D. Noise

This section describes the existing noise environment and the potential impacts associated with the implementation of the Kaiser Permanente OMC Project, and appropriate standard conditions of approval are identified, as necessary. It analyzes potential noise impacts caused both during the construction and operational phases of the proposed project on the ambient noise environment. Projected increases in the noise levels in the project vicinity can be expected from additional traffic and parking structures, expansion of various mechanical systems used at the medical facility, and construction operations. The incremental change in noise levels experienced by the receptors in the project vicinity is evaluated against standards in the City's Noise Element and Noise Ordinance to determine whether changes in the ambient noise environment would be significant.

Background information on environmental acoustics, including definitions of terms commonly used in noise analysis, is provided below.

Setting

Technical Background

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise is defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. Sound pressure level is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies instead of the frequency mid-range. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA).[1] Frequency A-weighting

[1] All noise levels reported herein reflect A-weighted decibels unless otherwise stated.

follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements.

Noise Exposure and Community Noise

An individual's noise exposure is a measure of the noise experienced by the individual over a period of time. A noise level is a measure of noise at a given instant in time. However, noise levels rarely persist consistently over a long period of time. Rather, community noise varies continuously with time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.

These successive additions of sound to the community noise environment varies the community noise level from instant to instant requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq}: The equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The L_{eq} is the constant sound level, which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

L_{max}: The instantaneous maximum noise level measured during the measurement period of interest.

L_{min}: The instantaneous minimum noise level measured during the measurement period of interest.

L_x: The sound level that is equaled or exceeded x percent of a specified time period. The L_{50} represents the median sound level.

DNL: The energy average of the A-weighted sound levels occurring during a 24-hour period, and which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises.

CNEL: Similar to the DNL, the Community Noise Equivalent Level (CNEL) adds a 5-dBA "penalty" for the evening hours between 7:00 p.m. and 10:00 p.m. in addition to a 10-dBA penalty between the hours of 10:00 p.m. and 7:00 a.m.

Effects of Noise on People

The effects of noise on people can be placed into three categories:

- Subjective effects of annoyance, nuisance, dissatisfaction;
- Interference with activities such as speech, sleep, learning; and
- Physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants generally experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation exists in the individual thresholds of annoyance, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion; hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate of 6 to 7.5 dBA per doubling of distance from the source, depending on the topography of the area and environmental conditions (i.e., atmospheric conditions and noise barriers, either vegetative or manufactured, etc.). Widely distributed noise, such as a large industrial facility spread over many acres or a street with moving vehicles, would typically attenuate at a lower rate, approximately 4 to 6 dBA.

Noise Sources and Levels

Transportation sources, such as automobiles, trucks, trains, and aircraft, are the principal sources of noise in the urban environment. Along major transportation corridors, noise levels can reach 80 DNL, while along arterial streets, noise levels typically range from 65 to 70 DNL. Industrial and commercial equipment and operations also contribute to the ambient noise environment in their vicinities.

Primary noise sources in the project site vicinity include traffic on the elevated portion of I-580 located to the south of the project site, traffic on the roadway network surrounding the project site, as well as noise from the existing hospital. Noise from activities associated with the retail, commercial and business establishments in the area would be secondary.

To provide the basis for evaluating potential impacts of the project on the nearest noise-sensitive uses, ESA undertook noise measurements on the project site. Five (5) short-term (15-minute) measurements were taken on a weekday at different locations in the vicinity of the project site during the afternoon peak hour. The monitoring locations and the measured peak hour L_{eq} at the locations are listed in **Table IV.D-1**.

TABLE IV.D-1
EXISTING NOISE LEVELS AT THE PROJECT SITE (DBA)

	L_{eq}	Location
ST-1	72	At the mortuary along Piedmont Avenue
ST-2	68.1	At the northeastern boundary of Mosswood Park near the intersection of Broadway and West MacArthur Boulevard
ST-3	65.3	At the residences along Manila Avenue across the street from the proposed new outpatient services building
ST-4	71.5	At the intersection of West MacArthur Boulevard and Piedmont Avenue at the Piedmont Apartments
ST-5	67.6	At the intersection of Piedmont and Rio Vista Avenues

SOURCE: Environmental Science Associates, 2005.

Sensitive Receptors

Human response to noise varies considerably from one individual to another. Effects of noise at various levels can include interference with sleep, concentration, and communication; physiological and psychological stress; and hearing loss. Given these effects, some land uses are considered more sensitive to ambient noise levels than others. In general, residences, schools, hotels, hospitals, and nursing homes are considered to be the most sensitive to noise. Commercial and industrial uses are considered the least noise-sensitive.

A variety of commercial, retail, civic, and residential uses surround the project site. Sensitive uses along Piedmont Avenue include primarily residential uses and a mortuary located to the east of

the project site. East of Piedmont Avenue, along its length, are residential neighborhoods comprised of multifamily and single-family residences. MacArthur Boulevard to the east also primarily contains one-two-unit residences and varied commercial uses including a child care center. The uses to the south of the project site are mainly commercial.

