F. NOISE

This section describes the general characteristics of sound and the categories of audible noise. It then summarizes the regulatory framework related to noise issues at the City, State, and federal levels. Existing sources of noise near the Project site are described. Impacts that may result from the proposed Project are identified and mitigation measures to reduce potential impacts are recommended where appropriate.

1. Setting

This setting section begins with an introduction to several key concepts and terms that are used in evaluating noise. It then explains the various agencies that regulate the noise environment in Oakland and summarizes key standards that are applied to proposed development. This setting section concludes with a description of current noise sources that affect the Project site and the noise conditions that are experienced in the Project vicinity.

a. Characteristics of Sound. To the human ear, sound has two significant characteristics: *pitch* and *loudness*. A specific pitch can be an annoyance, while loudness can affect our ability to hear. Pitch is the number of complete vibrations or cycles per second of a wave that results in the range of tone from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment, and it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments.

Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation or sleep.

Several noise measurement scales exist which are used to describe noise in a particular location. A *decibel* (dB) is a unit of measurement which indicates the relative intensity of a sound. The 0 point on the dB scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Changes of 3.0 dB or less are only perceptible in laboratory environments. Audible increases in noise levels generally refer to a change of 3.0 dB or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. Sound levels in dB are calculated on a logarithmic basis. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense. Each 10-dB increase in sound level is perceived as approximately a doubling of loudness. Sound intensity is normally measured through the *A-weighted sound level* (dBA). This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Table IV.F-1 shows representative outdoor and indoor noise levels in units of dBA.

As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Geometric spreading causes the sound level to attenuate or be reduced, resulting in a 6-dB reduction in the noise level for each doubling of distance from a single point source of noise to the noise sensitive receptor of concern.

b. Noise Regulatory Framework. The following section summarizes the regulatory framework related to noise, including federal, State, and City of Oakland plans, policies and standards.

Table IV.F-1: Typical A-Weighted Sound Levels

Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Evaluations
Near Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle at a few feet away	110	Very Loud	16 time as loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Loud	
Pneumatic Drill; Vacuum Cleaner	80	Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	
Near Freeway Auto Traffic	70	Moderately Loud	
Average Office	60	Moderate	1/2 as loud
Suburban Street	55	Moderate	
Light Traffic; Soft Radio Music in Apartment	50	Quiet	1/4 as loud
Large Transformer	45	Quiet	
Average Residence Without Stereo Playing	40	Faint	1/8 as loud
Soft Whisper	30	Faint	
Rustling Leaves	20	Very Faint	
Human Breathing	10	Very Faint	Threshold of Hearing

Source: Compiled by LSA Associates, Inc., 2002.

(1) U.S. Environmental Protection Agency (EPA). In 1972 Congress enacted the Noise Control Act. This act authorized the EPA to publish descriptive data on the effects of noise and establish levels of sound "requisite to protect the public welfare with an adequate margin of safety." These levels are separated into health (hearing loss levels) and welfare (annoyance levels) as shown in Table IV.F-2. The EPA cautions that these identified levels are not standards because they do not take into account the cost or feasibility of the levels. For protection against hearing loss, 96 percent of the population would be protected if sound levels are less than or equal to an Leq(24) of 70 dB. The "(24)" signifies an Leq duration of 24 hours. The EPA activity and interference guidelines are designed to ensure reliable speech communication at about 5 feet in the outdoor environment. For outdoor and indoor environments, interference with activity and annoyance should not occur if levels do not exceed 55 dBA and 45 dBA, respectively.

Table IV.F-2: Summary of EPA Noise Levels for Protection of Public Health and Welfare with an Adequate Margin of Safety

Effect	Level	Area
Hearing loss	Leq(24) $\leq$ 70 dB	All areas.
Outdoor activity interference and annoyance	Ldn $\leq$ 55 dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	Leq(24) $\leq$ 55 dB	Outdoor areas where people spend limited amounts of time, such as school yards, play-grounds, etc.
Indoor activity interference and annoyance	Leq $\leq$ 45 dB	Indoor residential areas.
	Leq(24) $\leq$ 45 dB	Other indoor areas with human activities such as schools, etc.

Source: U.S. Environmental Protection Agency, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety." March 1974.

The noise effects associated with an outdoor Ldn of 55 dB are summarized in Table IV.F-3. At 55 dB Ldn, 95 percent sentence clarity (intelligibility) may be expected at 3.5 meters, and no community reaction. However, 1 percent of the population may complain about noise at this level and 17 percent may indicate annoyance.

Table IV.F-3: Summary of Human Effects in Areas Exposed to 55 dB CNEL

Type of Effects	Magnitude of Effect
Speech – Indoors	100 percent sentence intelligibility (average) with a 5 dB margin of safety.
Speech – Outdoors	100 percent sentence intelligibility (average) at 0.35 meters. 99 percent sentence intelligibility (average) at 1.0 meters. 95 percent sentence intelligibility (average) at 3.5 meters.
Average Community Reaction	None evident; 7 dB below level of significant complaints and threats of legal action and at least 16 dB below "vigorous action."
Complaints	1 percent dependent on attitude and other non-level related factors.
Annoyance	17 percent dependent on attitude and other non-level related factors.
Attitude Towards Area	Noise essentially the least important of various factors.

Source: U.S. Environmental Protection Agency, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety." March 1974.

For the purposes of this EIR, the EPA findings provide a more complete understanding of the issue of noise as well as a context in which to evaluate the proposed Uptown Project.

