3.12 NOISE

NOISE – Would the Project:	**Potentially Significant Impact**	**Less Than Significant with Mitigation**	**Less Than Significant Impact**	**No Impact**
a) 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?	☐	☒	☐	☐
b) Result in exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?	☐	☐	☒	☐
c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
e) For a project located within an airport land use plan 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 project area to excessive noise levels?	☐	☐	☐	☒
f) 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?	☐	☐	☐	☒

3.12.1 Environmental Setting

The MOT lies primarily offshore, with approximately 300 feet of fuel oil submarine pipeline located onshore below riprap on Carlsbad State Beach and extending under Carlsbad Boulevard to the beach valve pit within the EPS. Noise sources in the Project area include: traffic on Carlsbad Boulevard, I-5, and other local roads; passing trains; ocean waves; marine vessels; and various sounds from local land uses. Residential uses (considered to be noise sensitive) are located north and south of Project area, with the closest located about 1,400 feet south of the pipeline landfall.

3.12.1.1 Air Noise Characteristics

Noise is defined as unwanted or objectionable sound. Measurement of sound involves determining three variables: (1) magnitude, (2) frequency, and (3) duration. The magnitude of variations in air pressure associated with sound waves results in the quality commonly referred to as loudness. Human ears respond to a very wide range of sound pressures producing numbers of awkward size when sound pressures are

related on an arithmetic (1, 2, 3…) scale. It has therefore become customary to express sound pressure level in decibels which are logarithmic (1, 10, 100…) ratios comparing sound pressures to a reference pressure. The reference pressure commonly used for noise measurements in air is 20 µPa. The quietest sound that a normal young adult human ear can hear is assigned the value 0 dB. A multiplication of sound pressure by a factor of 10 corresponds to an increase in sound pressure level of 20 dB. A doubling of any value of sound pressure corresponds to an increase in sound pressure level of 6 dB. As a rule of thumb, a 1 dB change in sound level requires close attention to notice a change in loudness, whereas a 3 dB change is clearly noticeable, and a 10 dB change would be nearly twice (or one-half) as loud. Some sample typical SPLs for common sounds are: 10 dB for rustling of leaves; 60 dB for ordinary conversation at 3 feet; and 100 dB for a power mower at 5 feet.

Because decibels are logarithmic ratios, they cannot be manipulated in the same way as arithmetic numbers. Addition of decibels produces results such as 70 dB + 70 dB = 73 dB. When the difference between two sound levels is greater than about 10 decibels, the lesser sound is negligible in terms of affecting the total level.

Sound level diminishes as distance from the source increases. For a “point” source of sound in free space, the rate at which the sound attenuates is inversely proportional to the square of the distance from the source. This means the sound level would drop 6 dB each time the distance from the source is doubled. A stream of vehicles on a busy highway represents a “line” source of sound and the attenuation rate is only about 3 dB for each doubling of distance.

Another characteristic of sound that must be considered is frequency, which is measured in Hz. One vibration per second equals 1 Hz. The human ear responds to sounds in the frequency range from 20 Hz to 20 kHz. While loudness depends primarily on sound pressure, it is also affected by frequency, and while pitch is closely related to frequency, it also depends on sound pressure. Thus, a 2 kHz tone at 5 dB SPL sounds just as loud as a 20 Hz tone at 70 dB SPL. A 20 Hz sound at 70 dB is quiet to the ear, while a 2 kHz sound at 70 dB is quite loud. Because of these variations, systems have been developed to relate physical measurements of sound to human response. Presently, the most widely used measure of loudness for community noise evaluation is the A-weighted sound level. Sound levels using this system are referred to as dBA.

The duration of noise and the time period at which it occurs are important factors in determining the human response to sound. For example, noise induced hearing loss is directly related to the magnitude, frequency, and duration of exposure. Annoyance due to noise is also associated with how often noise is present and how long it persists. One approach to quantifying time-varying noise levels is to calculate the Energy Equivalent Sound Level (L_{eq}) for the time period of interest. The L_{eq} represents a sound level which,

if continuous, would contain the same total acoustical energy as the actual time-varying noise which occurs during the observation period.

