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SOUND LEVELS FROM OIL AND GAS EXPLORATION ACTIVITIES

Flathead National Forest
Glacier National Park
Helena National Forest

by

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ABSTRACT

Data from a sound measurement survey conducted in 1981 within and in the vicinity of Glacier National Park are analyzed and presented. Measurements were made of oil and gas seismic exploration activities in Flathead National Forest and Helena National Forest, including sounds from above ground blasts, helicopters and associated activities. Typical reference sound levels are identified for above ground blasts and helicopters, and theoretical procedures for estimating their propagation are developed, considering terrain and meteorological conditions characteristic of Glacier National Park. A sample application of the prediction method shows sound levels from above ground blasts outside the Park remain significantly above ambient levels at locations inside the Park for long durations. These results corroborate anecdotal reports and biological studies which indicate that sound from oil and gas exploration activities can be heard well inside the Park and could be affecting sensitive wildlife populations in the area. Recommendations for additional monitoring and modeling are outlined.

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SYMBOLS AND ABBREVIATIONS

The following symbols and abbreviations are used in this report. Many are based on standards available from the American National Standards Institute, Inc., and the American Society for Testing Materials (Harris, 1979). Definition of these terms is provided in the Glossary at the end of this report.

ANSI - American National Standards Institute

ARCO - Atlantic Richfield Company

c - Speed of sound

dB - Decibel, the unit of measure for sound levels

f - Frequency, in hertz, of a sound

Hz - Hertz, the frequency, in cycles per second, of a sound

L_A - A-weighted sound level

$L_{A\ max}$ - Maximum A-weighted sound level

L_{eq} - Equivalent continuous sound level

L_{max} - Maximum overall unweighted sound level

L_{max} (oct) - Maximum unweighted sound level of a particular octave band

Lmin - Minimum sound level

Lx - Statistical level, the sound level exceeded X% of the time

m - Meter (3.28 feet in length)

NTAC - Noise Technical Assistance Center

PC - Personal computer (microcomputer)

p - Sound pressure

r - Distance from sound source to receiver

s - Seconds, the unit of measure for sound duration

SPL - Sound pressure level

USEPA - U.S. Environmental Protection Agency

USFS - United States Forest Service

USFWS - United States Fish and Wildlife Service

USGS - United States Geological Survey

USNPS - United States National Park Service

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EXECUTIVE SUMMARY

As demands upon our natural resources have grown over recent decades, public land managers have been faced with the dilemma of protecting areas of special interest such as national parks, wilderness areas, preserves, and wild and scenic rivers, while responding at the same time to development and consumption pressures. One such situation exists in northwestern Montana. Oil and gas companies have become increasingly interested in locating and extracting petroleum reserves in this area in the vicinity of Glacier National Park. Partially as a result of this pressure, Glacier was rated as the most threatened National Park in the State of the Park Report submitted to Congress in 1980. As a result of these events, the U.S. National Park Service (USNPS), charged with the responsibility of preserving Glacier unimpaired for future generations, felt it was important to document the existing acoustic environment of the Park, and to assess the sound levels which are produced by oil and gas exploration activities.

During the summer of 1981, the Park Service requested sound level monitoring assistance from U.S. Environmental Protection Agency (USEPA) Region VIII. In response to this request, staff from the USEPA Region VIII Noise Office in Denver, Colorado and the USEPA Noise Technical Assistance Center at the University of Colorado in Boulder, Colorado, began a sound monitoring study in Glacier National Park and the Flathead and Helena National Forests. The purpose of the monitoring was to develop data on the impacts of sound from seismic exploration activities associated with oil and gas development in the vicinity of the Park.

In June of 1981, baseline ambient sound level measurements were made on the western side of the Park, and at locations in the northern part of the Flathead National Forest to the west of the Park. During a subsequent monitoring period in July 1981, sound level measurements were

made at the same monitoring sites in Flathead National Forest while a seismic crew using the shallow shot method of blasting (buried charges) was in the vicinity. During this period, monitoring was also conducted in the Helena National Forest where a seismic crew was using the Modified Poulter (above ground) method of blasting. It was planned to use the data gathered during the Helena portion of the study to develop projections on what the noise impacts on Glacier National Park would be from above ground blasting activities which commonly occur just outside the Park. This information was to be made available to the Park Service and other federal land managers for their use in analyzing the impacts of oil and gas exploration activities.

At the end of August 1981, the USEPA Noise Program was abolished and the Region's Noise Technical Assistance Center was closed. Since the noise study had not yet been completed, the data tables, tape recordings, maps, field notes and other materials associated with the study were stored at USEPA offices. In the meantime, while both the USEPA and the USNPS looked for funding to finish the work, exploration and development pressure on the Park and nearby National Forests and wilderness areas increased, with 80 percent of the exploration projects using the Modified Poulter method. In the summer of 1984, the study was resumed with money from USEPA. Engineering-Science, Inc., an environmental studies firm with offices in Denver, Colorado, and Pasadena, California, was asked to finish the data analysis and prepare this report under the direction of Mr. Richard E. Burke, with the assistance of Dr. James D. Foch, Jr., who had been Director of the Noise Technical Assistance Center and had led the monitoring effort in 1981.

One of the first tasks involved in the renewal of the study was to reanalyze the tape recordings made in 1981 to determine if there had been any data loss since 1981. The average difference between maximum blast levels analyzed in 1984 and those analyzed in 1981 using the same tapes was found to be less than one decibel (dB).[1] After the quality of the tapes was verified, sound levels for the ambient, blasts, and helicopters were analyzed in detail. Results of the analyses indicated that ambient sound levels in the western section of the Park where the monitoring was conducted ranged from 20 to 35 dBA. Using the propagation factors and application methods presented in this report for a sample case, it was estimated that sound levels from above ground blasts outside the Park could reach 60 dBA at a location five miles inside the Park boundary, that is, 40 dBA or more above the Park's low background levels. This estimate does not include the additional enhancement which often results during morning hours due to temperature inversion conditions. As observed in the Helena National Forest, the sudden onset of above ground blast sounds was startling, and the sounds remained audible for a remarkable long length of time. The measured rate of decay of the maximum blast sound level over time was found to be slower than expected -- about 6 dBA per second. Conversely, however, the rate of decay of the maximum blast sound levels over distance was found to be greater than expected -- about 22 dBA per doubling of distance, including effects of atmospheric absorption. Complex terrain and ground cover may be factors related to these findings.

Where underground blasting or ground vibration are used in seismic exploration, helicopters dominate the sound levels in the vicinity of seismic projects and transportation corridors. Helicopters produce sound levels which could propagate over five miles into the Park before becoming inaudible, as shown in the sample analysis. The rate of decay of maximum helicopter sound levels over distance was found to lower than expected -- about 2 to 3 dBA per doubling of distance. This result is due to unknown factors which may include directivity and operating mode of the sound source, location of the observers relative to the surrounding terrain, or meteorological factors. When the observer is in

[1] All sound levels in this report are measured in terms of decibels, either A-weighted (dBA) or unweighted (dB). If the levels are averaged on a logrythmic or energy basis, they are referred to as average levels. If they are averaged on a statistical or arithmetic basis, they are referred to as arithmetic average levels.

a valley and a helicopter passes overhead, audibility was found to be limited to the time when the helicopter is within line of sight, due to the barrier effect of the intervening mountains.

It should be noted that the propagation models developed and used in example estimates in this study are based upon very limited field data. Additional measurements made under different meteorological, terrain, or source/receiver conditions may yield different results. These findings should therefore only be considered as preliminary until they have been validated by further study.

In the final section of the report, specific recommendations for further study are presented. They include the need for: additional analysis of the propagation of sound levels in the vicinity of Glacier National Park; refined acoustic measurements of seismic exploration sound sources at particular source/receptor locations and under worst case meteorological conditions; a study of the reactions of Park users and residents to sounds produced by seismic activities; documentation of the reaction of grizzly bears and other animals to above ground blasts; centralized collection of information on existing and proposed seismic project locations and operation methods; development of a computer model for projecting sound levels and distances of audibility for future projects; simplication of the model for use with a hand calculator as an initial screening tool prior to the environmental assessment stage of a project; and finally, a study of the sound levels produced by oil and gas extraction and processing activities, which are longer term activities whose impacts are not addressed in this report.

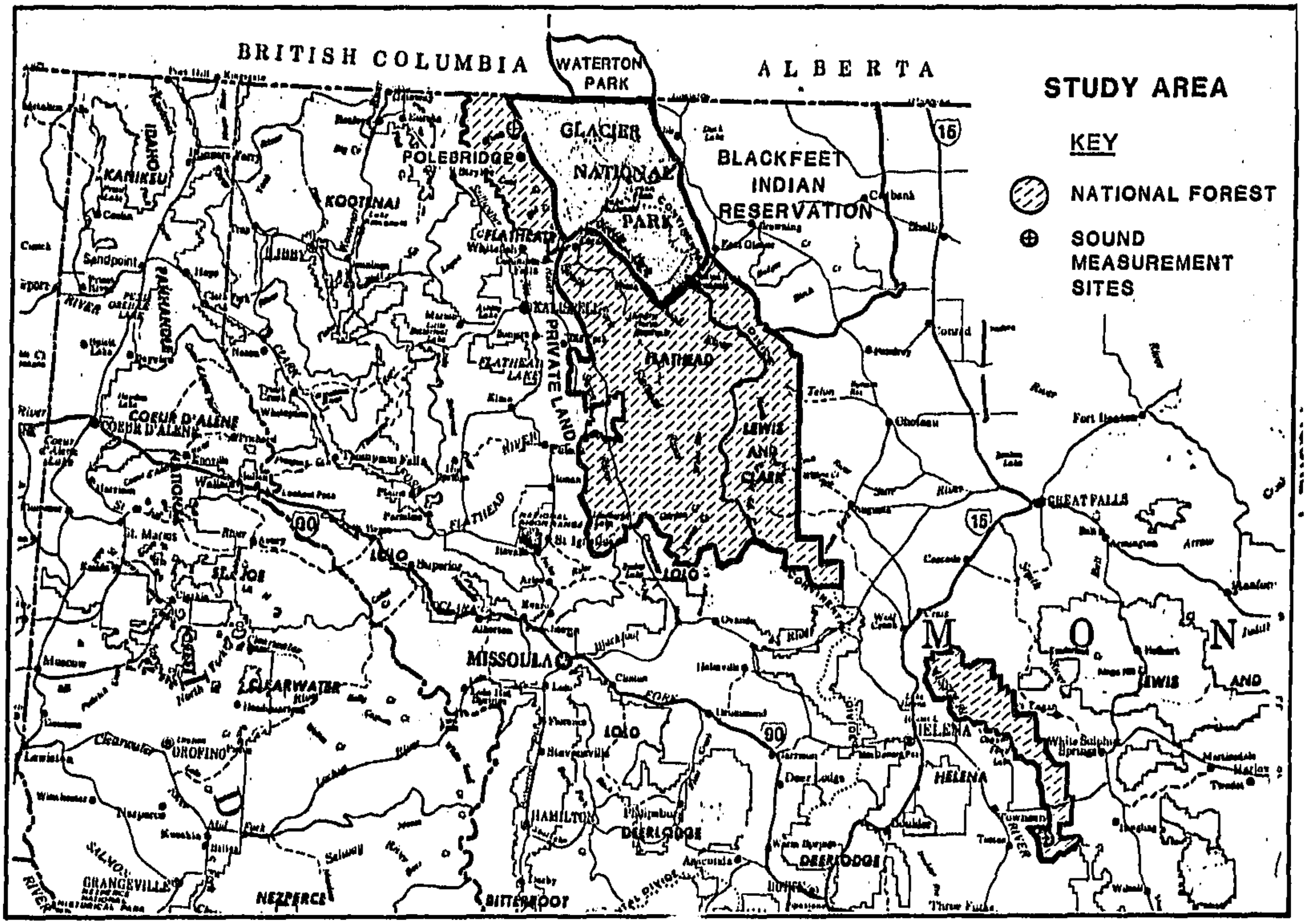
CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

This report concerns sound levels measured in Flathead National Forest, Glacier National Park and Helena National Forest, located in northwestern Montana (Figure 1). During the summer of 1981, the U.S. National Park Service (USNPS) requested sound level monitoring assistance from the U.S. Environmental Protection Agency (USEPA) Region VIII Noise Office. The Park Service, charged with the responsibility of preserving Glacier National Park unimpaired for future generations, was concerned about the possible noise impacts of the oil and gas exploration activities which were occuring outside the Park (see Appendix A.1). The special nature of the acoustic environment of the Park, the unique research and recreational opportunities offered in the Park, and the sensitive wildlife populations which inhabit the Park were all factors which suggested the importance of documenting existing sound levels and gathering new data on the sound levels from blasting, helicopters and related operations near the Park.

In response to the Park Service's request, staff from USEPA and the USEPA's Noise Technical Assistance Center at the University of Colorado at Boulder began a sound level monitoring study in Glacier National Park and the Flathead and Helena National Forests. In June 1981, baseline ambient sound level measurements were made on the western side of the Park, and at locations in the northern part of the Flathead National Forest to the west of the Park. During a subsequent monitoring period in July 1981, sound level measurements were made again in Flathead while a seismic crew using the shallow shot method of blasting (buried charges) was in the vicinity. During this same period, monitoring was


STUDY AREA
KEY
NATIONAL FOREST
SOUND MEASUREMENT SITES
BRITISH COLUMBIA
ALBERTA
WATERTON PARK
GLACIER NATIONAL PARK
BLACKFEET INDIAN RESERVATION
POLEBRIDGE
KANIKSU
KOOTENAI
FLATHEAD
PRIVATE LAND
LEWIS AND CLARK
COEUR D'ALENE
ST. JOE
LOLO
CLEARWATER
MISSOULA
GREAT FALLS
HELENA
HAMILTON
DEERLODGE
NEZPERCE
BITTERROOT
OROFINO
GRANGEVILLE
Sandpoint
M
O
N

also conducted in the Helena National Forest where a seismic crew was using the Modified Poulter (above ground) method of blasting. It was planned to use the data gathered during the Helena portion of the study to develop projections on what the noise impacts would be from above ground blasting which occurs outside the Park. This information was to be made available to the Park Service and other federal land managers for their use in analyzing the impacts from oil and gas exloration activities.

1.2 PURPOSE

The primary purposes of this study are to describe the ambient sound levels measured on the western side of Glacier National Park, to report the sound levels from oil and gas activities in the Flathead and Helena National Forests, and to develop estimating procedures for predicting sound propagation from those exploration activities for use in future impact assessments. Recreational uses and grizzly bear habitats and movements in and near the Park are also summarized. The report provides a preliminary method for estimating how sound levels from exploration might propagate from the Flathead National Forest into Glacier National Park, and illustrates the method with an example. Finally, the report suggests how the accuracy of the findings presented might be improved with further study.

After the reference section (Chapter 9), appendices are provided at the end of the report which contain further details on the location of existing and planned exploration activities near Glacier National Park, a description of exploration methods, supporting sound level and meteorological data, and other information pertinent to the investigation. A glossary of acoustical terms used in the text is included after the appendices.