Directly west (and south, generally) of the project site is the 11-acre Mosswood Park, a community park that provides open green space area and recreational facilities at the southwest corner of Broadway and West MacArthur Boulevard. Further west of the project site (north and south of West MacArthur Boulevard) are residential neighborhoods. A number of single-family residences abut the existing medical center along the west.

Uses north of the project site include residential neighborhoods of primarily one- and two-unit residences with low-rise apartment buildings in dense development pattern. A number of single-family residences abut the existing medical center along the north (generally 38th Street). This area also contains a variety of commercial services, medical offices, retail, and service uses.

Regulatory Framework

Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies. Local regulation of noise involves implementation of general plan policies and noise ordinance standards. Local general plans identify general principles intended to guide and influence development plans; local noise ordinances establish standards and procedures for addressing specific noise sources and activities. Noise issues relevant to the proposed project are addressed in Title 24 of the *California Code of Regulations*, City of Oakland General Plan policies and the Oakland noise ordinance standards.

State of California

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 collectively known as the California Noise Insulation Standards and are found in *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 sources, the noise insulation standards set forth an interior standard of DNL 45 dBA in any habitable room and, where such units are proposed in areas subject to noise levels greater than DNL 60 dBA, require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard. If the interior noise level depends upon windows being closed, the design for the structure must also specify a ventilation or air-conditioning system to provide a habitable interior environment. Title 24 standards are enforced through the building permit application process in Oakland, as in most jurisdictions.

City of Oakland

The Noise Element of the Oakland General Plan contains guidelines for determining the compatibility of various land uses with different noise environments (City of Oakland, 2005). The Noise Element recognizes that some land uses are more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. The City uses state noise guidelines for judging the compatibility between various land uses and their noise environments (City of Oakland, 2005). For institutional uses such as hospitals, nursing homes, schools, libraries and churches, the guidelines indicate that a noise environment of DNL 60 dBA or less is "normally acceptable," while a noise environment between DNL 60 and 70 dBA is considered "conditionally acceptable" and DNL 70 to 80 dBA is "normally unacceptable." Noise environments of DNL greater than 80 dBA are considered "clearly unacceptable" for such uses. For commercial, business and office uses, which are generally less noise-sensitive, a noise environment of DNL 65 dBA or less is considered normally acceptable, while a noise environment between DNL 65 and 75 dBA is considered conditionally acceptable.

In this context, "normally acceptable" is defined as satisfactory for the specific land use, assuming that normal conventional construction is used in buildings. "Conditionally acceptable" means that 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 conditioning, will normally suffice. "Normally unacceptable" means that 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.

The Noise Element also identifies the following are the maximum interior noise levels generally considered acceptable for various common land uses:

- 45 dB: residential, hotels, motels, transient lodging, institutional (churches, hospitals, classrooms, libraries), movie theaters;
- 50 dB: professional offices, research and development, auditoria, meeting halls;
- 55 dB: retail, banks, restaurants, sports clubs; and
- 65 dB: manufacturing, warehousing.

The City of Oakland also regulates noise through enforcement of the noise ordinance, which is found in Section 17.120 of the Oakland Planning Code. The noise ordinance regulates only operational noise from stationary sources as cities and counties do not have regulatory authority over noise from mobile sources (transportation noise). Transportation noise is regulated at the state and federal level by noise limits placed on vehicle manufacturers. **Table IV.D-3** presents maximum allowable receiving noise standards applicable to long-term exposure for residential and civic land uses. The noise ordinance states that if the measured ambient noise level exceeds

the applicable noise level standard in any category, then the stated applicable noise level shall be adjusted so as to equal the ambient noise level. **Table IV.D-3** presents noise level standards that apply to temporary exposure to short- and long-term construction noise. In this context, short-term refers to construction activity lasting less than 10 days while long-term refers to construction activities lasting greater than 10 days.

TABLE IV.D-2
MAXIMUM ALLOWABLE RECEIVING NOISE STANDARDS FOR SPECIFIED LAND USES, DBA

Receiving Land Use	Cumulative Number of Minutes in One-Hour Time Period[a]	Maximum Allowable Noise Level Standards (dBA) Daytime 7:00 a.m. to 10:00 p.m.	Nighttime 10:00 p.m. to 7:00 a.m.
Residential, School, Child Care, Health Care, or Nursing Home, and Public Open Space	20	60	45
	10	65	50
	5	70	55
	1	75	60
	0	80	65
		Anytime	
Commercial	20	65	
	10	70	
	5	75	
	1	80	
	0	85	
		Anytime	
Manufacturing, Mining, and Quarrying	20	70	
	10	75	
	5	80	
	1	85	
	0	90	

[a] The concept of "20 minutes in an hour" is equivalent to the $L_{33.3}$, which is a noise descriptor identifying the noise level exceeded one-third (33.3 percent) of the time. Likewise, "10 minutes in an hour," "5 minutes in an hour," and "1 minute in an hour" are equivalent to the $L_{16.7}$, $L_{8.3}$, and $L_{1.7}$, respectively. L_{max}, or maximum noise level, represents the standard defined in terms of "0 minutes in an hour."

