA
ST-2 – Multi-family Residential Uses 8/18/16 (12:35 P.M. to 12:50 P.M.)/Thursday	74 dBA
ST-3 – Multi-family Residential Uses 8/18/16 (12:58 P.M. to 1:13 P.M.)/Thursday	61 dBA
ST-4 – Single- and Multi-family Residential Uses 8/18/16 (1:20 P.M. to 1:35 P.M.)/Thursday	61 dBA
ST-5 – Multi-family Residential Uses 8/18/16 (2:21 P.M. to 2:34 P.M.)/Thursday	69 dBA
ST-6 – Single- and Multi-family Residential Uses 8/18/16 (14:42 P.M. to 14:57 P.M.)/Thursday	59 dBA

SOURCE: ESA 2017

Existing Roadway Noise Levels

Existing roadway noise levels were calculated for 44 roadway segments located in the project area based on existing traffic volumes reported in the Traffic Impact Analysis (TIA). The roadway segments selected for analysis are those that are expected to be most directly impacted by the project, which includes roadways that are located near and immediately adjacent to the project area. These roadways, when compared to roadways located further away from the project area, would experience the greatest change in traffic as a result of the project. (As distance from the project area increases, traffic is spread out over a greater geographic area and its effects are reduced.)

Calculation of the existing roadway noise levels was accomplished using the Federal Highway Administration's (FHWA) Highway Noise Prediction Model and traffic volumes at the study intersections analyzed in the project's TIA (IBI 2017). The model calculates the average noise level at specific locations based on traffic volumes, average speeds, and site environmental conditions. The average daily noise levels (dBA CNEL) along these roadway segments are presented in **Table 3.10-2**.

TABLE 3.10-2
EXISTING ROADWAY NOISE LEVELS

Roadway Segment	Existing Land Uses Located Along Roadway Segment	dBA CNEL[a]
Coast Highway		
Between SR-76 Ramps and Surfrider Way	Commercial	68.2
Between Surfrider Way and Civic Center Drive	Residential/Commercial	66.3
Between Civic Center Drive and Pier View Way	Commercial	66.3
Between Pier View Way and Mission Way	Commercial	66.0
Between Mission Way and Seagaze Street	Commercial	66.4
Between Seagaze Street and Missouri Avenue	Residential/Commercial	66.7
Between Missouri Avenue and Washington Avenue	Commercial	66.5
Between Washington Avenue and Wisconsin Avenue	Residential/Commercial	66.5
Between Wisconsin Avenue and Oceanside Boulevard	Commercial	67.3
Between Oceanside Boulevard Morse Street	Residential/Commercial	67.4
Between Morse Street and Cassidy Street	Commercial	66.9
Between Cassidy Street and Vista Way	Lodge/Commercial	67.5
Between Vista Way and Eaton Street	Commercial	67.0
Vista Way		
Between Broadway Street and Coast Highway	Residential/Commercial	60.5
Between Coast Highway and Ditmar Street	Residential/Commercial	67.3
Cassidy Street		
Between Broadway Street and Tremont Street	Residential/Commercial	61.9
Between Tremont Street and Coast Highway	Residential/Commercial	63.0
Between Coast Highway and Freeman Street	Residential/Commercial	62.2
Between Freeman Street and Ditmar Street	Residential/Commercial	62.0
Morse Street		
Between Coast Highway and Freeman Street	Commercial	60.2
Between Freeman Street and Ditmar Street	Residential/Commercial	57.3
Oceanside Boulevard		
Between Tremont Street and Coast Highway	Commercial	62.9
Between Coast Highway and Ditmar Street	School/Commercial	68.4
Wisconsin Avenue		
Between Tremont Street and Coast Highway	Commercial	63.3
Between Coast Highway and Freeman Street	Residential/Commercial	59.9
Between Freeman Street and Ditmar Street	Residential/Commercial	59.9
Washington Avenue		
West of Coast Highway	Commercial	53.3
East of Coast Highway	Residential/Commercial	53.0
Missouri Avenue		
West of Coast Highway	Commercial	55.4
East of Coast Highway	Residential/Commercial	53.2

Roadway Segment	Existing Land Uses Located Along Roadway Segment	dBA CNEL[a]
Michigan Avenue		
West of Coast Highway	Commercial	60.2
East of Coast Highway	Residential/Commercial	57.6
Seagaze Street		
Between Tremont Street and Coast Highway	Commercial	63.9
Between Coast Highway and Freeman Street	Commercial	64.5
Between Freeman Street and Ditmar Street	Commercial	64.5
Mission Avenue		
Between Cleveland Street and Coast Highway	Commercial	63.1
Between Coast Highway and Horne Street	Commercial	64.0
Pier View Way		
West of Coast Highway	Commercial	59.8
Between Coast Highway and Horne Street	Commercial	58.8
Civic Center Drive		
West of Coast Highway	Residential/Commercial	57.8
East of Coast Highway	Residential/Commercial	59.8
Surfrider Way		
West of Coast Highway	Residential/Commercial	62.8
East of Coast Highway	Residential/Commercial	58.8

[a] Based on noise levels at 25 feet distance from the roadway and residential uses if residential uses are shown along roadways.

SOURCE: ESA 2017

Existing Ground-borne Vibration Levels

Aside from periodic construction work that may occur throughout the city, other sources of ground-borne vibration in the project area include heavy-duty vehicular travel (e.g., refuse trucks, delivery trucks) on local roadways. Truck traffic at a distance of 50 feet typically generates ground-borne vibration velocity levels of approximately 63 VdB (approximately 0.006 inches per second [in/sec] PPV). These levels could reach 72 VdB (approximately 0.016 in/sec PPV) where trucks pass over irregularities in the road surface.

3.10.2 Regulatory Framework

State

California Department of Transportation Vibration Guidance

While there are no state or California Department of Transportation (Caltrans) vibration standards, the Caltrans *Transportation and Construction Vibration Guidance Manual* provides guidelines that can be used as screening tools for assessing the potential for adverse vibration effects related to structural damage and human perception. The manual is meant to provide practical guidance to Caltrans engineers, planners, and consultants who must address vibration

issues associated with the construction, operation, and maintenance of Caltrans projects. The vibration criteria established by Caltrans for assessing structural damage and human perception are shown in **Table 3.10-3** and **Table 3.10-4**, respectively.

