APPENDIX NOI

Noise Technical Analysis

Martinez Renewable Fuels Project

Noise Technical Analysis

Tesoro Refining & Marketing Company LLC, an indirect, wholly owned subsidiary of Marathon Petroleum Corporation

July 27, 2021

NOISE

1.1 INTRODUCTION

Noise is a by-product of urbanization and there are numerous noise sources and receptors in an urban community. Noise is generally defined as unwanted sound. The range of sound pressure perceived as sound is extremely large. The decibel is the preferred unit for measuring sound since it accounts for these variations using a relative scale adjusted to the human range for hearing (referred to as the A-weighted decibel or dBA). The A-weighted decibel is a method of sound measurement which assigns weighted values to selected frequency bands in an attempt to reflect how the human ear responds to sound. The range of human hearing is from 0 dBA (the threshold of hearing) to about 140 dBA which is the threshold for pain. Examples of noise and their A-weighted decibel levels are shown in Figure 1.

In addition to the actual instantaneous measurements of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. To analyze the overall noise levels in an area, noise events are combined for an instantaneous value or averaged over a specific time period. The time-weighted measure is referred to as equivalent sound level and represented by energy equivalent sound level (Leq). The percentage of time that a given sound level is exceeded also can be designated as L10, L50, L90, etc. The subscript notes the percentage of time that the noise level was exceeded during the measurement period. Namely, an L10 indicates the sound level is exceeded 10 percent of the time and is generally taken to be indicative of the highest noise levels experienced at the site. The L90 is that level exceeded 90 percent of the time and this level is often called the base level of noise at a location. The L50 sound (that level exceeded 50 percent of the time) is frequently used in noise standards and ordinances.

1.1.2 TERMINOLOGY USED IN NOISE ANALYSIS

1.1.2.1 Noise Fundamentals

Because all humans perceive and interpret sound differently, the types of sound which comprise noise are subjective. The objectionable nature of sound can be caused by its pitch or its loudness. Pitch of a tone or sound depends on the relative rapidity (frequency) of the vibrations by which it is produced. Loudness is the amplitude of sound waves combined with the reception characteristics of the ear. Amplitude may be compared with the height of an ocean wave. Technical acoustical terms commonly used in this section are defined in Table 1.