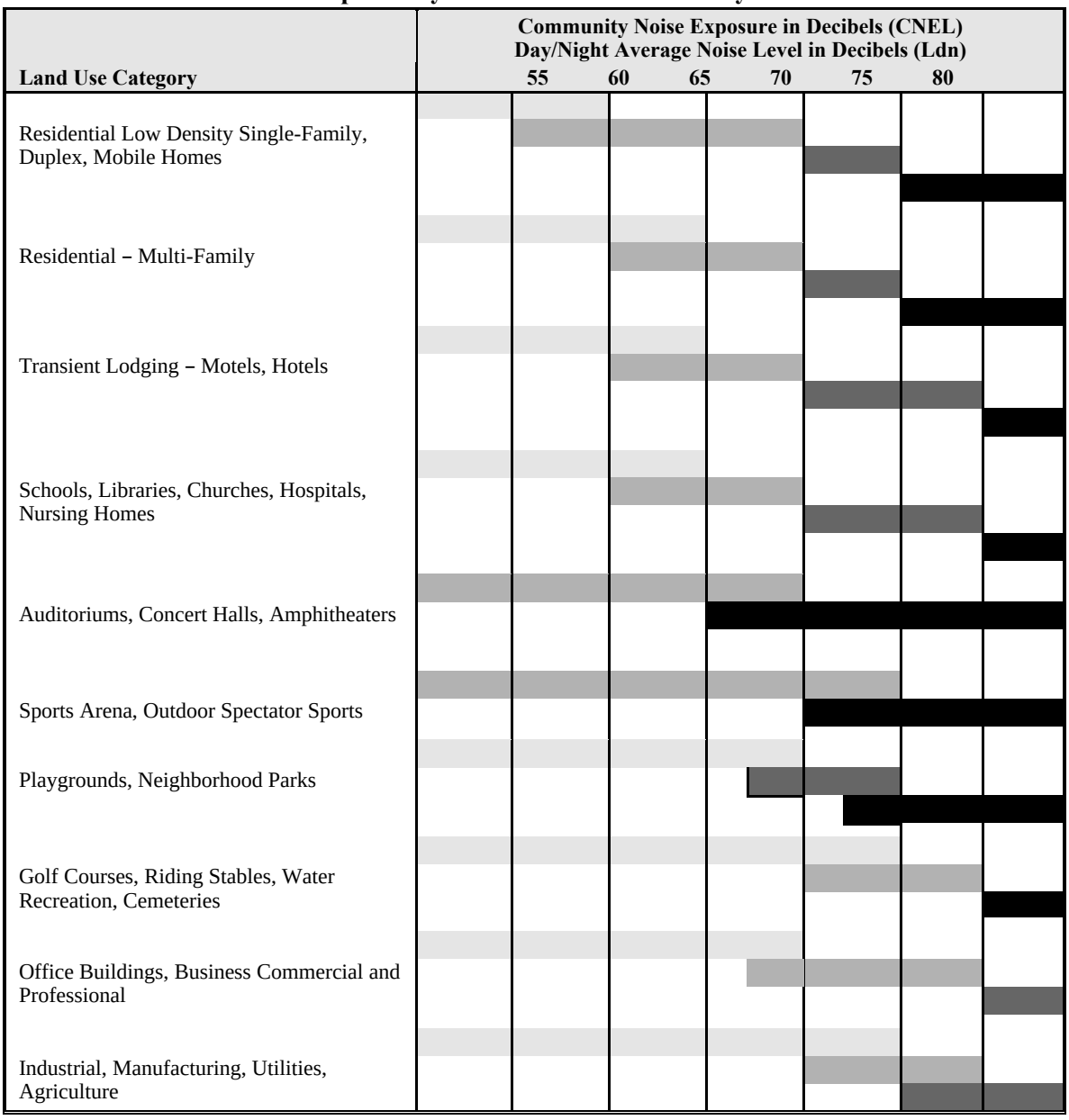
(2) State of California. The State of California has established regulations that help prevent adverse impacts to occupants of buildings located near noise sources. Referred to as the "State Noise Insulation Standard," it requires buildings to meet performance standards through design and/or building materials that would offset any noise source in the vicinity of the receptor. State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are found in the California Code of Regulations, Title 24 (known as the Building Standards Administrative Code), Part 2 (known as the California Building Code), Appendix Chapters 12 and 12A. For limiting noise transmitted between adjacent dwelling units, the noise insulation standards specify the extent to which walls, doors, and floor ceiling assemblies must block or absorb sound. For limiting noise from exterior noise sources, the noise insulation standards set an interior standard of 45 dBA DNL in any habitable room with all doors and windows closed. In addition, the standards require preparation of an acoustical analysis demonstrating the manner in which dwelling units have been designed to meet this interior standard, where such units are proposed in an area with exterior noise levels greater than 60 dBA DNL.

The State has also established land use compatibility guidelines for determining acceptable noise levels for specified land uses, as shown in Table IV.F-4 below.[1] This bar chart also recommends steps to be taken if one of the specified land uses (e.g., a school or church) is proposed for an area exposed to a high noise level (e.g., >85 dB): "Clearly unacceptable. New construction or development should generally not be undertaken."

(3) City of Oakland. The City of Oakland addresses noise in its Noise Element of its General Plan and in a Noise Ordinance.

[1] State of California, Governor's Office of Planning and Research, *General Plan Guidelines, 1998* (Appendix A, Figure 2).

Table IV.F-4: Land Use Compatibility Standards for Community Noise Environments



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.

NORMALLY UNACCEPTABLE
New construction or development should 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 or development clearly should not be undertaken.

Source: Modified from State of California General Plan Guidelines, June 1987.