SOURCE: Oakland Noise Ordinance No. 11895, 1996

TABLE IV.D-3
MAXIMUM ALLOWABLE RECEIVING NOISE STANDARDS FOR TEMPORARY CONSTRUCTION OR DEMOLITION ACTIVITIES, DBA

Operation/Receiving Land Use	Daily 7:00 a.m. to 7:00 p.m.	Weekends 9:00 a.m. to 8:00 p.m.
Short-Term Operation (less than 10 days)		
Residential	80	65
Commercial, Industrial	85	70
Long-Term Operation (more than 10 days)		
Residential	65	55
Commercial, Industrial	70	60

SOURCE: Oakland Noise Ordinance No. 11895, 1996

Alameda County Airport Land Use Commission and the Federal Aviation Administration

The Alameda County Airport Land Use Plan (ALUP) developed by the Airport Land Use Commission of Alameda County has adopted Noise Impact Zones for the Oakland International Airport. Noise Impact Zones are areas where exposure to aircraft noise would be above the levels acceptable per the state noise guidelines for judging the land use compatibility of a site. Noise Impact Zones ensure that new development in the vicinity of an airport would not be incompatible with existing and projected noise from airport operations. The project site would be located outside the 65-dBA contour for the Oakland International Airport. Hence the site would not be located within the Noise Impact Zone for the Airport.

Impacts and Mitigation Measures

Significance Criteria

The City of Oakland considers a project to 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 regarding operational noise (Oakland Planning Code Section 17.120.050 shown in **Table IV.D-2**);
- Violate the City of Oakland Noise Ordinance (shown in **Table IV.D-3**) regarding construction noise, except if an acoustical analysis is performed and all feasible mitigation measures imposed, including the standard City of Oakland measures adopted by the Oakland City Council on January 16, 2001;
- Violate the City of Oakland Noise Ordinance (Oakland Municipal 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 DNL or CNEL greater than 45 dBA for multi-family dwellings, hotels, motels, dormitories and long-term care facilities (and 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 DNL 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 for all specified land uses for determination of acceptability of noise (State of California, Governor's Office of Planning and Research, General Plan Guidelines, 2003);

- Be located within an airport land use plan 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.

Noise from project-related traffic would not be regulated by the local general plan and noise ordinance. Therefore, the significance of increase in noise levels due to project traffic has been evaluated based on the seventh criterion listed above. For long-term operational impacts, such as mechanical noise from stationary sources, Oakland Noise Ordinance standards, as presented in **Table IV.D-2** would apply to the proposed project. Therefore, based on the first and second criteria listed above, operational noise from stationary sources that would exceed the values presented in **Table IV.D-2** would result in a significant impact to the noise environment. The significance of temporary increases in ambient noise levels is evaluated based on the third and fourth criteria listed above. For land use compatibility impacts (noise impacts of the environment on the proposed project occupants), the land use compatibility categories published in the State of California General Plan Guidelines referenced in the eighth significance criterion listed above would apply to the proposed project.

The project site is not located within an airport land use plan or in the vicinity of a private airstrip. Therefore, there would be no impacts associated with these criteria.

Noise Impacts

Construction Noise

Impact D.1: Construction activities would intermittently and temporarily generate noise levels above existing ambient levels in the project vicinity. (Significant)

The project would involve the construction of approximately 1.78 msf of total building area of the new OMC on an approximately 20.6-acre site. Many existing structures would be demolished to make way for new construction (see Chapter III, Project Description). The new medical center campus would be developed in three phases over a period of approximately 14 years, from year 2006 to year 2020 (buildout). The medical center would continue to provide uninterrupted medical service on site during implementation of the project.

During the construction period, a wide variety of construction and demolition equipment would be used, and material would be transported to and from the site by truck. These activities would intermittently and temporarily increase ambient noise levels in the project vicinity over the duration of construction. Construction-related noise levels at and near locations on the project site would fluctuate depending on the particular type, number, and duration of use of various pieces of construction equipment. The effect of construction noise would depend upon the level of construction activity on a given day and the related noise generated by that activity, the distance between construction activities and the nearest noise-sensitive uses, and the existing noise levels at those uses.

Table IV.D-4 shows typical noise levels generated by construction of commercial buildings. **Table IV.D-6** shows noise levels generated by individual construction equipment. As shown in **Table IV.D-4**, the noisiest phase of construction would be during pile driving which could generate noise levels of approximately 90-105 L_{eq} at 50 feet. Drilling is an alternate method of pile installation where a hole is drilled into the ground up to the required elevations and concrete is then cast into it. Based on preliminary soil studies conducted for the project site, it has been determined that drilling is a viable method for installation of piles at the site. Pile drilling generally produces noise levels approximately 10-15 dBA lower than pile driving. **Table IV.D-5** provides details on the locations, number and duration of pile driving. Excavation and exterior finishing may also generate a substantial amount of noise. The main noise sources associated with excavation are the operation of excavators removing material and trucks hauling excavated materials away. The main noise sources associated with exterior finishing would be operation of concrete mixers and pumps for application of stucco material to the building exterior.