FIGURE 1

General Noise Sources and Associated Sound Pressure Levels

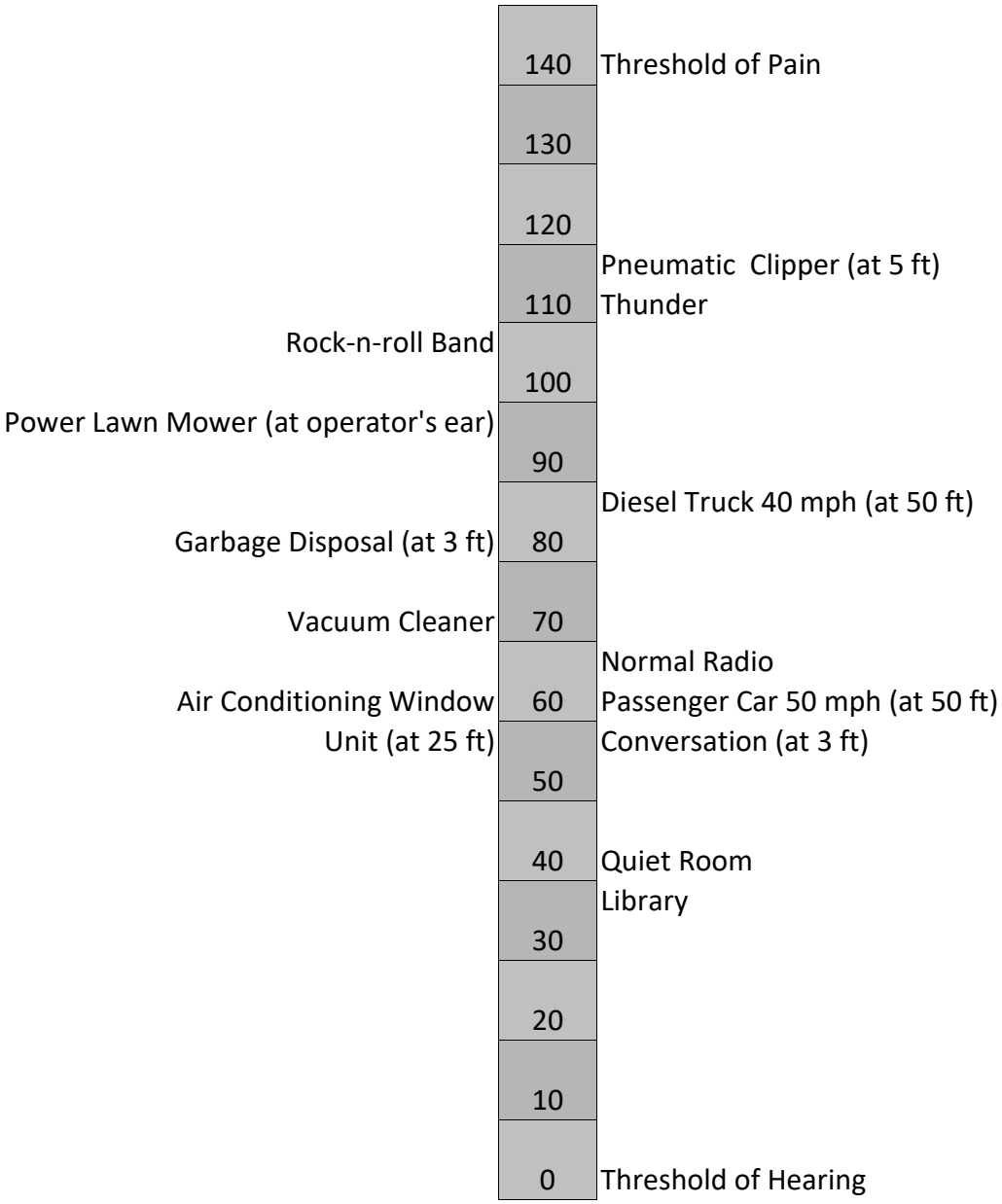

TABLE 1

Definition of Acoustical Terms

Term	Definition
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
A-Weighted Sound Level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Community Noise Equivalent Level (CNEL)	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and after addition of 10 decibels to sound levels in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level (L_{dn})	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 p.m. and 7:00 a.m.
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Equivalent Noise Level (L_{eq})	The average A-weighted noise level during the measurement period.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sounds are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, and tonal or informational content as well as the prevailing ambient noise level.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1 percent, 10 percent, 50 percent, and 90 percent of the time during the measurement period.
L_{max}, L_{min}	The maximum and minimum noise levels during the measurement period.
Loudness	The amplitude of sound waves combined with the reception characteristics of the human ear.
Pitch	The height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced.
SEL	Sound Exposure Level is a measure of cumulative noise exposure of a noise event expressed as the sum of the sound energy over the duration of a noise event, normalized to a one-second duration.
Sound Pressure	Sound pressure or acoustic pressure is the local pressure deviation from the ambient atmospheric pressure caused by a sound wave. Sound pressure can be measured using a microphone. The unit for sound pressure (p) is the Pascal [symbol: Pa or 1 Newton exerted over an area of 1 square meter (N/m^2).
Sound Pressure Level	The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals in air). Sound pressure level is the quantity that is directly measured by a sound level meter.
Vibration	Vibration means mechanical motion of the earth or ground, building, or other type of structure, induced by the operation of any mechanical device or equipment. The magnitude of vibration is stated as the acceleration in "g" units (1 g is equal to 32.2 feet/$second^2$ or 9.3 meters/$second^2$).

1.1.2.2 Decibels and Frequency

Environmental noise is measured on a logarithmic scale in decibels (dB). Decibels measure the relative magnitude of pressure fluctuations in a sound medium under the influence of a vibratory source. An increase of 10 decibels represents a 10-fold increase in acoustic energy, which is perceived by people as approximately a doubling of loudness over a wide range of amplitudes. Since decibels are logarithmic units, sound pressure levels are not added arithmetically. When two sounds of equal sound pressure level are added, the result is a sound pressure level that is three dB higher. For example, 60 dB plus 60 dB equals 63 dB. However, where noise levels differ, there may be little change in comparison to the louder noise source; for example when 70 dB and 60 dB sources are added, the resulting noise level equals 70.4 dB.

Because of the nature of the human ear, a sound must be about 10 dBA greater than the reference sound to be judged twice as loud. In general, a three to five dBA change in community noise levels starts to become noticeable, while one to two dBA changes are generally not perceived.

The frequency of a sound wave is the number of times in one second that the sound wave is repeated (i.e., the number of cycles per second). Frequency is designated by a number, and is expressed by the unit Hertz (Hz). The frequency range over which a healthy, young person is capable of hearing is approximately 20 Hz at the low frequency end to 20,000 Hz at the high frequency end.

Because the human hearing system is not equally sensitive to sound at all frequencies, the A-weighted filter system is used to express measured sound levels, in units of dBA, based on the sensitivity of the human ear. The dBA scale emphasizes mid- to high-range frequencies and de-emphasizes the low frequencies to which human hearing is less sensitive. Figure 1 shows typical A-weighted exterior and interior noise levels that occur in human environments.

Because A-weighted sound levels are adjusted to the sensitivity of the human ear, they are commonly used to quantify noise events and environmental noise. However, community response also depends on the existing ambient sound level, magnitude of sound with respect to the background noise level, duration of the sound, repetitiveness, number of events, and time of day.

1.1.2.3 Vibration Fundamentals

Vibration is an oscillatory motion in a solid medium that can be described in terms of displacement, velocity, and acceleration. With a vibrating floor, for example, the displacement is simply the vertical distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement, while acceleration is the rate of change of that speed. In an environmental setting, vibratory motion will most often propagate through the soil, and can potentially affect humans, structures, and equipment. The effects of ground vibration are dependent on the source and amplitude of vibration, source to receptor distance, soil conditions, and receptor characteristics.

1.2 EXISTING REFINERY NOISE SETTING

The greatest sources of existing noise in the Martinez area are attributable to transportation. Transportation noise primarily depends on the speed and percentage of the noise source. Significant facilities within or adjacent to the area include: Interstate 680, State Highway 4, Union Pacific and BNSF railroads, major arterials, local streets, and the Buchanan Field Airport. Other noise sources include existing Refinery processes, other adjacent industrial uses, construction and demolition activities, landscaping and maintenance activities, mechanical equipment, street sweepers, parking lot activities, and loading/unloading activities. Many of these noise sources can be disruptive but are usually temporary and intermittent.

Residential areas are located west of the project site in the Vine Hill area and along Blum Road. The community of Clyde lies to the east of the Refinery site. The Vine Hill site is approximately one mile west of the main Refinery complex in Tract 1, and the Blum Road site is about one mile south-west. Clyde is approximately 1.5 miles east of the main Refinery complex. Open lands intervene between the Refinery and these neighborhoods.