The City of Oakland Noise Ordinance addresses operational noise by establishing the noise standards set forth in Table IV.F-5.[2] For each of these three general land use categories, new development must not expose users to more than the noted levels for more than the noted time periods.

The Noise Ordinance also addresses construction noise by establishing the maximum allowable noise levels shown in Table IV.F-6, except if an acoustical analysis is performed and all feasible mitigation measures are imposed (including the standard City of Oakland noise measures adopted by the Oakland City Council on January 16, 2001).[3]

The Noise Ordinance also addresses the potential nuisance of persistent construction-related noise[4] and vibrations.[5]

c. Existing Noise Sources. Noise levels in Oakland and their effect on the City's quality of life will revolve around at least five key sources as described below.

(1) Construction Activity. Short-term noise impacts are associated with demolition, excavation, grading, and building construction. Construction-period noise levels are higher than existing noise levels, but eventually cease once construction is complete.

Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. The character of the noise generated on each construction site and, therefore, the noise levels surrounding the site, changes as construction progresses through its sequential phases. Despite the variety in the type and size of

Table IV.F-5: City of Oakland Operational Noise Standards at Receiving Property Line, dBA[a]

Receiving Land Use	Cumulative No. of Minutes in a 1-Hr Period[b]	Maximum Allowable Noise Level (dBA)	
		Daytime 7 a.m.-10 p.m.	Nighttime 10 p.m.-7 a.m.
Residential and Civic[c]	20 (L_{33})	60	45
	10 ($L_{16.7}$)	65	50
	5 ($L_{8.3}$)	70	55
	1 ($L_{1.7}$)	75	60
	0 (L_{max})	80	65
		Anytime (Daytime or Nighttime)	
Commercial	20 (L_{33})	65	
	10 ($L_{16.7}$)	70	
	5 ($L_{8.3}$)	75	
	1 ($L_{1.7}$)	80	
	0 (L_{max})	85	
Manufacturing, Mining, and Quarrying	20 (L_{33})	70	
	10 ($L_{16.7}$)	75	
	5 ($L_{8.3}$)	80	
	1 ($L_{1.7}$)	85	
	0 (L_{max})	90	

[a] These standards are reduced 5 dBA for simple tone noise, noise consisting primarily of speech or music, or recurring impact noise. If the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level.

[b] L_x represents the noise level that is exceeded X percent of a given period. L_{max} is the maximum instantaneous noise level.

[c] Legal residences, schools and childcare facilities, health care or nursing homes, public open spaces, or similarly sensitive land uses.

Source: City of Oakland, 1996b.

Table IV.F-6: City of Oakland Construction Noise Standards at Receiving Property Line, dBA[a]

Receiving Land Use	Maximum Allowable Noise Level (dBA)	
	Weekdays 7 a.m.-7 p.m.	Weekends 9 a.m.-8 p.m.
Less Than 10 days		
Residential	80	65
Commercial, Industrial	85	70
More Than 10 Days		
Residential	65	55
Commercial, Industrial	70	60

[a] If the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level.

[b] During the hours of 7 p.m. to 7 a.m. on weekdays and 8 p.m. to 9 a.m. on weekends and federal holidays, noise levels received by any land use from construction or demolition shall not exceed the applicable nighttime operational noise level standard.

Source: City of Oakland, 1996b.

[2] Oakland Planning Code Section 17.120.050.

[3] Ibid.

[4] Oakland Planning Code Section 8.18.020.

[5] Oakland Planning Code Section 17.120.060.

construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table IV.F-7 lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 feet between the equipment and a noise receptor.

Typical noise levels range up to 91 dBA L_{max} at 50 feet during the noisiest construction phases. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels because the noisiest construction equipment is earth-moving equipment. Earth moving equipment includes excavating machinery such as backhoes, bulldozers, draglines and front loaders, and earth moving and compacting equipment, which includes compactors, scrapers and graders. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 to 4 minutes at lower power settings.

The City of Oakland requires that all construction vehicles or equipment, fixed or mobile, be equipped with properly operating and maintained mufflers. All operations must comply with the noise ordinance standards, and stockpiling and/or vehicle staging areas must be located as far as practicable from any nearby dwellings.

(2) Stationary Sources. A wide variety of stationary sources also contribute to noise throughout the City. These sources include machinery or equipment that emit noise during operation (e.g., air conditioners, generators, restaurant loudspeakers). Noise associated with certain land uses (e.g., industrial and commercial) could be considered stationary sources if the point for noise generation was stationary and not mobile (e.g., a forklift operated in a certain area of a building or outdoor facility).

(3) Vehicular Traffic. The amount of motor vehicle noise varies according to many factors, such as traffic volumes, vehicle mix (percentage of cars and trucks), average traffic speed, and distance from the observer. Major contributing roadway noise sources in the Project area include Interstate 980 (I-980), Telegraph Avenue, San Pablo Avenue, 14th Street, Thomas L. Berkley Way (20h Street), and other roadways.

The Federal Highway Administration (FHWA) highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions along roadway links within the Project study area. A typical vehicle mix for urban/suburban areas in California was used in this modeling effort.

(4) Rail Operations. Rail operations are a source for noise within cities with existing rail networks. The City of Oakland contains a functioning rail line that produces noise and groundborne vibration. Activity on the Amtrak rail lines represents a significant source of noise and groundborne vibration in the City. Factors that influence the overall impact of railroad noise on adjacent uses include the distance of the uses from the tracks, surrounding land topography, the intermittent nature of train events, and the absence or presence of sound walls or other barriers between the tracks and adjacent uses. The Project site is not directly adjacent to any railroad tracks and would not be significantly affected by rail operations.

