

**DEPARTMENT OF HEALTH SERVICES
COUNTY OF LOS ANGELES**



SUBJECT: DESIGN/CONSTRUCTION AND MAINTENANCE RISK ASSESSMENT:
POLICIES AND PROCEDURES
NOISE AND VIBRATION CONTROL POLICY

**POLICY
NO.:**

918.4

PURPOSE: To control unnecessary excessive and annoying noise and vibration generated during construction in DHS facilities.

POLICY: It is the policy of the Department of Health Services (DHS) to provide a safe environment for patients, visitors and staff in DHS facilities. In order to abide by that policy, a policy plan, which from hereon will be referred to either "the plan" or "the noise and vibration control plan" or "the policy plan", has been created to establish acceptable noise and vibration criteria and appropriate control measures to prevent adverse impact on hospital operations and healthcare services at DHS Facilities caused by construction-related activities.

PROCEDURE:

I. Noise and Vibration Control Plan

- A. The contractor shall create a plan to reduce the anticipated noise and vibration levels generated during construction to acceptable levels. The plan shall include noise and vibration maps indicating the anticipated noise and vibration levels corresponding to the type of construction to be conducted at each project location and the projected or calculated noise levels at the impacted neighboring or surrounding occupied sites, rooms, structures and/or buildings. The plan shall specify appropriate and detailed noise and vibration control measures, by either using quieter equipment, installing an appropriate muffler, a temporary noise barrier, and/or if deemed necessary, the contractor may recommend to the facility administrator to relocate the patients and staff to a shielded area. This plan shall also detail how noise and vibration levels will be monitored. The cost for the development of the plan shall be borne by the contractor.

- B. The Noise and Vibration Control Plan, with delineated proposed construction sites and mapped as to anticipated noise and vibration levels including mitigation and monitoring measures, shall be reviewed and approved by the Facility Project Manager or designee, and if deemed necessary, the Facility Project Manager or designee shall consult with the Los Angeles County Department of Health Services, Bureau of Environmental Protection, Environmental Hygiene Program or its designee. The Environmental Hygiene Program's noise control engineer shall review and approve the efficacy of

APPROVED BY:

EFFECTIVE DATE: February 16, 2004

SUPERSEDES:

PAGE 1 OF 11

DEPARTMENT OF HEALTH SERVICES COUNTY OF LOS ANGELES

SUBJECT: DESIGN/CONSTRUCTION AND MAINTENANCE RISK ASSESSMENT:
POLICIES AND PROCEDURES
NOISE AND VIBRATION CONTROL POLICY

POLICY NO.: 918.4

noise and vibration control measures affecting the patients, visitors and staff, and the surrounding occupied properties.

- C. The cost for the Noise and Vibration Control Plan review and approval by Los Angeles County Department of Health Services, Bureau of Environmental Protection, Environmental Hygiene Program shall be borne by the Project Budget.

II. Exposure Limits for Noise

Protection against the effects of noise exposure shall be provided when acceptable noise levels are exceeded. Applicable ordinance regulating noise exposure for patients, visitors and staff, and surrounding residential, commercial and industrial properties is the Los Angeles County Noise Control Ordinance, Chapters 12.08-12.12. Noise exposure limits for construction workers and DHS employees are regulated by Cal OSHA in reference to CCR Title 8, Section 5095 to 5100. Tables below are presented as references in determining exposure limits and also in delineating the same in a noise map.

Table 1. Patients, Visitors, and Staff, and Surrounding Receptor Areas

Zones	Time	Level (dBA)					
		Max Interior Limits ¹	Max Exterior Limits ²				
			Std 1 L ₅₀ ³ 30 min/hr	Std 2 L ₂₅	Std 3 L _{8,3} 5 min/hr	Std 4 L _{1,7} 1 min/hr	Std 5 L ₀ At no time
Health Facilities							
Patient Room, ICU, Surgery, and other similar Noise Sensitive Areas ⁴	Anytime	40	45	50	55	60	65
Offices, Conference Rooms ⁵	10 pm to 7 am	40	45	50	55	60	65
	7 am to 10 pm	45	50	55	60	65	70