TABLE IV.D-4
TYPICAL COMMERCIAL CONSTRUCTION NOISE LEVELS

Phase	Noise Level (L_{eq})[a]
Ground Clearing	84
Excavation	89
Foundations	78
Erection	85
Exterior Finishing	89
Pile Drilling	80-95
Pile Driving	90-105

[a] Estimates correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase and 200 feet from the other equipment associated with that phase.

SOURCE: U.S. Environmental Protection Agency, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, December 1971.

TABLE IV.D-5
PROPOSED PILE INSTALLATION AT THE PROJECT SITE

Location	Expected Number & Size of piles to be installed	Method of Installation	Expected Duration of Pile Installation[a]
Honda MOB Site	25 piers - approximately 3' diameter and 10 to 70 feet long	Drilling	8 working days
Main Hospital	850-1000 piers - approximately 3' to 4' diameter and average length of 70 feet	Drilling	6 – 8 months[b]
Central Utility Plant	30-50 piers - 3' diameter and average length of 70 feet	Drilling	12 working days

[a] Durations will be refined when a structural soils report is available and structural design is further developed.
[b] Double shift may be required in order to meet the schedule

SOURCE: Kaiser Permanente, 2005.

TABLE IV.D-6

Equipment	Noise Level (dBA) Leq @ 50 Feet
Earthmoving:	
Front Loader	79
Backhoe	85
Dozer	80
Tractor	80
Scraper	88
Grader	85
Paver	89
Materials Handling:	
Concrete Mixer	85
Concrete Pump	82
Crane	83
Stationary:	
Pump	76
Generator	78
Impact:	
Drilled Piles	75
Pile Driver	101
Jack Hammer	88
Rock Drill	98
Pneumatic Tools	86
Other:	
Saw	78
Vibrator	76

TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVELS

SOURCE: U.S. Environmental Protection Agency (1971); Charles M. Salter Associates, 2006.

Noise from construction activity generally attenuates (decreases) at a rate of 6 to 7.5 dBA per doubling of distance. Construction associated with the project could take place as close as 100 feet from the nearest existing sensitive receptors along Manila Avenue, Piedmont Avenue, and West MacArthur Boulevard. Conservatively assuming an attenuation of 6 dBA per doubling of distance, unattenuated construction noise levels could be as high as 80 to 95 dBA, Leq at these receptors. Average noise levels at these receptors would vary by phase depending on the equipment used and the duration of the phase. During demolition phases, it could be expected that jackhammers, front loaders, and trucks would be the major noise sources. During excavation, bulldozers, front loaders and trucks would be expected to be the major noise sources. During foundation and building construction, concrete mixers, concrete pumps, cranes, generators, pumps, and other power tools are expected to be used. Truck movements for material delivery and hauling would also lead to an increase in roadside noise levels over the construction period.

At noise levels above 85 dBA, normal conversation is extremely difficult. Other noise-sensitive uses located within approximately 1,600 feet of pile-driving activity could also be substantially affected, depending on the presence of intervening barriers or other insulating materials. Intermittent noises such as pile-driving noise are more disturbing to many people than typical construction noise. During excavation and exterior finishing, noise levels at these residences could be as high as 79 dBA, Leq. These predicted noise levels would exceed the standards of the Oakland Noise Ordinance, which states that, for residential receptors, the maximum allowable receiving noise for weekday (Monday through Friday, 7:00 a.m. to 7:00 p.m.) construction activity of greater than 10 days duration is 65 dBA. For construction activity of 10 days or less, the residential receiving standard is 80 dBA. Consequently, the noisiest phases of construction would have the potential to exceed the construction noise standard of the City of Oakland's Noise Ordinance. Therefore, without mitigation, this impact, though temporary, would be considered significant. As construction activities would be likely to occur during daytime hours, construction noise would also be disruptive to local businesses. This analysis focuses on impacts to nearest residential and commercial uses that are sensitive to noise.

As would be required for all construction projects in Oakland, the project applicant will be required to implement and comply with the following uniformly-applied City Standard Conditions of Approval throughout the duration of construction activity:

> **Standard Condition D.1a: The project sponsor shall require construction contractors to limit standard construction activities as required by the City Building Department. Such activities are generally limited to between 7:00 a.m. and 7:00 p.m. Monday through Friday, with pile driving and/or other extreme noise generating activities greater than 90 dBA limited to between 8:00 a.m. and 4:00 p.m. Monday through Friday. No construction activities shall be allowed on weekends until after the building is enclosed, without prior authorization of the Building Services Division, and no extreme noise generating activities shall be allowed on weekends and holidays.**
>
> **Standard Condition D.1b: To reduce daytime noise impacts due to construction, the project sponsor shall require construction contractors to implement the following measures:**

- **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 from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible.**

- **Stationary noise sources shall be located as far from adjacent receptors as possible, and they shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or other measures to the extent feasible.**

- **If feasible, the noisiest phases of construction (such as pile driving) shall be limited to less than 10 days at a time to comply with the local noise ordinance.**

Standard Condition D.1c: To further mitigate potential pier drilling, 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. Prior to commencing construction, a plan for such measures shall be submitted for review and approval by the City to ensure that maximum feasible noise attenuation will be achieved. These attenuation measures shall include as many of the following control strategies as feasible:

- **Erect temporary plywood noise barriers around the construction site, particularly along on sites adjacent to residential buildings;**

- **Implement "quiet" pile driving technology (such as pre-drilling of piles, the use of more than one pile driver to shorten the total pile driving duration), where feasible, in consideration of geotechnical and structural requirements and conditions;**

- **Utilize noise control blankets on the building structure as the building 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.**

Standard Condition D.1d: Prior to the issuance of each building permit, along with the submission of construction documents, the project sponsor shall submit to the City Building Department a list of measures to respond to and track complaints pertaining to construction noise. These measures shall include:

- **A procedure for notifying the City Building Division staff and Oakland Police Department;**
- **A plan for posting signs on-site pertaining to permitted construction days and hours and complaint procedures and who to notify in the event of a problem;**
- **A listing of telephone numbers (during regular construction hours and off-hours);**
- **The designation of an on-site construction complaint manager for the project;**
- **Notification of neighbors within 300 feet of the project construction area at least 30 days in advance of pile-driving activities about the estimated duration of the activity; and**
- **A preconstruction meeting shall be held with the job inspectors and the general contractor/on-site project manager to confirm that noise mitigation and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed.**

Based on the significance criteria used by the City of Oakland, compliance with the Noise Ordinance is achieved if the above measures are implemented. Given the proximity of noise-sensitive receptors to the proposed construction areas, and the anticipated duration of project construction on all sites, additional detail is provided in **Table IV.D-7** regarding when and what type of construction activities will occur and for how long, the type of noise-sensitive receptors (i.e., residences, hospital, motel, etc.), and identifies the following specific recommended measures for areas where noisy construction would occur near these receptors:

Standard Condition D.1.e: Consistent with Standard Condition D.1b and D.1c and prior to the issuance of each building permit, the project sponsor shall install a sound-rated fence/barrier along the project site property line located closest to any noise-sensitive receiver(s), to the extent feasible.

Standard Condition D.1f: Consistent with Standard Condition D.1b and D.1c and throughout all noise-generating construction activities, the project application shall locate removal areas for demolition debris as far as possible from noise-sensitive receptors.

Standard Conditions D.1d and D.1e are consistent with the standard conditions required by the City's Noise Ordinance (specifically Standard Conditions D.1b and D.1c, which address measures to reduce noise levels near residences, inducing the installation of temporary noise barriers), and would be implemented in addition to those conditions required by the ordinance and all other conditions identified to address Impact D.1 (construction noise).

TABLE IV.D-7

CONSTRUCTION ACTIVITY SCHEDULE AND ANTICIPATED NOISE ANALYSIS

Sub-Phase	Activities	Time in Months	Receptor(s)	Proposed Standard Conditions
PHASE 1				
WEST BROADWAY MSB (PHASE 1)				
Mobilization	Build sound-rated fence: handheld tools, movement of materials such as saws, drills, fencing materials	1.5	Motel Nearest residence on Manila Ave.	-
Abatement / Demolition of Buildings	Demo and removal of existing buildings	1.0	Motel Nearest residence on Manila Ave.	Install sound-rated fence/barrier along the property line closest to receiver(s), to the extent feasible. (Standard Condition D.1e)Locate construction / demolition debris removal area as far as possible from receivers. (Standard Condition D.1e)
Excavation / Grading	Site grading using bulldozers, backhoes, excavators, and dump trucks.	2.5	Motel Nearest residence on Manila Ave.	Same as above (Standard Condition D.1e and D.1f)
Foundation and Basement Walls	Concrete pumps and the drilling of piers	3.5	Motel Nearest residence on Manila Ave.	Same as above (Standard Condition D.1e and D.1f)
Superstructure/Building Enclosure	Structural steel erection, exterior framing, and plaster installation	6.5	Motel Nearest residence on Manila Ave.	Same as above (Standard Condition D.1e and D.1f)
Finish Work	(Handheld tools)	6	Motel Nearest residence on Manila Ave.	Same as above (Standard Condition D.1e and D.1f)
Site Work	Site preparation, paving, and concrete work	5	Motel Nearest residence on Manila Ave.	Same as above (Standard Condition D.1e and D.1f)
WEST BROADWAY PARKING GARAGE (PHASE 1)				
Mobilization	Build sound-rated fence: handheld tools,	1.5	Nearest residence on	-