TABLE 3.10-3
CALTRANS VIBRATION DAMAGE POTENTIAL THRESHOLD CRITERIA

	Maximum PPV (in/sec)	
Structure and Condition	**Transient Sources**	**Continuous/Frequent Intermittent Sources**
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

NOTE: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

SOURCE: Caltrans 2013. Transportation and Construction Vibration Guidance Manual. September.

TABLE 3.10-4
CALTRANS VIBRATION PERCEPTION POTENTIAL CRITERIA

	Maximum PPV (in/sec)	
Structure and Condition	**Transient Sources**	**Continuous/Frequent Intermittent Sources**
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

NOTE: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

SOURCE: Caltrans 2013. Transportation and Construction Vibration Guidance Manual. September.

Local

City of Oceanside General Plan Noise Element

The City's General Plan Noise Element establishes acceptable noise levels within the City's jurisdiction (City of Oceanside 2002). The Noise Element establishes the following noise level regulations for construction-related noise:

1. It should be unlawful for any person within any residential zone of 500 feet therefrom to operate any pile driver, power shovel, pneumatic, power hoist, or other construction equipment between 8:00 p.m. and 7:00 a.m. generating an ambient noise level of 50 dBA at any property line, unless an emergency exists.
2. It should be unlawful for any person to operate any construction equipment at a level in excess of 85 dBA at 100 feet from the source.
3. It should be unlawful for any person to engage in construction activities between 6:00 p.m. and 7:00 a.m. when such activities exceed the ambient noise level by 5 dBA. A special permit may be granted by the Director of Public Works if extenuating circumstances exist.

The City's Noise Element also outlines general noise policies as follows:

- Noise levels shall not be so loud as to cause danger to public health in all zones except manufacturing zones where noise levels may be greater.
- Noise shall be controlled at the source where possible.
- Noise shall be intercepted by barriers or dissipated by space where the source cannot be controlled.
- Noise shall be reduced from structures by the use of soundproofing where other controls fail or are impractical.
- Noise levels shall be considered in the approval of any projects or activities, public or private, which requires a permit or other approval from the City.
- Noise levels shall be considered in any changes to the Land Use and Circulation Elements of the General Plan.
- Noise levels of City vehicles, construction equipment, and garbage trucks shall be reduced to acceptable levels.

City of Oceanside Noise Ordinance

Chapter 38 of the City of Oceanside Municipal Code (Noise Ordinance) governs operational noise and contains the maximum 1-hour average sound levels for various land uses for operational noise. The Noise Ordinance sets an allowed level for single-family and medium-density residential areas of 50 dBA L_{eq} from 7:00 a.m. to 9:59 p.m., and 45 dBA L_{eq} from 10:00 p.m. to 6:59 a.m. High-density residential areas are limited to 55 dBA L_{eq} from 7:00 a.m. to 9:59 p.m. and 50 dBA L_{eq} from 10:00 p.m. to 6:59 a.m. **Table 3.10-5** outlines these acceptable limits.

Construction work may be exempt from the noise level limits established in Table 3.10-5 by the City Manager upon a determination that the authorization furthers the public interest. However, Section 38.17 specifically prohibits the operation of any pneumatic or air hammer, pile driver, steam shovel, derrick, steam, or electric hoist, parking lot cleaning equipment, or other appliance, the use of which is attended by loud or unusual noise, between the hours of 10:00 p.m. and 7:00 a.m. Section 38.16 prohibits nuisance noise as recommend in the General Plan Noise Element. It is unlawful for any person to make, continue, or cause to be made or continued,

within the limits of the City, any disturbing, excessive, or offensive noise that causes discomfort or annoyance to reasonable persons of normal sensitivity. However, Section 35.15 exempts construction, maintenance or other public improvement activities by government agencies or public utilities.

TABLE 3.10-5
CITY OF OCEANSIDE EXTERIOR NOISE STANDARDS

Zone	Applicable Limit (dBA)	Time Period
Residential Estate, Single-Family Residential, Medium Density Residential, Agricultural, Open Space	50	7:00 a.m. to 9:59 p.m.
	45	10:00 p.m. to 6:59 a.m.
High Density, Residential Tourist	55	7:00 a.m. to 9:59 p.m.
	50	10:00 p.m. to 6:59 a.m.
Commercial	65	7:00 a.m. to 9:59 p.m.
	60	10:00 p.m. to 6:59 a.m.
Industrial	70	7:00 a.m. to 9:59 p.m.
	65	10:00 p.m. to 6:59 a.m.
Downtown	65	7:00 a.m. to 9:59 p.m.
	55	10:00 p.m. to 6:59 a.m.

SOURCE: City of Oceanside Municipal Code Section 38.12, 2016

City of Oceanside Engineering Manual

Construction noise in the city is governed by the City Engineering Manual. Construction is normally limited to the hours of 7:00 a.m. to 6:00 p.m., Monday through Friday.

3.10.3 Impacts and Mitigation Measures

Significance Criteria

Based on Appendix G of the CEQA Guidelines, the project would result in a significant impact on noise and vibration if it would cause:

1. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
2. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.
3. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
4. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

5. For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels.
6. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels.

Impact Analysis

Issue 1: Would the proposed project result in exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Complete Streets Improvements

Construction of the Complete Streets improvements would require the use of heavy equipment during the demolition, grading, and excavation activities associated with the Complete Streets improvements. During each stage of development, there would be a different mix of equipment. Therefore, construction activity noise levels at and near the project area would fluctuate depending on the particular type, number, and duration of use of the various pieces of construction equipment.

Individual pieces of construction equipment anticipated to be used during project construction could produce maximum noise levels (L_{max}) of 77 dBA to 90 dBA L_{max} at a reference distance of 50 feet from the noise source, as shown in **Table 3.10-6**. These maximum noise levels would occur when equipment is operating at full power. The estimated usage factors for the equipment are also shown in Table 3.10-6, which is based on FHWA Roadway Construction Noise Model User's Guide.