Table IV.F-7: Typical Construction Equipment Noise Levels

Type of Equipment	Range of Maximum Sound Levels Measured (dBA at 15 m [50 feet])	Suggested Maximum Sound Levels for Analysis (dBA at 15 m [50 feet])
Pile Drivers, 12,000 to 18,000 ft-lb/blow	81 to 96	93
Rock Drills	83 to 99	96
Jackhammers	75 to 85	82
Pneumatic Tools	78 to 88	85
Pumps	68 to 80	77
Dozers	85 to 90	88
Tractors	77 to 82	80
Front-End Loaders	86 to 90	88
Hydraulic Backhoe	81 to 90	86
Hydraulic Excavators	81 to 90	86
Graders	79 to 89	86
Air Compressors	76 to 86	86
Trucks	81 to 87	86

Source: Noise Control for Buildings and Manufacturing Plants, Bolt, Beranek & Newman, 1987.

(5) Aircraft Operations. Aircraft overflights also contribute to the ambient noise levels in Oakland. The Metropolitan Oakland International Airport (MOIA) provides a variety of services to commercial aircraft and is planning for expansion through the implementation of its Airport Development Program (ADP). Increased airport operations, changes in the mix of aircraft, and changes in the distribution of different classes of aircraft operations among the runways of MOIA would all be expected to increase aircraft-related noise.

2. Impacts and Mitigation Measures

This section evaluates potential noise impacts associated with the Specific Plan and identifies mitigation measures to address these impacts, as appropriate.

a. Significance Criteria. The Project would have a significant impact on the environment if it would:

- Expose persons to or generate noise levels in excess of standards established in the Oakland general plan or applicable standards of other agencies (e.g., OSHA);
- Violate the City of Oakland Noise Ordinance (Oakland Planning Code Section 17.120.050) regarding operational noise;
- Violate the City of Oakland Noise Ordinance (Oakland Planning Code Section 17.120.050) regarding construction noise, except if an acoustical analysis is performed and all feasible mitigation measures imposed, including the standard City of Oakland noise measures adopted by the Oakland City Council on January 16, 2001:

During the hours of 7 p.m. to 7 a.m. on weekdays and 8 p.m. to 9 a.m. on weekends and federal holidays, noise levels received by any land use from construction or demolition shall not exceed the applicable nighttime operational noise level standard (see previous table);

- Violate the City of Oakland Noise Ordinance (Oakland Planning Code Section 8.18.020) regarding nuisance of persistent construction-related noise;
- Create a vibration which is perceptible without instruments by the average person at or beyond any lot line containing vibration-causing activities not associated with motor vehicles, trains, and temporary construction or demolition work, except activities located within the (a) M-40 zone or (b) M-30 zone more than 400 feet from any legally occupied residential property (Oakland Planning Code Section 17.120.060);
- Generate interior L_{dn} or CNEL greater than 45 dBA for multi-family dwellings, hotels, motels, dormitories and long-term care facilities (may be extended by local legislative action to include single family dwellings) per California Noise Insulation Standards (CCR Part 2, Title 24);
- Result in a 5 dBA permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project;
- Conflict with State Land Use Compatibility Guidelines (Office of Planning and Research, 1998) for all specified land uses for determination of acceptability of noise Source: State of California, Governor's Office of Planning and Research, *General Plan Guidelines, 1998* (Appendix A, Figure 2);
- Be 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, and would expose people residing or working in the Project area to excessive noise levels; or
- Be located within the vicinity of a private airstrip, and would expose people residing or working in the Project area to excessive noise levels.

b. Less-than-Significant Noise Impacts. Three noise sources would produce less-than-significant effects on residents and employees at the Project site.

(1) Train Noise. The proposed Project is located approximately one half mile north of the Union Pacific railroad tracks. In addition, the railroad tracks are located on the opposite side of I-880 from the Project. Therefore, while train noise might be noticeable from locations on the Project site, the levels would not be significant.

(2) Aircraft Noise. The proposed Project is located approximately six miles northwest of the Oakland International Airport. Due to the Project's distance from the airport, no significant noise impacts in terms of 24-hour averaged noise level, such as CNEL or L_{dn}, would occur at the Project site. Also, the Project site is not located within the vicinity of a private airstrip.

(3) Vibration Impact. The proposed Project does not include any sources that would generate long-term vibrations that would be perceptible to humans at nearby sensitive receptors. (Impact NOISE-1 below addresses short-term construction period pile driving and the resulting impact.)

c. Significant Noise Impacts. Noise impacts related to three sources would result in significant impacts.

Impact NOISE-1: Noise levels from construction activities may range up to 91 dBA L_{max} at the nearest land uses to the Project site for limited time periods during the duration of construction for certain activities such as pile driving or the use of other heavy equipment. (S)

The transport of workers and construction equipment and materials to the Project site would incrementally increase noise levels on access roads leading to the site. Because workers and construction equipment would use existing routes, noise from passing trucks (87 dBA L_{max} at 50 feet) would be similar to existing truck-generated noise. For this reason, short-term intermittent noise from trucks would be minor when averaged over a longer time period. In addition, noise associated with on-road vehicles is regulated by federal and state governments and is exempted from local government regulations. Therefore, short-term construction-related impacts associated with worker and equipment transport to the proposed Project site would result in a less-than-significant impact on receptors along the access routes leading to the proposed Project site.