1.3 REPORT SCOPE LIMITATIONS

It is hoped that the data and the methodologies presented here will be useful as first steps in the assessment of the acoustic impacts of seismic exploration activities. U.S. National Park Service decision makers, other federal land managers, recreation and acoustic specialists, wildlife biologists and others may wish to use this research to help in their assessment of impacts on sensitive recreational, research and wildlife uses of the Park; however, users of this report should take into account its limitations. Particular caution should be exercised in applying the measured data and the specific sound propagation estimates for Glacier National Park to projects in other locations where wind conditions, temperature gradients, terrain and operational conditions are different than those evaluated here. Even within the area evaluated in this study, further collection and analysis of data under a variety of meteorological and operational conditions is warranted to verify the assumptions and methodologies used. The step-by-step procedure for predicting sound level propagation requires additional testing, and broad application of the method is not recommended at this time.

CHAPTER 2

BACKGROUND ON FLATHEAD/GLACIER MEASUREMENTS

2.1 EXPLORATION ACTIVITY

A great deal of seismic exploration for oil and gas resources takes place in the area of study. Typical objectives of these seismic explorations are (U.S. Forest Service 1980):

1. To gather seismic data of sufficient detail and precision to permit an analysis of the subsurface geologic structure along the lines of survey, and to determine areas where geologic characteristics are favorable for the accumulation and entrapment of oil and natural gas.
2. To gather seismic data which will permit a better interpretation of the regional geology, and improve knowledge of the geologic evolution of the Northern Montana Overthrust Belt, where these resources are known to exist.

Various methods may be used in seismic exploration (see Appendix A for explanations of these methods). They include:

1. Deep shot
2. Vibroseis
3. Portadrill (shallow shot)
4. Surface Charge
5. Modified Poulter Method
6. Core Drilling
7. Rotary Drilling
8. Thumper Method
9. Dinoseis

The method used most often (80 to 90 percent) by exploration teams in Flathead and Lewis and Clark National Forests is the above-ground blasting technique known as the Modified Poulter method (Strathy 1984). This method is the noisiest method of those shown, and is discussed in detail in Chapter 3. It is the method preferred by exploration companies in rugged terrain.

Although it is used infrequently (one per year or less), the method used during the period when noise measurements were taken in Flathead National Forest was the portadrill method (U.S. Forest Service 1980). This method uses small, helicopter-portable drills capable of drilling a 3- to 4-inch diameter hole (called a shot hole) to a depth of 10 to 20 feet. Each drill is driven by a gasoline engine and fitted with an air compressor which is used to blow the drill cuttings (rock chips and dust) out of the hole.

The shot holes are typically loaded with a 3- to 5-pound charge of dynamite fitted with an electric cap. The hole is backfilled to the surface with drill cuttings and gravel if necessary. Shot holes are typically drilled every 330 feet along the seismic line, which provides exactly 16 holes per mile.

Ten portadrills, each with a 3-person crew, are usually needed. Two helicopters move the portadrills along the seismic line; each portadrill being moved ahead in leapfrog fashion from the most recently completed hole to a new shot hole at the front of the seismic line. Each helicopter passes a given point along the line at least five times, typically at an altitude of about 400 feet (Kiefer 1984a). Helicopters also transport the 30-person drilling crew to and from non-wilderness base camps. Such trips are normally flown at an altitude of about 1,000 feet (Kiefer 1984a).

The speed of helicopters used in exploration depends on their activity (Kiefer 1984a):

Function	Speed (knots)
Carrying equipment	0-60
Working at the seismic line	0-30
Unloaded	Over 60
Carrying people only	60-110

Types of helicopters which have been used include Loma, A-Star, Twin Star, Hughes 500, Bell L3, and Bell 206 Jet Ranger. The Loma helicopter was used during the activity measured in Flathead National Forest.

On a large project, the portadrill method requires about 3 to 4 months for drilling and loading shot holes (Strathy 1984). After a set of shot holes have been drilled, a 25-person seismic crew, using two helicopters, passes along the seismic line at a rate of about 1 to 3 miles per week, loading and detonating the subsurface charges and recording the seismic data in the recording module. It takes an extra month beyond the time when the last hole is drilled for a seismic field crew to complete this work. Thus, a total of about 4-1/2 months are needed to complete a large portadrill seismic exploration program. Sound levels from the portadrill method were not measured in this survey, however, sound from helicopters was measured, as described in Chapter 4.

During the 3- to 4-month drilling period, sound levels increase during daytime hours in the local area of each shot hole due to drilling, vehicle travel, and other crew activities, and over a wider area due to helicopter traffic to and from the site. During the underground detonation period, sound levels increase in each local area momentarily during the blasts, and over a wide area due to helicopter traffic. During the entire period, sound levels are increased in the vicinity of the base camp due to helicopter traffic, vehicles, and miscellaneous camp activities.

2.2 SITE DESCRIPTION

The following description of the physical characteristics of the Flathead/Glacier measurement site area is primarily based upon information presented in previous environmental assessments of the area (U.S. Forest Service 1980, U.S. National Park Service 1983).

Topography

The scenery of the Flathead National Forest is spectacular and full of physical variety. Deep valleys eroded by streams and sculpted by glaciers result in narrow ridges and steep valleys. There are broad expanses of alpine and subalpine country with perennial snowfields, sparse vegetation, and steep and rocky terrain. Interspersed are many broad mountain valleys with some heavy stands of timber and scattered mountain meadows.

The mountain ranges on both the Flathead and Glacier sides of the North Fork of the Flathead River contain ridges which run east-west. Drainage winds, which occur during evening and early morning hours as a result of diurnal temperature changes, follow this east-west pattern. As a consequence, early morning sounds generated in Flathead National Forest are often channeled toward Glacier National Park.

Weather

Wind direction during most daytime summer time periods is from the southwest (Glacier National Park 1980). This condition tends to enhance sound level propagation from blasting activities in Flathead National Forest toward observers in Glacier National Park.

Maximum temperatures occasionally reach 90°F in the valley of the North Fork, but generally range from about 65°F to 75°F during the exploration season. Minimum temperatures generally range from 30°F to 45°F during this period.

Seismic exploration activity is halted during periods of thunderstorm activity and excessive winds, since helicopters cannot operate under these conditions.

Vegetation

The vegetation in the Flathead National Forest varies greatly. Where the terrain is dominated by steep rocky ridges and narrow valleys, the landscape is sparsely forested. Much of the lower lands are heavily forested, while at the upper elevations subalpine vegetation dominates. Larch, Douglas fir, and subalpine fir dominate the slopes, while in the bottom lands spruce and ponderosa pine are found.

Threatened and Endangered Species

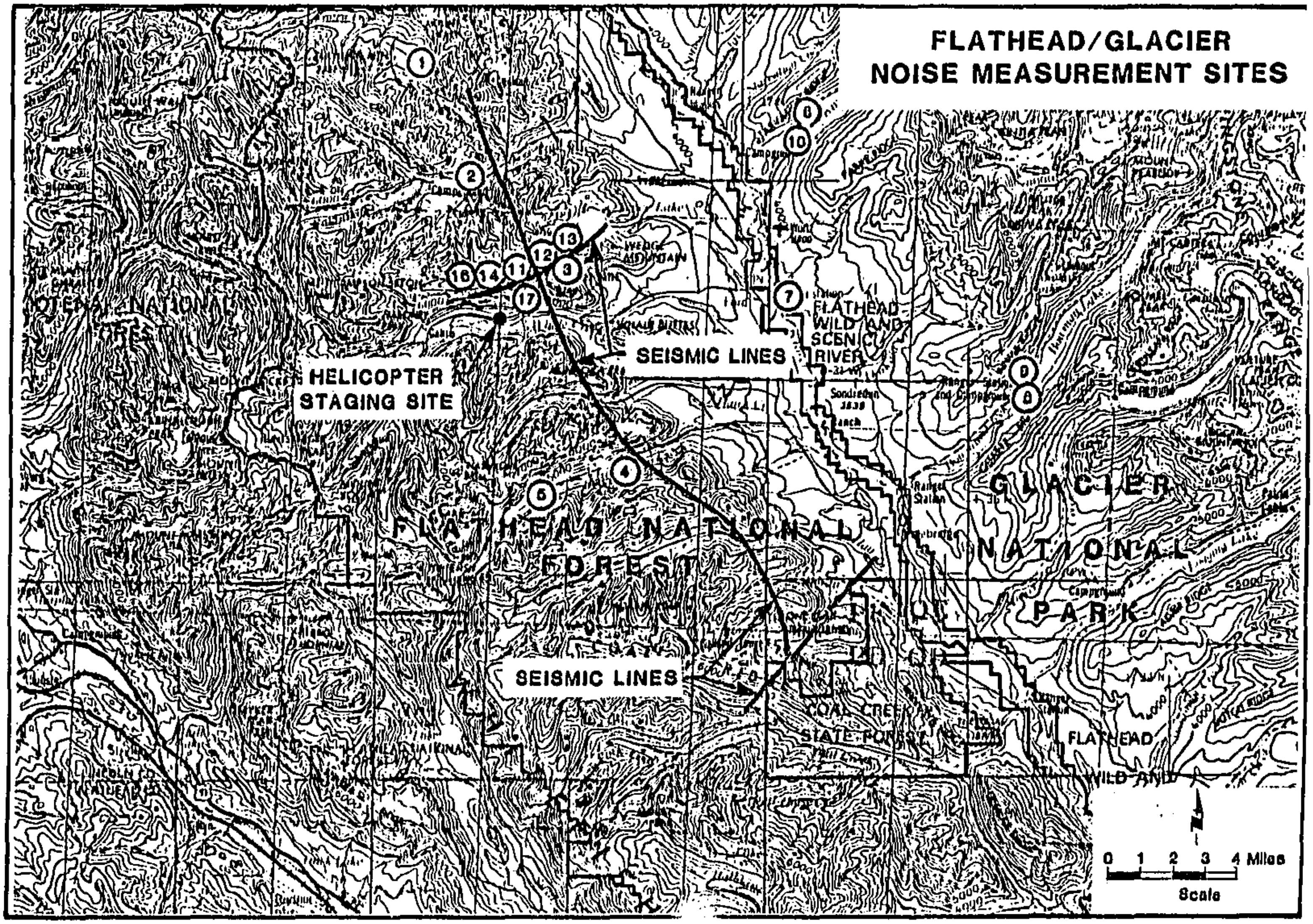
Species protected by the Endangered Species Act of 1973 which are known to inhabit the area include the grizzly bear, the gray wolf, the bald eagle, and the peregrine falcon. Some of the general effects of oil and gas exploration activities on these wildlife are discussed in Sections 6.1 and 6.2.

2.3 MEASUREMENT PROCEDURE

Measurement Sites

Sound measurement sites were selected at 17 locations in Flathead National Forest and Glacier National Park (Figure 2). After the measurement tapes were played back, it was verified that none of the sites selected was affected by other sound-generating activities such as logging or highway traffic. The measurement sites comprised three groups.

Sites 1 through 5. Five sites in Flathead National Forest were selected for continuous sound level measurement, after consultation with Professor Charles Jonkel of the University of Montana and two of his students, Dr. Chris Servheen and Mr. Bruce McIntosh. These three biologists were knowledgeable about areas representative of bear habitation, since they had been involved in trapping grizzly bears in the Flathead National Forest, placing radio collars on the bears, and tracking the bears by radio as the bears moved about their habitat. The five sites selected in Flathead are identified as Sites 1 through 5 in Figure 2.



FLATHEAD/GLACIER
NOISE MEASUREMENT SITES
SEISMIC LINES
HELICOPTER
STAGING SITE
SEISMIC LINES
FLATHEAD
WILD AND
SCENIC
RIVER
FLATHEAD NATIONAL
FOREST
GLACIER
NATIONAL
PARK
COAL CREEK
STATE FOREST
FLATHEAD
WILD AND
0 1 2 3 4 Miles
Scale

Sites 6 through 10. These five sites were located in Glacier National Park. Tape recordings of about 30 minutes duration were made at each site to characterize ambient conditions in the Park. In addition, some 24-hour sound level measurements were made. No audible or visual observations were made from these sites of oil/gas exploration activities.

Sites 11 through 17. Special tape recordings and maximum sound level readings were made at these sites on days when exploration activity was taking place to assess helicopter flyovers near Hornet Mountain (Figure 2). These helicopter operations were observed to involve transportation of seismic test equipment and other material used in the exploration project.

Equipment

Sound measurement equipment used at the Flathead/Glacier sites included six Digital Acoustics Company community noise analyzers, and various General Radio precision sound level meters, Nagra and Uher tape recorders, sling psychrometers, Dwyer wind gauges, and portable two-way radios. A detailed list of equipment system components used in the program is included in Appendix C.

Five of the Digital Acoustics analyzers were set up at Sites 1 through 5 in Flathead National Forest. They operated continuously for approximately one week, printing on paper tape a running summary of sound level measurements. A sixth Digital Acoustics analyzer was deployed at some of the other sites for shorter periods of time. The General Radio precision sound level meters were used at Sites 6 through 17, some with tape recorders. The recordings were analyzed within a few days by playing them through one of the six Digital Acoustics analyzers. Windscreens were used on all microphones to minimize interference with the measurements by wind and insects.

Measurement Procedure

Measurements were made over two separate one-week periods. From June 26 to July 2, no exploration activity was taking place. These measurements are termed "ambient" measurements in this report. Two to three weeks later, from July 19 to July 25, the same sites were revisited, and since exploration activity was observed during the measurement period, these measurements are termed "exploration measurements."

Usually, at the beginning and end of each sound level measurement period, dry bulb temperature and wet bulb temperature were measured for subsequent determination of relative humidity, and wind speed was noted. The person making the tape recording also kept a log in which distinctive sounds were identified and correlated precisely with time. Calibration of the system was ensured by recording a calibration tone on each tape.

To measure sound levels from helicopters used in the seismic exploration effort, tape recordings were made on Hornet Lookout near Site 3 and in the valleys on either side of the Lookout. Sound levels from helicopters were measured as they transported workers, equipment, and supplies to drilling and blasting sites in the National Forest. Helicopters were also used to move drilling rigs from one site to the next, where a few trees had been felled to make room for the drilling activity. A helicopter was also used to move the data processing center, which recorded the seismic wave data received by the geophones arranged along the seismic exploration line., A large portion of this helicopter traffic was observed and measured.

The Digital Acoustics community noise analyzers were all programmed to measure significant sounds from helicopters and other single events associated with seismic exploration. One of the programming options involves establishing a threshold and a time interval above the threshold. An event must exceed the threshold and remain above it for the established time interval to be identified on the paper tape record. This option was employed using thresholds from 65 to 75 dB, and a 10-second minimum duration. A significant increase in the number of such events was noticed from the first measurement period to the second, particularly at Site 2.

Between the first and second visits, the amount of water flowing in the creeks of the Flathead National Forest diminished greatly. Some creek beds which had contained rushing streams dwindled to barely a trickle. This change produced a marked decrease in indigenous sound levels at several of the sites, as noted in Chapter 4.

In addition to tape recordings at most of Sites 6 through 17, tape recordings were also made at Sites 1 and 2 where the Digital Acoustics community noise analyzers were deployed. These brief recordings, usually 10 to 15 minutes in duration, were intended to be used for octave band analysis of indigenous sounds.

Data Reduction

After the measurements were completed, the recorded data were reduced using a Digital Acoustics analyzer. Statistical levels, L_{eq}, L_{max}, L_{min}, and other values (see Symbols and Abbreviations) were tabulated and stored for later use. In October 1984, these tabulated data were entered onto an IBM personal computer (PC). With the use of the Lotus 1-2-3 software, the data were input onto the PC's spread sheet and retained on diskettes in the form shown in Appendix D. The computerized data were categorized according to the sequence of the original 1981 tables and site numbers, as shown by the example output in Table 1. Copies of the diskettes have been provided to USEPA.