EFFECTIVE

DATE: February 16, 2004

SUPERSEDES:

PAGE 2 OF 11

DEPARTMENT OF HEALTH SERVICES COUNTY OF LOS ANGELES

SUBJECT: DESIGN/CONSTRUCTION AND MAINTENANCE RISK ASSESSMENT:
POLICIES AND PROCEDURES
NOISE AND VIBRATION CONTROL POLICY

POLICY NO.: 918.4

Common areas, Hallways, Lobbies, Cafeterias (Interior using exterior noise criteria) ⁶	10 pm to 7 am	55	55	60	65	70	75
	7 am to 10 pm	60	60	65	70	75	80
Surrounding Receptor Areas							
Noise Sensitive Area	Anytime		45	50	55	60	65
Residential	10 pm to 7 am		45	50	55	60	65
	7 am to 10 pm		50	55	60	65	70
Commercial	10 pm to 7 am		55	60	65	70	75
	7 am to 10 pm		60	65	70	75	80
Industrial	Anytime		70	75	80	85	90

¹Maximum internal limits are nominal designations. The actual interior ambient will determine the basis to designate the actual maximum limits. The actual values will account for the present acoustical condition of the rooms considering such factors as the noise contributed by air duct vibration of the air-conditioning unit, proximity to the elevator system, reflective surfaces inside the room, acoustical absorption of the interior surfaces, the structural integrity of the plenum spaces over the ceiling, the acoustical condition of the floor surfaces, and the type of activities going on when the rooms are occupied. Only the exterior limits are considered in the surrounding receptor sites since the expected interior sound level can be determined from the exterior sound measurement readings and that the interior limits are also dependent upon the outside ambient noise levels.

²Criteria apply to unmodified windows and windows in the normal seasonal configuration, i.e., closed in winter and open during summer and where a/c is not provided. The table provides the nominal exterior noise criteria. Determination of the actual exterior noise criteria is dependent upon the actual ambient noise level measured. The procedure and formula for determining the actual noise criteria is provided in the Los Angeles County Code Secs. 12.08.390 and 12.08.400.

³Noise Level (L_N) means that noise level expressed in decibels which exceeds the specified (L_N) value as a percentage of total time measured. For instance, an L_{25} noise level means that noise level which is exceeded 25 percent of the time measured.

⁴Equivalent to noise sensitive area (Secs.12.08.390 & 12.08.400).

⁵Equivalent to residential area where background noise level will permit normal conversation (Secs. 12.08.390 & 12.08.400).

⁶Equivalent to commercial area since background noise level is higher due to human activities (Secs. 12.08.390 & 12.08.400).

EFFECTIVE

DATE: February 16, 2004

SUPERSEDES:

PAGE 3 OF 11

DEPARTMENT OF HEALTH SERVICES COUNTY OF LOS ANGELES

SUBJECT: DESIGN/CONSTRUCTION AND MAINTENANCE RISK ASSESSMENT:
POLICIES AND PROCEDURES
NOISE AND VIBRATION CONTROL POLICY

POLICY NO.: 918.4

1. The contractor shall institute feasible engineering controls when noise levels are anticipated to exceed the actual maximum limits designated in each project site. If exceedances are not anticipated during the course of construction, contractor shall institute additional feasible, safe and appropriate control measures.
2. Construction work including drilling, repair, alteration or demolition shall be prohibited from 7:00 p.m. to 7:00 a.m. or at any time on Sundays or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real-property line, except for emergency work of public service utilities.
3. Contractor shall abide by vehicle exhaust and noise restrictions as regulated by the California Vehicle Code §§ 27150-27159 and §§ 27200-27207. Contractor shall also abide by mobile equipment noise restrictions and construction noise as regulated by the Los Angeles County Noise Ordinance 12.08.440.