TABLE 3.10-6
CONSTRUCTION EQUIPMENT NOISE LEVELS

Construction Equipment	Estimated Usage Factor	Noise Level at 50 Feet (dBA, Lmax)
Backhoe	40%	80
Compactor	20%	83
Concrete Saw	20%	90
Excavator	40%	81
Forklift	10%	75
Grader	40%	85
Paver	50%	77
Paving Equipment	20%	90
Roller	20%	80
Rubber Tired Loader	50%	79
Pavement Breaker	20%	89
Trencher	50%	85

SOURCE: FHWA 2006

However, equipment used on construction sites often operate under less than full power conditions. To more accurately characterize construction-period noise levels, the average (L_{eq}) noise level associated with each construction stage is provided in **Table 3.10-7**. These average noise levels are based on the quantity, type, and usage factors for each type of equipment that would likely be used during each construction stage, and are typically attributable to multiple pieces of equipment operating simultaneously.

TABLE 3.10-7
CONSTRUCTION AVERAGE L_{EQ} NOISE LEVELS BY DISTANCE AND CONSTRUCTION STAGE

	Sound Level in dBA (L_{eq}) at Doubled Distance				
Construction Stage	**25 feet**	**50 feet**	**100 feet**	**200 feet**	**400 feet**
Demolition	93	87	81	75	69
Vegetation Grubbing/Clearing	87	81	75	69	63
Site Surface Grading	88	82	76	70	64
Facilities Construction	91	85	79	73	67
Paving	95	89	83	77	71
Site Restoration	88	82	76	70	64

Assumes a hard surface propagation path drop-off rate of 6 dB per doubling of distance (sound level at distance X = sound level at 50 feet - 20LOG (x/50)), which is appropriate for use in characterizing point-source (such as construction equipment) sound attenuation.

SOURCE: ESA 2016

Table 3.10-7 provides the estimated worst-case construction noise levels at nearby noise-sensitive receptors from construction along the Coast Highway corridor. The estimated noise levels represent a conservative scenario because construction activities are analyzed as occurring at the closest extent of the construction areas from the nearest noise-sensitive receptor. However, construction activities would typically occur at varying locations throughout the construction area, with some equipment being operated farther away from the nearest noise-sensitive receptors, which would result in lower actual noise levels.

As shown in Table 3.10-7, the average temporary construction-period noise level would range from approximately 75 to 83 dBA L_{eq} at 100 feet, and from approximately 69 to 77 dBA L_{eq} at 200 feet from construction activities of the Complete Streets improvements. These noise levels would be considered loud compared to the City's operational noise level limits (non-construction) for the zoning classification of "high density, residential tourist" of 55 dBA L_{eq} daytime. However, the construction noise would occur during the daytime, when sleeping typically does not occur, and thus these land uses are less sensitive.

Construction activities of the Complete Streets improvements would be required to comply with the City's noise standards. The City's General Plan Noise Element prohibits construction between

8 p.m. and 7 a.m. within 500 feet of a residential area if the activity would generate a noise level of 50 dBA at the property line. Consistent with this policy, construction of the Complete Streets improvements would occur from 7:00 a.m. to 6:00 p.m. Monday through Saturday, and no construction would occur on Sundays. The City's Municipal Code also prohibits construction between 10 p.m. to 7 a.m. for private development projects. However, Section 35.15 of the Code exempts construction, maintenance or other public improvement activities by government agencies or public utilities. The proposed street improvements would be construction by a government agency (i.e., the City). Regardless, the project would be constructed within the more stringent parameters that apply to private projects. Therefore, construction of the Complete Streets improvements would adhere to the City's regulatory requirements for construction noise. For these reasons, construction noise generated by the Complete Streets improvements would not expose persons to, or generate, noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies, and therefore noise impacts would be less than significant.

Incentive District

The Incentive District could result in an increase in intensity of development and redevelopment within the commercially designated areas of the project corridor. Future development within commercial zones along project corridor would be infill development. The placement of residential infill adjacent to nonresidential land uses could result in operational noise impacts on residential land uses because of the differences of the allowable maximum exterior noise levels between residential and commercial land uses. However, the timing of the construction activities of individual projects associated with the Incentive District is unknown and cannot be determined at this time. Construction of individual projects would occur as property owners decide that development is warranted based in large part on the market. Additionally, the duration of construction is dependent on individual project types.

Table 3.10-7 provides the estimated worst-case construction noise levels of construction activities at various distances. The estimated noise levels represent a conservative scenario because construction activities are analyzed as occurring at the closest extent of the construction areas from the nearest noise-sensitive receptor; whereas, construction activities would typically be moving throughout the construction area, farther away from the nearest noise-sensitive receptors. As shown in Table 3.10-7, the average temporary construction-period noise levels would range from approximately 87 to 95 dBA L_{eq} at 25 feet, and from 65 to 74 dBA L_{eq} at 200 feet from a construction area. These construction noise levels would be considered loud compared to the City's operational noise level limits of 55 dBA L_{eq} daytime for areas zoned residential tourist, as shown in Table 3.10-5. However, the Incentive District construction noise would be expected to occur during the daytime, as required by the City, when residential noise sensitive land uses (i.e., sleeping activities), are not typically occurring.

Construction activities of the Incentive District would be required to comply with the City's noise standards. The City's General Plan Noise Element prohibits construction between 8 p.m. and 7 a.m. within 500 feet of a residential area if the activity would generate a noise level of 50 dBA at the property line, and operating any construction equipment at a level in excess of 85 dBA

measured at 100 feet from the source. The City's Municipal Code prohibits construction between 10 p.m. to 7 a.m. Construction of projects under the Incentive District would adhere to the City's regulatory requirements for construction noise. For these reasons, construction of the development projects that would occur through implementation of the Incentive District would not expose persons to, or generate, noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies. No conflicts with applicable noise standards would occur with construction of the individual projects under the Incentive District; noise impacts for this issue would be less than significant.

Mitigation Measures: No mitigation measures would be required.