However, noise generated during excavation, grading, and building erection on the Project site would result in potential noise impacts on off-site uses and to on-site uses if they were to occupy the site while later phases of construction were continuing. Existing tenants in the Project vicinity may be subject to short-term noise generated by construction equipment and activities on the Project site when construction occurs near the Project boundary.

Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These phases would change the character of the noise generated on the Project site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table IV.F-7 lists typical construction equipment noise levels recommended for use in noise impact assessments, based on a distance of 50 feet between the equipment and a noise receptor. Typical construction noise levels vary up to a maximum of 91 dBA L_{max} at 50 feet during the noisiest construction phases. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backhoes, bulldozers, draglines, and front loaders and earthmoving and compacting equipment, which includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings.

Construction of the proposed Project is expected to require the use of earthmovers such as bulldozers and scrapers, loaders and graders, water trucks, and pickup trucks. As shown in Table IV.F-7, the typical maximum noise level generated by each earthmover on the proposed Project site is assumed to be 88 dBA L_{max} at 50 feet from the operating earthmover. The maximum noise level generated by water and pickup trucks is approximately 86 dBA L_{max} at 50 feet from these vehicles. Each doubling of the sound sources with equal strength would increase the noise level by 3 dBA. Assuming each piece of construction equipment operates at some distance apart from the other equipment, the worst-case combined noise level at the nearest residences during this phase of construction would be 91

dBA L_{max} at a distance of 50 feet from an active construction area. Pile driving may also be required, which could generate noise levels above 90 dBA L_{max}.

Pile driving may be necessary in the construction of the proposed buildings. Noise associated with pile driving can be a very loud, impulsive sound, resulting from a large hammer that drops on reinforced concrete piles. Individual noise impacts are of short duration (under one second), but the noise is repetitive, occurring about once every two seconds. Pile driving also generates vibration that is perceptible at a distance of 100 feet but would not cause damage to other properties.

Construction of the proposed project will require more than ten days to complete. The City's construction noise thresholds for residential land uses are 65 dBA L_{max} on weekdays, between the hours of 7:00 a.m. and 7:00 p.m., and 55 dBA L_{max} on weekends, between the hours of 9:00 a.m. and 8:00 p.m. For commercial and industrial land uses the construction noise thresholds are 70 dBA L_{max} on weekdays and 60 dBA L_{max} on weekends. These thresholds are shown in Table IV.F-6. The closest land uses to the project area are located at a distance of approximately 50 feet from the project boundary. Therefore, the nearest land uses will be exposed to noise levels of up to 91 dBA L_{max}. This noise level will exceed the City's weekday and weekend noise thresholds for residential, commercial, and industrial land uses even with the implementation of the mitigation measures detailed below. However, due to the short-term nature of this construction-related impact, the City of Oakland considers it a less-than-significant impact if all feasible mitigation measures are imposed as detailed in the above significance criteria.

The following measures shall be implemented during construction of the proposed Project:

Standard Construction Requirements

Mitigation Measure NOISE-1a: Standard construction activities shall be limited to between 7:00 a.m. and 7:00 p.m. Monday through Friday. No construction activities shall be allowed on weekends until after the buildings are enclosed without prior authorization of the Building Services and Planning Divisions of the Community and Economic Development Agency.

Mitigation Measure NOISE-1b: To reduce daytime noise impacts due to construction, to the maximum feasible extent, the City shall require the applicant to develop a site-specific noise reduction program, subject to city review and approval, which includes the following measures:

- Signs shall be posted at the construction site that include permitted construction days and hours, a day and evening contact number for the job site, and a day and evening contact number for the City in the event of problems;
- An on-site complaint and enforcement manager shall be posted to respond to and track complaints;
- A pre-construction meeting shall be held with the job inspectors and the general contractor/on-site Project manager to confirm that noise mitigation and practices are completed prior to the issuance of a building permit (including construction hours, neighborhood notification, posted signs, etc.);
- Equipment and trucks used for Project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers,

ducts, engine enclosures, and acoustically attenuating shields or shrouds, wherever feasible);

- Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for Project construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed-air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed-air exhaust shall be used; this muffler can lower noise levels where feasible, which could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible; and
- Stationary noise sources shall be located as far from sensitive receptors as possible, and they shall be muffled and enclosed within temporary sheds, or insulation barriers or other measures shall be incorporated to the extent feasible.

Pile-Driving Requirements and Conditions (to be implemented if pile driving required).

Mitigation Measure NOISE-1c: If pile-driving occurs as part of the Project, it shall be limited to between 8:00 a.m. and 4:00 p.m., Monday through Friday, with no pile driving permitted between 12:30 and 1:30 p.m. No pile driving shall be allowed on Saturdays, Sundays, or holidays.

Mitigation Measure NOISE-1d: To further mitigate potential pile-driving and/or other extreme noise-generating construction impacts, a set of site-specific noise attenuation measures shall be completed under the supervision of a qualified acoustical consultant. This plan shall be submitted for review and approval by the City to ensure that maximum feasible noise attenuation is achieved. These attenuation measures shall include as many of the following control strategies as feasible and shall be implemented prior to any required pile-driving activities:

- Implement "quiet" pile-driving technology, where feasible, in consideration of geotechnical and structural requirements and conditions;
- Erect temporary plywood noise barriers around the entire construction site;
- Utilize noise control blankets on the building structure as it is erected to reduce noise emission from the site;
- Evaluate the feasibility of noise control at the receivers by temporarily improving the noise reduction capability of adjacent buildings; and
- Monitor the effectiveness of noise attenuation measures by taking noise measurements.
- A third-party peer review, paid for by the applicant, shall be required to assist the City in evaluating the feasibility and effectiveness of the noise reduction plan submitted by the applicant.
- A special inspection deposit is required to ensure compliance with the noise reduction plan. The amount of deposit shall be determined by the Building Official and the deposit shall be submitted by the project sponsor concurrent with submittal of the noise reduction plan.