Each computer table indicates sound source measured, the measurement area, the site number, date, hour, type of measurement, meteorological factors, and system of equipment used. In the example shown, "F" indicates the measurements were made in Flathead National Forest and "A" indicates ambient sounds were measured. All output was checked for accuracy and revised accordingly.

Values in the computer tables were used to generate plots. For instance, the L_{50} sound level during hour 1100-1200 can be plotted for days 7/19 through 7/25 by reading the value in the L_{50} column and the 1100-1200 hours row in Tables 60-65 (Appendix D).

TABLE 1. SAMPLE MEASUREMENT DATA TABLE

TABLE	SOURCE	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
						LEVEL (dBA)																
11	A	F	2	6/27	0100-0200	44	-	51	45	44	44	44	44	43	43	55	43	0.5	-	-	-	D
11	A	F	2	6/27	0200-0300	44	-	48	44	44	44	43	43	43	43	54	42	0.4	-	-	-	D
11	A	F	2	6/27	0300-0400	44	-	44	44	44	44	43	43	43	43	45	42	0.3	-	-	-	D
11	A	F	2	6/27	0400-0500	44	-	46	45	45	44	44	44	43	43	50	43	0.5	-	-	-	D
11	A	F	2	6/27	0500-0600	44	-	53	46	44	44	44	44	43	43	58	43	0.8	-	-	-	D
11	A	F	2	6/27	0600-0700	44	-	48	45	44	44	44	44	43	43	73	43	0.5	-	-	-	D
11	A	F	2	6/27	0700-0800	44	-	52	45	44	44	44	44	43	43	56	42	0.6	-	-	-	D
11	A	F	2	6/27	0800-0900	46	-	49	48	47	47	45	45	43	42	53	42	1.4	-	-	-	D
11	A	F	2	6/27	0900-1000	44	-	49	46	45	45	44	44	43	42	57	41	0.9	-	-	-	D
11	A	F	2	6/27	1000-1100	43	-	48	44	43	43	42	42	42	41	57	41	0.5	-	-	-	D
11	A	F	2	6/27	1100-1200	44	-	57	49	46	45	43	43	42	42	65	41	1.4	-	-	-	D
11	A	F	2	6/27	1200-1300	48	-	64	55	50	48	46	45	43	43	74	42	2.5	-	-	-	D
11	A	F	2	6/27	1300-1400	44	-	52	47	45	44	43	43	43	42	58	42	0.8	-	-	-	D
11	A	F	2	6/27	1400-1500	54	-	78	63	52	45	43	43	42	42	82	41	3.9	-	-	-	D
11	A	F	2	6/27	1500-1600	50	-	70	56	53	48	46	46	44	43	76	42	2.8	-	-	-	D
11	A	F	2	6/27	1600-1700	44	-	49	47	45	44	43	43	43	42	52	42	0.8	-	-	-	D
11	A	F	2	6/27	1700-1800	44	-	46	45	45*	45	44	44	43	43	53	42	0.6	-	-	-	D
11	A	F	2	6/27	1800-1900	44	-	48	46	45	45	44	43	43	43	51	42	0.8	-	-	-	D
11	A	F	2	6/27	1900-2000	44	-	54	45	43	43	43	44	43	42	57	42	0.6	-	-	-	D
11	A	F	2	6/27	2000-2100	44	-	47	44	43	43	43	43	43	43	50	42	0.3	-	-	-	D
11	A	F	2	6/27	2100-2200	45	-	48	47	47	45	44	43	43	43	55	42	1.1	-	-	-	D
11	A	F	2	6/27	2200-2300	46	-	64	45	44	44	43	43	43	43	78	42	1.1	-	-	-	D
11	A	F	2	6/27	2300-0000	44	-	46	45	44	44	43	43	43	43	53	42	0.5	-	-	-	D

SOURCE

A - AMBIENT
E - EXPLORATION
- - NO DATA

AREA

F - FLATHEAD NATIONAL FOREST
G - GLACIER NATIONAL PARK
H - HELENA NATIONAL FOREST

METEOROLOGY

T - TEMPERATURE
H - RELATIVE HUMIDITY
W - WIND SPEED

EQUIPMENT SYSTEMS A-D (SEE APPENDIX)

CHAPTER 3

BACKGROUND ON HELENA MEASUREMENTS

3.1 EXPLORATION ACTIVITY

The oil/gas exploration method used during the 1981 noise measurements in the Helena National Forest was the Modified Poulter Method. This method (National Park Service, no date) typically consists of detonating a series of 50-pound shots of explosives at shotpoints located at 330-foot intervals along the seismic line. Each shot usually consists of 8 to 10 individual 5-pound charges of explosive, each affixed to a wooden lath so that the explosive is suspended about 30 to 36 inches above the ground. For each shotpoint, the charges are distributed evenly over a 165-foot interval of the seismic line, that is, the charges are separated by 16 to 20 feet. Primacord is suspended between them and attached to an electric blasting cap and shooting wire. The individual charges explode sequentially, separated by milliseconds, as the ignition point travels down the primacord. No live shots are left unattended and at least four people are positioned around each shot to ensure the safety of forest users and forest animals.

Implementation of this method normally requires 29 people: 4 surveyors, 3 for checking for fires, and 22 for layout, shooting, and pickup. The crew is responsible for laying out the seismic cable and geophones; setting up and detonating the shot; recording the seismic data; picking up all cable, flagging, and debris; and monitoring for safety and fire hazard.

Typically, two helicopters provide daily transportation of the crew from nonwilderness campsites to and from the seismic line, and transport equipment and supplies along the seismic line. One helicopter must be capable of moving the recording module which has a gross weight of 1,100 pounds. This recording module is moved forward in leapfrog fashion along the seismic line every one to three days.

Once the recording module is lowered to the ground in a natural clearing along the seismic line, the seismic cables are attached. Under favorable conditions seismic exploration can be conducted for a distance of up to five miles on either side of the recording module before the module must be moved.

When the helicopters are transporting the recording module and ferrying other pieces of equipment along the seismic line, they fly at an altitude of about 400 feet (Kiefer 1984a). This altitude allows a piece of equipment hanging on 150 feet of cable below the helicopter to clear a 100-foot tall stand of trees by 150 feet. When a helicopter is taking passengers on longer flights, such as to and from the base camp, it flies at a higher speed and at an altitude of about 1,000 feet.

3.2 SITE DESCRIPTION

The following site description primarily includes summarized information from the Helena National Forest Land and Resource Management Plan, Draft Environmental Impact Statement (U.S. Forest Service 1985).

Topography

The Helena National Forest contains about 975,000 acres. It straddles the Continental Divide and encompasses headwaters of both the Missouri and Columbia River systems. The Forest extends east from the edge of the open grassland country in the upper reaches of the Big and Little Blackfoot drainages to the more arid open grasslands of the Missouri drainages.

Elevations range from about 3,500 feet along the Missouri River shore, to several peaks over 9,000 feet. Generally, the low elevation along the Forest boundary ranges from 5,000 to 5,500 feet and normal ridgetop elevations rarely exceeding 8,000 feet. Most of the forest is on slopes of 40 percent or less, although one-third of the land is 40 to 60 percent slope, and 3 percent is over 60 percent slope.

Climate

The Helena National Forest has a continental type climate which exhibits large variations in temperature and precipitation. Temperatures range from above 90°F in the summer to well below 0°F in the winter. The coldest temperature ever recorded in the lower 48 states (-70°F) occurred near Rogers Pass on the Helena Forest in 1952.

This variation is typical of the Northern Rocky Mountain Region, with brief periods of extremes on either end of the temperature scale. Heavy precipitation is found on the west slopes of the Continental Divide -- up to 60 inches annually -- as compared to 10 to 12 inches of moisture for portions of the Big Belt Mountains. Much of the Forest is relatively dry, with vegetation being slow to recover from impacts of heavy use by man and animals.

Vegetation

The Forest exhibits a wide range of vegetative cover. On eastern slopes, rolling grassland is interspersed with timber patches at the lower elevations, progressing to more solid timber on the steeper middle and upper slopes, and to subalpine types or bare ridges in the higher elevations. The region is more heavily timbered on slopes west of the Divide.

Approximately 80 percent of the Helena National Forest has some degree of timber cover. About 75 percent of this is suitable commercial timberland, capable of producing 20 cubic feet per acre per year or more. The nonforested portions of the Helena are divided roughly into the following categories:

Meadows, grasslands and brush	83,000 acres
Rock and scree	55,000 acres
Open water and aquatic	2,500 acres
Alpine and barren	1,800 acres

Within the forested portions of the Forest, the most common ground cover species are beargrass, pinegrass, twinflower, snowberry, huckleberry, rough fescue, grouse whortleberry, bluebunch wheatgrass, whitebark pine, and menziesia.

3.3 MEASUREMENT PROCEDURE

Measurement Sites

The sound level measurements in the Helena National Forest were made on July 16, 1981, a sunny day with negligible surface wind, along the seismic exploration line at a location arranged by the National Forest Service. Figure 3 shows measurement sites 18, 19, 20, and 21, each separated by 330 feet along the line. The measurements began before noon and lasted until about 6:30 p.m.

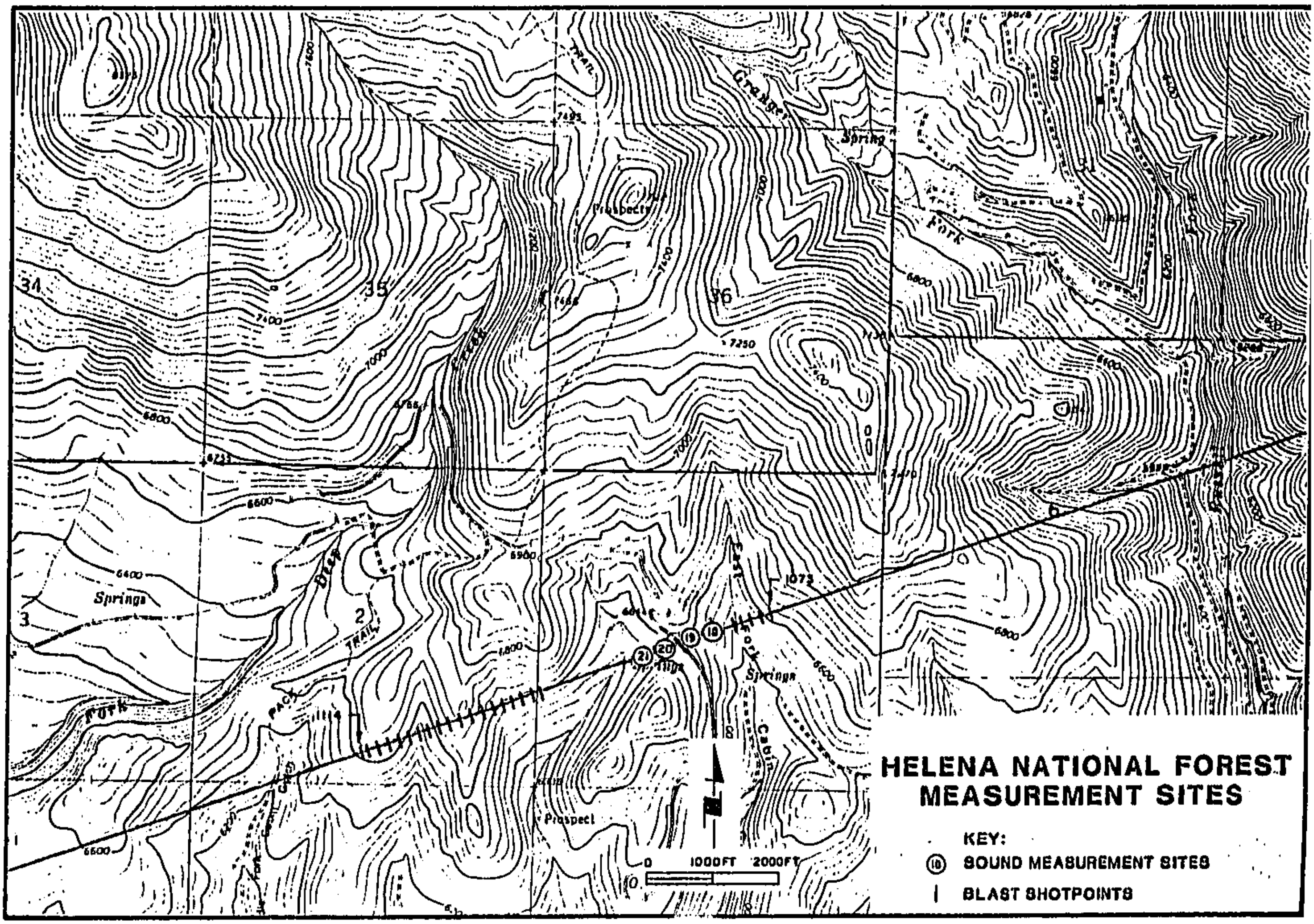
Before the sound measurement period began, the seismic exploration crew had already laid out cables along the exploration line with geophones and communication plugs located every 165 feet. Each such geophone location was identified with a number, such as 1079, indicating 1,079 intervals of 165 feet from some reference point. The geophone locations were numbered sequentially, and each carried a clearly visible flag bearing its number.

The blasts began east of the sound measurement equipment, approached the equipment positions, omitted several geophone locations in their immediate vicinity, and continued toward the west as the day concluded. The field bearing of the seismic line was 240 degrees. It crossed Cabin Gulch Road 423 at a distance of 8.1 miles from the paved highway. The sound measurement sites were at the intersection of the seismic line and Cabin Gulch Road 423, where the latter had a field bearing of 300 degrees. Two sound measurement sites were east of the road, and two were to the west.

Measurements were taken in an area remote from other major sources of noise, such as highway vehicles, aircraft, or camping. None of these or other extraneous sources interfered with the tape recordings made in the area.

Equipment

The seismic exploration crew allowed the sound measurement equipment operators to listen in on their communications, which provided a five- to ten-second warning before each blast. The advance warning enabled the equipment operators to disconnect from the communication


HELENA NATIONAL FOREST
MEASUREMENT SITES
KEY:
SOUND MEASUREMENT SITES
BLAST SHOTPOINTS
0
1000FT
2000FT
34
35
36
Prospect
Spring
Springs
Fork
TRAIL
PACK
Creek
Cabin
Prospect
Springs
18
19
20
21

system, turn off their portable radio equipment, and activiate the sound level measuring equipment in time to catch the blast.

Four sound measuring systems were deployed on the crown of a hill along a straight line about 25 feet north of and parallel to the seismic line. Each microphone was approximately 5 feet above ground level. Each system was operated with flat weighting, fast response, and was recalibrated approximately once each hour. The calibration adjustments were generally less than one decibel.

The first system, a Digital Acoustics community noise analyzer, was placed opposite geophone location 1082. The second system, a GenRad Model 1982 precision sound level meter, was placed opposite geophone location 1084 (165 feet x 2 = 330 feet from the first system). The third system, a GenRad Model 1988 precision sound level meter/Nagra Model IV D tape recorder, was placed opposite geophone location 1086. The fourth system, a GenRad Model 1933 precision sound level meter/Nagra IV SJ tape recorder, was placed opposite geophone location 1088.

The third and fourth systems have a range selector on the sound level meter which affects the voltage transmitted to the tape recorder. In addition, each tape recorder has an input attenuation selector. The Nagra IVSJ, a two channel recorder, has two such input attenuation selectors, one for each channel. By adjusting the sound level meter range selector and the tape recorder input channel attenuation selectors, one channel was usually able to record the proper signal to noise ratio without saturation.