Significance Determination: Less than significant

Issue 2: Would the proposed project result in exposure of persons to, or generation of, excessive ground-borne vibration or ground-borne noise levels?

Complete Streets Improvements

Construction of the Complete Streets improvements would have the potential to generate low levels of ground-borne vibration as the operation of heavy equipment (e.g., backhoes, excavators, graders, loaders, haul trucks) generates vibrations that propagate though the ground and diminish in intensity with distance from the source. No high-impact activities such as pile driving or rock blasting would be used during construction of the Complete Streets improvements. The nearest off-site receptors to the Complete Streets improvements that could be exposed to vibration levels generated by construction include single-family residential uses west of the Coast Highway corridor. Ground-borne vibrations from typical construction activities very rarely reach levels at structures that can cause damage, but they may be perceived by humans in buildings very close (i.e., within 25 feet) to a construction activity.

The vibration levels for several types of heavy construction equipment that can generate perceptible vibration levels are identified in **Table 3.10-8**. Based on the information presented in Table 3.10-8, vibration levels could range from 0.003 to 0.089 in/sec PPV at 25 feet from the operation of the equipment.

As indicated in Table 3.10-8, the highest vibration level of 0.089 in/sec PPV at 25 feet from the operation of a large bulldozer would reduce to 0.031 in/sec PPV at 50 feet. At 100 feet, the vibration level from a large bulldozer would further reduce to 0.011 in/sec PPV.

As previously shown in Tables 3.10-3 and 3.10-4, Caltrans provides threshold criteria for potential structural damage to fragile buildings of 0.2 in/sec PPV, and human perception of strongly perceptible at 0.1 in/sec PPV. Therefore, for a noise-sensitive receptor to be exposed to vibration that meets the Caltrans threshold for strongly perceptible to humans (0.1 in/sec PPV), the receptor would need to be located within 25 feet of construction activity. This analysis

assumes that pile driving is not necessary for Complete Streets construction, as specified by the City of Oceanside.

TABLE 3.10-8
VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

	Approximate PPV (in/sec)				
Equipment	**25 Feet**	**50 Feet**	**60 Feet**	**75 Feet**	**100 Feet**
Large Bulldozer	0.089	0.031	0.024	0.017	0.011
Caisson Drilling	0.089	0.031	0.024	0.017	0.011
Loaded Trucks	0.076	0.027	0.020	0.015	0.010
Jackhammer	0.035	0.012	0.009	0.007	0.004
Small Bulldozer	0.003	0.001	0.0008	0.0006	0.0004

NOTE: Pile driving would not be necessary for of the Complete Streets improvements.

SOURCE: FTA 2006. Transit Noise and Vibration Impact Assessment. May.

The Complete Streets improvements would occur within existing roadway intersections and street segments, which are more than 25 feet from inhabited buildings. Therefore, construction activity of the Complete Streets improvements would not cause significant vibration impacts for the vibration threshold of human perception. As the vibration threshold of 0.1 in/sec PPV for human perception is lower than the vibration threshold of 0.2 in/sec PPV for potential structural damage, the threshold distance (i.e., setback distance) between equipment and receptor is greater for the human perception threshold, and is thus more stringent and conservative for vibration impact analysis. Therefore, the construction vibration levels for the Complete Streets improvements would be less than significant.

Sources of ground-borne vibration from the operation of the Complete Streets improvements (once constructed) would include heavy-duty vehicular travel (e.g., refuse trucks, delivery trucks) on local roadways. Because the sources of ground-borne vibration and distances from receptors would be unchanged from the existing conditions, operational vibration impacts of the improvements at the off-site receptors would be consistent with the existing vibration velocity levels and with the existing ambient vibration velocity levels. Therefore, operational vibration impacts of the Complete Streets improvements would be less than significant.

Incentive District

With regard to construction activities of the potential development under the Incentive District, ground-borne vibration would be generated by the operation of heavy equipment primarily during site clearing and grading activities and to a lesser degree by off-site haul trucks traveling on surface streets. The type of structures and construction methods and equipment of each of the potential developments of the Incentive District is unknown at this time. Pile driving during foundation development and vibratory compaction during surface grading may be required. Vibratory compaction rollers generate vibration levels of 0.210 in/sec PPV at 25 feet (FTA 2006).

Pile driving has the greatest potential to generate high ground-borne vibration levels, ranging from 0.170 to 1.518 in/sec PPV at 25 feet (FTA 2006) depending upon pile driving method and usage. Therefore, pile driving would have the potential to exceed the Caltrans human perception vibration threshold of 0.1 in/sec PPV within 150 feet, depending on the site-specific soil conditions, pile driving methods and equipment used.

Due to the densely developed area within the Incentive District boundaries and the inability to know the exact nature of future proposed projects under the Incentive District, development within the Incentive District zone could be adjacent to other properties with existing structures (e.g., residences, commercial businesses). Therefore, construction activities of typical heavy construction equipment, as detailed in Table 3.10-8, associated with future development under the Incentive District could result in temporary significant ground-borne vibration impacts that would exceed the threshold of human perception to sensitive receptors.

Depending on the location of future development projects occurring under the provisions of the Incentive District, there may or may not be residences located near the development that would potentially be affected by construction vibration. For this reason, Incentive District construction activities would result in a potentially significant impact.

Operational activities that would occur during the Incentive District would include typical residential and commercial-grade stationary mechanical and electrical equipment such as air handling units, condenser units, exhaust fans, and electrical emergency power generators, which would produce vibration at the source. Ground-borne vibration generated by such activities would be similar to the vibration generated by existing operational sources (i.e., traffic vibration on adjacent roadways) in the vicinity. The potential vibration impacts from all operation activities at the closest structure locations would be less than the significance threshold for perceptibility. Therefore, vibration impacts associated with operation of projects developed under the Incentive District provisions would be below the significance threshold, and operational impacts would be less than significant.