In a residential or other noise sensitive environment, noise is more disturbing at night than during the day. Thus, noise indices have been developed to account for the differences in intrusiveness between daytime and nighttime noise. The Community Noise Level Equivalent (CNEL) and the Day-Night Average Sound Level (L_{dn}) are such indices. CNEL and L_{dn} values result from the averaging of hourly L_{eq} values for a 24-hour period, with a weighting factor applied to the nighttime L_{eq} values (and the evening values for CNEL). The CNEL penalizes noise levels during the night (10:00 p.m. to 7:00 a.m.) by 10 dB to account for the increased sensitivity of people to noise after dark. Evening noise levels (7:00 p.m. to 10:00 p.m.) are penalized 5 dB by the CNEL. The L_{dn} also penalizes nighttime noise levels by 10 dB, but does not penalize evening levels. These two indices are generally equivalent. In general, the CNEL may be thought qualitatively as an accumulation of noise associated with individual events occurring throughout a 24-hour period. The noise of each individual event is accounted for in a separate, discrete measurement that integrates the changing sound level over time as, for example, when an aircraft approaches, flies overhead, then continues off into the distance. These integrated sound levels for individual operations are referred to as SELs. The accumulation of the SELs from each individual operation during a 24-hour period determines the CNEL for the day.

To limit population exposure to physically and/or psychologically significant noise levels, the State and various local cities and counties in the state have established guidelines and/or ordinances to control noise as discussed in Section 3.12.2, Regulatory Setting.

3.12.1.2 Existing Community Noise Environment

Padre Associates, Inc. collected ambient (baseline) noise measurements at two onshore locations near the Project area using a Larson Davis LXT noise meter (Figure 3.12-1). Noise level readings were taken in 15-minute intervals using an A-weighted frequency. Table 3.12-1 describes the two locations and the results of ambient noise measurements taken on January 14, 2013, between 9:15 a.m. and 9:35 a.m. (weekday morning). These measurements provide a snap shot of the existing noise environment and are representative of daytime noise levels within that timeframe only.

Table 3.12-1. Ambient (Baseline) Noise Levels

Approximate Location	Ambient Noise Level (dBA L_{eq})
Carlsbad Beach, within the existing fuel oil submarine pipeline alignment, approximately 50 feet from the edge of Carlsbad Boulevard	62.8 dBA
Carlsbad Beach, approximately 1,300 feet south of the fuel oil submarine pipeline alignment, 150 feet from the center of Carlsbad Boulevard	60.6 dBA

Figure 3.12-1. Ambient Noise Level Measurement Locations

3.12.1.3 Underwater Noise Characteristics

According to the National Research Council of the National Academies (2003), in the absence of shipping, natural forces are the dominant sources of long-term averaged noise at all frequencies in the ocean. The dominant source of naturally occurring ocean noise across the frequencies from 1 Hz to 100 kHz is associated with ocean surface waves generated by the wind acting on the sea surface. Above 100 kHz, the thermal agitation of the ocean medium itself is the dominant contributor to ocean noise. Additionally, biological sounds such as dolphin whistling and echolocation, whale calls, and snapping shrimp make noticeable contributions to ocean noise at specific times. Elastic vibrations in the earth are also known to contribute to ocean noise.

Anthropogenic or human-caused noise in the marine environment is an important component of ocean noise and includes the following general noise-source categories: shipping, seismic surveying, sonars, explosions, industrial activity, and miscellaneous sources. Vessel traffic is a major contributor to noise in the world's oceans, especially at low-frequencies between 5 and 500 Hz.