Mitigation Measure NOISE-1e: A process with the following components shall be established for responding to and tracking complaints pertaining to pile-driving construction noise:

- A procedure for notifying City Building Division staff and Oakland Police Department;
- A list of telephone numbers (during regular construction hours and off-hours);
- A plan for posting signs on-site pertaining to complaint procedures and who to notify in the event of a problem;
- Designation of a construction complaint manager for the Project; and
- Notification of neighbors within 300 feet of the Project construction area at least 30 days in advance of pile-driving activities.

Construction period impacts would still occur with implementation of the measures detailed above. However, because they would be short-term in duration, the City considers this a less-than-significant impact. (LTS)

Impact NOISE-2: Local traffic will generate long-term noise levels exceeding *Normally Acceptable* and *Conditionally Acceptable* noise levels on the Project site. (S)

The FHWA highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions in the vicinity of the Project site. The traffic volumes were taken from the traffic report prepared for the Project by Korve Engineering . The resultant noise levels were weighted and summed over a 24-hour period in order to determine the CNEL values. CNEL contours are derived through a series of computerized iterations to isolate the 60, 65, and 70 dBA CNEL contour for traffic noise levels in the Project area. The future traffic noise levels that would occur with and without the Project are shown in Tables IV.F-8 and IV.F-9.

Table IV.F-9 shows that implementation of the proposed Project would result in relatively minor changes in traffic noise levels. The largest increase in traffic related noise would occur on William Street, which would experience a 1.6 dBA increase over the no-build scenario. Since the Project would not result in a significant increase in traffic noise, no mitigation is required for off-site areas.

Table IV.F-9 shows that portions of the project site would be exposed to noise levels between 65 dBA CNEL and 75 dBA CNEL. Such noise levels would conflict with the State's Land Use Compatibility Guidelines, which define noise levels below 65dBA CNEL as *Normally Acceptable* and between a 60 dBA CNEL and 70 dBA CNEL as *Conditionally Acceptable* for multi-family residential uses (see Table IV.F-4). The traffic noise levels predicted adjacent to streets within the Project site are as follows:

- *San Pablo Avenue.* The distance of the Project site property line to the centerline of San Pablo Avenue is approximately 50 feet. The 70 CNEL is estimated to be less than 50 feet[6] from the centerline and the 65 CNEL from between 72 feet and 109 feet from the centerline. As a result, noise levels within portions of the Project site adjacent to San Pablo Avenue will be as high as 70 dBA, which falls within the *Conditionally Acceptable* range for multi-family residential uses and the *Normally Acceptable* range for commercial uses.

[6] The traffic noise prediction model cannot predict distances less than 50 feet.

- *Telegraph Avenue.* The distance of the Project site property line to the centerline of Telegraph Avenue ranges from approximately 45 to 50 feet. The 70 CNEL is estimated to encroach into the Project site a maximum of 17 feet. The 65 CNEL is estimated to encroach between 87 and 41 feet (depending on exact location) into the Project site. As a result, noise levels within portions of the Project site adjacent to Telegraph Avenue will be as high as 72 dBA, which falls within the *Normally Unacceptable* range for multi-family residential and the Conditionally Acceptable range for commercial uses.
- *21st Street.* Traffic volumes were not modeled for 21st Street, but the volumes are estimated to result in an ADT of less than 5,000. Based on this estimation and comparison with other similar streets, the noise levels within portions of the Project site adjacent to 21st Street are estimated to be as high as between 60 and 65 dBA, which fall within the *Normally Acceptable* range for multi-family residential and commercial uses.
- *Thomas L. Berkley Way (20th Street)*. The distance of the Project site property line to the centerline of Thomas L. Berkley Way (20th Street) is approximately 40 feet. The 70 CNEL is estimated to be less than 50 feet from the street centerline and the 65 CNEL is estimated to be 63 feet from the centerline. As a result, noise levels within portions of the Project site adjacent to Thomas L. Berkley Way (20th Street) will be as high as 68 dBA, which falls within the *Conditionally Acceptable* range for multi-family residential uses and the *Normally Acceptable* range for commercial and neighborhood park uses.
- *William Street*. The distance of the Project site property line to the centerline of William Street is approximately 25 feet. The 65 CNEL is estimated to be less than 50 feet from the street centerline and the 60 CNEL is estimated to be 69 feet from the centerline. As a result, noise levels within portions of the Project site adjacent to William Street will be as high as 68 dBA, which falls within the *Conditionally Acceptable* range for multi-family residential uses and the *Normally Acceptable* range for commercial and neighborhood park uses.
- *19th Street.* The distance of the Project site property line to the centerline of 19th Street is approximately 30 feet. The 70 CNEL is estimated to be less than 50 feet from the street centerline and the 65 CNEL is estimated to be 56 feet from the centerline. As a result, noise levels within portions of the Project site adjacent to 19th Street will be as high as 69 dBA, which falls within the *Conditionally Acceptable* range for multi-family residential uses and the *Normally Acceptable* range for commercial uses.
- *18th Street.* Noise levels on portions of the site adjacent to 18th Street are not expected to exceed 65 dBA, which falls within the *Normally Conditional* range for multi-family residential and commercial uses.