Mitigation Measures:

> **MM Incentive District NOI-1:** For development projects considered under the Incentive District provisions, a project-level vibration analysis would be required if the construction plans for the project would include the use of any of the following:
>
> a) Typical heavy construction equipment within 25 feet of existing inhabited structures. Typical heavy equipment is defined as equipment with an engine size of 600 horsepower or greater and includes: large dozers, large excavators, and large loaders.
>
> b) Vibratory compaction rollers for use within 80 feet of inhabited structures.
>
> c) Pile drivers for use within 150 feet of inhabited structures.
>
> If none of the construction methods mentioned in the list enumerated above are proposed within the described boundaries, no further analysis would be required, since the

distances to sensitive receptors would create enough of a buffer to ensure impacts are less that significant.

The purpose of each project-level vibration analysis would be to determine if the specific project-level construction would generate vibration levels exceeding the human perception threshold of 0.1 in/sec PPV at the receptor. Project-specific details that would be required in each analysis would include, but not be limited to, type, size, and horsepower of the actual construction equipment to be used; specific locations of each activity; and actual distances from the activity to inhabited buildings. Vibration levels of actual equipment to be used shall be estimated from FTA vibration guidance documents (FTA 2006), attenuated with distance to the inhabited structures, and compared to the Caltrans vibration threshold for human perception. If applicable, the intervening ground between equipment and structures would be considered for its soil properties for additional vibration attenuation.

If the project-specific analysis determines that a project-specific significant impact could occur, mitigation shall be required to reduce the impact to less than significant. Alternative construction methods and equipment that generate lower vibration levels shall be considered. Estimated construction vibration levels would be required to not to exceed the vibration threshold of human perception at inhabited buildings (0.1 in/sec PPV at the receptor). Field vibration measurement surveys of actual construction vibration would be considered, as determined to be required by the vibration specialist, as part of construction vibration compliance with the threshold.

This requirement shall be implemented for all projects under the Incentive District (Administrative Development Plan Review, Development Plan Review, and Conditional Use Permit processing requirements as specified in Section 1203 of the Coast Highway Incentive District).

Significance Determination: Less than significant with mitigation measures

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Issue 3: Would the proposed project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Future (2035) Traffic Conditions

Future roadway noise levels without the project were calculated along various arterial segments adjacent to the Coast Highway corridor as compared to calculated 2035 baseline traffic noise levels that would occur with implementation of the project. The future traffic scenario with the project includes both the Complete Streets improvement and a predicted net traffic change associated with the development under the Incentive District.

According to the project's TIA (IBI 2017), the Future with Project 2035 scenario generates lower vehicle miles traveled per capita by approximately 11 percent when compared to the baseline

Future without Project Condition. This result is expected, as the project seeks to promote smart growth with strategies such as encouraging and emphasizing multimodal transportation to increase access and mobility. This would be a benefit to some roadway segments, as it would reduce traffic volumes and traffic noise levels. As shown in **Table 3.10-9**, traffic noise levels were reduced at 22 roadway segments with the implementation of the Complete Streets improvements (e.g., traffic noise levels were reduced by 5.3 dBA along Cassidy Street between Freeman Street and Ditmar Street).

TABLE 3.10-9
OFF-SITE TRAFFIC NOISE IMPACTS – FUTURE (2035) WITH PROJECT CONDITIONS

	Calculated Traffic Noise Levels at 25 Feet from Roadway CNEL (dBA)			
Roadway Segment	**Future without Project (A)**	**Future with Project (B)**	**Project Increment (B-A)**	**Exceed Threshold?**
Coast Highway				
Between SR-76 Ramps and Surfrider Way	69.0	70.2	1.2	No
Between Surfrider Way and Civic Center Drive	67.1	68.3	1.2	No
Between Civic Center Drive and Pier View Way	67.6	68.1	0.5	No
Between Pier View Way and Mission Way	67.6	68.0	0.4	No
Between Mission Way and Seagaze Street	68.0	68.3	0.3	No
Between Seagaze Street and Missouri Avenue	67.3	67.0	-0.3	No
Between Missouri Avenue and Washington Avenue	67.3	66.6	-0.7	No
Between Washington Avenue and Wisconsin Avenue	67.4	66.8	-0.6	No
Between Wisconsin Avenue and Oceanside Boulevard	68.3	67.9	0.5	No
Between Oceanside Boulevard and Morse Street	68.0	68.5	0.9	No
Between Morse Street and Cassidy Street	67.1	68.0	0.9	No
Between Cassidy Street and Vista Way	67.7	68.6	0.9	No
Between Vista Way and Eaton Street	67.3	68.6	1.3	No
North of West Street	65.4	64.0	-1.4	No
South of West Street	65.5	63.9	-1.6	No
North of Kelly Street	63.7	66.0	2.3	No
South of Kelly Street	63.2	64.1	0.9	No
Vista Way				
Between Broadway Street and Coast Highway	61.9	62.1	0.2	No
Between Coast Highway and Ditmar Street	67.8	68.4	0.6	No
Cassidy Street				
Between Broadway Street and Tremont Street	63.1	62.1	-1.1	No
Between Tremont Street and Coast Highway	63.6	63.5	-0.1	No
Between Coast Highway and Freeman Street	62.8	62.6	-0.2	No
Between Freeman Street and Ditmar Street	63.3	58.0	-5.3	No
Morse Street				
Between Coast Highway and Freeman Street	62.4	63.3	0.9	No
Between Freeman Street and Ditmar Street	59.9	60.8	0.9	No
Oceanside Boulevard				
Between Tremont Street and Coast Highway	63.8	64.5	0.7	No
Between Coast Highway and Ditmar Street	69.1	68.7	-0.4	No