Sound waves in the underwater environment are similar to sound in air; however, sound attenuates much quick in air than in water, meaning that sound can propagate over longer distances in water than in air. Sound in water also propagates much faster. The

speed of sound in water is generally accepted as approximately 1,500 meters per second (m/s) or 4,921 feet per second (feet/s) compared to 340 m/s or 1,115 feet/s in the air, though it is affected by numerous variables such as temperature and salinity, etc. A major difference between underwater and in-air sound measures is that the amplitude of the reference pressure variation in the case of underwater sound is by definition 1 µPa (versus 20 µPa in air). This difference is an important cause of misunderstanding when comparing above-water sound levels with underwater sound levels because both are expressed in decibels, but with respect to a different reference level. A second important difference is the difference in characteristic impedance between water and air. The characteristic impedance (Z) is the product of density ρ and speed of sound c. Thus, $Z = \rho \times c$. In water, impedance is approximately 1,000 x 1,500 kilograms per square meter seconds (kg/m^2s), whereas in air impedance is approximately 1.2 x 340 kg/m^2s. This difference corresponds to a factor of almost 3,700, meaning that a particular pressure variation in water represents much less power than the same pressure variation in air (Ainslie et al. 2009).

Numerous factors influence the efficiency of sound transmission in the ocean, including, but not limited to: the variation of sound speed within the water column, bottom bathymetry, sediment and subbottom layer composition and thickness. As reported by Greeneridge (Appendix J), in the case of the MOT decommissioning site, the parameters describing the acoustic waveguide environment are generally associated with high transmission loss, which means that sound energy decreases rapidly with distance in this environment. The very shallow waters (roughly 30 m or less) lend themselves to repeated interactions of sound waves with the seafloor and sea surface, with sound energy lost in each interaction. In addition, the fine sand comprising the sediment layer attenuates sound energy more than sediments of larger grain size. Furthermore, historical sound speed profiles measured in the shallow waters off California are typically isovelocity (approximately the same sound speed throughout the water column) or downward-refracting (refracts sound waves toward the seafloor) and thus do not enhance long-range sound transmission. All of these waveguide characteristics suggest that sound originating at the MOT decommissioning site would likely suffer from relatively high acoustic transmission loss and its received levels would decrease rapidly with distance from the source.

3.12.2 Regulatory Setting

3.12.2.1 Federal and State

Federal and State laws and regulations pertaining to this issue area and relevant to the Project are identified in Table 3.12-2.

Table 3.12-2. Laws, Regulations, and Policies (Noise)

U.S.	• The **Noise Control Act** (42 USC 4910) required the USEPA to establish noise emission criteria, as well as noise testing methods (40 CFR Chapter 1, Subpart Q). These criteria generally apply to interstate rail carriers and to some types of construction and transportation equipment. The USEPA published a guideline (USEPA 1974) containing recommendations for acceptable noise level limits affecting residential land use of 55 dBA L_{dn} for outdoors and 45 dBA L_{dn} for indoors. • The **Department of Housing and Urban Development Environmental Standards** (24 CFR Part 51) set forth the following exterior noise standards for new home construction (for interior noise levels, a goal of 45 dBA is set forth and attenuation requirements are geared to achieve that goal): o 65 L_{dn} or less – Acceptable o 65 L_{dn} and < 75 L_{dn} – Normally unacceptable, appropriate sound attenuation measures must be provided o > 75 L_{dn} – Unacceptable • **Federal Highway Administration Noise Abatement Procedures** (23 CFR Part 772) are procedures for noise studies and noise abatement measures to help protect the public health and welfare, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways. It establishes five categories of noise sensitive receptors and prescribes the use of the Hourly L_{eq} as the criterion metric for evaluating traffic noise impacts. • **Federal Energy Regulatory Commission Guidelines On Noise Emissions From Compressor Stations, Substations, And Transmission Lines** (18 CFR 157.206(d)(5)) require that "the noise attributable to any new compressor stations, compression added to an existing station, or any modification, upgrade or update of an existing station, must not exceed a L_{dn} of 55 dBA at any pre-existing noise sensitive area (such as schools, hospitals, or residences)." • **NTIS 550\9-74-004, 1974** ("Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety"). In response to a Federal mandate, the USEPA provided guidance in this document, commonly referenced as the, "Levels Document," that establishes an L_{dn} of 55 dBA as the requisite level, with an adequate margin of safety, for areas of outdoor uses including residences and recreation areas. The USEPA recommendations contain a factor of safety and do not consider technical or economic feasibility (i.e., the document identifies safe levels of environmental noise exposure without consideration for achieving these levels or other potentially relevant considerations), and therefore should not be construed as standards or regulations.
CA	State regulations for limiting population exposure to physically and/or psychologically significant noise levels include established guidelines and ordinances for roadway and aviation noise under California Department of Transportation as well as the now defunct California Office of Noise Control. The California Office of Noise Control land use compatibility guidelines provided the following: • An exterior noise level of 60 to 65 dBA Community Noise Equivalent Level (CNEL) is considered "normally acceptable" for residences. • A noise level of 70 dBA CNEL is considered to be "conditionally acceptable" (i.e., the upper limit of "normally acceptable" noise levels for sensitive uses such as schools, libraries, hospitals, nursing homes, churches, parks, offices, and commercial/professional businesses). • A noise level of greater than 75 dBA CNEL is considered "clearly unacceptable" for residences.

