

F. ENVIRONMENTAL HEALTH

Affected Environment

Hazardous Materials

In its role as a major research operation, the University of Washington uses some materials in its laboratories and medical facilities that are considered to be hazardous due to their toxicity, flammability, radioactivity, or because of contamination with infectious agents. These materials are generated in the course of conducting research and providing patient care, and are typical for medical research and hospital facilities. The University has instituted procedures to safely manage these materials during their use and disposal.

The Washington occupational safety and health standards and local fire codes generally control the use of toxic and flammable materials in the campus environment. Required ventilation controls are available and maintained in work areas where toxic materials and volatile flammables are used. Code-conforming rooms and cabinets will continue to be provided for the storage and dispensing of flammable materials.

The collection, treatment and disposal of wastes from the operations using hazardous chemicals conform with the Washington State Department of Ecology and the U.S. Department of Transportation regulations. Personnel with special training for handling laboratory wastes collect and package materials prior to shipping them to licensed treatment and disposal facilities.

Procedures have been established by the University for decontaminating medical wastes from hospitals and laboratory operations prior to removing them from the University. Pressurized steam and disinfectants are used to sterilize those wastes that are considered to be infectious prior to disposal through normal waste channels. Locations that do not have access to these mechanisms dispose of their infectious waste via the University's contracted Infectious Waste Contractor. That company is responsible for pickup and transport of the infectious material to an approved off-site treatment facility. There it is treated and then disposed.

Within the University, a number of research and clinical programs use radioactive materials. Clinical programs, similar to those conducted in most major hospitals, are primarily in the University of Washington Medical Center. These involve use of radioactive materials for diagnostic and therapeutic purposes. Research programs involving the use of small amounts of radioactive labels in tracer type research are conducted in over 600 University laboratories. The Washington Department of Health (DOH) controls the uses of radioactive materials through a licensing process. The University of Washington programs are inspected annually by DOH to assure compliance with regulations and special license conditions.

Management of radioactive waste is also regulated by DOH. The primary method of disposal is collection and shipment of radioactive wastes to a waste broker in Turlock, California. The waste must be securely packaged at the University of Washington for transport, and is inspected and processed at the Turlock site. Processed waste is shipped by the broker from Turlock to either Gainesville, Florida for destruction, or to the U.S. Ecology Low Level Radioactive Waste Site in Richland, Washington for burial.

Special attention, inspection and maintenance are carried out to assure that no contaminated materials can be accidentally introduced back in the water supply by cross connection. Backflow and cross connection prevention are an important part of the plumbing permit procedure. Upon installation, these devices are inspected by Seattle Water Department specialists, maintained by University specialists, and are subject to ongoing inspection.

Noise

Noise is defined as any sound that is undesirable because of speech and hearing interference or annoyance. The intensity, duration and character of sounds can have an adverse effect on personal health and welfare. While one of the more serious consequences of noise is hearing loss, other significant effects include interference with sleep, disruption of conversation, and effect on work performance.

Sound level descriptors are ways of measuring and describing noise, including factors that account for sound duration, magnitude, frequency and pitch. Sound is measured in decibels (dB), a logarithmic ratio between pressures caused by a given sound spectrum. Environmental noise is measured as "A-weighted" sound level in decibels, symbolized as dBA. The A-weighted scale represents noise using the scale that corresponds the closest to the range and characteristics of the human ear. Equivalent sound level, shown as Leq, is a common descriptor for measuring fluctuating sounds. The Leq is the level of a constant sound that, over a given time period, contains the same amount of sound energy as the measured fluctuating sound. People commonly experience sound levels in the range of between 5 to 90 dBA. Table 9 identifies sound levels of typical noise sources and activities. The smallest change in sound levels that is noticeable to most people is about 3 dBA.

Ambient noise is regulated by the Seattle Department of Design, Construction and Land Use (DCLU) under the City's noise ordinance (Seattle Municipal Code, Chapter 25.08). This ordinance adopts provisions contained in Washington State's Maximum Environmental Noise Levels (W.A.C. 173-60). State and City maximum permissible sound levels are shown in Tables 10 and 11. The University of Washington maintains noise standards that are consistent with those of Washington State.