Standard residential construction in northern California would provide 25 dBA exterior-to-interior noise reduction with windows closed and ensure that interior noise levels within most of the buildings would be reduced to 45 dBA. However, buildings that front onto Telegraph Avenue could be exposed to noise levels as high as 72 dBA. Building façade upgrades will be necessary for these buildings to meet the 45 dBA interior noise standard. Additionally, to ensure that windows can remain closed for prolonged periods of time, an air-conditioning system will be required in all buildings.

The State's Land Use Compatibility Guidelines are used as the bases for determining acceptable noise levels for exterior uses. Noise levels below 65 dBA are considered *Normally Acceptable* for multi-

family residential uses and levels below 70 dBA are considered *Normally Acceptable* for commercial and playgrounds or neighborhood parks. Outdoor use areas that may be developed as part of the Uptown Project include patios, balconies and common use areas (e.g., BBQ area, playground, recreation area) associated with the residential units, the neighborhood park, and outdoor eating areas. Outdoor residential use areas that may be included in the final Project design adjacent to any of the street frontages other than 21st or 18th Streets could be exposed to traffic noise levels that exceed 65 dBA and the *Normally Acceptable* range for residential exterior uses. Sound barriers such as walls or berms at an effective height of 6 feet or plexiglass at a height of 5 feet (i.e., to shield balconies and or outdoor patio areas) would provide 5dBA or more in noise reduction for outdoor use areas.

Implementation of the following mitigation measure would ensure that conditionally acceptable noise levels are achieved:

> Mitigation Measure NOISE-2: Once the project design is finalized and the location of specific uses are determined, the project applicant shall have an acoustical analysis prepared that details noise reduction requirements and noise insulation features necessary to achieve acceptable interior and exterior noise levels. The requirements shall be sufficient to achieve a minimum of 45 dBA for all interior building spaces and shall achieve either Normally Acceptable or Conditionally Acceptable ranges for exterior uses according to the applicable land use category as set forth in Table IV.F-4.
>
> Measures to reduce the interior noise levels may include:
>
> - To meet the City's 45 dBA CNEL interior noise standard, building facade upgrades will be required for building located along Telegraph Avenue. All windows facing Telegraph Avenue must have a sound transmission class (STC) of 31 or greater.
> - All of the proposed buildings on the project site shall be designed and constructed with ventilation systems, to achieve the indoor fresh-air ventilation requirements specified in Chapter 35 of the Uniform Building Code, to achieve the 45 dBA CNEL interior noise standard.
>
> Measures to reduce the exterior noise levels may include:
>
> - The inclusion of plexiglass enclosures for outdoor patio and balcony areas at a height of 5 feet (i.e., to shield balconies and or outdoor patio areas) would provide 5dBA or more in noise reduction for outdoor use areas.
>
> Implementation of the above mitigation measure would reduce this impact to a less-than-significant level by achieving, at a minimum, *Conditionally Acceptable* noise levels. (LTS)

Table IV.F-8: 2025 Baseline Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (Feet)	Centerline to 65 CNEL (Feet)	Centerline to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outermost Lane
Martin Luther King Jr. Way					
North of 18th Street	5,460	< 50[a]	< 50	109	62.8
Between 18th Street and 17th Street	5,395	< 50	< 50	109	62.7
San Pablo Avenue					
Grand Avenue and TLB Way (20th Street)[b]	14,960	< 50	100	210	67.1
Between TLB Way (20th Street) and William Street	7,835	< 50	68	138	64.3
Between William Street and 19th Street	9,150	< 50	74	153	65.0
Between 19th Street and 18th Street	7,230	< 50	64	131	64.0
Between 18th Street and 17th Street	7,555	< 50	66	135	64.2
Telegraph Avenue					
Between Grand Ave and TLB Way (20th Street)	21,125	62	125	264	68.6
Between TLB Way (20th Street) and William Street	18,205	57	113	239	68.0
Between William Street and 19th Street	15,570	< 50	102	214	67.3
Between 19th Street and 18th Street	10,910	< 50	82	171	65.8
Between 18th Street and 17th Street	11,445	< 50	85	177	66.0
Broadway					
South of Grand Ave	21,490	62	126	267	68.7
North of TLB Way (20th Street)	13,220	< 50	93	194	66.6
Between TLB Way (20th Street) and 19th Street	14,310	< 50	97	204	66.9
Between 19th Street and 17th Street	14,315	< 50	97	204	66.9
Grand Avenue					
Between San Pablo Ave and Northgate Ave	24,715	67	138	293	69.3
Between Northgate Ave and Telegraph Ave	24,340	67	136	290	69.2
Between Telegraph Ave and Broadway	21,650	62	126	269	68.7
Thomas L. Berkly Way (20th Street)					
Between San Pablo Ave and Telegraph Ave	5,015	< 50	< 50	104	62.4
Between Telegraph Ave and Broadway	6,725	< 50	62	125	63.7
William Street					
Between San Pablo Ave and Telegraph Ave	3,575	< 50	< 50	54	59.7
19th Street					
Between San Pablo Ave and Telegraph Ave	10,925	< 50	53	113	64.6
Between Telegraph Ave and Broadway	14,230	< 50	63	134	65.7
18th Street					
Between Martin Luther King Jr. Way and San Pablo Ave	6,220	< 50	< 50	77	62.1

Table IV.F-8 *continued*

Roadway Segment	ADT	Centerline to 70 CNEL (Feet)	Centerline to 65 CNEL (Feet)	Centerline to 60 CNEL (Feet)	CNEL (dBA) 50 Feet from Outermost Lane
Between San Pablo Ave and Telegraph Ave	1,955	< 50	< 50	< 50	57.1
17th Street					
Between Martin Luther King Jr. Way and Jefferson Street	6,370	< 50	< 50	79	61.7
Between Jefferson Street and San Pablo Ave	8,555	< 50	< 50	96	62.9
Between San Pablo Ave and Telegraph Ave	10,645	< 50	53	111	63.9
Between Telegraph Ave and Broadway	9,560	< 50	< 50	104	63.4

[a] Traffic noise within 50 feet of roadway centerline requires site specific analysis.
[b] TLB Way = Thomas L. Berkley Way.