3.12.2.2 Local

To address noise-related issues, the City of Carlsbad relies on two primary documents: the City of Carlsbad General Plan Noise Element (1994) and Noise Guidelines Manual

(1995). The purpose of the Noise Guidelines Manual is to provide guidelines and procedures to implement policies outlined in the Noise Element of the City of Carlsbad General Plan, which establishes general policies and specific noise standards to achieve noise compatibility between land uses. The Noise Element identified one objective applicable to onshore Project activities:

- Objective B.2: To control harmful or undesirable noise is relevant to the Project.

Noise generated from construction activities is regulated by Carlsbad Municipal Code Section 8.47. When potential noise impacts from construction activities have been identified (for projects requiring approval from the City), conditions from the Noise Guidelines Manual may be implemented to minimize those impacts. For example, prior to project approval, the project proponent may be required to produce evidence acceptable to the City that:

- All construction vehicles or equipment, fixed or mobile, operated within 1,000 feet of a dwelling or noise sensitive use shall be equipped with properly operating and maintained mufflers;
- Stockpiling and/or vehicle staging areas shall be located as far as practicable from dwellings and other noise sensitive receptors.

Carlsbad Municipal Code Section 8.48 addresses construction noise with a limit to construction working hours as follows.

- 8.48.010 Limitation of hours for construction (Ord. 3109 § 1 (part), 1978)). The erection, demolition, alteration, or repair of any building or structure or the grading or excavation of land in such manner as to create disturbing, excessive or offensive noise during the following hours, except as hereinafter provided, is a violation of this code:
    - After sunset on any day, and before seven a.m., Monday through Friday, and before eight a.m. on Saturday; and
    - All day on Sunday, Birthday of Martin Luther King Jr., Presidents' Day, Columbus Day, New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day and Christmas Day.
- 8.48.020 Exceptions (Ord. 3109 § 1 (part) 1978).
    - An owner/occupant or resident/tenant of residential property may engage in a home improvement or home construction project involving the erection, demolition, alteration or repair of a building or structure or the grading or excavation of land on any weekday between the hours of seven a.m. and sunset and on weekends between the hours of eight a.m. and sunset, provided such project is for the benefit of said residential property and is personally carried out by said owner/occupant or resident/tenant.

- The city manager may grant exceptions to Section 8.48.010 by issuing a permit in the following circumstances: when emergency repairs are required to protect the health and safety of any member of the community; and in nonresidential zones, provided there are no inhabited dwellings within one thousand feet of the building or structure being erected, demolished, altered or repaired or the exterior boundaries of the site being graded or excavated.

Based on the City of Carlsbad Noise Guidelines Manual, an exterior noise level of up to 60 dBA CNEL is considered "normally acceptable" for residential uses. A noise level between 60 and 70 dBA CNEL is considered to be "normally unacceptable" and a noise level of greater than 75 dBA CNEL is discouraged for construction of new residences. Noise levels up to 70 dBA CNEL are considered to be normally acceptable for water recreation areas (these are general standards, not construction noise thresholds).

3.12.3 Impact Analysis

a) 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?