Unlike the State's environmentally designated noise standards, construction-related noise in Seattle is not exempt from noise regulation (25.08.425). Seattle's noise standards provide for temporary increases in the maximum permissible sound levels based on equipment type. During daytime hours¹², sound levels from large construction equipment (e.g., tractors, dozers, loaders, cranes, compactors, compressors, pneumatic equipment, etc.) are allowed a 25 dBA increase in the noise standards; portable equipment (e.g., chainsaws, powered hand tools, etc.) are allowed a 20 dBA increase; and maintenance equipment (e.g., lawn mowers, etc.) are allowed a 15 dBA increase. These increases are as measured at the property line of the receiving property or a distance of 50 feet from the equipment, whichever is greater. In addition, Seattle's noise regulations authorize noise from impact-type equipment to temporarily exceed the sound levels associated with other construction equipment. Sounds above an Leq of 99 dBA are prohibited unless a variance is obtained from DCLU.

¹² Defined by Chapter 25.08 of the Seattle Code as 7 AM - 10 PM during weekdays and 9 AM - 10 PM on weekends.

Table 9

TYPICAL SOUND LEVELS

Noise Source or Activity	dBA
Aircraft Carrier Flight Deck Operations	140
Threshold of Pain	130 - 140
Fireworks.....	130
Jet Takeoff (200 ft. distance)	120
Jack Hammer	120
Auto Horn (3 ft. distance)	120
Chain Saw/Noisy Snowmobile	110
Jet Takeoff (2,000 ft. distance)	105
Lawn Mower, Power Tools (3 ft. distance).....	85 - 100
Noisy Motorcycle (50 ft. distance)	100
Heavy Truck (50 ft. distance)	90
Quiet Snowmobile, Motorcycle (50 ft. distance)	80
Busy Urban Street.....	80
Normal Automobile, Commercial Area	70
Seagulls and Crows	70
Normal Conversation (3 ft. distance)	60
Quiet Residential Area	50
Moderate Rainfall	50
Quiet Residence, Library.....	40
Bedroom at Night or Whisper.....	30
Background Level in a Concert Hall.....	30
Broadcasting Studio.....	10
Rustle of Leaves	10
Threshold of Hearing.....	0

Sources: EPA, 1978; EPA, 1972.

Table 10

WASHINGTON MAXIMUM PERMISSIBLE ENVIRONMENTAL SOUND LEVELS (dBA)

EDNA of Noise Source	EDNA of Noise Receivers		
	A-Residential Day/Night	B-Commercial	C-Industrial
A-Residential	55/45	57	60
B-Commercial	57/47	60	65
C-Industrial	60/50	65	70

EDNA – Environmental designation for noise abatement. This designation is based on the typical land use and/or zoning of the noise source and the receiving properties. The categories of uses specified above are general descriptions of the sorts of uses and zoning in each EDNA category (8.767.050).

WAC 173-60

Table 11

CITY OF SEATTLE MAXIMUM PERMISSIBLE ENVIRONMENTAL SOUND LEVELS (dBA)

Land Use of Noise Source	Land Use of Receiving Property		
	<i>Residential</i>	<i>Commercial</i>	<i>Industrial</i>
Rural	52	55	57
Residential	55	57	60
Commercial	57	60	65
Industrial	60	65	70

Seattle Ch. 25.08 (Ord. No. 106360, Section 302).

DCLU considers major institutions to be commercial land uses. As indicated by Table 11, the allowable noise level from a commercial source received by another commercial source is 60 dBA; the allowable noise level for residential receiving properties is 57 dBA. For residential receiving properties, there is a 10-dBA reduction (to 47 dBA) during nighttime hours (10 PM to 7 AM, and 10 PM to 9 AM on weekends). For commercial receiving properties, there is no nighttime 10-dBA reduction. The location of measurement is the property line of receiving property. When noise impacts are of limited duration, sound level limits may be increased by the following amounts: 5 dBA for a total of 15 minutes in any one-hour period, 10 dBA for a total of 5 minutes in any one-hour period, and 15 dBA for a total of 1.5 minutes in any one-hour period.