TABLE 3.10-9
OFF-SITE TRAFFIC NOISE IMPACTS – FUTURE (2035) WITH PROJECT CONDITIONS

Roadway Segment	Calculated Traffic Noise Levels at 25 Feet from Roadway CNEL (dBA)			
	Future without Project (A)	Future with Project (B)	Project Increment (B-A)	Exceed Threshold?
Wisconsin Avenue				
Between Tremont Street and Coast Highway	64.7	64.7	0.0	No
Between Coast Highway and Freeman Street	61.2	63.3	2.1	No
Between Freeman Street and Ditmar Street	59.3	65.3	6.0	**Yes**
Washington Avenue				
West of Coast Highway	55.3	59.1	3.8	No
East of Coast Highway	54.3	56.8	2.5	No
Missouri Avenue				
West of Coast Highway	56.1	54.6	-1.5	No
East of Coast Highway	55.4	58.0	2.6	No
Michigan Avenue				
West of Coast Highway	65.4	62.3	-3.1	No
East of Coast Highway	58.0	59.8	1.8	No
Seagaze Street				
Between Tremont Street and Coast Highway	66.4	66.0	-0.4	No
Between Coast Highway and Freeman Street	63.4	63.3	-0.1	No
Between Freeman Street and Ditmar Street	66.2	67.2	1.0	No
Mission Avenue				
Between Cleveland Street and Coast Highway	65.2	64.9	-0.3	No
Between Coast Highway and Horne Street	65.2	64.5	-0.7	No
Pier View Way				
West of Coast Highway	61.8	60.8	-1.0	No
Between Coast Highway and Horne Street	60.9	59.8	-1.1	No
Civic Center Drive				
West of Coast Highway	59.5	59.8	0.3	No
East of Coast Highway	61.1	60.8	-0.3	No
Surfrider Way				
West of Coast Highway	63.2	64.7	1.5	No
East of Coast Highway	60.0	60.7	0.7	No

[a] Based on noise levels at 25 feet distance from the roadway and residential uses if residential uses are shown along roadways.

SOURCE: ESA 2017

However, as summarized in Table 3.10-9, Future with Project traffic noise levels (due primarily to redistribution of traffic volumes from lane reduction along the Coast Highway corridor) compared to Future without Project traffic noise levels would increase in some locations. Of these increases, the only significant increase would be along the roadway segment of Wisconsin Avenue, between Freeman Street and Ditmar Street. In this location, increase in traffic noise compared to the 2035 Future without Project condition is predicted to be as much as 6.0 dBA

CNEL, which would be a significant increase in noise levels due to the project, as this increase in sound level would exceed the significance threshold of a 5 dBA CNEL increase. The increase in sound would be substantially lower at the remaining roadway segments analyzed, and other noise impacts along the project area roadway segments would be less than significant.

Stationary Noise

The Complete Streets improvements would not include any stationary facilities that would introduce a new operational noise source. Therefore, there would be no operational noise impacts associated with the Complete Streets improvements.

Implementation of the Incentive District would include operational stationary noise sources; a particular project would generate noise and expose off-site sensitive receptors to noise sources typical of mixed-use areas, such as doors slamming, air conditioning units, property maintenance equipment (e.g., landscape, parking lot sweeping) radio/stereo systems, domestic animals, etc. These noise sources contribute to the ambient noise levels experienced in all similarly developed areas, and typically do not exceed the noise standards for the types of land uses. In addition, these noise sources are consistent with adjacent uses in the vicinity. Therefore, stationary point-source noise impacts resulting future projects developed under the Incentive District would not exceed ambient noise levels and thus would not result in a substantial increase in ambient noise levels.

Development under the Incentive District could result in new commercial and residential developments located adjacent to noise-sensitive properties such as existing residential areas. Depending on how close these developments are situated to existing residential areas, the types of mechanical equipment used at the developments, and the activities that would occur at the developments, ambient noise levels may increase. Chapter 38 of the Oceanside Municipal Code (Noise Ordinance) governs operational noise and contains the maximum 1-hour average sound level limits for various land uses for operational noise, as shown in Table 3.10-5. For this reason, it is assumed that all mechanical equipment would be designed with appropriate noise-control devices, such as sound attenuators, acoustic louvers, or sound screens/parapet walls, to comply with noise limitation requirements provided in the City Noise Ordinance, which prevents the noise from such equipment from exceeding the sound level limits. Therefore, operation of mechanical equipment associated with the Incentive District would not exceed the City's noise thresholds, and impacts would be less than significant.

Mitigation Measures: No mitigation measures have been identified.

Significance Determination: The project-related noise increases that would occur with implementation of the Complete Streets project and development that would be anticipated to occur under the Incentive District provisions would result in a significant impact along one roadway segment, Wisconsin Avenue between Freeman Street and Ditmar Street. Because of the configuration of existing land uses in this area, these impacts could not be avoided with implementation of the project. Specifically, existing residential uses and the Saint Mary Star of the Sea School are using the roadway segment of Wisconsin Avenue between Freeman Street and Ditmar Street for access. Thus, the addition of sound walls or other attenuation approaches are

not feasible in this location. Therefore, noise impacts would be significant and unavoidable along this roadway segment.

Issue 4: Would the proposed project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Complete Streets Improvements

Construction activities would increase existing ambient noise levels at noise-sensitive receptors (i.e. residences) in proximity to the construction activity. As shown in Table 3.10-7, construction noise would average approximately 80 dBA L_{eq} at 100 feet from a construction activity, which would temporarily increase existing ambient noise levels of approximately 65 dBA L_{eq} at sensitive receptor locations along the project corridor, as shown in Figure 3.10-1 (i.e., an approximate 15 dBA increase). As discussed in the Noise and Vibration Study Technical Report (refer to Appendix E of this EIR), a substantial temporary increase in ambient noise levels is defined as a direct project-related increase of 10 dBA L_{eq} or greater (FTA 2006). Therefore, these impacts would be considered significant.

Incentive District

As discussed previously, construction activities could substantially increase ambient noise levels at noise-sensitive receptors (i.e., existing residences and schools) near future construction activity within the Incentive District. As shown in Table 3.10-7, construction noise would average approximately 80 dBA L_{eq} at 100 feet from construction activities, which would temporarily increase existing ambient noise levels of approximately 65 dBA, by approximately 15 dBA L_{eq} at existing residences located within the Incentive District. As discussed in the Noise and Vibration Study Technical Report (refer to Appendix E of this EIR), a substantial temporary increase in ambient noise levels is defined as a direct project-related increase of 10 dBA L_{eq} or greater (FTA 2006). Therefore, these impacts would be considered significant.