Noise in Air

Less than Significant with Mitigation. Decommissioning activities would generate temporary noise in the vicinity of the Project site. Noise levels and potential noise-related impacts at receptor points near the Project site depend on three factors: (1) the location and type of noise-generating equipment (source); (2) the distance between the noise sources and sensitive receptors; and (3) the obstacles or barriers between the noise sources and sensitive receptors that may influence sound propagation. The nearest sensitive receptors are residential uses located about 1,400 feet south of the fuel oil submarine pipeline landfall. To estimate noise levels at this location, a worst case “noise-producing” scenario (requiring the most equipment/vessels in operation) was calculated based on: construction equipment and vessel noise levels during decommissioning activities in the onshore, beach, surf zone, and offshore segments; the percent usage factor for each piece of equipment or vessel; and the distance between each noise-generating piece of equipment or vessel and the sensitive receptor using the Federal Highway Administration Roadway Construction Noise Model (RCNM). Table 3.12-3 shows the reference noise levels at 50 feet from the source for the types of equipment associated with the Project under the modeled scenarios, as well as the expected percent usage factor for the worst case phase/task for a given decommissioning segment (e.g., hours of operation for the piece of equipment/total operating hours [days x 12 hours per day]). Equipment with usage factors of less than one percent is not included in the table below.

Table 3.12-3. Noise Levels at 50 Feet from Typical Project Equipment

Equipment Type (Number of Pieces)	Noise Level (L_{max}) at 50 Feet (dBA)	Percent Usage Factor (%)
Offshore Segment – Excavate and Remove Pipeline		
Barge with Generator (1)	81.0	100
Barge with Crane (1)	85.0	67
Barge Anchor Winches (2)	79.0	17
Barge with Pull Winch (1)	79.0	67
Tugboat #1 (1)	82.1	33
Tugboat #1 – Generator (1)	83.0	100
Tugboat #2 (1)	82.1	33
Tugboat #2 – Generator (1)	83.0	100
Crew Boat (1)	88.0	17
Crew Boat – Generator (1)	83.0	100
Welding Machine (1)	74.0	33
Jet Pump (1)	81.0	33
Industrial Air Compressor (1)	78.0	8
5120 Divers Air Compressor (1)	67.6	83
Surf Zone Segment – Excavate and Prepare for Surf Zone Extraction (Onshore)		
Excavator (2)	80.7	67
Dozer (1)	81.7	67
Loader (1)	79.1	33
Crane (1)	80.6	33
Divers Compressor (1)	67.6	67
Light Plant (2)	50.0	33
Surf Zone Segment – Excavate and Prepare for Surf Zone Extraction (Offshore)		
Barge with Generator (1)	80.0	100
Barge with Crane (1)	85.0	83
Barge Anchor Winches (2)	79.0	8
Barge with Pull Winch (1)	79.0	33
Tugboat #1 (1)	82.1	33
Tugboat #1 – Generator (1)	83.0	100
Crew Boat (1)	88.0	33
Crew Boat – Generator (1)	83.0	100
Welding Machine	74.0	50
Jet Pump (1)	81.0	50
Industrial Air Compressor (1)	78.0	33
5120 Divers Air Compressor (1)	67.6	33
Beach Segment – Remove/Store Riprap Groin		
Excavators (2)	80.7	42
Bulldozer (1)	81.7	67
Front-End Loader (1)	79.0	67
Crawler Crane (1)	81.0	67

Table 3.12-3. Noise Levels at 50 Feet from Typical Project Equipment

Equipment Type (Number of Pieces)	Noise Level (L_{max}) at 50 Feet (dBA)	Percent Usage Factor (%)
Onshore Segment – Cut and Demolish Underpass End Structure Vertical Vault		
Excavators (2)	81.0	67
Bulldozer (1)	82.0	67
Front-End Loader (1)	79.0	67
Generator (1)	81.0	83
Industrial Air Compressor (1)	78.0	50
Concrete Breaker (1)	90.0	33

Acronyms: L_{max} = maximum sound level; dBA = A-weighted sound level.

Notes: Noise levels are mostly provided from the Roadway Construction Noise Model (RCNM); however, tug and crew boat noise levels are from California State Lands Commission (2004). Winch noise levels were not available; as a result, the assumed noise level is based on RCNM levels for a rivet buster/chipping gun. Noise levels for the concrete breaker were not available; as a result, the assumed noise level is based on RCNM levels for a mounted impact hammer. The diver air compressor noise level is from the specifications for a MCH-6/EM single-phase electric compressor (Aerotecnica Coltri, S.p.A. 2014).