Sound level naturally decreases with greater distance from the source. The basic attenuation rate depends on whether a given noise source can be characterized as a point source or a line source. Point sources of noise, including stationary mobile sources such as idling vehicles or onsite construction equipment, attenuate (lessen) at a rate of 6.0 dBA per doubling of distance from the source. In many cases, additional noise attenuation occurs due to ground absorption, reflective wave canceling, and physical barriers and/or topography that block the line of sight between the source and receiver (FTA, 2018).

Previous noise monitoring conducted in the area has included noise readings on Blum View Drive, about 300 feet from I-680. These noise readings showed a maximum noise level of 80 decibels, with an average noise level (Leq) of 52 and a day/night average sound level (Ldn) of 55 decibels (City of Martinez, 2015).

1.3 REGULATORY BACKGROUND

Occupational noise exposure is regulated at the federal and state levels. Residential noise exposure is regulated at the state and local government levels as discussed in the following subsections.

1.3.1 Noise Regulations for Worker Protection

Exposure to employee noise levels is regulated by Cal OSHA and the federal Occupational Safety and Health Administration/National Institute for Occupational Safety and Health (NIOSH). Employers are required to administer a continuing, effective hearing conservation program, whenever employee noise exposures equal or exceed an 8-hour time-weighted average sound level (TWA) of 85 dBA (CCR Title 8, Section 5097 and 29 CFR 1910.95(c)). In addition, an employer must institute a training program for all employees who are exposed to noise at or above an 8-hour TWA of 85 dBA (CCR Title 8, Section 5099).

Workers exposed to noise sources in excess of 85 dBA for an eight-hour period will be required to wear hearing protection devices that conform to applicable California regulations (CCR Title 8, Section 5098 and 29 CFR 1910.95(i)). Employers must give employees the opportunity to select their hearing protectors from a variety of suitable hearing protectors, shall provide training in the use and care of hearing protectors, shall ensure proper initial fitting and supervise the correct use of all hearing protectors(CCR Title 8, Section 5098 and 29 CFR 1910.95(i)).

1.3.2 State Noise Regulations

The State Department of Aeronautics and the California Commission of Housing and Community Development have adopted the CNEL to measure and regulate noise sources within communities. The CNEL is the adjusted noise exposure level for a 24-hour day and accounts for noise source, distance, duration, single event occurrence frequency, and time of day. The CNEL considers a weighted average noise level for the evening hours, from 7:00 p.m. to 10:00 p.m., increased by five dBA (i.e., an additional five dBA are added to all actual noise measurements), and the late evening and morning hour noise levels from 10:00 p.m. to 7:00 a.m., increased by 10 dBA (an additional 10 dBA are added to all actual noise measurements). The daytime noise levels are combined with these weighted levels and averaged to obtain a CNEL value. Using this formula, the CNEL weighted average noise level weights noise measurements taken in the evening and nighttime hours more heavily than noise during the daytime. The adjustment accounts for the lower tolerance of people to noise during the evening and nighttime period relative to the daytime period.

1.3.3 Local Noise Regulations

The Facility is located within Contra Costa County. The noise element of the Contra Costa County General Plan sets various goals and policies that apply to all development projects in the County. Most of these policies address land use compatibility for evaluating the acceptability of existing and future exterior noise levels at new projects proposing noise-sensitive receptors and are not directly applicable to the project. Noise from construction activities in Contra Costa County is exempt from applicable standards during daytime hours. The County uses project-specific conditions of approval to regulate construction noise levels for projects that require County approvals.

The Noise Element of the Contra Costa County General Plan discusses the County's goal to improve the overall environment in the County by reducing annoying and physically harmful levels of noise for existing and future residents, and for all land uses. The County's adopted Land Use Compatibility Standards for Community Noise Environments are shown in Table 2.

TABLE 2

Contra Costa County Land Use Noise Compatibility Guidelines
(L_{dn} or CNEL, dB)

Land Use	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Single-Family, Duplex, Mobile Homes	50-60	55-70	70-75	Above 75
Multi-Family Homes	50-65	60-70	70-75	Above 75
Schools, Libraries, Churches, Hospitals, Nursing Homes	50-70	60-70	70-80	Above 80
Transient Lodging – Motels, Hotels	50-65	60-70	70-80	Above 80
Auditoriums, Concert Halls, Amphitheaters	--	50-70	--	Above 65
Sports Arena, Outdoor Spector Sports	--	50-70	--	Above 70
Playgrounds, Neighborhood Parks	50-70	--	67-75	Above 72
Golf Courses, Riding Stables, Water, Recreation, Cemeteries	50-75	--	70-80	Above 80
Office Buildings, Business and Commercial	50-70	67-77	Above 75	--
Industrial Manufacturing, Utilities, Agriculture	50-75	70-80	Above 75	--

Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditional will normally suffice.
Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable: New construction of development generally should not be undertaken.

Source: Contra Costa County, 2010.
KEY: NA= Not Applicable
(a) L_{dn} is an average A-weighted noise level during a 24-hour day with 10 dBA added to levels measured between 10 p.m. and 7 a.m. CNEL is similar to L_{dn} except that CNEL also adds 5 dBA to levels between 7 p.m. and 10 p.m.

1.4 SIGNIFICANCE THRESHOLDS

The proposed project impacts on noise will be considered significant if:

- Construction noise levels exceed the local noise ordinances or, if the noise ordinance is currently exceeded, project noise sources increase ambient noise levels by more than three decibels (dBA) at the closest off-site receptor.
- The proposed project operational noise levels exceed any of the local noise ordinances at the site boundary or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three dBA at the site boundary.