<u>Measured Events</u>

The exploration crew in the field stated that each blast was produced in the following way. First, eight stakes were driven into the ground along a straight line parallel to the seismic line, 50 to 75 feet from it, and centered on a geophone. The line of stakes extended about 100 feet with 5 pounds of dynamite on each stake. Each charge was approximately 4 feet above ground. It is not known whether any detonation delays were used.

The seismic crew referred to each blast by the number of the adjacent geophone. Thus, from monitoring their communications, the geophone location of each blast was known, and hence its distance from each of the sound level measuring systems could be determined.

The observers stationed 825 to 5,280 feet from the blasts noticed that each blast had a sharp, startling, loud character. They also noticed each blast was audible a surprisingly long duration (8 to 14 seconds). Because of shielding by terrain and atmospheric propagation factors, variations in L_{max} of 10 to 20 decibels (for the same blast) among the measuring sites were common, even though the separation between observation sites was a maximum of 990 feet.

This seismic exploration activity also used a helicopter. It flew low and produced correspondingly high sound levels which were tape recorded. The type of helicopter flown during the measurements is not known.

Date Reduction

After the measurements were completed, the recorded data was reduced as described in Chapter 2. The computerized data were categorized in the same manner as the Flathead/Glacier data, as shown by the example output in Table 2. All output was checked for accuracy and revised accordingly.

TABLE 2. SAMPLE MEASUREMENT DATA TABLE

Helena

Helicopter Sound Levels

HELICOPTER OCTAVE BAND LEVELS SITE 21 (Helena National Forest)

July 16, 1981 Time : 124543-124733
(Helicopter Passby)

filter	Leq	Lmx	Lmn
31.5	67.5	72.5	62.5
63	71.4	77.4	60.5
125	64.8	72.5	49.5
250	63.3	76.9	48.5
500	64.0	77.6	48.4
1000	57.3	70.3	43.4
2000	46.9	91.0	38.4
4000	38.2	44.3	34.4
8000	38.5	42.5	38.0
16000	37.7	41.5	37.2
All pass	75.1	81.1	68.6
A-weighted	63.1	76.0	50.5

HELICOPTER OCTAVE BAND LEVELS SITE 21 (Helena National Forest)

July 16, 1981 Time : 161053-161653
(Helicopter hovering at 5100 ft. distance)

filter	Leq	Lmx	Lmn	Lmean	L.01	L.1	L1	L5	L10	L50	L90	L99	S.D.
31.5	59.2	64.6	37.2	58.2	65	63	63	61	61	59	53	40	4.1
63	54.0	60.9	37.5	53.0	61	60	59	57	56	53	49	40	3.4
125	42.0	50.8	25.1	40.3	51	50	48	46	44	41	34	27	4.2
250	31.2	38.7	24.4	30.5	39	37	36	34	33	30	27	25	2.3
500	31.9	40.6	25.3	30.9	41	40	39	36	34	30	28	26	2.5
1000	28.8	37.4	22.4	27.9	38	37	36	33	31	27	25	23	2.4
2000	22.8	27.5	20.1	22.7	28	27	26	24	24	22	21	20	1.0
4000	19.8	28.7	18.3	19.6	29	28	25	21	20	19	18	18	1.2
8000	16.6	25.6	15.4	16.5	27	26	19	17	17	16	16	15	0.8
16000	13.1	16.5	12.3	13.1	17	16	14	13	13	13	12	12	0.4
All pass	62.1	66.4	41.5	61.1	67	66	65	64	63	62	57	43	4.1
A-weighted	33.0	39.8	27.3	32.5	40	39	39	36	35	32	29	27	2.1

CHAPTER 4

MEASUREMENT RESULTS

In this chapter, the measurement data collected at Flathead, Glacier, and Helena are analyzed and important findings summarized. Results are presented sequentially for the ambient, helicopters, seismic blasts, and other sources of sound.

4.1 AMBIENT SOUND LEVELS

After all the ambient sound level data were tabulated from the measurement results and verified to be correct, a comprehensive study of the results was made. First, for the continuous measurement sites (Sites 1 through 5), the variation of sound levels over a 24-hour period was examined for days with and without exploration activity. Noticeable differences were apparent between daytime and evening sound levels, with the transition typically occurring around the hours of 6:00 a.m. and 11:00 p.m. (see data tables in Appendix D). Sound levels measured during the nighttime hours between 11:00 p.m. and 6:00 a.m. were generally constant; therefore, these hours were chosen as indicative of background conditions during the two measurement periods. Average nighttime sound levels for each day of the measurements are shown in Figures 4 through 8. The levels exceeded one percent of the time (L_1), ten percent of the time (L_{10}), and 90 percent of the time (L_{90}) are shown, as well as the energy equivalent level (L_{eq}). These terms are further described in the Glossary.

Sites 1 and 3 had the lowest daytime background (L_{90}) levels, as low as 15 to 25 dBA. Sites 2, 4 and 5, dominated by the sound of water flowing nearby, had the highest background levels, ranging from 35 to 40 dBA.

SITE 1 NIGHTTIME (2300—0600) LEVELS

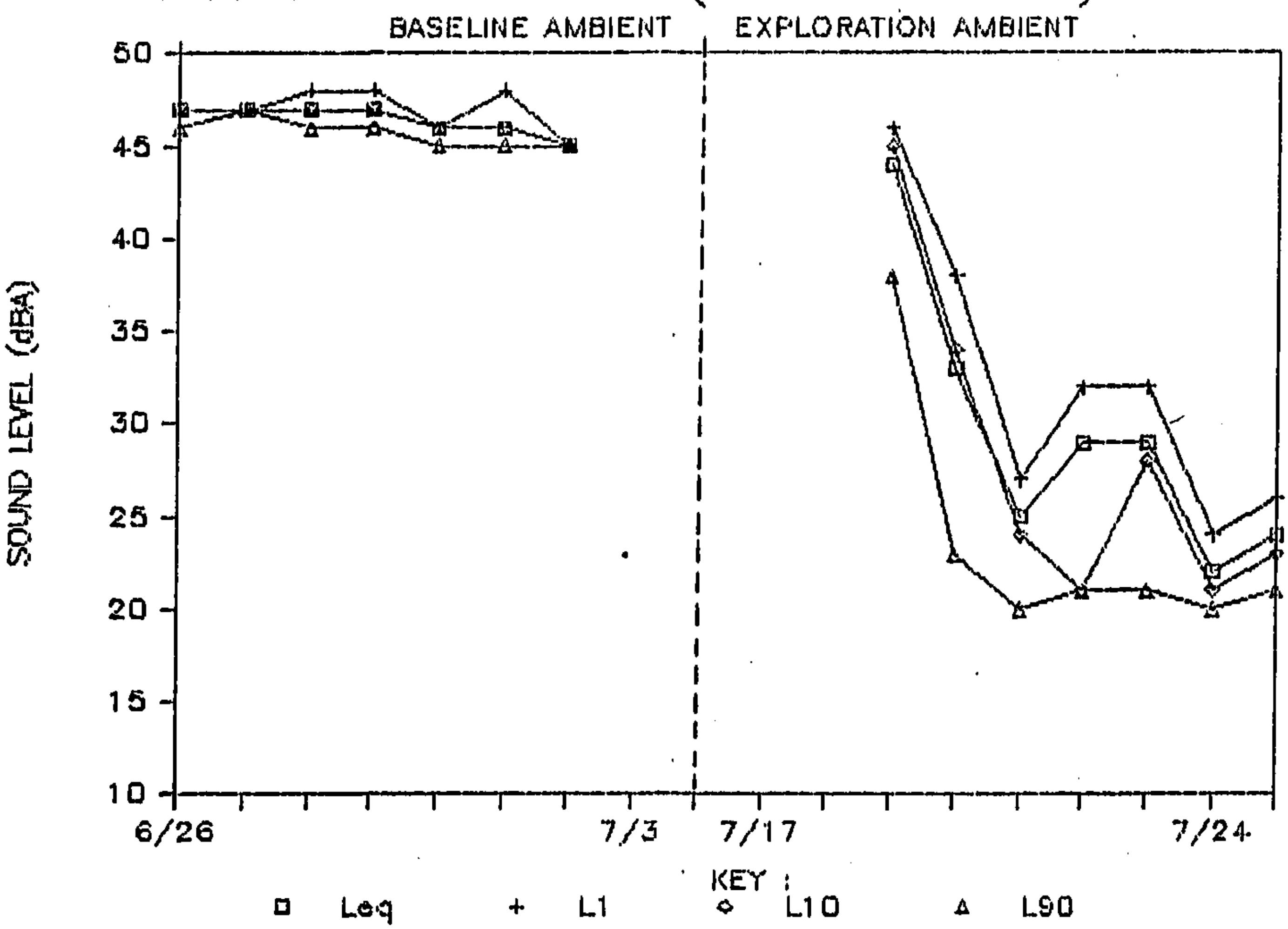


FIGURE 4

SITE 2 NIGHTTIME (2300-0600) LEVELS

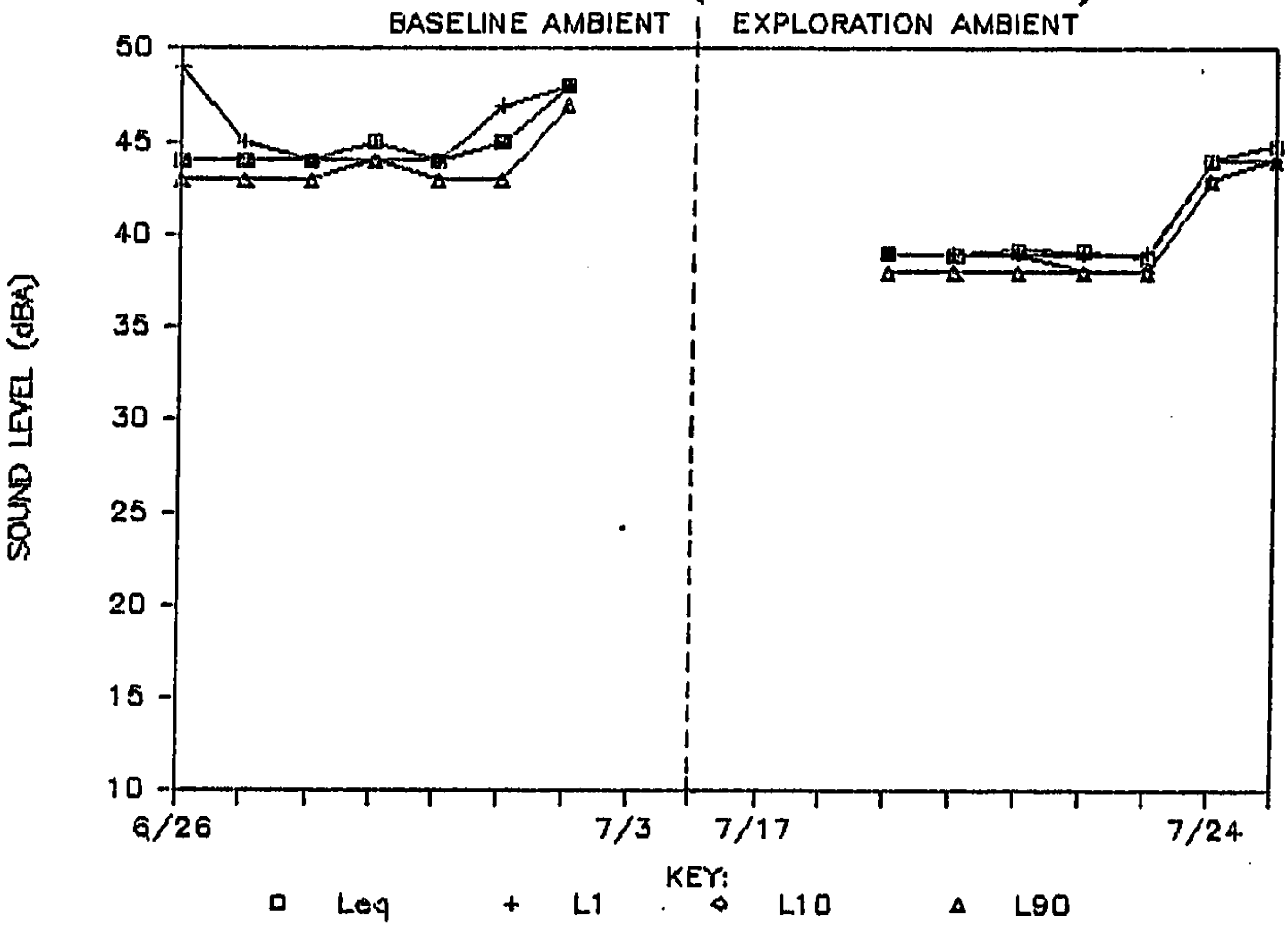


FIGURE 5

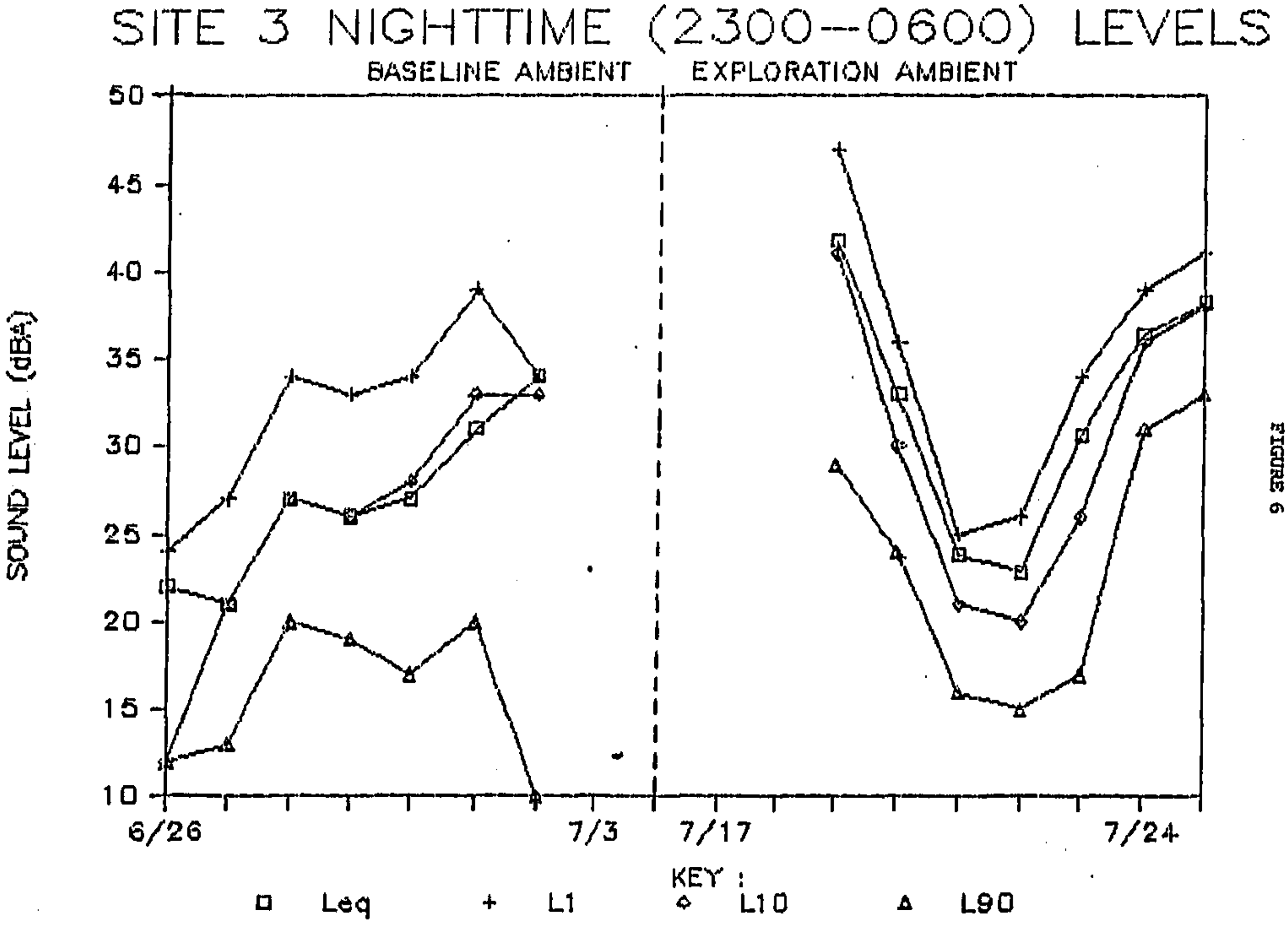

SITE 3 NIGHTTIME (2300—0600) LEVELS
BASELINE AMBIENT
EXPLORATION AMBIENT
SOUND LEVEL (dBA)
50
45
40
35
30
25
20
15
10
6/26
7/3
7/17
7/24
KEY :
□ Leq
+ L1
◇ L10
△ L90