Table 2. Exposure Noise Limits for Construction Workers and DHS employees (See Title 8, CCR, §5096)

Sound Level (dBA)	Permitted Duration Per Workday (hours-minutes)	Hours
90	8-0	8.00
91	6-58	6.96
92	6-4	6.06
93	5-17	5.28
94	4-36	4.60
95	4-0	4.00
96	3-29	3.48
97	3-2	3.03
98	2-38	2.63
99	2-18	2.30
100	2-0	2.00
101	1-44	1.73
102	1-31	1.52
103	1-19	1.32
104	1-9	1.15
105	1-0	1.00

EFFECTIVE

DATE: February 16, 2004

SUPERSEDES:

DEPARTMENT OF HEALTH SERVICES COUNTY OF LOS ANGELES

SUBJECT: DESIGN/CONSTRUCTION AND MAINTENANCE RISK ASSESSMENT:
POLICIES AND PROCEDURES
NOISE AND VIBRATION CONTROL POLICY

POLICY NO.: 918.4

106	0-52	0.86
107	0-46	0.76
108	0-40	0.66
109	0-34	0.56
110	0-30	0.50
111	0-26	0.43
112	0-23	0.38
113	0-20	0.33
114	0-17	0.28
115	0-15	0.25

1. Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in Table 2 when measured on the A-scale of a standard sound level meter at slow response.
2. When construction workers and DHS employees are subjected to sound levels exceeding those listed in Table 2, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of the table, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.
3. Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level. (See Title 8, CCR, § 5096).
4. There is an 85-decibel action threshold whereby an employer must take appropriate action to reduce the noise level when this level is reached.

III. Exposure Limits for Ground Vibration (See County Code §§ 12.08.350 & 12.08.560)

The contractor shall prohibit construction activities involving vibration level exceeding the perception threshold measured at a motion velocity of 0.01 in/sec over the range of 1 to 100 Hertz at the property line of surrounding properties and/or occupied health facility building(s). Any anticipated vibration levels exceeding the perception threshold at the property line and/or occupied health facility building(s) shall be marked on the noise and vibration map and contractor shall institute control measures to mitigate such vibration levels.

EFFECTIVE

DATE: February 16, 2004

SUPERSEDES:

PAGE 5 OF 11

DEPARTMENT OF HEALTH SERVICES COUNTY OF LOS ANGELES

SUBJECT: DESIGN/CONSTRUCTION AND MAINTENANCE RISK ASSESSMENT:
POLICIES AND PROCEDURES
NOISE AND VIBRATION CONTROL POLICY

POLICY NO.: 918.4

Plans to mitigate ground vibration shall be reviewed and approved by the Facility Project Manager or designee and, if deemed necessary, the Facility Project Manager or designee may consult with the Los Angeles County Department of Health Services, Bureau of Environmental Protection, Environmental Hygiene Program or its designee. The Environmental Hygiene Program's noise control engineer shall review and approve the efficacy of noise and vibration control measures affecting the patients, visitors and staff, and the surrounding occupied properties.

Facility Oversight

1. The Facility Project Manager or designee (e.g. Facility Safety Officer, Facility Environmental Health Coordinator or other qualified individual) shall perform the following duties: Convene a Pre-Construction meeting with Facility Management, Area/Unit Manager(s), Los Angeles County Project Manager (Contract Administrator), Safety Officer, and the Contractor to review the approved Noise and Vibration Control Plan with the unit or area managers.
2. Apprise the affected unit or area manager on how to register concerns about noise and vibration levels.
3. Monitor adherence to the Noise and Vibration Control Plan and Policy.
4. Halt construction immediately when notified by the area or unit manager that patient care, facility staff or visitors are adversely affected by the perceived noise and vibration levels generated during construction.
5. Notify the Los Angeles County Project Manager (Contract Administrator), the Facility Safety Officer and the Contractor immediately when a work stoppage has been instituted.
6. Review and approve the Noise and Vibration Control Plan.
7. Review and approve the Noise Monitoring Strategies.