1.5 PROJECT NOISE IMPACTS

1.5.1 Construction Noise Impacts

The developed portions of the site are primarily devoted to petroleum refining and associated uses, including oil processing units, raw material and product storage tanks, wastewater treatment facilities, and marine wharfs with associated pipelines at the Suisun Bay shoreline. The Refinery is also surrounded by industrial uses including other terminals, storage tank farms, and other industrial uses.

Construction activities associated with the proposed project would generate noise from construction equipment and construction-related traffic. The types of construction equipment to be used include, but are not limited to, trucks, cranes, forklifts, air compressors, generators, excavators, scrapers, backhoes, front end loaders, and welding machines. Noise levels for various construction equipment are provided in Table 3. It should be noted that these noise levels are detected at 50 feet from the source. Noise attenuation due to distance will reduce these values as discussed later in this section.

Contra Costa County does not have a specific noise ordinance, but it addresses impacts that are due to construction noise under the Grading Ordinance Section 716-8.1008, stating that operations shall be controlled to prevent nuisances to public and private ownerships because of dust, drainage, removal of natural support of land and structures, encroachment, noise, and/or vibration.

TABLE 3

Construction Noise Sources

Equipment	Typical Noise Level 50 Feet from source (dBA)[(a)]
Air Compressor	80
Backhoe	80
Compressors	80
Concrete Mixers	85
Concrete Pumps	82
Cranes	83
Front Loader	80
Generators	82
Jackhammers	88
Pavers	85
Pumps	77
Scrapers, Graders	85
Tractor	77-98
Truck	84-95

(a) Federal Transit Administration, 2018. Levels are in dBA at 50-foot reference distance. These values are based on a range of equipment and operating conditions.

(b) Analysis values are intended to reflect noise levels from equipment in good conditions, with appropriate mufflers, air intake silencers, etc. In addition, these values assume averaging of sound level over all directions from the listed piece of equipment at 50 feet.

The estimated noise level during construction activities at the project site are expected to be an average of about 80 dBA at 50 feet from the center of construction activity. The project site is located in a heavy industrial area and is surrounded by heavy industrial uses. Using an estimated six dBA reduction for every doubling distance, the noise levels would drop off to about 62 dBA or less at about 400 feet from the sources of construction noise. The closest residential area is over one mile (5,280 feet) from the project site. Noise from construction equipment associated with the project at the closest residential area is expected to be about 40-41 dBA, or less than existing ambient noise levels. Ambient noise levels at the closest residential area are estimated to be Leq of 52 decibels and a day/night average sound level (Ldn) of 55 decibels (City of Martinez, 2015).[1] The addition of the construction noise would not result in an increase in noise at the closest residential area.[2] Most of the construction noise sources will be located near ground level, so the noise levels are expected to attenuate further than analyzed herein. Noise attenuation due to existing structures or topography has not been included in the analysis. Based on the above evaluation of noise from construction equipment, noise levels at the closest residential area are not expected to increase during construction activities and would be much less than 3 dBA. Therefore, noise impacts associated with the project construction activities are expected to be less than significant.

1.5.2 Operational Noise Impacts

Once constructed, the project is not expected to produce noise in excess of current operations. The proposed project is expected to result in a reduction in operating processing units at the Refinery, which are also noise sources, including the Crude Units, No. 4 HDS Unit, Alkylation Unit, No. 4 Gas Plant, Catalytic Reformer, No. 3 Reformer, Sulfur Recovery Unit, Benzene Saturation Unit, Fluid Catalytic Cracking Unit, Boilers #6 and #7, and #1 and #2 Feed Prep (Vacuum) Units. The shutdown of existing units results in the operation of fewer units, boilers, vessels, towers, columns, fugitive emissions and other similar equipment, generally reducing the overall noise associated with the operation of the Martinez Facility. Table 4 below summarizes the equipment changes required for the proposed project. As can been seen in Table 4, the proposed project will result in the shutdown of 12 existing processing units, plus two additional boilers. The proposed project will result in the construction of two new processing units (the Pretreatment Unit and Stage 1 Wastewater Treatment Unit) and one thermal oxidizer. Therefore, the number of operating processing units and the related noise sources will substantially decrease. Because the project will result in fewer operating units and noise sources, the overall noise at the facility is expected to be reduced.

The noise levels associated with the existing equipment at the Refinery is estimated based on industrial hygiene readings that are routinely taken at the various operating units. The estimated noise levels for the existing Refinery operations are shown in Figure 2. In addition, Table 5 provides the estimated noise for the existing Refinery equipment, plus the estimated noise for the new and modified units at the Refinery.

[1] The ambient noise levels are based on the environmental review of the City of Martinez's General Plan completed in 2015, which is expected to provide a reasonable estimate of baseline noise levels in the vicinity of the operating Martinez Refinery.

[2] The total sound level was calculated using the following formula: $T_{sl}=10\log_{10}(10^{Bsl/10} + 10^{Csl/10})$ where T_{sl} = the total sound level (dBA); B_{sl} = baseline sound level (dBA); and C_{sl} = construction sound level (dBA).