Source: LSA Associates, Inc., August 2003.

Impact NOISE-3: Long-term stationary noise sources on the Project site could potentially generate noise levels in excess of the thresholds set in Section 17.120.050 of the City's Planning Code. (S)

As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Geometric spreading causes the sound level to attenuate, resulting in a six-decibel reduction in the noise level for each doubling of distance from a single point source of noise to the noise receptor.

Mechanical equipment and other on-site sources (e.g., air-conditioning or other mechanical ventilation equipment, delivery loading docks or areas, emergency generators, etc.) from the proposed retail and residential uses could generate noise that would exceed the City's noise standards.

To prevent noise impacts on adjacent land uses, loading docks or loading areas and noise-generating equipment associated with the proposed uses should be located as far as practical from all existing and planned residential properties.

Mitigation Measure NOISE-3: The following measures are required for the operations of the proposed Project:

- All on-site stationary noise sources shall comply with the standards listed in Section 17.120.050 of the City's Planning Code; and
- Loading docks or loading areas and noise-generating equipment associated with the retail uses will be located as far as practical from all existing and planned residential properties.

Implementation of the above mitigation measure would reduce the impact to below a level of significance. (LTS)

Table IV.F-9: 2025 Plus Project Traffic Noise Levels

Roadway Segment	ADT	Center-line to 70 CNEL (Feet)	Center-line to 65 CNEL (Feet)	Center-line to 60 CNEL (Feet)	CNEL (dBA) 50 Feet From Outermost Lane	Change From No Project Level (dBA)
Martin Luther King Jr. Way						
North of 18th Street	5,460	< 50[a]	< 50	109	62.8	0.0
Between 18th Street and 17th Street	5,265	< 50	< 50	107	62.6	-0.1
San Pablo Avenue						
Grand Avenue and TLB Way (20th Street)[b]	17,620	< 50	109	231	67.7	0.6
Between TLB Way (20th Street) and William Street	9,655	< 50	76	158	65.2	0.9
Between William Street and 19th Street	10,410	< 50	80	166	65.6	0.6
Between 19th Street and 18th Street	8,700	< 50	72	148	64.8	0.8
Between 18th Street and 17th Street	8,740	< 50	72	148	64.8	0.6
Telegraph Avenue						
Between Grand Ave and TLB Way (20th Street)	24,370	67	137	290	69.3	0.7
Between TLB Way (20th Street)and William Street	21,040	61	124	263	68.6	0.6
Between William Street and 19th Street	17,570	56	111	234	67.8	0.5
Between 19th Street and 18th Street	12,205	< 50	88	184	66.3	0.5
Between 18th Street and 17th Street	12,815	< 50	91	190	66.5	0.5
Broadway						
South of Grand Ave	21,750	63	127	269	68.8	0.1
North of TLB Way (20th Street)	13,470	< 50	94	196	66.7	0.1
Between TLB Way (20th Street) and 19th Street	14,775	< 50	99	209	67.1	0.2
Between 19th Street and 17th Street	14,315	< 50	97	204	66.9	0.0
Grand Avenue						
Between San Pablo Ave and Northgate Ave	25,440	69	140	299	69.4	0.1
Between Northgate Ave and Telegraph Ave	20,950	61	124	263	68.6	-0.6
Between Telegraph Ave and Broadway	23,540	66	133	284	69.1	0.4
Thomas L. Berkly Way (20th Street)						
Between San Pablo Ave and Telegraph Ave	6,960	< 50	63	128	63.8	1.4
Between Telegraph Ave and Broadway	7,420	< 50	65	133	64.1	0.4
William Street						
Between San Pablo Ave and Telegraph Ave	5,185	< 50	< 50	69	61.3	1.6
19th Street						
Between San Pablo Ave and Telegraph Ave	11,875	< 50	56	119	64.9	0.3
Between Telegraph Ave and Broadway	14,945	< 50	65	139	65.9	0.2

Table IV.F-9 *continued*

Roadway Segment	ADT	Center-line to 70 CNEL (Feet)	Center-line to 65 CNEL (Feet)	Center-line to 60 CNEL (Feet)	CNEL (dBA) 50 Feet From Outermost Lane	Change From No Project Level (dBA)
18th Street						
Between Martin Luther King Jr. Way and San Pablo Ave	6,535	< 50	< 50	80	62.4	0.3
Between San Pablo Ave and Telegraph Ave	2,510	< 50	< 50	< 50	58.2	1.1
17th Street						
Between Martin Luther King Jr. Way and Jefferson Street	7,540	< 50	< 50	89	62.4	0.7
Between Jefferson Street and San Pablo Ave	9,840	< 50	< 50	105	63.5	0.6
Between San Pablo Ave and Telegraph Ave	11,040	< 50	54	114	64.0	0.1
Between Telegraph Ave and Broadway	9,910	< 50	< 50	106	63.6	0.2

[a] Traffic noise within 50 feet of roadway centerline requires site specific analysis.
[b] TLB Way = Thomas L. Berkley Way.

Source: LSA Associates, Inc., August 2003.