FIGURE 6

SITE 4 NIGHTTIME (2300–0600) LEVELS

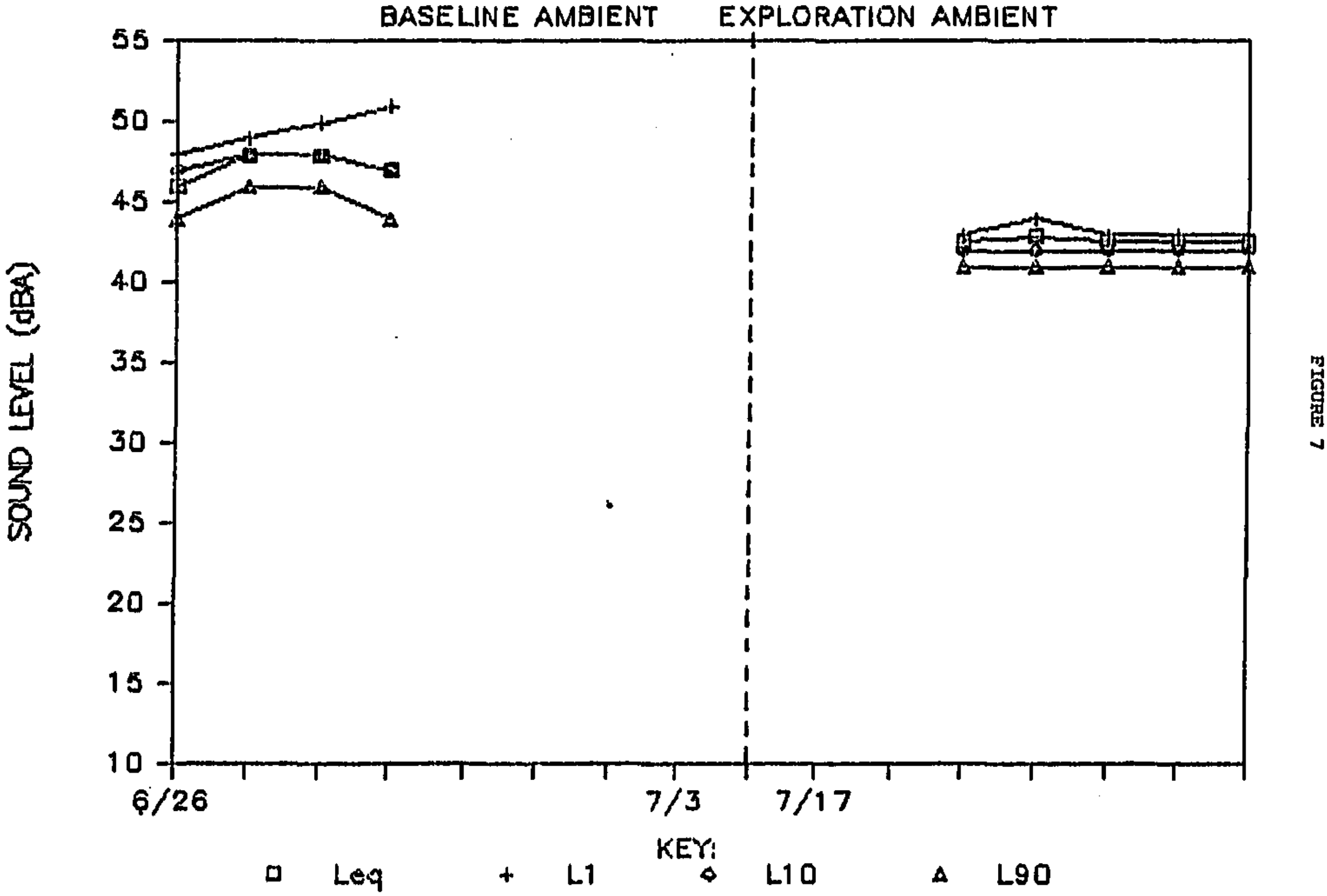
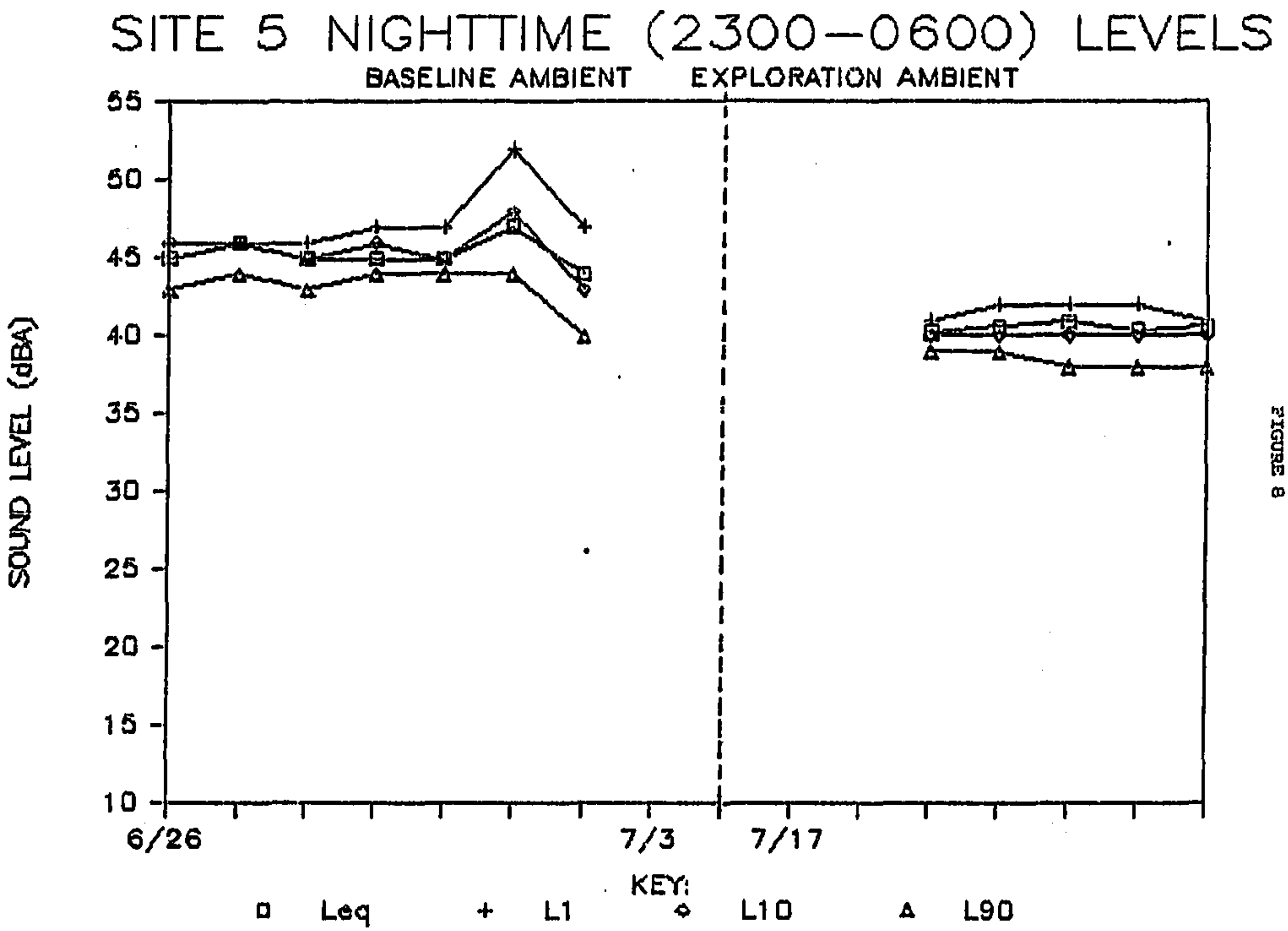


FIGURE 7



SITE 5 NIGHTTIME (2300–0600) LEVELS
BASELINE AMBIENT
EXPLORATION AMBIENT
SOUND LEVEL (dBA)
55
50
45
40
35
30
25
20
15
10
6/26
7/3
7/17
KEY:
Leq
L1
L10
L90

FIGURE 8

Water Runoff

The sound levels for nighttime hours shown in Figures 4 through 8 illustrate the dominance of water sound levels at Sites 1, 2, 4, and 5. These sites are located close to Thoma Creek (Site 1), Trail Creek (Site 2), and Red Meadow Creek (Sites 4 and 5). Site 3 is located on a mountain top and, therefore, is not near running water.

For the water-dominated sites, a large difference is shown in the figures between sound levels in June and July. This difference was found to be directly related to the difference between runoff volumes in the two periods. Figure 9 shows the mean monthly values of water flow of the north fork of the Flathead River, measured by the U.S. Geological Survey at Columbia Falls, Montana for the past five years (USGS 1984). The year 1981, when the noise measurements were taken, appears to be a relatively high water runoff year, although not the highest in the past five years. Figure 10 illustrates water flow levels which have been measured over the past five years during the June-July period (USGS 1984). Again, it is apparent that 1981 was a relatively high water runoff year for June-July, and the background sound level measurements were affected accordingly.

The observed influence of water flow on the measurements is not indicative of normal ambient conditions experienced by bears, humans, or other species in the study area. Rather, an analysis of the data shows that ambient sound levels in the study area are affected by spring runoff during a relatively short period of time (April to June), and within a relatively short distance from major creeks (about 1,000 feet). During most of the year, and over most of the study area, ambient levels are expected to be as low as or lower than the levels indicated by the July measurements shown in Figures 4 through 8.

To better define the low ambient levels which occur during the middle and later portions of the exploration season, it is recommended that additional baseline ambient measurements be carried out in areas and during time periods which are not significantly influenced by running water.

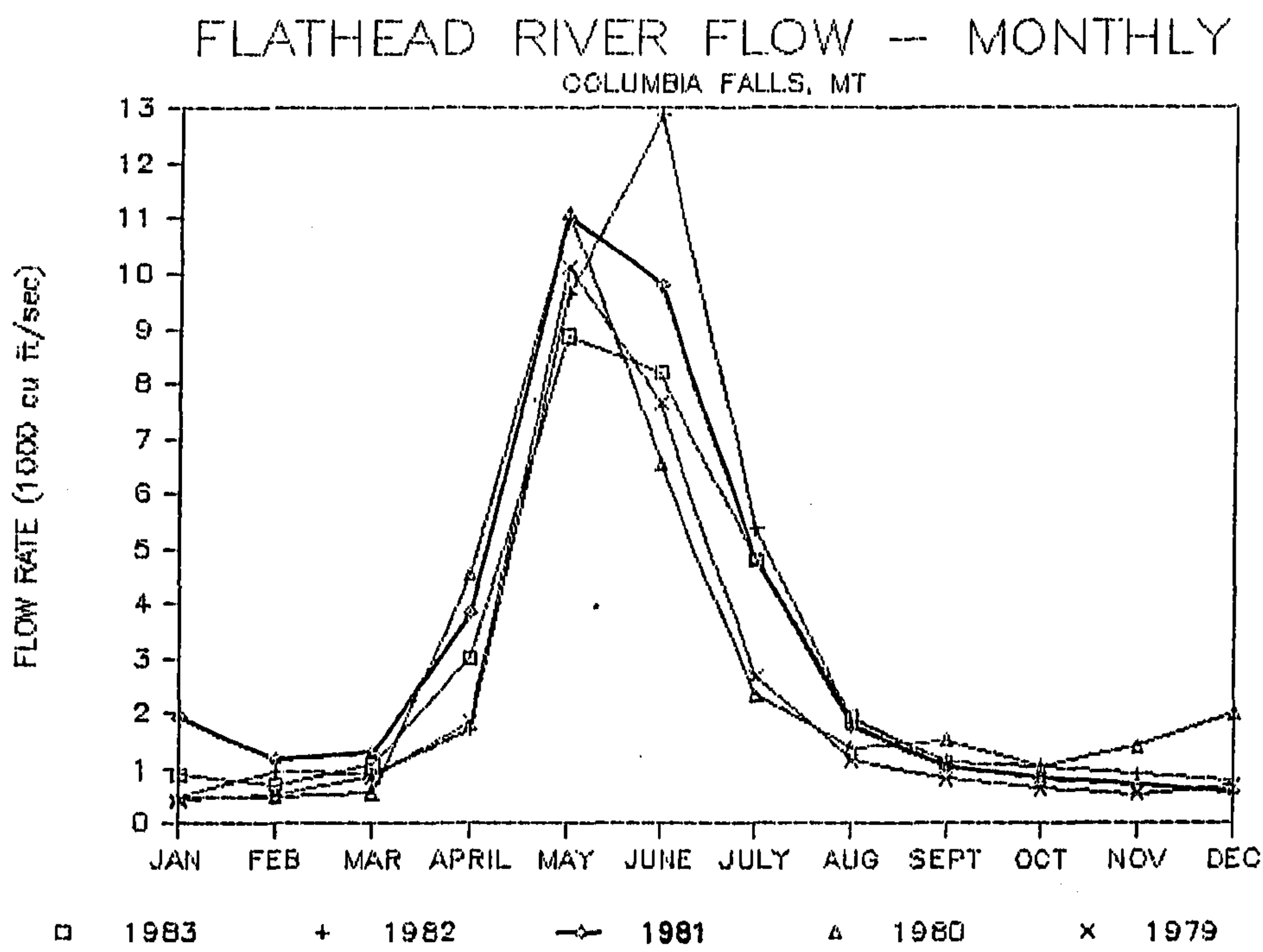

FLATHEAD RIVER FLOW -- MONTHLY
COLUMBIA FALLS, MT
FLOW RATE (1000 cu ft/sec)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
JAN
FEB
MAR
APRIL
MAY
JUNE
JULY
AUG
SEPT
OCT
NOV
DEC
□ 1983
+ 1982
—◇— 1981
△ 1980
× 1979