Decommissioning of the offshore and onshore segments would occur concurrently. For the analysis, below, the beach directly in front of the EPS was considered the closest sensitive noise receptor location from decommissioning activities in the offshore segment, with Project work vessels and offshore equipment estimated to be as close as 1,200 feet from the beach. Given the information above and using the assumptions in Table 3.12-3, noise levels from offshore decommissioning activities closest to the beach are estimated to be 66.2 dBA L_{eq}. As a result, the increase in noise level over ambient is expected to be in the order of 3.4 dBA (derived from subtracting the appropriate ambient site-specific noise level from Table 3.12-1 [62.8 dBA] from the estimated noise level from offshore decommissioning activities [66.2 dBA]), and noise levels at the closest residence are estimated to be 65.2 dBA or 4.6 dBA above ambient noise levels. Generally, a 3 dBA increase in noise level is considered to be perceptible to most receptors; therefore it is expected that noise associated with offshore decommissioning activities (which are scheduled to span a 3-month period) would be noticeable to the closest residences and beachgoers.

It is noted that the reference noise level for the tugboat in Table 3-12.3 is not illustrative of a tugboat under load (e.g., moving a loaded barge). Over the course of the Project, barges would be loaded with anchors and chains for offshore recycling and disposal, which may elevate noise levels above those indicated in Table 3.12-3 for tugboat operations and could be discernable to sensitive receptors on the beach and in residential areas; however, these increased noise levels would be intermittent and would only occur when a tugboat moves a loaded barge. Furthermore, the modeled scenario does not take into account noise that may result from discrete events, such as the placement of anchors and chains on the barge. Noise levels generated by the placement of these objects on the barge would be dependent upon the barge surface

and method of placement; however, because the contractor would need to comply with Occupational Safety and Health Administration (OSHA) regulations for workers, the number of anchors and chains, as well as the distance of the operation from shore, it is not expected that this activity would result in significant noise impacts on the public.

For the onshore segment, the demolishing of the vertical vault of the underpass end structure (on the west side of Carlsbad Boulevard) was considered the worst-case noise-producing scenario. Under the worst-case scenario (i.e., all equipment operating at the same location), noise levels would be 82.8 dBA, or 20.0 dBA higher than ambient, at a distance 100 feet from the work area, which would mask any noise from offshore operations. Noise levels at the closest residence (1,400 feet away) are estimated to be 63.4 dBA, an increase of 2.8 dBA, which is not typically considered a perceptible increase in noise; however, when combined with the noise produced as a result of decommissioning activities in the offshore segment, noise levels at the closest residence would be 66.4 dBA, an increase of 5.8 dBA from ambient. This particular worst-case noise-producing scenario would last about three weeks. Remaining decommissioning work in the onshore and offshore segments, including work in both segments that would overlap (which would last approximately 3 months), would be considerably less.

Most of the decommissioning work in the surf zone and beach segments would overlap, with work occurring in the surf zone segment from September to early December and in the beach segment from September to mid-November. The worst-case noise-producing scenario for these segments would occur during the simultaneous restoration of the riprap groin on the beach and the extraction of the fuel oil submarine pipeline from the surf zone. Noise levels during the removal of the riprap groin are expected to be 78.1 dBA at 100 feet and, assuming that offshore work would occur 1,200 feet from shore, noise levels from work in the surf zone segment would be 63.0 dBA onshore (not including the use of DPR). The two combined noise levels from work in the surf zone and beach segments in addition to the ambient noise level in the area would be 78.5 dBA onshore. At the closest residence, noise levels are estimated to be 63.0 dBA (combined noise) during this worst-case noise-producing scenario. This noise level is an increase of 2.4 dBA above ambient and is generally not considered a perceptible increase in noise. More distant homes would experience lower Project-related noise levels due to distance and some shielding (from beach activities) provided by buildings.