The University of Washington also currently has additional conditions/considerations that campus project contractors meet the following noise control criteria:

- The sound pressure level of construction noise inside adjacent buildings and/or rooms cannot exceed 60 dBA (with windows closed) between the hours of 8 AM and 5 PM on weekdays. Barriers can be erected between construction activities and such interior areas, or equipment noise attenuators can be provided.
- The use of electric equipment and machinery is preferred. If noise levels on any equipment or device cannot reasonably be reduced to criteria levels, either that equipment or device will not be allowed on the job or use times will have to be scheduled subject to approval.
- The sound pressure level of each piece of equipment cannot be greater than 85 dBA at a distance of 50 feet. Rubber-tired equipment is to be used whenever possible instead of equipment with metal tracks. Mufflers for stationary engines are to be used in hospital areas. Construction traffic should be routed through nearest campus exit.
- Air compressors are to be equipped with silencing packages.

- Jack hammers and roto hammers may be used where no other alternative is available; core drilling and saw cutting equipment is preferred.
- Within occupied facilities, noise-producing equipment is allowed only before 7 AM and after 6 PM. Specific scheduling of construction-related noise activities is required at the University of Washington Medical Center.

Existing noise conditions in the University District area vary considerably, with generally higher noise levels toward the periphery of the campus along heavily traveled arterials. Elevated noise levels occur along the I-5 corridor, NE Pacific St., NE 45th St., and Montlake Boulevard NE. Along major arterials surrounding the campus, maximum noise levels of 80 dB are not uncommon; the average day-night noise level on and around most major arterials is approximately 60 dB (University of Washington, 1992). Recent monitoring at NE 45th Street and 15th Avenue NE and along Campus Parkway indicated that average noise levels are 68 dBA, with peak hour levels reaching 67 dBA L_{eq} . Noise levels were measured to be lower near Portage Bay with an L_{dn} of 64 dBA, and a peak hour L_{eq} value of 62 dBA (Sound Transit, 1998).

Aside from periodic construction projects and intermittent traffic noise on Stevens Way, the core University's Central Campus has relatively low noise levels, largely limited to voice level sounds. Average noise levels on campus vary from 60 dB to a maximum of 80 dB. Traffic noise from Stevens Way in most areas is buffered by vegetation. The University currently experiences noise primarily from vehicle and boat traffic, recreation and sports programs, and periodic construction. University parking lots associated with east campus recreational facilities are also sources of traffic noise. Outdoor events and ingress/egress of spectators at Husky Stadium (capacity of 74,000 people) and Hector Edmundson Pavilion are the most significant sources of recreational noise in the project vicinity.

Overall, existing noise conditions for the University campus are acceptable. Some isolated on-campus and adjoining areas, especially sensitive residential areas, experience noise impacts from periodic construction and renovation work, high traffic volumes and special campus events. Existing noise sources and affected campus areas are discussed below.

In the portion of the University District that is in and adjacent to West Campus, residential areas along I-5, Roosevelt Way NE, 11th Avenue NE and Campus Parkway are subject to traffic-related noise stress. In and adjacent to the northern area of Central Campus, along NE 45th Street, residential buildings are also subject to traffic related noise. However, Central Campus is primarily insulated from noise-related disturbances. The Montlake Neighborhood, across the Ship Canal from South/Southwest Campus and along the Montlake Boulevard NE corridor, experiences noise impacts during high vehicle use (morning and evening rush hour) and during special events (such as Husky football games). There are no residential areas or institutional buildings sensitive to noise generated in or adjacent to East Campus.

Impacts of the Proposed Action

Hazardous Materials

Implementation of the proposed *Master Plan Seattle Campus* would result in increased use of research chemicals and waste materials over the planning period; the level of increased medical waste materials use would depend on the amount of new research and patient care that occurs on campus. Under the *Master Plan Seattle Campus*, risk to human health would not be

expected to significantly increase. Safety measures would be applied as required by law and support facilities would be appropriately upgraded as development occurs or as is necessary.