TABLE IV.D-7

CONSTRUCTION ACTIVITY SCHEDULE AND ANTICIPATED NOISE ANALYSIS

Sub-Phase	Activities	Time in Months	Receptor(s)	Proposed Standard Conditions
	movement of materials such as saws, drills, fencing materials		Manila Ave.	
Abatement / Demolition of Buildings	Demo and removal of existing buildings	0.5	Nearest residence on Manila Ave.	Same as above (Standard Condition D.1e and D.1f)
Excavation / Grading	Site grading using bulldozers, backhoes, excavators, and dump trucks.	3.5	Nearest residence on Manila Ave.	Same as above (Standard Condition D.1e and D.1f)
Foundation and Basement Walls	Concrete pumps and the drilling of piers	3.5	Nearest residence on Manila Ave.	Same as above (Standard Condition D.1e and D.1f)
Superstructure/Building Enclosure	Structural steel erection, exterior framing, and plaster installation	5	Nearest residence on Manila Ave.	Same as above (Standard Condition D.1e and D.1f)
Finish Work	(Handheld tools)	3	Nearest residence on Manila Ave.	Same as above (Standard Condition D.1e and D.1f)
Site Work	Site preparation, paving, and concrete work	5	Nearest residence on Manila Ave.	Same as above (Standard Condition D.1e and D.1f)
PHASE 2				
REPLACEMENT HOSPITAL (PHASE 2)				
Mobilization	Build sound-rated fence: handheld tools, movement of materials such as saws, drills, fencing materials	3.5	Apartment complex/Businesses	-
Abatement / Demolition of Buildings	Demo and removal of existing buildings	6	Apartment complex/Businesses	Same as above (Standard Condition D.1e and D.1f)
Excavation / Grading	Site grading using bulldozers, backhoes, excavators, and dump trucks.	4	Apartment complex/Businesses	Same as above (Standard Condition D.1e and D.1f)
Foundation and Basement Walls	Concrete pumps and the drilling of piers	6 to 8	Apartment complex/Businesses	Same as above (Standard Condition D.1e and D.1f)
Superstructure/Building Enclosure	Structural steel erection, exterior framing, and plaster installation	21	Apartment complex/Businesses	Same as above (Standard Condition D.1e and D.1f)
Finish Work	(Handheld tools)	40	Apartment complex/Businesses	Same as above (Standard Condition D.1e and D.1f)
Site Work	Site preparation, paving, and concrete work	10	Apartment complex/ Businesses Businesses	Same as above (Standard Condition D.1e and D.1f)
CENTRAL UTILITY PLANT (PHASE 2)				
Mobilization	Build sound-rated fence: handheld tools, movement of materials such as saws, drills, fencing materials	1.5	Mortuary Residential	-

TABLE IV.D-7

CONSTRUCTION ACTIVITY SCHEDULE AND ANTICIPATED NOISE ANALYSIS

Sub-Phase	Activities	Time in Months	Receptor(s)	Proposed Standard Conditions
Excavation / Grading	Site grading using bulldozers, backhoes, excavators, and dump trucks.	2	Mortuary Residential	Same as above (Standard Condition D.1e and D.1f)
Foundation / UG Utilities	Concrete pumps and the drilling of piers	4	Mortuary Residential	Same as above (Standard Condition D.1e and D.1f)
Superstructure/Building Enclosure	Structural steel erection, exterior framing, and plaster installation	8	Mortuary Residential	Same as above (Standard Condition D.1e and D.1f)
Finish Work	(Handheld tools)	12	Mortuary Residential	Same as above (Standard Condition D.1e and D.1f)
Site Work	Site preparation, paving, and concrete work	5	Mortuary Residential	Same as above (Standard Condition D.1e and D.1f)
HOSPITAL PARKING GARAGE (PHASE 2)				
Mobilization	Build sound-rated fence: handheld tools, movement of materials such as saws, drills, fencing materials	1	Mosswood Park M.O.B. Residential (Piedmont Ave)	-
Excavation / Grading	Site grading using bulldozers, backhoes, excavators, and dump trucks.	3	Mosswood Park M.O.B.	Same as above (Standard Condition D.1e and D.1f)
Foundation and Basement Walls	Concrete pumps and the drilling of piers	3.5	Mosswood Park M.O.B.	Same as above (Standard Condition D.1e and D.1f)
Superstructure/Building Enclosure	Structural steel erection, exterior framing, and plaster installation	7.5	Mosswood Park M.O.B. Residential (Piedmont Ave)	Same as above (Standard Condition D.1e and D.1f)
Finish Work	(Handheld tools)	5.5	Mosswood Park M.O.B.	Same as above (Standard Condition D.1e and D.1f)
Site Work	Site preparation, paving, and concrete work	5	Mosswood Park M.O.B.	Same as above (Standard Condition D.1e and D.1f)
PHASE 3				
CENTRAL ADMINISTRATION MSB (PHASE 3)				
Mobilization	Build sound-rated fence: handheld tools, movement of materials such as saws, drills, fencing materials	1.5	Single-family homes	-

TABLE IV.D-7

CONSTRUCTION ACTIVITY SCHEDULE AND ANTICIPATED NOISE ANALYSIS

Sub-Phase	Activities	Time in Months	Receptor(s)	Proposed Standard Conditions
Abatement / Demolition of Buildings	Demo and removal of existing buildings	12	Single-family homes	Same as above (Standard Condition D.1e and D.1f)
Excavation / Grading	Site grading using bulldozers, backhoes, excavators, and dump trucks.	2	Single-family homes	Same as above (Standard Condition D.1e and D.1f)
Foundation and Basement Walls	Concrete pumps and the drilling of piers	2	Single-family homes	Same as above (Standard Condition D.1e and D.1f)
Superstructure/Building Enclosure	Structural steel erection, exterior framing, and plaster installation	5	Single-family homes	Same as above (Standard Condition D.1e and D.1f)
Finish Work	(Handheld tools)	5	Single-family homes	Same as above (Standard Condition D.1e and D.1f)
Site Work	Site preparation, paving, and concrete work	5	Single-family homes	Same as above (Standard Condition D.1e and D.1f)

Source: Charles M. Salter Associates, 2006

Summary

Implementation of Standard Conditions of Approval D.1a through D.1f would reduce the construction noise levels from the project to the extent feasible, and thus project construction impacts would be considered less than significant.