TABLE 4

Summary of Project Changes

Units Shutdown	Units Repurposed/Altered	Units Purchased/Built	Units Kept As-Is (Change in Capacity)
• Delayed Coker • Crude Units No. 3 & No. 50 • No. 4 HDS Unit • Alkylation Unit • No. 4 Gas Plant • No. 2 Catalytic Reformer • No. 3 Reformer (UOP Platforming Unit) • Sulfur Recovery Unit (Chem Plant) • Benzene Saturation Unit • Fluid Catalytic Cracking Unit • Boilers #6 and #7 • #1 and #2 Feed Prep (Vacuum Units)	• No. 3 HDS • No. 1 Hydrogen Plant • Delayed Coker Heater No. 1 to Hot Oil Heater • Hydrocracker 1st Stage • Hydrocracker 2nd Stage • No. 2 HDS • No. 5 Gas Plant • No. 1 Gas Plant • Select Storage Tanks	• Sour Water Stripper Thermal Oxidizer • Pretreatment Unit • Stage 1 Wastewater Treatment Unit	• Loading/unloading facilities • Cooling towers • Flares • No. 1 HDS • Wastewater Treatment Units • No. 2 Hydrogen Plant (third party owned & operated) • Martinez Cogen Plant (third party owned & operated) • Storage tanks not "repurposed or altered"

HDS = Hydrodesulfurization

TABLE 5

Noise Impact Summary(1)

Unit	Noise at Unit Level (dBA)	Notes
UNITS TO BE SHUTDOWN		
Delayed Coker Unit	80	Up to 80 at unit boundary
Crude Unit No. 3	80-85	Up to 85 at Unit boundary
Crude Unit. No. 50	80-85	Up to 85 at Unit boundary (near 100)
No. 4 HDS	75-80	Less than 80 at Unit boundary
Alkylation Unit	80-85	Up to 85 at Unit boundary
No. 4 Gas Plant	80-85	Air Compressor House K-326, K-299 stay (see 4Gas2-noise figure). Rest of the equipment is removed.
No. 3 Reformer (UOP Platforming Unit)	80	Mostly 80 dBA at Unit boundary
Sulfur Recovery Unit (Chem Plant)	80	Included in Chem Plant
Benzene Saturation Unit	80	80 dBA at Unit boundary
Fluid Catalytic Cracking Unit	85	85 dBA and close to 100 dBA at Unit boundary
Boilers #6 and #7	85	85 dBA at Unit boundary
#1 and #2 Feed Prep (Vacuum Units	85	85 dBA throughout plant
UNITS REPURPOSED/ALTERED		
No. 3 HDS	85	Up to 85 dBA at Unit boundary.
No. 1 Hydrogen	100	These 3 plants are adjacent and all at 85 at Unit boundary. The Hydrogen Plant is close to 100 dBA at boundary.
Hydrocracker 1st Stage	85	
Hydrocracker 2nd Stage	85	
Delayed Coker Heater No. 1 (to Hot Oil Heater)	80	Estimated 80 @ 70 feet based on No. 13 Heater
No. 2 HDS	85 dBA	Up to 85 dBA at Unit boundary
No. 5 Gas Plant	80 dBA	Up to 85 dBA at Unit boundary
No. 1 Gas Plant	80-85	80 to 85 dBA at Unit boundary.
Sour (Foul) Water Stripper	80-85	Up to 85 dBA at Unit boundary
UNITS KEPT AS-IS		
Loading/Unloading facilities		Same noise in baseline as project.
Cooling Towers		Same noise in baseline as project.
Flares		Confirm no. of operating flares in baseline and project.
No. 1 HDS	80 dBA	Up to 80 dBA at Unit boundary. Same noise in baseline as project.
No. 2 Hydrogen Plant	85-100	Use same noise as No. 1 Hydrogen Plant.
Martinez Cogen Plant		Not on Figure; don't have data; project and baseline are the same.
API	80 dBA	Not included in Project Description
NEW UNITS		
Sour Water Stripper Thermal Oxidizer	85	Assume 85 dBA at 50 feet
Pretreatment Unit	85	Assume 85 dBA at 50 feet
Stage 1 Wastewater Treatment Unit	80	Assume same as API

(1) Based on industrial hygiene surveys completed on a quarterly basis for the operating units