Beach decommissioning activities that do not overlap with offshore work (e.g., removal and storage of riprap) are expected to increase noise levels at the closest residence by an estimated 1.3 dBA, which is not considered a perceptible increase in noise; however, within 100 feet of the work area, the noise level would be 79.1 dBA, which is 16.3 dBA above ambient.

Additionally, if DPR were used to extract the fuel oil submarine pipeline from the surf zone, a Taurus Rammer would generate additional noise over an approximate 4-hour period. With a reference noise level of 93 dB at 50 m (164 feet) the Taurus Rammer would result in a barely noticeable difference in construction noise relative to the otherwise expected noise level at the beach and a substantial increase in noise at the closest residence during this combined surf zone and beach segment work (2.2 dBA and 9.7 dBA, respectively) (TT Technologies, Inc. 2014).[13]

Decommissioning activities requiring the use of equipment within the City of Carlsbad would require compliance with Chapter 8.48 of the City of Carlsbad Municipal Code, which limits disturbing or offensive construction noise between 7 a.m. and sunset on weekdays, between 8 a.m. and sunset on Saturdays, and prohibits such noise on Sundays and on 10 major holidays (Section 8.48.020 allows the city manager to permit exceptions to these limits in nonresidential zones where there are no inhabited dwellings within 1,000 feet of the noise source).

During decommissioning work in the surf zone and beach segment, nighttime or early morning work, and possibly some weekend work, may be required to take advantage of low tides in order to access the fuel oil submarine pipeline or riprap groin. The exact timing of these events, if necessary at all, would depend on the tide schedule and the progress of removing the pipeline and riprap groin. If nighttime, early morning, or weekend work is necessary, an exemption from the requirements of Chapter 8.48 of the City of Carlsbad Municipal Code would be required.

Overall, Project-generated noise levels may be considered significant in some cases, as described above, where sensitive receptors would be subject to a noticeable increase in noise levels. To ensure that potential short-term noise impacts associated with Project activities are avoided or mitigated to less than significant, the following measures would be implemented.

> **MM NOI-1: Advanced Noticing**. Advanced notices shall be posted on the beach and/or along Carlsbad Boulevard within a 1,500-foot radius around the fuel oil submarine pipeline to notify the public about the location and timing of decommissioning operations. The notices shall be: (1) posted at least 1 week prior to any decommissioning operations on the beach or ocean, and shall include a map of the Project site, contact name and phone number; (2) maintained until all Project operations impacting the beach and marine environment have been completed; and (3) removed within 1 week of completing the operations described in the notice.

[13] For purposes of this analysis, the dB value for the Taurus Rammer was assumed to be equivalent to the noise level of this equipment if it were A-weighted. This may not be the case, however, and the noise level as weighted for the human hearing range may be higher or lower.

MM NOI-2: Shielding of Stationary Equipment. Onshore stationary noise sources shall be shielded, where feasible, using enclosures or barriers constructed of temporary prefabricated sound blankets or sound walls.

Additionally, proposed Project scheduling would avoid the summer months and weekends, which are the times when residents would be most likely to utilize outdoor living areas.

Underwater Noise

Less than Significant with Mitigation. The potential effects associated with DPR on marine wildlife are evaluated in Section 3.4, Biological Resources. The potential impacts to humans from underwater noise generated by DPR are discussed below.

Studies have shown that high levels of underwater noise can cause dizziness, hearing damage, or other sensitive organ damage to divers and swimmers and may elicit startle responses (TNO 2008). Table 3.12-4 presents noise thresholds identified for unprotected recreational divers.

Table 3.12-4. Suggested Noise Thresholds for Recreational Divers

Source	Frequency Range (Hz)	Maximum Value (dB re 1 µPa)
NATO Undersea Research Center	600 to 2,500	154
Diving Medical Advisory Committee	Unspecified; believed to be 1,500	201
Parvin	500 to 2,500	155

Source: TNO 2008

Based on the studies summarized above, which considered different noise sources (that may not be directly transferable to the proposed Project), underwater noise levels in excess of 154 dB re 1 µPa could be considered potentially harmful to recreational divers and swimmers in the Project area.