Significance after Implementation of Standard Conditions: Less than Significant.

Project Operational Noise

Impact D.2: Noise from project-generated traffic would not significantly increase roadside ambient noise levels. (Less than Significant)

Operational activities associated with the project that would generate noise primarily from increased vehicular circulation on the local roadway network. Motor vehicle trips generated by the project would be distributed on the local road network and would increase noise levels along the affected roads. To assess the significance of the increase in traffic noise due to the project, roadside p.m. peak-hour noise levels have been estimated for existing, 2010 baseline, 2010 plus project, 2025 baseline and 2025 plus project conditions along those roadways most affected by the project. Noise modeling using Federal Highway Administration's Noise Prediction Model was conducted for roadway segments on West MacArthur Boulevard, Piedmont Avenue, Manila Avenue and Broadway using data from the Traffic Report prepared by Fehr & Peers. Results of the modeling effort are presented in **Table IV.D-8**. These segments were chosen for analysis as they were found to experience the greatest percent increase in traffic due to the project. As a rule of thumb, a doubling in traffic would lead to a 3-dBA increase in traffic noise.

As seen from **Table IV.D-8**, the proposed project would not lead to 5 dBA or greater increase in noise over the existing total ambient noise level at any of the analyzed roadway segments under all analyzed scenarios. Since the increase in ambient noise from the addition of project and cumulative traffic would below 3 dBA, this increase would barely be perceivable over the baseline total ambient noise level. Therefore, addition of project and cumulative traffic would not increase the total ambient noise level by 5 dBA or greater over existing ambient levels. This would be less than significant impact.

TABLE IV.D-8
TRAFFIC NOISE INCREASES ALONG LOCAL ROADWAYS IN THE PROJECT AREA

Street Segment	Modeled Noise Level at 50 Feet From Roadway Centerline						
	Existing (2005)	2010 Baseline	2010 + Project	Change vs. Existing	2025 (Cumulative) Baseline	2025 + Project	Change vs. Existing
Manila Avenue							
- North of W MacArthur	50.8	51.7	52.9	+2.1	51.7	52.9	+2.1
W MacArthur Blvd.							
- East of Broadway	66.4	68.5	69.2	+2.8	69.0	69.5	+3.1
Broadway							
- North of W MacArthur	65.9	66.4	67.2	+1.3	66.9	67.5	+1.6
- South of W MacArthur	65.1	65.7	66.6	+1.5	66.2	66.9	+1.8
- North of Piedmont Ave.	65.3	65.9	66.5	+1.2	66.3	66.8	+1.5
- South of Piedmont Ave.	66.3	66.9	67.4	+1.0	67.3	67.9	+1.5
- North of I-580 Off Ramps	65.0	65.5	66.1	+1.1	66.0	66.4	+1.5
- South of I-580 Off Ramps	65.3	65.9	66.5	+1.2	66.3	66.8	+1.5

SOURCE: Environmental Science Associates, 2005.

Mitigation: None required.

Impact D.3: Operational noise sources generated by HVAC equipment, the Central Utility Plant, emergency generators, ambulance sirens, proposed parking structures, truck loading/unloading, etc., would not exceed the Oakland Noise Ordinance standards regarding operational noise and would not substantially impact nearby noise-sensitive receptors. (Less than significant)

HVAC Systems: Once operational, a major source of noise would be from the operation of mechanical equipment associated with the heating, ventilation, and air conditioning (HVAC) systems of project buildings. It is assumed that the majority of HVAC equipment to serve the project buildings would be located within the mechanical equipment wells on the roofs of the buildings. All roof HVAC equipment is proposed to be visually and acoustically screened by roof parapets and mechanical screens. Operation of HVAC equipment would be subject to noise ordinance standards shown in **Table IV.D-2**. Provided that the equipment is designed and used in a manner that complies with those standards, the related noise impact to project residences and adjacent land uses would not be significant. The applicable design standard would be 45 dBA at adjacent sensitive land uses. Air handling equipment is mounted on the rooftops of many buildings in Oakland and operates without noise impacts to adjacent buildings. The equipment for the proposed project is anticipated to be of recent manufacture and be compliant with the operational restrictions of the Oakland Noise Ordinance. For these reasons, noise from HVAC equipment would not be expected to significantly affect the noise environment at nearby land uses.

Central Utility Plant (CUP): The project proposed to build a new 60,000-sq.ft central utility plant in addition to the existing one. The new CUP would be located at Site 4. Cooling towers at the new CUP would be the primary source of noise. Typical noise levels from cooling towers at a distance of 500 feet range from 55 to 60 dBA (Dyer, 1959). The cooling towers will be located within the enclosure of the CUP, and would be subject to the City's noise ordinance standards. Given the already high ambient noise levels of 68 – 72 dBA Leq along Piedmont Avenue, noise from cooling towers designed in accordance with the City's noise ordinance standards would not pose a significant noise impact at these receptors.