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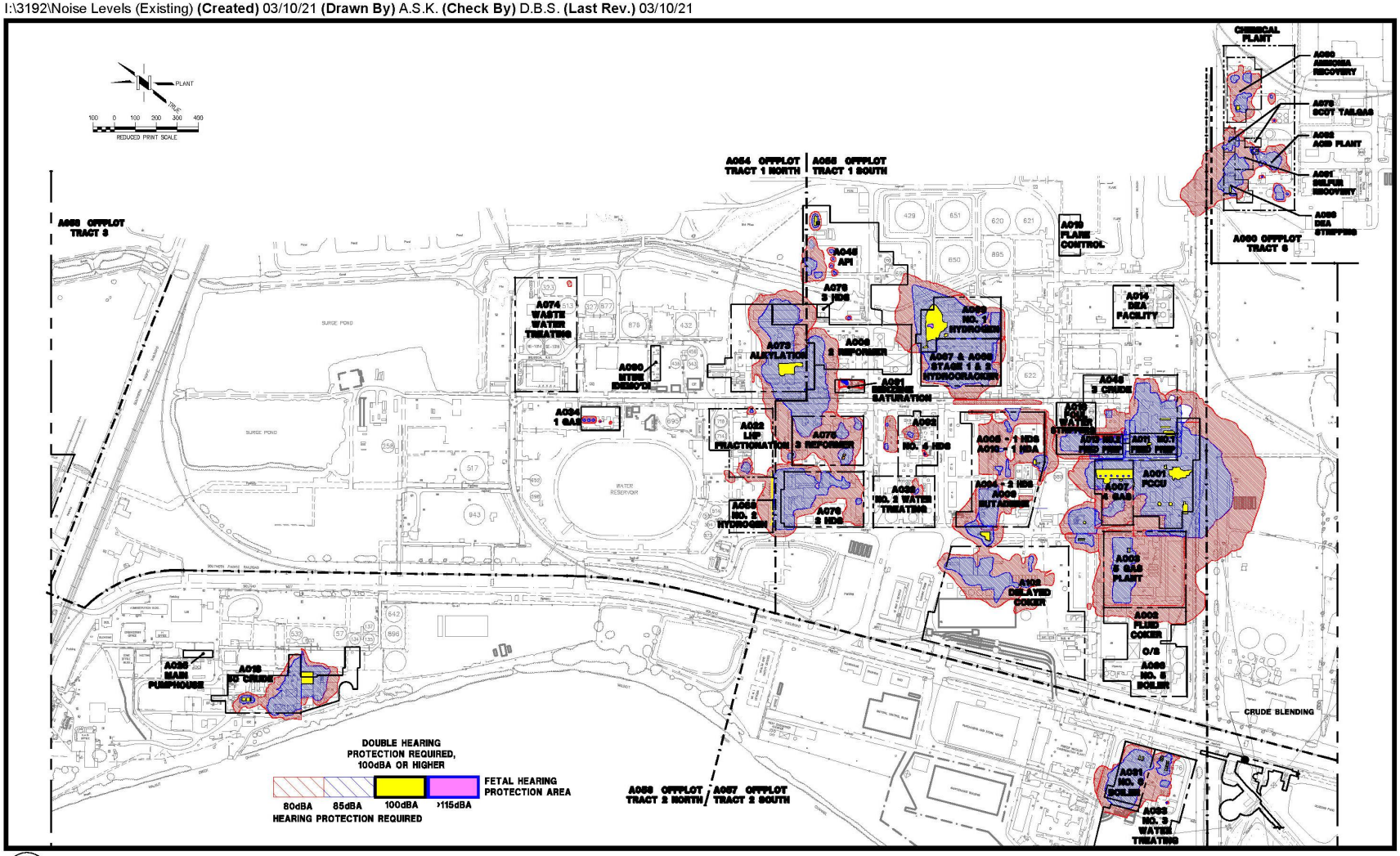

Environmental Audit, Inc.

NOISE LEVELS FROM EXISTING REFINERY EQUIPMENT
MARATHON MARTINEZ REFINERY
150 Solano Way
Martinez, CA 94553

Project No.3192

Figure 2

Figure 2 shows the noise levels from the existing operation of the major refinery units. The closest sensitive noise receptor to the Refinery is approximately one mile west (e.g., Central Avenue) of the major operating portions of the Refinery. Residential areas are also located about 1.5 mile east of the major operating portions of the Refinery in the community of Clyde.

Figure 3 shows the noise sources associated with the modified facility following completion of the project. Twelve of the units will cease operation and the noise associated with those units will cease, reducing the overall noise from the Refinery. Three new units will be constructed which are expected to be a maximum of 80 to 85 dBA. These new units would not be located any closer to sensitive noise receptors and the closest residential area would be located over one mile away.

Table 6 shows a list of major noise-generating equipment from the units that will be modified as part of the proposed project, including the #2 Wastewater, API separator, Sour Water Stripper; Hydrocracker Stage 1, Hydrocracker Stage 2; the Hydrogen Plant, No. 1 HDS; No. 2 HDS, No. 2 Water Treatment; No. 3 Crude Unit, and No. 3 HDS. As can be seen in Table 6, the proposed project would result in an overall decrease in noise generating equipment.

TABLE 6

Refinery Noise-Generating Equipment Changes – Renewable Fuels Project

EQUIPMENT	PRE-PROJECT EQUIPMENT	POST-PROJECT EQUIPMENT
Boilers	24	13
Compressors	92	66
Cooling Towers	12	8
Eductors	7	3
Furnace	13	10
Heaters/Boilers	48	41
Pumps	535	429
Fans	21	18
Blowers	2	21

(1) List of equipment associated with the modifications to the major refinery units associated with the renewable fuels project. Does not include all equipment from the units shutdown.

The estimated noise from the new units are presented in Table 5 and shown in Figure 3. The estimated noise levels during operation of the various new and existing units are expected to be an average of about 80 dBA at 50 feet from the center of the unit. The project site is located in a heavy industrial area and is surrounded by heavy industrial uses. Using an estimated six dBA reduction for every doubling distance, the noise levels would drop off to about 62 dBA or less at about 400 feet from the sources for the proposed project. The closest residential area is over one mile (5,280 feet) from the project site. Noise from operation of equipment associated with the project at the closest residential area is expected to be about 40-41 dBA, or less than existing ambient noise levels. Ambient noise levels at the closest residential area are estimated to be Leq of 52 and a day/night average sound level (Ldn) of 55 decibels (City of Martinez, 2015). Therefore, noise associated with the project modifications is expected to result in an overall decrease and would not be significant.