Mitigation Measures:

> **MM Complete Streets NOI-1:** The following field techniques shall be implemented by the City's construction contractor to reduce construction-related noise at nearby noise-sensitive receptors (residential uses):
>
> a. Unless safety provisions require otherwise, the Complete Streets construction contractor shall adjust all audible back-up alarms to the lowest volume appropriate for safety purposes (i.e., still maintaining adequate signal-to-noise ratio for alarm effectiveness). The contractor shall consider signal persons, strobe lights, or alternative safety equipment and/or processes as allowed, for reducing reliance on high-amplitude sonic alarms.
>
> b. The construction contractor shall place stationary noise sources at the construction site, such as generators and air compressors, away from affected noise-sensitive receivers (residential and school uses). Non-noise-producing mobile equipment, such

as trailers, shall be located in the direct sound pathways between suspected major noise-producing sources and sensitive receptors.

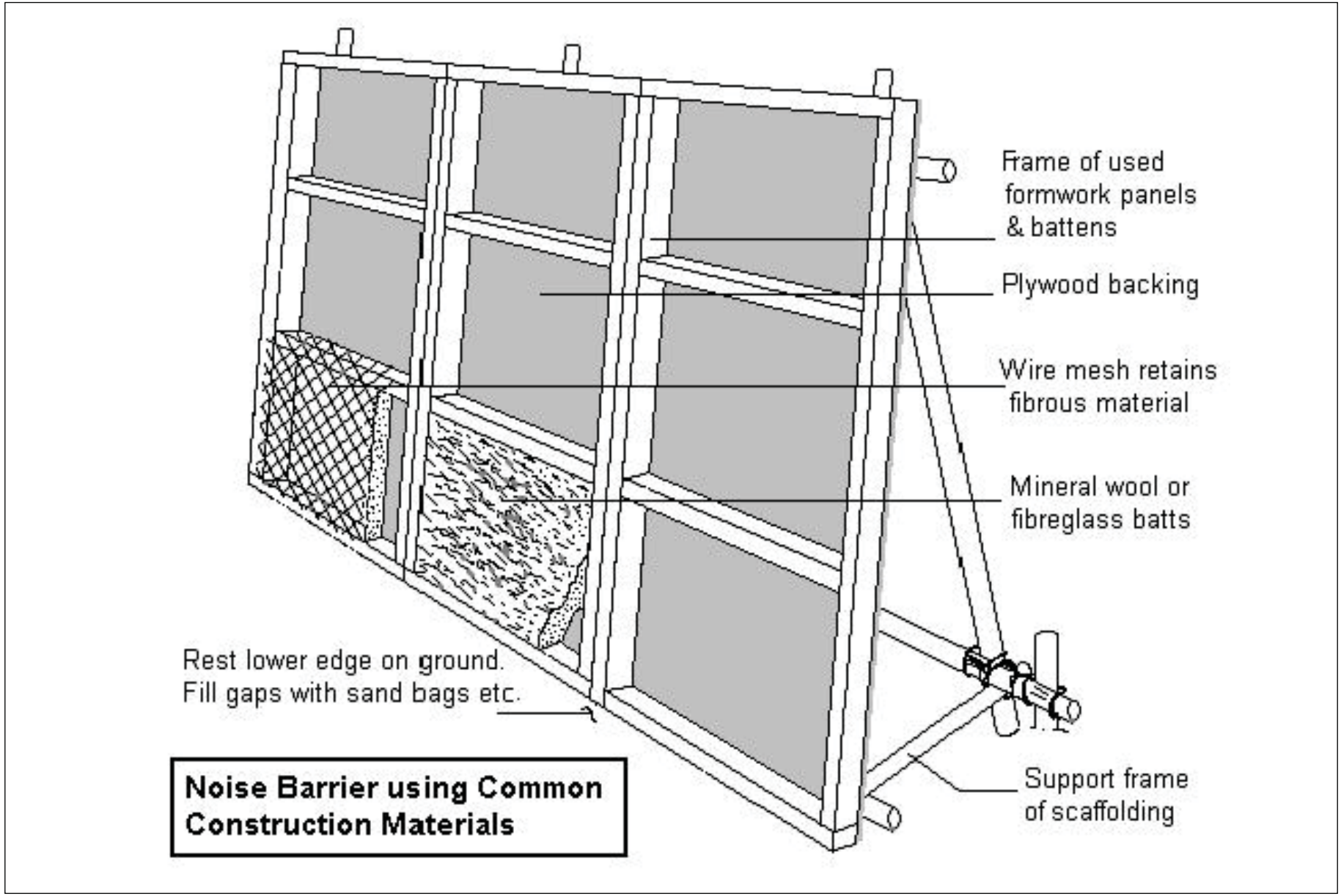
c. Noise-producing equipment (e.g., jackhammers and pavement breakers) shall use noise-attenuating shields, shrouds, or portable barriers or enclosures, to reduce operating noise.

d. Line or cover hoppers, storage bins, and chutes shall include sound-deadening material (e.g., apply wood or rubber liners to metal bin impact surfaces).

e. To the extent practicable and available, the construction contractor shall use construction equipment manufactured or modified to reduce noise and vibration emissions, such as: electric instead of diesel-powered equipment, hydraulic tools instead of pneumatic tools, and electric saws instead of air- or gasoline-driven saws.

MM Complete Streets NOI-2: Where feasible, the City's contractor shall install temporary, field-erected noise barriers to block the line of sight between construction equipment and sensitive receptors prior to construction (in the Complete Streets project area these are limited to residential uses). Noise barriers could include sound blankets hanging on existing fences, or the use of freestanding portable sound walls. Noise barriers should be a minimum of 8 feet in height and continuous between the source of noise and adjacent or nearby noise-sensitive receptors. Noise barriers are most effective when placed directly adjacent to either the noise source or receptor.