V. Noise and Vibration Control Measures

EFFECTIVE

DATE: February 16, 2004

SUPERSEDES:

PAGE 6 OF 11

DEPARTMENT OF HEALTH SERVICES COUNTY OF LOS ANGELES

SUBJECT: DESIGN/CONSTRUCTION AND MAINTENANCE RISK ASSESSMENT:
POLICIES AND PROCEDURES
NOISE AND VIBRATION CONTROL POLICY

POLICY NO.: 918.4

- A. The contractor shall take all appropriate measures to minimize noise generated from construction related activities in accordance with the actual determined noise limits.
- B. In areas where noise exposure levels exceed the actual noise limits, the contractor shall restrict access to the said area(s) and require only authorized individuals who have the temporary need to be in the said area(s) to wear appropriate hearing protection.
- C. In areas where engineering and administrative controls do not reduce noise and/or vibration levels to the actual noise and/or vibration limits, or when notified by the Facility Project Manager or designee that noise and/or vibration levels are not tolerable even if the noise and/or vibration levels do not exceed the designated limits, the contractor shall immediately stop work until appropriate measures can be taken to reduce noise levels to within acceptable levels.
- D. Architects/Engineers shall consider during the design phase and contractors shall comply during the construction phase with:
 - 1. American Institute of Architects (AIA)/Facilities Guidelines Institute – “Guidelines for Design and Construction of Hospital and Healthcare Facilities”.
 - 2. All applicable federal, state and local laws and regulations governing noise and vibration statute(s), ordinance(s), and/or regulations to prevent work stoppage and fees assessed for each day the violation continues.
- E. Wherever possible the following measures shall be used to control vibrating surfaces:
 - 1. Isolate the floor from the machine.
 - 2. Place heavy machines on isolated floor pads and tighten bolts.
 - 3. Fasten plates to the machine with flexible or dampened connectors.
 - 4. Use rubber washers and gaskets between metal parts
- F. Contractors shall use the following controls and methods to control noise and vibration at the source:
 - 1. Trenchers, pavers, graders and trucks shall not produce 90 dBA at 50 feet as measured under the noisiest conditions. All other equipment shall not produce 85 dBA at 50 feet as detailed and abated in the approved Noise and Vibration Control Plan.
 - 2. “Whisperized” type generators and air compressors shall be used at all times when feasible.

EFFECTIVE

DATE: February 16, 2004

SUPERSEDES:

PAGE 7 OF 11

DEPARTMENT OF HEALTH SERVICES COUNTY OF LOS ANGELES

SUBJECT: DESIGN/CONSTRUCTION AND MAINTENANCE RISK ASSESSMENT:
POLICIES AND PROCEDURES
NOISE AND VIBRATION CONTROL POLICY

POLICY NO.: 918.4

3. Jackhammers shall be equipped with exhaust mufflers and steel muffling sleeves. Jackhammer use must be approved by the County Project Manager (Contract Administrator), and the Facility Project Manager or designee in compliance with the approved Noise and Vibration Control Plan prior to use.
4. Noisy equipment shall be kept as far as possible from noise-sensitive site boundaries.
5. Electric engines shall be used in lieu of internal combustion engines whenever possible.
6. Use of explosives and riveting is prohibited.
7. Noise barriers shall be maintained as needed by the Contractor and inspected by the Construction Project Manager or his/her designee prior to each workshift.
8. Powder-activated devices must be approved by the County Project Manager (Contract Administrator) and the Facility Project Manager or designee.

VI. Noise monitoring

- A. The contractor shall provide all necessary resources for monitoring noise when information indicates that noise exposures may equal or exceed the designated limits.
- B. Monitoring shall be performed whenever a change in production, process, equipment or controls increases noise exposures above the designated limits or the attenuation provided by hearing protection being used may be rendered inadequate.
- C. Noise monitoring strategies must be approved by the County Project Manager (Contract Administrator) and the Facility Project Manager or designee.
- D. All incurred costs from noise monitoring are the sole responsibility of the contractor.
- E. All construction noise monitoring shall be performed according to Cal/OSHA standards and procedures.
- F. Environmental noise monitoring shall be performed according to standard noise control engineering procedures.