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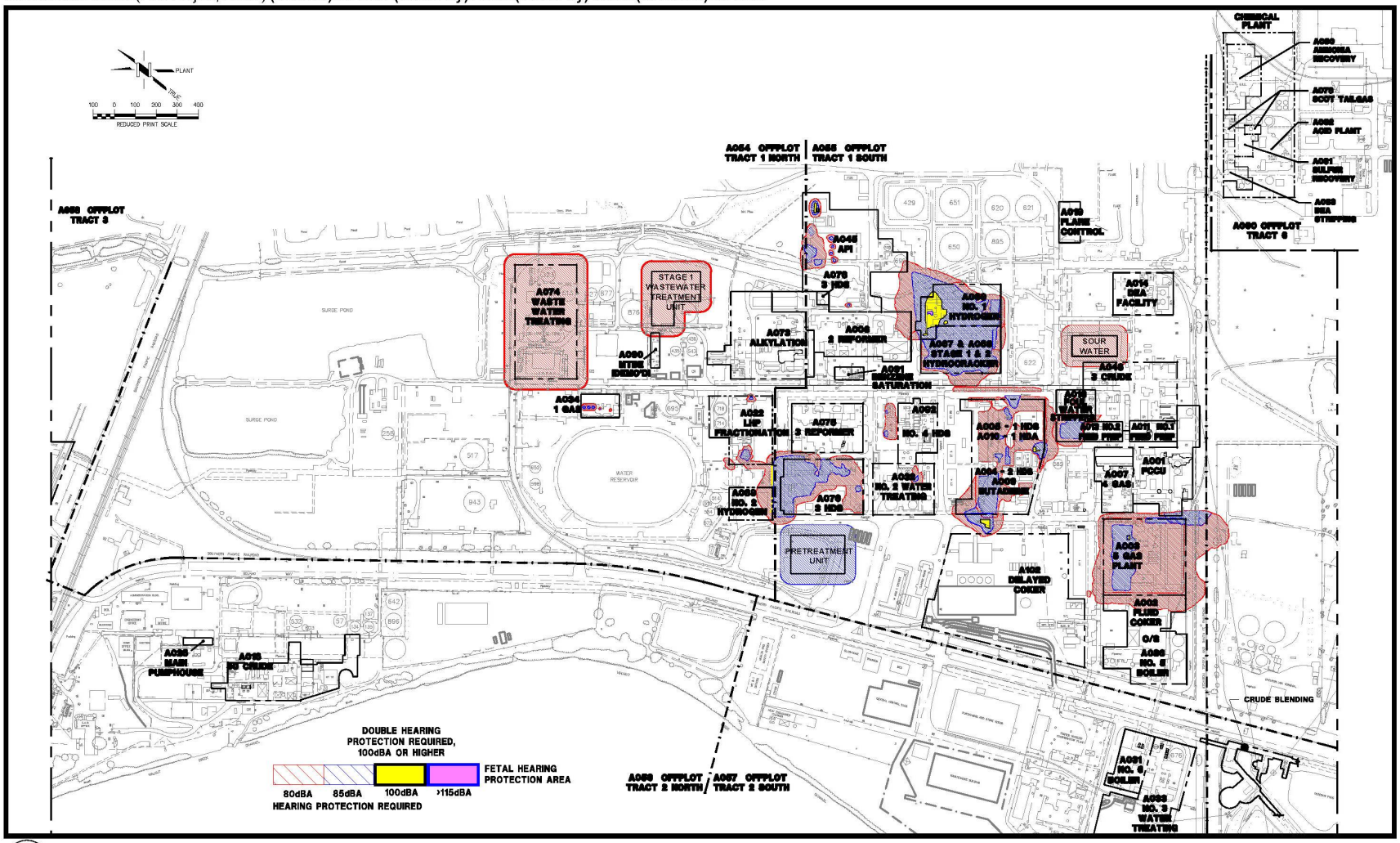

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NOISE LEVELS FROM POST PROJECT REFINERY EQUIPMENT
MARATHON MARTINEZ REFINERY
150 Solano Way
Martinez, CA 94553

Project No.3192

Figure 3

1.5.3 Mobile Source Noise Impacts

1.5.3.1 Truck Noise Impacts

Marathon receives various commodities for use in the production of fuels by way of truck transport on a daily basis. Some of the finished commodities produced at the facility are also delivered to end users via truck transport on a daily basis. Trucks associated with the operating refinery were approximately 205 trucks per day (74,894 trucks per year, as an annual average between October 2015 and September 2020) which included 37 percent associated with the transport of petroleum coke, 29 percent being used for the delivery of gasoline to the Bay Area, and 13 percent associated with transportation of miscellaneous commodities. Other commodities transported included propane (6 percent), diesel (7 percent), molten sulfur (3 percent), ethanol (3 percent) and sulfuric acid (2 percent).

The truck transport of finished commodities as a result of the project is anticipated to be less than the 2015-2020 Refinery operations. Overall, the project is expected to result in a decrease in truck transport due to the shutdown of the coker and sulfur plant, which previously accounted for a substantial portion of the total truck traffic associated with the delivery of petroleum coke and molten sulfur produced at the facility.

Post-project, the majority of truck operations will be to transport renewable diesel and gasoline within the Bay Area. An estimated 181 trucks per day (65,894 trucks per year) will be required to transport renewable diesel (55 percent of the trucks) and gasoline (22 percent of the trucks) to their distribution locations. Most of the trucks associated with the project are expected to travel within the Bay Area, although some are expected to come from outside the Bay Area.

Based on the above, the noise associated with truck transport would be expected to decrease because fewer trucks would be transporting materials. Further, the major portion of the trucks would continue to be those associated with the transport of gasoline and diesel into retail locations in the Bay Area, in volumes similar to those currently transported by the Marathon Refinery. No significant increase in noise associated with truck traffic is expected due to the proposed project.

1.5.3.2 Rail Noise Impacts

Railcars are used to transport various commodities over longer distances, typically outside the Bay Area, and outside the state of California. The existing operating refinery transports a number of commodities via rail including propane/propylene and butanes. . Between October 2015 and September 2020, the Refinery transported commodities in approximately 4,256 railcars per year or an average of 12 railcars per day, most of which were used to transport propane/propylene and butanes (3,366 railcars per year).