Barrier construction may include, but is not necessarily limited to, using appropriately thick wooden panel walls (at least 0.5-inch-thick), as shown in **Figure 3.10-2**, which are tall enough to block the line of sight between the dominant construction noise source(s) and the noise-sensitive receptor. Such barriers can reduce construction noise by 5 to 15 dBA at nearby noise-sensitive receptor locations, depending on barrier height and length, and the distance between the barrier and the noise-producing equipment or activity. Alternatively, field-erected noise curtain assemblies could be installed around specific equipment sites or zones of anticipated mobile or stationary activity, resembling the sample shown in **Figure 3.10-3**. These techniques are most effective and practical when the construction activity noise source is stationary (e.g., auger or drill operation) and the specific source locations of noise emissions are near the ground, and barriers can be placed as close to the equipment/activity as possible. Barrier layout and other implementation details would vary by construction site.



SOURCE: Eaton Stuart, 2000 *Construction Noise*. Workers' Compensation Board of BC, Engineering Section Report, ARCS Reference No. 0135-20, February.

City of Oceanside Coast Highway Corridor Study. 130217

Figure 3.10-2

Temporary Noise Wall Barrier Construction

SOURCE: AECOM, Inc., 2016 *Riverside Transmission Reliability Project, Noise Technical Report*, January.

City of Oceanside Coast Highway Corridor Study**.** 130217

Figure 3.10-3

Curtain-Type Noise Barrier

MM Incentive District NOI-2: For individual development projects proposed under the Incentive District, the following field techniques shall be implemented by the project construction contractor to reduce construction-related noise at noise-sensitive receptors within 100 feet of construction activity:

a. Unless safety provisions require otherwise, the Incentive District construction contractor shall adjust all audible back-up alarms to the lowest volume appropriate for safety purposes (i.e., still maintaining adequate signal-to-noise ratio for alarm effectiveness). The contractor shall consider signal persons, strobe lights, or alternative safety equipment and/or processes as allowed, for reducing reliance on high-amplitude sonic alarms.

b. The construction contractor shall place stationary noise sources at the construction site, such as generators and air compressors, as far away as possible from affected noise-sensitive receivers (residential and school uses). Non-noise-producing equipment, such as trailers, may be located as a sound barrier between suspected major noise-producing sources and sensitive receptors.

c. Noise-producing equipment (e.g., jackhammers and pavement breakers) shall use noise-attenuating shields, shrouds, or portable barriers or enclosures, to reduce operating noise.

d. Line or cover hoppers, storage bins, and chutes shall include sound-deadening material (e.g., apply wood or rubber liners to metal bin impact surfaces).

e. To the extent practicable and available, the construction contractor shall use construction equipment manufactured or modified to reduce noise and vibration emissions, such as: electric instead of diesel-powered equipment, hydraulic tools instead of pneumatic tools, and electric saws instead of air- or gasoline-driven saws.

MM Incentive District NOI-3: Where feasible, temporary, field-erected noise barriers to block the line of sight between construction equipment and sensitive receptors shall be installed prior to construction of the individual development projects under the Incentive District. Noise barriers could include sound blankets hanging on existing fences, or freestanding portable sound walls. Noise barriers should be a minimum of 8 feet in height and continuous between the source of noise and adjacent or nearby noise-sensitive receptors. Noise barriers are most effective when placed directly adjacent to either the noise source or receptor.

Barrier construction may include, but is not necessarily limited to, using appropriately thick wooden panel walls (at least 0.5-inch thick), as shown in Figure 3.10-2, which are tall enough to block the line of sight between the dominant construction noise source(s) and the noise-sensitive receptor. Such barriers can reduce construction noise by 5 to 15 dBA at nearby noise-sensitive receptor locations, depending on barrier height and length, and the distance between the barrier and the noise-producing equipment or activity. Alternatively, field-erected noise curtain assemblies could be installed around specific equipment sites or zones of anticipated mobile or stationary activity, resembling the

sample shown in Figure 3.10-3. These techniques are most effective and practical when the construction activity noise source is stationary (e.g., auger or drill operation) and the specific source locations of noise emissions are near the ground, and barriers can be placed as close to the equipment/activity as possible. Barrier layout and other implementation details would vary by construction site.

Significance Determination: Barrier material is assumed to be solid and dense enough to demonstrate acoustical transmission loss that is at least 10 dBA greater than the estimated noise level of the equipment or activity. These suggested barrier types do not represent the only ways to achieve the indicated noise reduction in dBA; they represent examples of how such noise attenuation might be attained by an implemented measure under the right conditions.

With the noise reduction achieved with the noise barriers of MM Complete Streets NOI-2, the attenuated construction noise levels at a source would be reduced by 5 to 15 dBA Leq, which would attenuate to a less than substantial increase in daytime ambient noise levels at an adjacent residential uses. However, MM Complete Streets NOI-2 (i.e., barriers) may not be feasible to implement at all locations at all times during construction activities, due to potential physical constraints at a location, which allow for line of sight between a noise source and a residence. For example, existing fences may not be tall enough or sturdy enough to support noise blankets being attached and the placement of temporary barriers could endanger construction crew members and equipment and may restrict removal of impacted materials beneath the barriers. Therefore, impacts would be potentially significant and unavoidable with regard to a temporary substantial increase in ambient noise levels.

Similar to the Complete Streets component of the project, MM Incentive District NOI-3 may not be feasible to implement at all locations at all times during construction activities, due to potential physical constraints at a location, which do not block line of sight between a noise source and a residence. For example, existing fences may not be tall enough or sturdy enough to support noise blankets being attached and the placement of temporary barriers could endanger construction crew members and equipment. Therefore, impacts would be potentially significant and unavoidable with regard to a temporary substantial increase in ambient noise levels.

Issue 5: For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the proposed project expose people residing or working in the area to excessive noise levels?

The project site is located approximately 1.8 miles west of the Oceanside Municipal Airport and is outside of the airport 60 CNEL noise contours (Airport Land Use Commission 2010) Therefore, the project would not expose people to excessive noise levels from airport activities, and no impacts would occur due to the project.

Mitigation Measures: No mitigation measures would be required.

Significance Determination: No impact

Issue 6: For a project located within the vicinity of a private airstrip, would the proposed project expose people residing or working in the project area to excessive noise levels?

The project site is not located within the vicinity of a private airstrip, or heliport or helistop. Therefore, the project would not expose people residing or working in the project area to excessive noise levels from such uses.

Mitigation Measures: No mitigation measures would be required.

Significance Determination: No impact