FIGURE 9

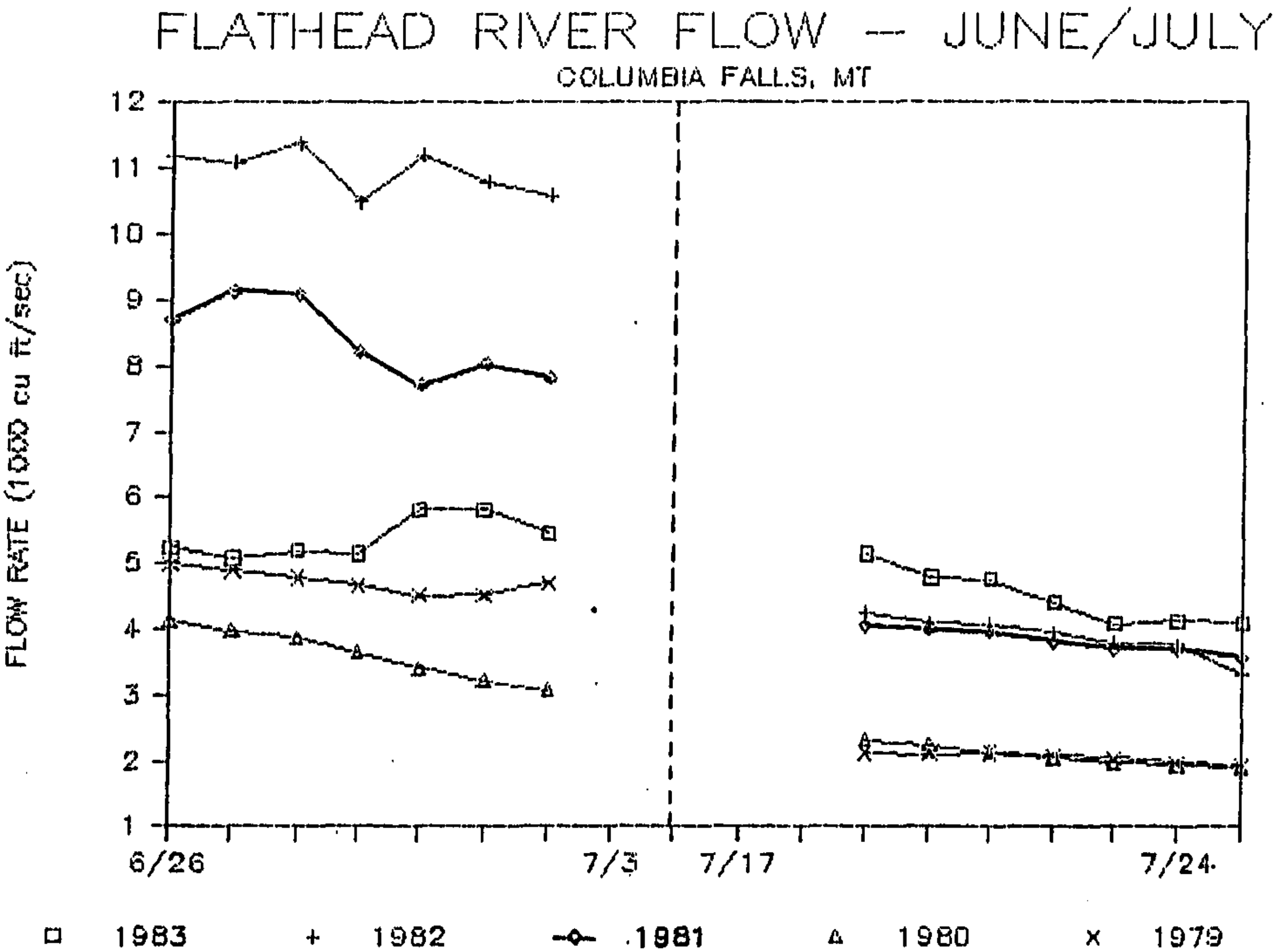

FLATHEAD RIVER FLOW — JUNE/JULY
COLUMBIA FALLS, MT
FLOW RATE (1000 cu ft/sec)
12
11
10
9
8
7
6
5
4
3
2
1
6/26
7/3
7/17
7/24
1983
1982
1981
1980
1979

FIGURE 10

Other Influences

Variations are observed in the nighttime sound level data presented in Figures 4 through 8 which are not obviously attributable to changes in water runoff. At Site 3 (Figure 6), a drop of 20 dB in both average levels (L_{eq}) and statistical levels (L_1, L_{10}, L_{90}) was observed over a three-day period, and a similar rise was observed over the following three days. Site 3 is on a mountain top and is, therefore, heavily influenced by sounds generated from greater distances than are the other sites. Changes in relative humidity and other meteorological factors characteristic of a frontal system moving through the area could have contributed to these substantial changes in ambient sound level.

Ambient Octave Band Levels

Short segments of tape recordings made in Flathead, Glacier, and Helena were analyzed to obtain representative octave band sound pressure levels of the ambient environment. These results are shown in Table 3 for Sites 1, 2, 7, 8, 10, and 21. These values are used in Chapter 6 to estimate audibility of exploration activity.

4.2 DAYTIME SOUND LEVELS DURING EXPLORATION

Sound levels measured at the five sites during the daytime exploration activity are shown in Figures 11 through 15. The figures show that the sound levels were highest at all sites on the second day of measurement (July 20). On this date, much seismic equipment was being flown in to begin the exploration, and the equipment was being set up. Levels were highest at Site 2, the site nearest the drilling and blasting activity. Here, daytime L_{eq}'s exceeded 52 dB for three days in a row. These levels represent a major change in sound environment, in spite of the presence of water as a sound source near Site 2. In the remaining sites, daytime L_{eq}'s ranged from 32 to 44 dB indicating that the exploration activity was audible, but not always dominant.

TABLE 3. AMBIENT OCTAVE BAND LEVELS

AMBIENT OCTAVE BAND LEVELS SITE 1 (Flathead National Forest)

July 2, 1981 Time : 105015-110045

Filter	Leq	Lmx	Lmn	Lmean	L.01	L.1	L1	L5	L10	L50	L90	L99	S.D.
31.5	39.1	61.0	36.3	29.2	62	57	49	44	41	35	32	30	3.6
63	40.4	45.1	40.2	35.5	46	45	43	42	41	40	38	37	1.3
125	42.9	47.0	42.8	38.6	48	46	45	44	44	42	41	40	1.2
250	35.9	39.9	35.8	33.2	40	38	37	46	36	35	34	34	0.7
500	39.0	41.3	39.0	36.6	42	40	40	39	39	38	38	37	0.6
1000	39.4	41.8	39.4	37.5	42	40	40	40	39	39	38	38	0.4
2000	39.1	40.9	39.0	37.3	41	40	39	39	39	39	38	38	0.4
4000	38.5	42.4	38.5	37.0	43	42	40	39	39	38	38	37	0.6
8000	35.7	43.8	35.7	34.1	44	42	37	36	36	35	35	34	0.5
16000	26.1	28.3	26.1	24.5	29	28	26	26	26	26	25	25	0.3
All pass	50.8	62.3	49.7	47.2	63	61	56	53	51	49	48	47	1.7
A-weighted	45.9	47.4	45.9	44.5	48	47	46	46	46	44	45	45	0.3

AMBIENT OCTAVE BAND LEVELS SITE 2 (Flathead National Forest)

July 2, 1981 Time : 115125-120125

Filter	Leq	Lmx	Lmn	Lmean	L.01	L.1	L1	L5	L10	L50	L90	L99	S.D.
31.5	40.1	60.3	35.8	10.4	61	58	50	45	42	35	31	14	6.2
63	32.5	50.6	30.7	10.4	51	44	40	35	33	31	28	13	4.4
125	29.1	39.3	28.2	12.4	40	37	32	31	30	29	26	14	3.5
250	34.1	40.8	33.4	20.5	41	37	36	35	35	34	31	21	3.1
500	37.7	41.0	37.2	26.0	42	40	39	39	38	38	34	27	2.7
1000	38.1	41.0	37.7	28.2	42	40	39	39	39	38	35	29	2.5
2000	35.0	40.6	34.6	27.1	41	40	37	36	36	35	32	27	2.1
4000	31.0	38.6	30.6	24.1	39	38	35	33	32	30	28	24	1.9
8000	26.8	37.5	26.0	20.5	38	37	35	29	27	25	23	21	2.3
16000	22.5	29.3	22.2	18.0	30	28	26	23	23	22	19	18	1.4
All pass	47.9	65.5	45.8	33.5	66	62	56	52	50	45	43	34	4.1
A-weighted	42.1	46.0	41.7	33.5	47	44	43	43	43	42	39	34	2.2

AMBIENT OCTAVE BAND LEVELS SITE 7 (Glacier National Park)

July 1, 1981 Time : 124914-125914

Filter	Leq	Lmx	Lmn	Lmean	L.01	L.1	L1	L5	L10	L50	L90	L99	S.D.
31.5	36.1	53.9	29.4	19.4	54	52	48	42	38	27	23	21	6.0
63	43.2	61.9	27.8	17.4	62	61	57	48	40	24	21	19	8.5
125	36.7	53.8	25.2	17.0	54	53	50	43	33	22	19	18	7.1
250	27.6	45.7	24.7	17.4	46	43	39	30	28	23	21	20	3.4
500	27.7	41.2	26.9	20.4	42	40	36	28	28	26	25	24	1.8
1000	25.4	40.7	24.4	19.4	41	38	34	27	25	24	23	22	2.0
2000	20.9	35.6	19.7	16.4	36	33	30	23	21	19	18	17	2.2
4000	23.4	39.8	19.4	14.1	40	38	35	29	26	17	15	14	4.5
8000	19.8	38.5	16.0	13.2	39	38	30	23	19	14	13	13	3.4
16000	11.1	24.6	10.7	10.2	25	24	11	11	10	10	10	10	1.0
All pass	45.6	61.7	38.1	31.3	62	61	58	52	47	35	33	32	6.2
A-weighted	31.5	44.5	29.9	26.2	45	43	41	36	32	29	27	27	2.8

(continued)

TABLE 3 (Continued)

AMBIENT OCTAVE BAND LEVELS SITE 8 (Glacier National Park)

July 2, 1981 Time : 144716-145916

filter	Leq	Lmx	Lmn	Lmean	L.01	L.1	L1	L5	L10	L50	L90	L99	S.D.
31.5	33.3	50.0	29.4	16.4	51	44	41	38	37	28	22	19	6.0
63	28.8	44.4	26.6	15.4	45	42	35	33	32	26	21	19	4.2
125	24.9	41.1	23.8	13.1	42	35	31	29	27	23	20	18	2.8
250	24.8	42.7	24.3	14.0	43	35	29	27	26	24	22	19	1.9
500	24.7	43.8	24.2	11.4	44	37	29	26	25	24	22	19	1.6
1000	20.8	38.8	18.9	8.0	39	35	27	22	21	18	17	11	2.2
2000	16.4	35.5	14.0	4.3	36	33	27	19	17	13	12	5	3.1
4000	18.7	39.6	14.7	4.4	40	36	30	24	19	13	12	6	4.0
8000	15.8	36.6	12.3	-4.7	37	34	27	19	15	11	10	5	3.4
16000	6.4	21.6	6.6	4.4	22	19	12	8	6	5	5	4	1.3
All pass	36.8	51.5	35.1	22.5	52	48	43	41	40	34	31	28	3.6
A-weighted	26.6	47.7	25.0	13.4	48	42	35	29	27	24	23	18	2.6

AMBIENT OCTAVE BAND LEVELS SITE 10 (Glacier National Park)

July 1, 1981 Time : 142200-143200

filter	Leq	Lmx	Lmn	Lmean	L.01	L.1	L1	L5	L10	L50	L90	L99	S.D.
31.5	45.3	59.8	35.7	23.4	60	59	57	51	50	31	27	25	8.9
63	39.5	55.0	33.5	25.4	56	54	52	43	40	31	29	27	5.2
125	32.3	46.0	30.4	24.4	47	45	43	37	33	29	27	26	3.0
250	29.3	47.4	28.3	24.4	48	45	37	31	29	27	26	25	2.0
500	30.9	43.6	30.7	27.4	44	39	34	32	31	30	29	28	1.1
1000	31.6	43.9	31.4	29.0	44	40	35	33	32	31	30	29	1.2
2000	27.6	40.9	27.1	25.1	41	38	34	29	28	26	26	25	1.4
4000	25.7	42.9	24.1	21.4	43	41	35	28	27	23	22	21	2.5
8000	21.2	41.2	19.0	17.2	42	37	32	22	20	18	17	17	2.5
16000	16.9	25.1	16.7	15.3	26	23	19	18	18	16	15	15	1.1
All pass	47.2	61.6	42.2	36.5	62	61	58	53	50	39	39	36	5.6
A-weighted	35.0	43.8	34.8	32.5	44	41	38	36	36	34	33	33	1.0

****

AMBIENT OCTAVE BAND LEVELS SITE 15 (Helena National Forest)

July 16, 1981 Time : 125845-125930

filter	Leq	Lmx	Lmn
31.5	30.4	63.3	22.5
63	27.0	33.2	21.1
125	24.6	34.5	18.4
250	26.3	34.9	22.3
500	25.4	34.5	22.2
1000	23.9	33.2	21.4
2000	21.2	26.5	19.3
4000	18.4	26.3	16.4
8000	14.0	21.6	12.4
16000	8.1	10.5	7.4
All pass	36.0	42.5	32.5
A-weighted	28.9	36.1	26.5