EFFECTIVE

DATE: February 16, 2004

SUPERSEDES:

PAGE 8 OF 11

DEPARTMENT OF HEALTH SERVICES COUNTY OF LOS ANGELES

SUBJECT: DESIGN/CONSTRUCTION AND MAINTENANCE RISK ASSESSMENT:
POLICIES AND PROCEDURES
NOISE AND VIBRATION CONTROL POLICY

POLICY NO.: 918.4

VII. Responsibilities

Contractor:

- A. The Contractor shall develop an approved Noise and Vibration Control Plan as detailed above. The plan shall be submitted to the Los Angeles County Project Manager (Contract Administrator). All costs for the development of this plan shall be borne by the contractor.
- B. The contractor shall implement feasible engineering controls when patients, staff, contractor's employees and the public are exposed to noise levels exceeding the designated limits or when patient care is affected. Examples and definitions of control measures may be found in an industrial hygiene reference text entitled *The Fundamentals of Industrial Hygiene, 4th edition, 1996, National Safety Council, Itasca, Illinois, for occupational noise monitoring and standard noise control engineering manual or text for environmental noise monitoring.*
- C. The contractor shall provide all resources necessary to monitor sound, and where needed also vibration levels. The contractor shall provide sound level measurements to the County Project Manager (Contract Administrator), and the Facility Project Manager or designee within one working day of the monitoring for review and approval.
- D. The contractor shall take immediate action upon having knowledge of monitoring results that exceed the Noise Exposure Limits. The contractor shall notify the County Project Manager (Contract Administrator), and the Facility Project Manager or designee immediately of the results.
- E. The contractor shall institute an effective Hearing Conservation Program for their employees if required. The Contractor will provide a copy of their approved Hearing Conservation Program to the County Project Manager (Contract Administrator) prior to the commencement of construction-related activities.
- F. The contractor shall notify their employees of noise monitoring results that exceed the applicable Action Threshold (85 dBA).
- G. At the County discretion the Contractor shall be required to post signage as directed by the Facility Project Manager.

EFFECTIVE

DATE: February 16, 2004

SUPERSEDES:

PAGE 9 OF 11

DEPARTMENT OF HEALTH SERVICES COUNTY OF LOS ANGELES

SUBJECT: DESIGN/CONSTRUCTION AND MAINTENANCE RISK ASSESSMENT:
POLICIES AND PROCEDURES
NOISE AND VIBRATION CONTROL POLICY

POLICY NO.: 918.4

Facility Safety Officer

- A. The Facility Safety Officer shall review and approve all monitoring results provided by the Facility Project Manager or designee as needed and has the independent authority to stop construction-related activities until effective remediation has been completed.
- B. The Facility Safety Officer shall discuss any and all monitoring results that are at variance with the designated limits with the County Project Manager (Contract Administrator), and Facility Project Manager or designee.
- C. The Facility Safety Officer shall notify staff of noise monitoring results that exceed the designated limits.

County Project Manager (Contract Administrator)

- A. The County Project Manager (Contract Administrator) will confer with the Facility Project Manager or designee when monitoring results indicate that the designated noise and vibration limits for patients, staff and visitors have been exceeded.
- B. Notification of patients and visitors will be carried out at the discretion of the County Project Manager (Contract Administrator) and the Facility Project Manager or designee..
- C. The County Project Manager (Contract Administrator) has the sole authority to restart a halted construction activity.

Facility Project Manager or Designee

See Procedure: IV. Facility Oversight.

Area or Unit Manager

- A. Notify and confer with the Facility Project Manager or designee and the Facility Safety Officer immediately when patient care is adversely affected by noise and/or vibration levels generated during construction.

EFFECTIVE

DATE: February 16, 2004

SUPERSEDES:

PAGE 10 OF 11

**DEPARTMENT OF HEALTH SERVICES
COUNTY OF LOS ANGELES**

SUBJECT: DESIGN/CONSTRUCTION AND MAINTENANCE RISK ASSESSMENT:
POLICIES AND PROCEDURES
NOISE AND VIBRATION CONTROL POLICY

POLICY NO.: 918.4

- B. Notify and confer with the Facility Project Manager or designee and the Facility Safety Officer immediately when staff and visitors are adversely affected by noise and/or vibration levels generated during construction.

VIII. References

Title 8, California Code of Regulations, Subchapter 7, Group 15, Article 105, Sections 5095-5100.
Los Angeles County Code, Chapter 12.08.
California Vehicle Code §§ 27150-27159 and §§ 27200-27207.

EFFECTIVE

DATE: February 16, 2004

SUPERSEDES:

PAGE 11 OF 11