As described in the Greeneridge report, the vibratory pile driving proxy showed sound energy over a broad range of frequencies. The highest sound level was estimated at approximately 180 dB re 1 µPa (rms) for the one-third octave band centered at 1 kHz. The frequency range 400 Hz to 3 kHz is a region of high energy for vibratory driving, with received levels of 170 dB re 1 µPa (rms) or more. Within a wider frequency range from 200 Hz to 10 kHz, received levels exceeded 160 dB re 1 µPa (rms) (based on measured sound levels back propagated to 1 meter [3.28 feet]) However, Greeneridge also stated that because of the limited and highly variable acoustic measurements for vibratory pile driving, meaningful quantitative comparison of metrics to thresholds is prohibited.

Based on the information for the vibratory pile driving proxy, noise levels in excess of the human safety threshold would be exceeded in close proximity to DPR operations. Although divers, swimmers, surfers, or other persons may be present in the vicinity of the offshore Project area, it would be unlikely that such persons would be able to approach the Project work area as an offshore safety zone would be established (see Figure A1-1 in Appendix A) and monitored by Project support boats; however, this safety zone, as currently identified, may not be adequate for the protection of persons underwater during DPR operations. Therefore, noise levels produced underwater by DPR could be harmful to humans.

To ensure that potential noise impacts to divers, swimmers, surfers, or other persons underwater from DPR operations are avoided or minimized to less than significant, the following measures would be implemented.

> **MM NOI-3: Advanced Notice to Swimmers and Divers.** At least 1 week prior to and during dynamic pipe ramming (DPR) operations, written notice to swimmers and divers shall be posted at area dive shops and along the beach within 1,500 feet of the DPR site indicating that swimming and diving in the Project area may be harmful due to underwater noise impacts during DPR operations. The notice shall state that the Project area should be avoided during the DPR operation period, which shall be identified on the notice along with a map showing the Project area and suggested area of preclusion for divers and swimmers. The notice will also provide a contact name and phone number.

This notice may be a supplement by the notice described in **MM NOI-1** above.

> **MM NOI-4: Observation and Removal of Divers and Swimmers from Waters in Project Area.** Marine wildlife monitors (MWMs) onboard Project vessels shall be instructed to observe for non-Project-related divers or swimmers in or about to enter the safety zone established for marine wildlife; however, the safety zone for human divers and swimmers may be modified based on the sound source characterization to be conducted for dynamic pipe ramming. If such persons are observed by MWMs or vessel crews, a support vessel shall be mobilized to inform them that their presence is not allowed in the Project safety zone, and the vessel crew shall arrange for them to be escorted from the active survey area.

b) Result in exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?

Less than Significant Impact. The Project would require the use of terrestrial construction equipment and vehicles; however, none of the equipment or vehicles are expected to create any greater vibration than that associated with the common garbage truck. Additionally, the construction site is distant enough from sensitive receptors (i.e., residences are located about 1,400 feet south of the fuel oil submarine pipeline landfall)

that vibrations from the Project would not be noticeable to these receptors; therefore, the impact would be less than significant.

c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

No Impact. The Project would result in a short-term increase in noise as a result of decommissioning activities; however, the Project would not result in a substantial permanent increase in ambient noise levels above existing levels; therefore, there would be no impact.

d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Less than Significant with Mitigation. See response for ***a)*** above.

e) For a project located within an airport land use plan 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 project area to excessive noise levels?

No Impact. The Project is not located within the Noise Hazard Area as identified in the McClellan-Palomar Airport Land Use Compatibility Plan (San Diego County Airport Land Use Commission 2010). As a result, the Project would not expose residents or workers in the Project area to excessive noise associated with aviation; therefore, there would be no impact.

f) 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?

No Impact. The Project site is not in the vicinity of a private airstrip; therefore, there would be no impact.

3.12.4 Mitigation Summary

Implementation of the following mitigation measure(s) would reduce the potential for Project-related noise impacts to less than significant.

- MM NOI-1: Advanced Noticing.
- MM NOI-2: Shielding of Stationary Equipment.
- MM NOI-3: Advanced Notice to Swimmers and Divers.
- MM NOI-4: Observation and Removal of Divers and Swimmers from Waters in Project Area.