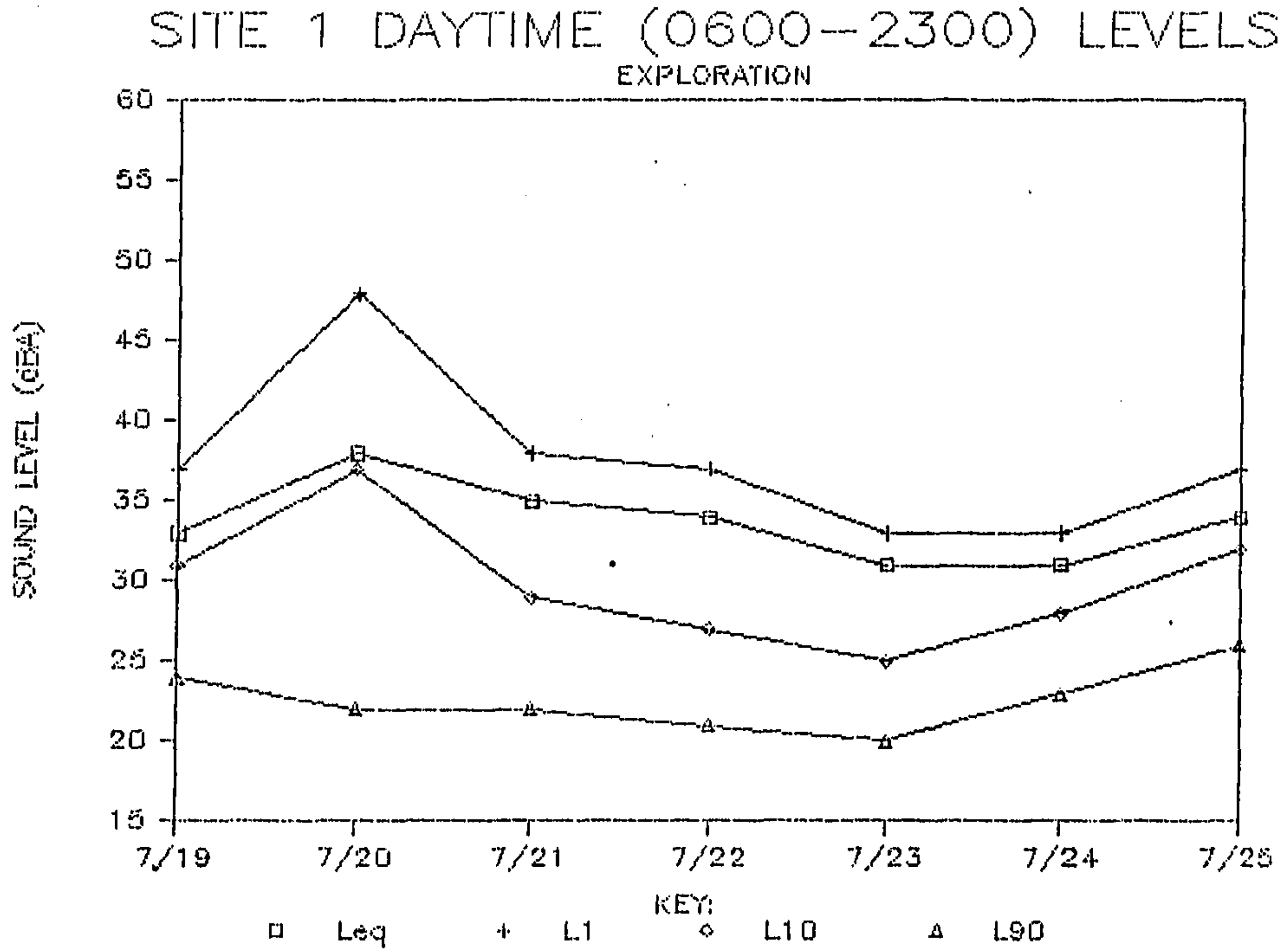
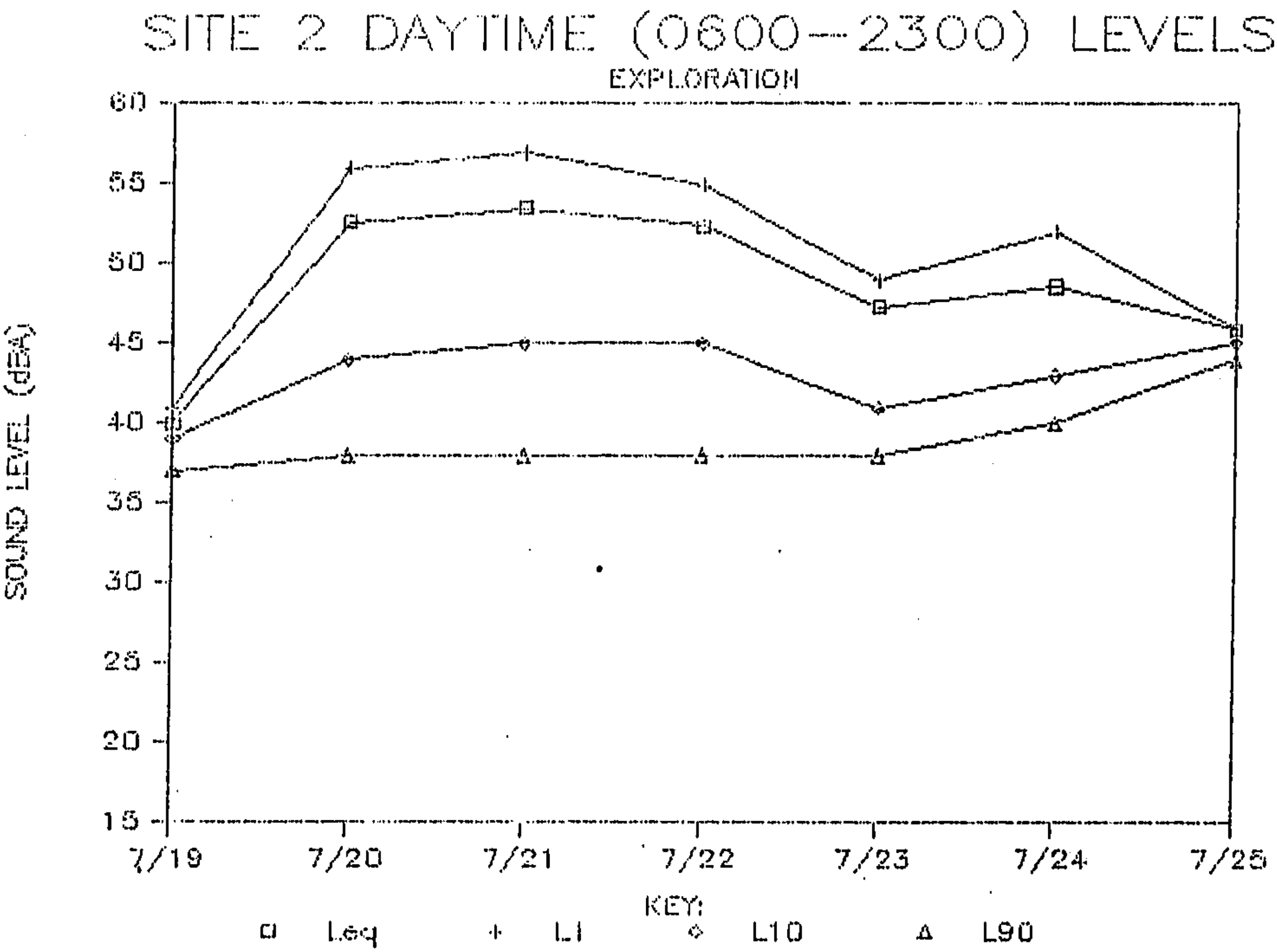

SITE 1 DAYTIME (0600-2300) LEVELS
EXPLORATION
SOUND LEVEL (dBA)
60
55
50
45
40
35
30
25
20
15
7/19
7/20
7/21
7/22
7/23
7/24
7/25
KEY:
□ Leq
+ L1
◇ L10
Δ L90

FIGURE 11



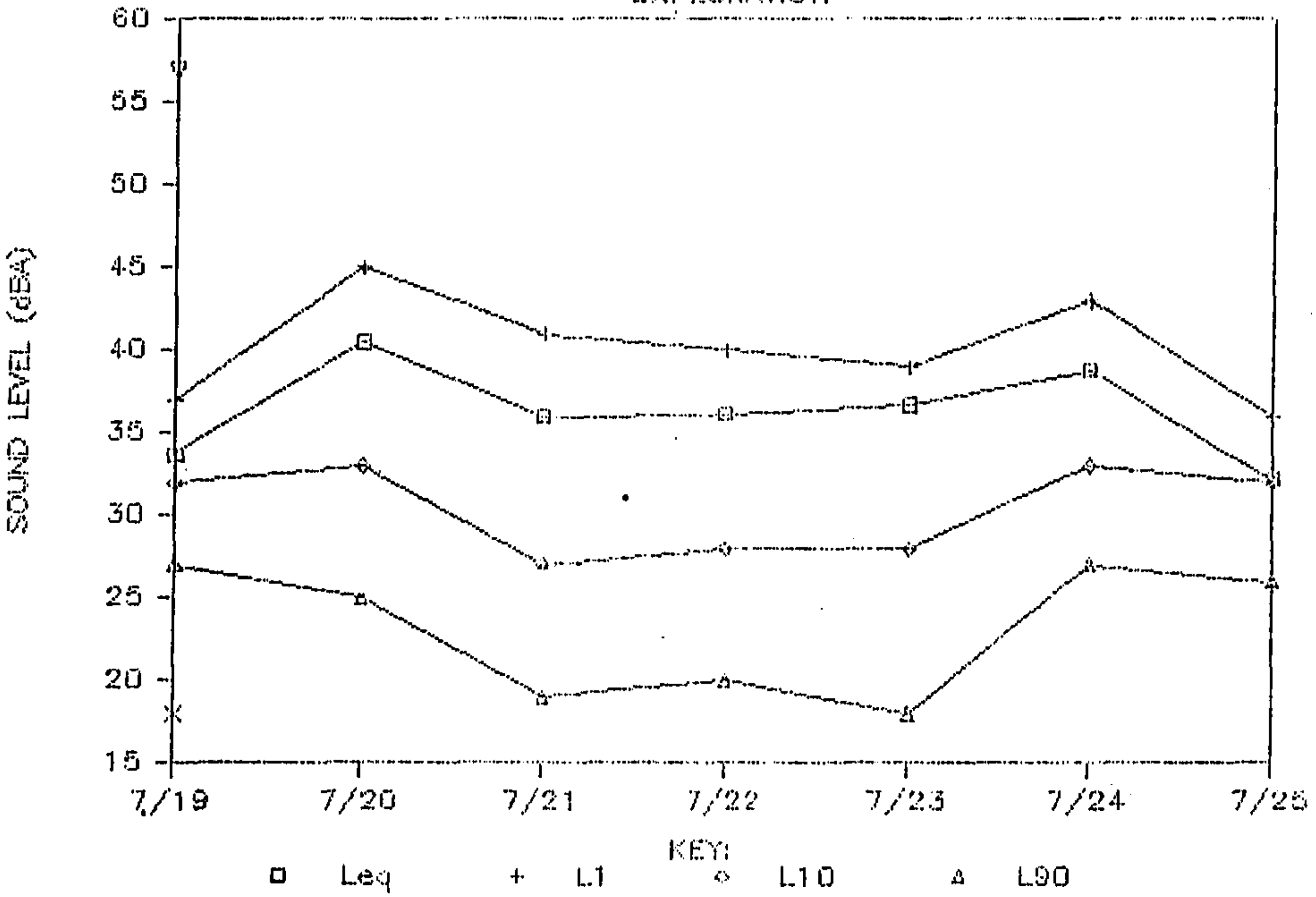
SITE 2 DAYTIME (0600-2300) LEVELS
EXPLORATION
SOUND LEVEL (dBA)
60
55
50
45
40
35
30
25
20
15
7/19
7/20
7/21
7/22
7/23
7/24
7/25
KEY:
Leq
L1
L10
L90

FIGURE 12

FIGURE 13

SITE 3 DAYTIME (0600–2300) LEVELS

EXPLORATION



SITE 4 DAYTIME (0600–2300) LEVELS

EXPLORATION

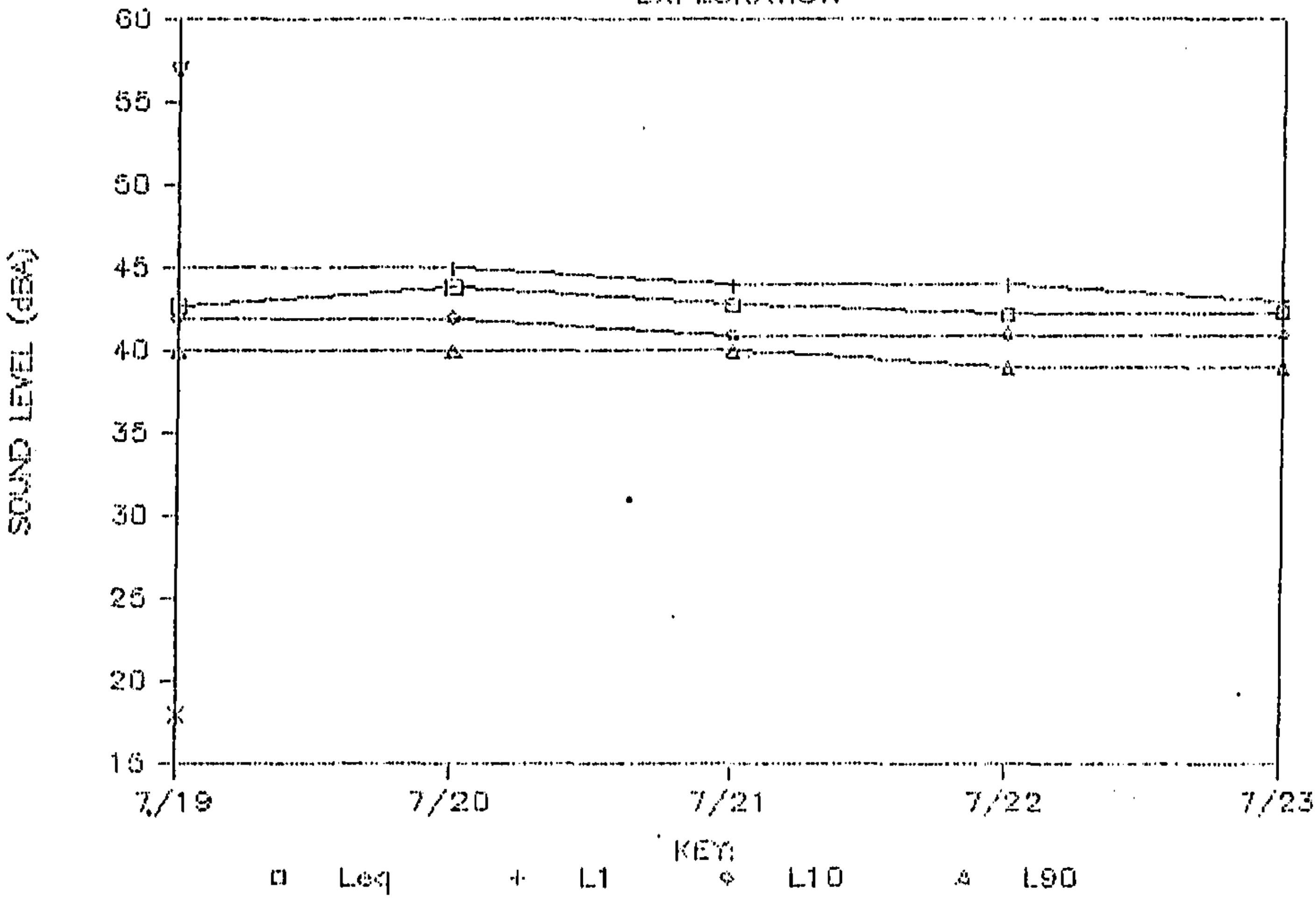
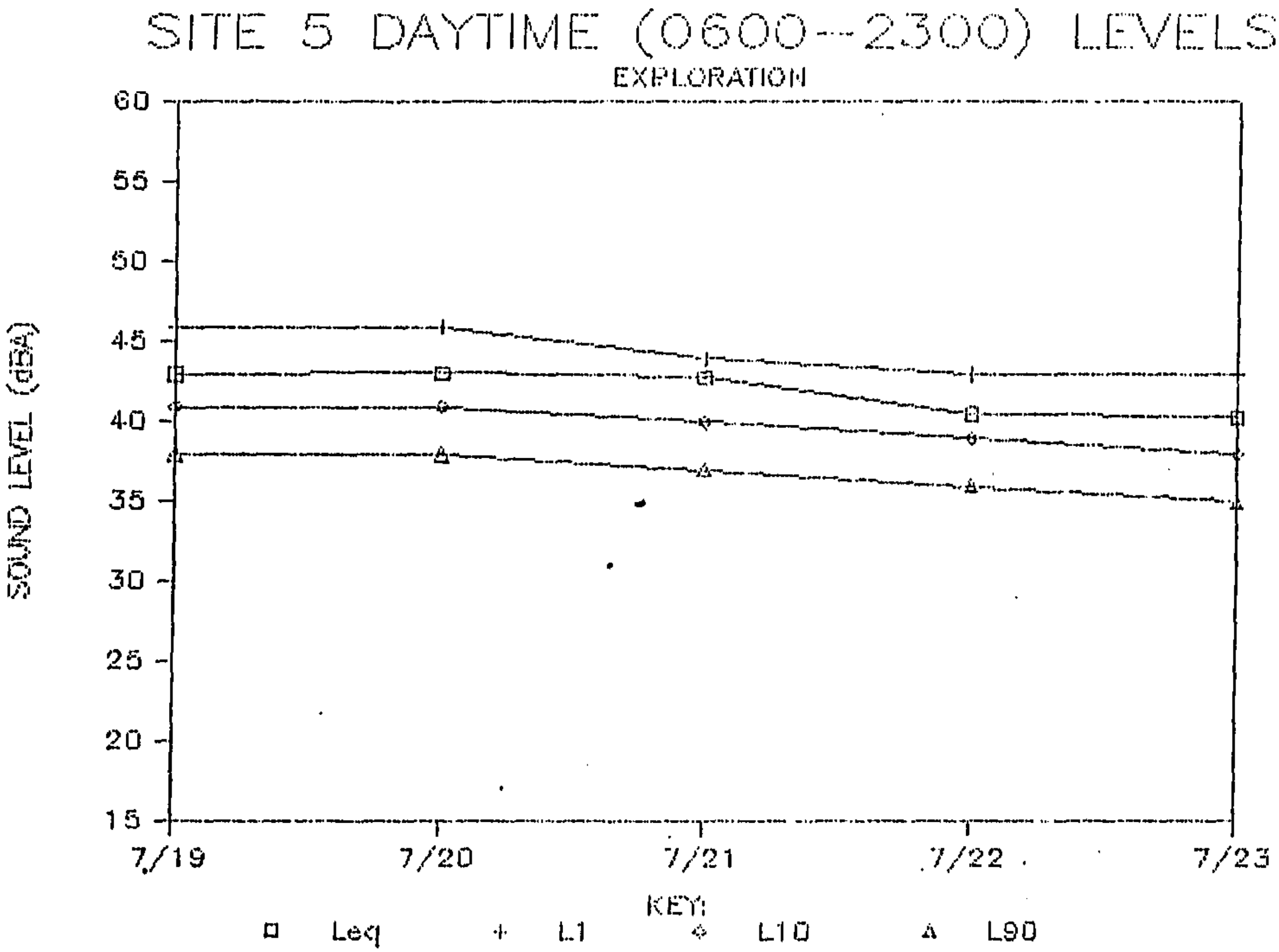