Emergency Generators: The project would install five 2000 kW generators in the new CUP and a 300 kW generator at the West Broadway Medical Services Building (MSB) on Site 7. Two existing generators on the current hospital site will continue to be used. All generators and enclosures will be designed to meet the Oakland noise ordinance standards. In addition, by definition, the emergency generators would not be regularly used and would be used only during emergency power outages. Therefore the noise impact from the generators would be less than significant.

Parking Structure: The West Broadway MSB parking structure (Site 7) would be located adjacent to noise sensitive receptors. The parking garage would have approximately 738 spaces on five parking levels, including two levels of parking below grade. A 34-space surface lot for staff-only parking would also be developed west from the West Broadway MSB to front on Manila Avenue. The receptors most affected by operational noise from the parking structure would be the residences along Manila Avenue and 38th Avenue. Noise sources would potentially include tires squealing, engines starting, doors slamming, car alarms, and people talking. Noise levels within parking structures and open air parking lots average around 60 to 65 dBA L_{eq} at 100 feet (University of California, 2003). Based on noise monitoring conducted by ESA, existing daytime noise levels at the affected receptors along Manila Avenue range from approximate 65 dBA , L_{eq}. Ambient noise levels (conservatively using 68 dBA) combined with parking lot noises (up to 65 dBA) would logarithmically add up to 68 dBA L_{eq} at approximately 75 feet. This would be a less than significant increase. Therefore, activities within the proposed parking structure and parking lots would not increase ambient noise levels at nearby receptors to result in a significant impact.

Truck Loading / Unloading: Operational noise would occur related to the arrival, departure, and loading/unloading of goods from delivery trucks associated with the project's proposed retail and commercial establishments. This noise would be less than significant, as it would primarily take place during the less noise sensitive daytime hours. Also, the presence of intervening structures and distance of the commercial and retail establishments to the existing residential receptors would attenuate these noise levels to a less than significant level.

Emergency Sirens: Emergency vehicle sirens are another noise source associated with hospital activity. The average number of ambulances visits to the Kaiser emergency department would increase from 22 to 29 ambulances per day. Although ambulance siren noise level is loud, typically about 90 dBA, noise generated by emergency vehicles is not considered to be a nuisance

considering the urgent and imperative nature of the operations and is not subject to the local noise standards. The use of ambulance sirens (and lights) for emergency cases is guided by the State Highway Patrol and Department of Motor Vehicles and is a necessary "request" for the right-of-way from other drivers. In most cases, sirens are no longer used as the ambulance approaches the hospital as critical cases are typically stabilized by that time.

Mitigation: None required.

Impact D.4: Given the measured exterior noise levels in the vicinity of the project site, the interior noise levels within hospital buildings, especially in rooms used for overnight use such as patient wards, could exceed DNL 45 dBA, the interior noise standard for hospitals according to the City of Oakland General Plan Noise Element. (Potentially Significant)

Based on noise measurements in the project site vicinity (see **Table IV.D-1**), exterior noise levels in certain parts of the project site are as high as DNL 72 dBA. In order to meet the interior noise standard of 45 DNL dBA, building construction would need to reduce exterior noise levels by as much as 27 dBA from the external facades of the building. Conventional contemporary building construction methods and materials decrease outdoor noise by 12-18 dB (with partially open windows) which would not be adequate to meet the City's interior noise stanbdard for hospitals. Therefore, this would be a significant impact.

> **Standard Condition D.4: To comply with the interior noise requirements of the City of Oakland's General Plan Noise Element and achieve an interior noise level of less than 45 dBA, noise reduction in the form of sound-rated assemblies (i.e., windows, exterior doors, and walls) shall be incorporated into project building design. Final recommendations for sound-rated assemblies will depend on the specific building designs and layout of buildings on the site and shall be determined during the design phase.**

Significance with Mitigation: Less than Significant

Cumulative Impacts

Impact D.5: The proposed project, together with anticipated future development in the area as well as Oakland in general, could result in long-term traffic increases that could cumulatively increase noise levels. (Less than Significant)

Noise from cumulative development in the area would primarily occur from increases in motor vehicle traffic. Cumulative traffic noise levels in the project area were estimated using traffic data provided by Fehr & Peers and are presented in **Table IV.D-8**. As shown in the table, the addition of project and cumulative traffic would not increase traffic noise levels by greater than 5 dBA along the analyzed roadway segments. Therefore, this increase would not be perceptible over the

total noise levels that were monitored along these segments. Traffic noise forms one component of the total noise environment. An increase in traffic noise of 5 dBA would not necessarily translate to an increase of 5 dBA in the total ambient noise environment. When the resultant noise levels from project and cumulative traffic along these segments is logarithmically added to the existing monitored noise levels, the increase would be less than 5 dBA and hence, less than significant.

Mitigation: None required.

References – Noise

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