Noise

Noise impacts associated with the *Master Plan Seattle Campus* time frame would primarily occur during construction of individual projects. Table 12 shows sound levels usually associated with construction activities. The higher levels in given noise ranges pertain to all pertinent equipment present at construction sites, and the lower levels apply to the minimum required equipment. Average noise levels for phases of construction range from 76 Leq to 89 Leq, 50 feet from the source. Leq (equivalent sound level) is the average energy level of the fluctuating noise for a specified time interval or activity.

Table 12

TYPICAL SOUND LEVELS DURING CONSTRUCTION

Phase	Leq (50 feet from Equipment)
Demolition	79-89
Building Erection	76-85
Finishing and Cleanup	76-89

Source: University of Washington, GPDP DEIS, 1990.

Depending on the location of construction activity, construction noise could result in annoyance, temporarily disrupt teaching and research activities, and cause disturbances to residential areas on campus. Construction activity occurring on-campus adjacent to off-campus areas could temporarily impact adjacent land uses. Noise from construction traffic would temporarily increase noise levels along certain roadways in the vicinity of the campus, including N.E. 45th Street, 15th Avenue N.E. and Montlake Blvd. N.E.

Over the planning period, significant operational noise impacts (in addition to those existing) would not be expected to occur. Because traffic volumes would not increase under the *Proposed Action*, traffic related noise would not be expected to increase in duration or intensity.

Impacts of the Alternatives

No Action Alternative

Under the *No Action Alternative*, environmental health impacts would be expected to occur to some extent as the University population grows and is accommodated. Remaining development planned for in the GPDP would likely lead to some construction-related noise impacts. Background noise impacts under the *No Action Alternative* would not be expected to differ significantly from the *Proposed Action*. The management of and impacts from hazard waste management would not likely change significantly from existing conditions.

Decentralized/Open Space Alternative

This alternative would include less on-campus development than under the *Proposed Action* (approximately 50 percent less development). Although the use of research chemicals and medical waste materials on campus would still likely increase to an extent, on-campus risks to environmental health would be reduced under this alternative – as a result of less development. In comparison with the proposed *Master Plan Seattle Campus*, construction-related noise impacts on campus would be reduced by about half. The potential for impacts from hazardous waste and noise could affect a broader, off-campus area than under the *Proposed Action* if decentralization occurs – depending on what types of development are shifted to off-campus areas.

No Street and Alley Vacations Alternative

Building area would be reduced under this alternative. With less building area, risks from hazardous materials and localized noise impacts could be reduced. The minimization of potential impacts would depend on the type of development that is limited by avoiding street and alley vacations. However, overall environmental health impacts would not likely differ significantly from that under the proposed *Master Plan Seattle Campus*.

Lifting of Lease Limit

Lifting of the lease limit could increase the amount of building area in the University District dedicated to University medical research or patient care. Lifting of the lease limit could increase the pace of development activity in the University District and construction-related noise impacts could increase. Lifting of the lease limit could also increase the amount of building area in the University District dedicated to University medical research or patient care use. Measures to minimize noise and medical waste impacts would be similar to those identified for on-campus uses, and significant impacts would not be anticipated.

Possible Mitigation Measures

The University's construction specifications and Seattle Noise Ordinance would minimize potential environmental health impacts. Additional mitigation measures could include the following:

- Proposed facilities could be designed to minimize risk and could be expected to provide more protection than the older facilities on campus.
- Existing facilities for handling research chemicals and medical wastes in the Health Sciences and East Campus areas could be improved to meet future needs and standards as necessary.
- Current procedures for plan approval and construction, inspection, collecting, treating and disposing of hazardous waste will continue to be reviewed by the University's Environmental Health and Safety Department, in accordance with State and federal regulations. Any need for new procedures to handle hazardous substances new to campus will be addressed by the Department of Environmental Health and Safety.

- Construction activities could be managed to comply with University noise control requirements and construction specifications (as described above). The contractor may meet noise criterion by erecting barriers between equipment on jobs and such interior areas, by using alternative equipment or silencing mechanisms, and limiting schedules according to work and class hours.

Unavoidable Adverse Impacts

No significant unavoidable adverse impacts would be anticipated over the long term. During construction, some temporary, intermittent unavoidable noise impacts may occur. These impacts could cause temporary interference with speech communication, stress reactions, and general annoyance.