As a result of the project, some commodities will no longer be transported via rail, including butane, iso-butane, and propylene. However, rail transport is anticipated to increase post-project due to the movement of the renewable feedstock which includes vegetable oils (e.g., soybean oil and corn oil), rendered fats, and other miscellaneous renewable feedstocks. Following completion of construction of the proposed project, the project is expected to require approximately 22,191 railcars per year or an average of 61 per day, the majority of which (89 percent or 19,746) are expected to be renewable feedstock coming from the mid-western portion of the United States.

The project is proposing to transport up to 16 railcars per day of renewable fuels feedstock and propane to/from the Martinez facility via rail. In addition, the project is expected to transport additional railcars to a yet to be determined third-party terminal because the Refinery is not equipped to unload all of the renewable feedstock that would be needed. The third-party terminals could be as far away as Stockton, at which point the renewable feedstock would be transferred onto a barge (or other vessel type) and delivered to the Marathon facility via the Avon Terminal. Other third-party facilities closer to Martinez could also be used and could include facilities where railcars could be transported to, unloaded, and the feedstock transported to Marathon via existing pipelines or barges. As a result, only 6 additional railcars per day are expected to arrive/depart the Martinez facility.

Propane would continue to be transported via rail. Overall, the number of railcars that arrive/depart at the Martinez facility as part of the proposed project are expected to be 6 additional railcars that arrive/depart the Refinery as compared to the pre-project conditions. Therefore, the potential noise related to rail transport from the proposed project is not expected to increase because the additional six railcars would be added to existing trains that are transported to the Refinery. The project is not expected to result in an increase in train trips, only an increase in the number of railcars on a train. Therefore, noise related to rail transport are expected to be less than significant.

1.5.3.3 Marine Vessel Noise Impacts

The main change associated with the proposed project is that crude oil, the major portion of which is delivered to the Martinez Facility via marine vessel, will no longer be used as a feedstock. Instead renewable feedstocks will be delivered to the Martinez Facility via marine vessel and rail.

Under the proposed project, the Amorco and Avon Marine Terminals are expected to handle similar throughput volumes, using smaller vessels. Crude oil is typically delivered to the marine terminals by marine tankers and barges with capacities of up to 750,000 barrels per vessel (bbls/vessel). Under the proposed project, the majority of the renewable fuels feedstock is expected to be delivered in smaller barges with capacities of 25,000 to 50,000 bbl/vessel, thus resulting in smaller, but more marine vessels (up to approximately 400 vessels per year) (see Table 7). A smaller percentage of the renewable feedstock will be delivered by smaller tanker vessels with capacities of approximately 260,000 barrels per vessel to Avon. In addition, current petroleum-based terminal operations would continue.

TABLE 7

Summary of Marine Vessel Visits

Marine Terminal	Annual Vessel Visits Pre-Project	Annual Vessel Visits Post-Project
Amorco	90	40
Avon	120	364
TOTAL	**210**	**404**

Field noise monitoring was conducted at the Tesoro Amorco Marine Oil Terminal to determine the existing noise level during typical marine vessel operational activities as part of the Final EIR prepared by the California State Lands Commission for the continued operation of the Terminal (CSLC, 2015). These data are considered to be similar to the operational noise levels at the Avon Terminal as well and were also used in the Final EIR for the continued operation of the Avon Terminal.

The noise measurements were taken during docking and unloading of a ship. The noise measurement period included inactivity prior to ship arrival, approach and docking of the ship, and the crude oil offloading process. The noise monitor was set up at the approximately midpoint of the berth. The results of the noise monitoring indicated that the Leq varied from 54.4 dBA to 61.8 dBA over the monitoring period. Lmax levels were recorded as high as 78.7 dBA, but these were observed to be attributable to sources outside the project area, including airplanes, trains, and vehicles on the I-680 bridge. Based on the noise measurement data collected and observations of monitoring personnel, noise in the area did not vary substantially before, during, or after the docking and unloading process, and no individual sources of increased noise attributable to the terminal activities were discernible (CSLC, 2015). These noise monitoring activities are expected to provide a representative, although conservative (worst-case), estimate of noise associated with the project related marine vessels, because the project will result in the use of smaller vessels which have smaller engines and generally less noise.

The closest sensitive receptor to the Avon Terminal is over two miles south of the facility. The existing facility operations are considered a partial contributor to the ambient noise environment, but the noise associated with the operation of the terminals is not expected to change noise levels in the closest sensitive receptors. .

While there may be additional marine vessels that visit the terminals, the size of the vessels that would visit the marine terminal are expected to be smaller. Barges in the range of 25,000 to 50,000 bbls would be more frequent visitors to the terminals than tankers with capacities up to 750,000 bbls/vessel. Therefore, the proposed project would not be expected to result in any changes/increases in noise to operation of the project. Further, there are no sensitive receptors near the marine terminals

1.6 MITIGATION MEASURES/CONCLUSIONS

The proposed Renewable Fuels Project is expected to reduce the overall noise associated with producing fuels because crude oil will no longer be used at the Martinez Facility, the number of noise-

generating units will be reduced, and the number of sources that generate noise will be reduced. No significant noise impacts were identified; therefore, no mitigation measures are required.

1.7 CONCLUSIONS

The proposed Renewable Fuels Project is expected to reduce the overall noise associated with producing fuels because the number of noise-generating units will be reduced, and the number of sources that generate noise will be reduced. Overall, transportation noise sources are not expected to increase. Therefore, the proposed project is not expected to result in any significant adverse noise impacts.

1.8 REFERENCES

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