FIGURE 14



SITE 5 DAYTIME (0600--2300) LEVELS
EXPLORATION
SOUND LEVEL (dBA)
60
55
50
45
40
35
30
25
20
15
7/19
7/20
7/21
7/22
7/23
KEY:
Leq
L1
L10
L90

FIGURE 15

4.3 HELICOPTERS

Helicopter sound levels were measured in both Flathead and Helena National Forests. Spectral values for helicopter flybys measured in Helena are presented in Appendix D. The exact distances of these flybys were not known, therefore, this data was not analyzed further, and data measured in Flathead was used in the following analysis.

<u>Maximum Levels</u>

Data on helicopters at Sites 11 through 17 in Flathead were collected at approximately known distances from the flight paths. Energy averages of the flat and A-weighted maximum flyby levels taken at these sites are shown in Table 4.

TABLE 4. MAXIMUM HELICOPTER SOUND LEVELS

Site	Slant Distance to Helicopter, m	Number of Measurements	L_{Amax}, dBA	L_{max}, dB
11	655	17	66.0	-
12	122	11	-	87.9
		10	74.0	-
		28	73.9	-
13	655	11	-	89.4
14	1,310	11	64.2	-
16	1,690	11	69.1	-
17	122	37	76.9	-

Based on these data, the least squares fit was obtained for the following relationship between L_{Amax} and distance:

$$L_{Amax}(r) = L_{Amax}(r_o) - A \log (r/r_o), \quad (1)$$

where r is the receptor distance,

r_o is the reference distance, chosen to be 305 m,

$L_{Amax}(r_o)$ is the maximum A-weighted level at the reference distance, found to be 71.4 dBA.

and A is the spatial attenuation coefficient, found to be 8.0.

This relationship indicates that helicopter noise decayed at the rate of 2.4 dBA per doubling of distance during these measurements. This low rate of decay may be due to a combination of factors, including the directivity of helicopter sound and the valley-like location of the measurement sites.

Octave Band Levels

In order to be able to estimate how helicopter sound levels are attenuated over distance from the maximum levels given above, the spectral shape of the helicopter sound was analyzed. First, for ten flybys at Site 11, the maximum unweighted level in each octave band which occurred during the event, L_{max}(oct), was tabulated. Then, the overall maximum sound pressure level, L_{max} (the result of adding all the octave band levels together), was subtracted from each of the octave band levels. These results are shown in Table 5. Since the overall level is higher than the octave band levels, the difference is a negative number.

The arithmetically averaged spectral shape shown in the table indicates that unweighted helicopter sound levels are highest at the lower frequencies (31.5 to 125 Hz); that is, the difference between the maximum octave band level and the maximum overall level is the smallest. Correspondingly, the sound levels at the higher frequencies (1,000 to 2,000 Hz) are low. Since sound at lower frequencies is attenuated less by the atmosphere and other factors than sound at higher frequencies, the dominance of the low frequency helicopter sound will increase beyond what is shown in the table at greater distances from the helicopter. Methods for estimating this attentuation at larger distances are provided in Chapter 6.

4.4 BLASTS

Maximum Levels

Maximum sound levels for blasts measured in Helena are listed in Table 6 for each of the four measurement stations. Blasts were repeated at some of the shot points, and sound level readings for these replications were found to be similar.

TABLE 5. HELICOPTER OCTAVE BAND LEVELS

Site 11 Helicopter Overflight

Time	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz
1:04	-7.0	-8.7	-9.8	-9.7	-1.7	-8.0	-16.0
2:10	-3.4	-4.6	-6.8	-6.4	-7.6	-12.2	-25.5
3:21	-8.0	-11.7	-9.0	-11.8	-5.4	-9.8	-21.5
4:41	-4.7	-6.1	-5.0	-5.3	-1.3	-2.3	-17.5
6:48	-6.3	-11.6	-2.0	-8.5	-12.4	-13.1	-27.5
8:00	-6.7	-12.3	-13.4	-16.0	-14.9	-17.8	-31.1
9:32	-8.8	-9.0	-3.2	-5.2	-7.1	-8.6	-20.2
14:16	-3.4	-12.8	-4.8	-8.7	-12.8	-15.4	-29.6
15:19	-9.8	-10.9	-6.4	-9.2	-10.7	-11.9	-26.4
16:17	-8.4	-11.9	-4.9	-10.5	-5.9	-10.5	-23.3
Arithmetic Average	-6.7	-10.0	-6.5	-9.1	-8.0	-11.0	-23.9
Standard Deviation	2.2	2.8	3.4	3.2	4.6	4.3	5.1

TABLE 6. MAXIMUM BLAST SOUND LEVELS

Sound Levels at Measurement Site, dB
(Shot point of site in parentheses)

Shot Point	18 (1082) Lmax	19 (1084) Lmax	20 (1086) Lmax	21 (1088) Lmax
1069	--	119.9	--	--
1070	--	118.5	--	--
1071	--	117.2	--	--
1072	--	117.0	117.3	--
1073	102.9	117.4	118.8	97.0
1074	101.6	118.7	118.5	96.7
1075	104.3	119.6	--	98.2
1076	102.5	127.2	122.8	96.7
1077	105.4	123.0	--	100.2
1096	93.3	115.6	126.2	104.8
1097	92.7	115.4	121.9	102.4
1098	--	115.3	122.3	105.1
1099	--	109.9	117.1	102.6
1100	--	115.0	123.4	98.7
1101	--	114.7	122.9	100.3
1102	--	114.5	121.5	--
1103	94.3	117.5	125.9	100.8
1096	92.8	112.5	125.5	106.7
1097	99.2	109.2	123.8	106.7

(continued)

TABLE 6 (continued)

Shot Point	18 (1082) Lmax	19 (1084) Lmax	20 (1086) Lmax	21 (1088) Lmax
1098	92.8	107.5	121.51	108.7
1099	--	105.8	118.5	108.6
1100	93.2	106.8	120.6	98.7
1101	--	104.5	119.7	98.7
1102	91.8	104.5	119.2	98.7
1103	98.4	109.8	117.7	98.7
1104	98.2	113.5	121.5	90.3
1105	97.1	108.4	116.4	91.5
1106	--	104.8	111.3	--
1107	93.1	101.2	--	--
1108	100.8	102.4	110.4	--
1109	91.9	98.0	106.2	--
1110	--	95.3	101.6	--
1111	93.3	101.8	107.6	--
1112	--	99.7	106.7	--
1113	--	98.4	106.0	--
1114	--	97.8	--	--

The overall unweighted maximum sound pressure levels (L_{max}) of blasts measured at Sites 18, 19, 20, and 21 were analyzed to determine how the sound levels varied with distance. The analysis yielded a relationship of the following form:

$$L_{max}(r) = L_{max}(r_o) - B \log (r/r_o) \qquad (2)$$

where r is the distance to the receiver

r_o is the reference distance, chosen to be 305 m

$L_{max}(r_o)$ is the maximum sound pressure level at the reference distance

and B is the spatial attenuation coefficient.

Using a least squares fit to this equation from the data in Table 6, the following results were found for each measurement site:

Site	Location	$L_{max}(r_o)$, dB	B
18	1082	102.7	20.3
19	1084	127.0	43.5
20	1086	134.3	43.6
21	1088	111.9	41.7

The difference in overall sound pressure level maxima at the reference distance varied by more than 30 dB among the sites. These results mean that the overall maximum sound pressure level depends on the observation point and the intervening terrain, not just on the distance between source and observer. The data also indicate that the overall maximum sound pressure level fell approximately 13 dB per doubling of distance (43 x log 2 = 13) for Sites 19, 20, and 21, but only 6 dB per doubling of distance for Site 18.

Tape recordings at Site 21 enabled a similar analysis to be made of maximum A-weighted sound levels (L_{Amax}) at location 1088, yielding results of the form:

$$L_{Amax}(r) = L_{Amax}(r_o) - C \log (r/r_o) \qquad (3)$$

where L_{Amax} is 106.5 dBA for r_o = 305 m (1,000 ft),

and C is 74.2 dBA.

These results indicate that the maximum A-weighted sound level of blasts fell approximately 22 dBA per doubling of distance (74 x log 2 = 22) for this observation point.

Octave Band Levels

Table 7 shows the maximum octave band levels and overall levels (noted as "all pass" in the table) for blasts measured at Site 21. To develop information on how these maximum levels decay with distance, the contribution of individual frequency bands to the overall level was evaluated. For the six blasts in the table for which data was available, the difference between each octave band level and the overall level was obtained. For instance, for the first event shown in Table 7, Blast 1073, the difference between the lowest octave band level (31.5 Hz) and the overall (all pass) level is 87.5 - 92.8 = -5.3 dB.

These differences were then arithmatically averaged for each octave band level and the overall level is (-5.3 - 2.3 - 0.0 - 2.0 - 3.4 - 2.4)/6 = -2.6 dB. Values of these average differences estimated in this way for each octave band are shown below.

Octave Band, Hz	31.5	63	125	250	500	1,000
L_{max} (oct) - L_{max}, dB	-2.6	-7.1	-11.9	-15.1	-15.5	-18.5

Note that levels measured in the 2,000 Hz band were too low to consider for analysis.

These octave band results may be used in conjunction with the overall maximum sound pressure level results given in the previous subsection to estimate maximum sound levels as a function of distance. Note that these results are not adjusted for barrier influences or terrain. Such adjustments are recommended if more detailed treatment of the data is desired.

Duration

The "time above" results shown in Table 7 for blast sound levels at location 1088 yield an average decay rate of 6 dBA/sec for blasts at different distances (Figure 16). The data also suggest, but do not establish convincingly, that the decay rate decreases as the separation between source and receiver increases.

TABLE 7. HELENA BLAST MEASUREMENTS

Blast Octave Band Levels and Durations

OCTAVE BAND LEVELS Blast 1073 (Helena National Forest)

July 16, 1981 Time : 140055

filter, Hz	Lmx, dB	time above Lmx - 5 dB (seconds)	time above Lmx - 10 dB	time above Lmx - 15 dB	time above Lmx - 20 dB	time above Lmx - 25 dB
31.5	87.5					
63	84.9		1.548	2.814	3.524	
125	82.7		0.774	1.372		
250	76.5		3.198			
500	76.9					
1000	73.9					
2000	68.2					
all pass	92.8					
A-weighted	78.8	0.9	2.000	3.846		

OCTAVE BAND LEVELS Blast 1074 (Helena National Forest)

July 16, 1981 Time : 140548

filter, Hz	Lmx, dB	time above Lmx - 5 dB (seconds)	time above Lmx - 10 dB	time above Lmx - 15 dB	time above Lmx - 20 dB	time above Lmx - 25 dB
31.5	90.3					
63	85.1					
125	78.4					
250	76.5					
500	74.6					
1000	72.7					
2000	66.9					
all pass	92.6					
A-weighted	78.7					

OCTAVE BAND LEVELS Blast 1075 (Helena National Forest)

July 16, 1981 Time : 141214

filter, Hz	Lmx, dB	time above Lmx - 5 dB (seconds)	time above Lmx - 10 dB	time above Lmx - 15 dB	time above Lmx - 20 dB	time above Lmx - 25 dB
31.5	94.2					
63	88.8					
125	79.0					
250	75.7					
500	76.4					
1000	71.9					
2000	65.3					
all pass	94.2					
A-weighted	76.1					

(continued)

TABLE 7 (Continued)

OCTAVE BAND LEVELS Blast 1096a (Helena National Forest)

July 16, 1981 Time : 150156

filter, Hz	Lmx, dB	time above Lmx − 5 dB (seconds)	time above Lmx − 10 dB	time above Lmx − 15 dB	time above Lmx − 20 dB	time above Lmx − 25 dB
31.5	101.6					
63	98.6		1.072	1.822	2.448	
125	98.2		0.724	1.322	1.646	
250	96.2		0.974	1.598	2.620	
500	96.8					
1000	95.5					
2000	88.7					
all pass	103.6					
A-weighted	98.6	0.620	1.024	1.620	2.346	3.350

OCTAVE BAND LEVELS Blast 1100b (Helena National Forest)

July 16, 1981 Time : 165120

filter, Hz	Lmx, dB	time above Lmx − 5 dB (seconds)	time above Lmx − 10 dB	time above Lmx − 15 dB	time above Lmx − 20 dB	time above Lmx − 25 dB
31.5	93.5					
63	90.6		1.096	2.122		
125	86.0		0.750	1.522		
250	79.7		0.774	3.572		
500	79.0					
1000	75.6					
2000	73.7					
all pass	96.9		1.157		3.072	
A-weighted	81.9	0.322	1.822			

OCTAVE BAND LEVELS Blast 1105 (Helena National Forest)

July 16, 1981 Time : 180130

filter, Hz	Lmx, dB	time above Lmx − 5 dB (seconds)	time above Lmx − 10 dB	time above Lmx − 15 dB	time above Lmx − 20 dB	time above Lmx − 25 dB
31.5	89.0					
63	80.8	0.448	1.870	2.448		
125	78.0	0.524	0.948	1.924		
250	76.2	0.524	1.148	2.672		
500	74.8					
1000	70.9					
2000	64.2					
all pass	91.4					
A-weighted	74.9	0.724	1.572			

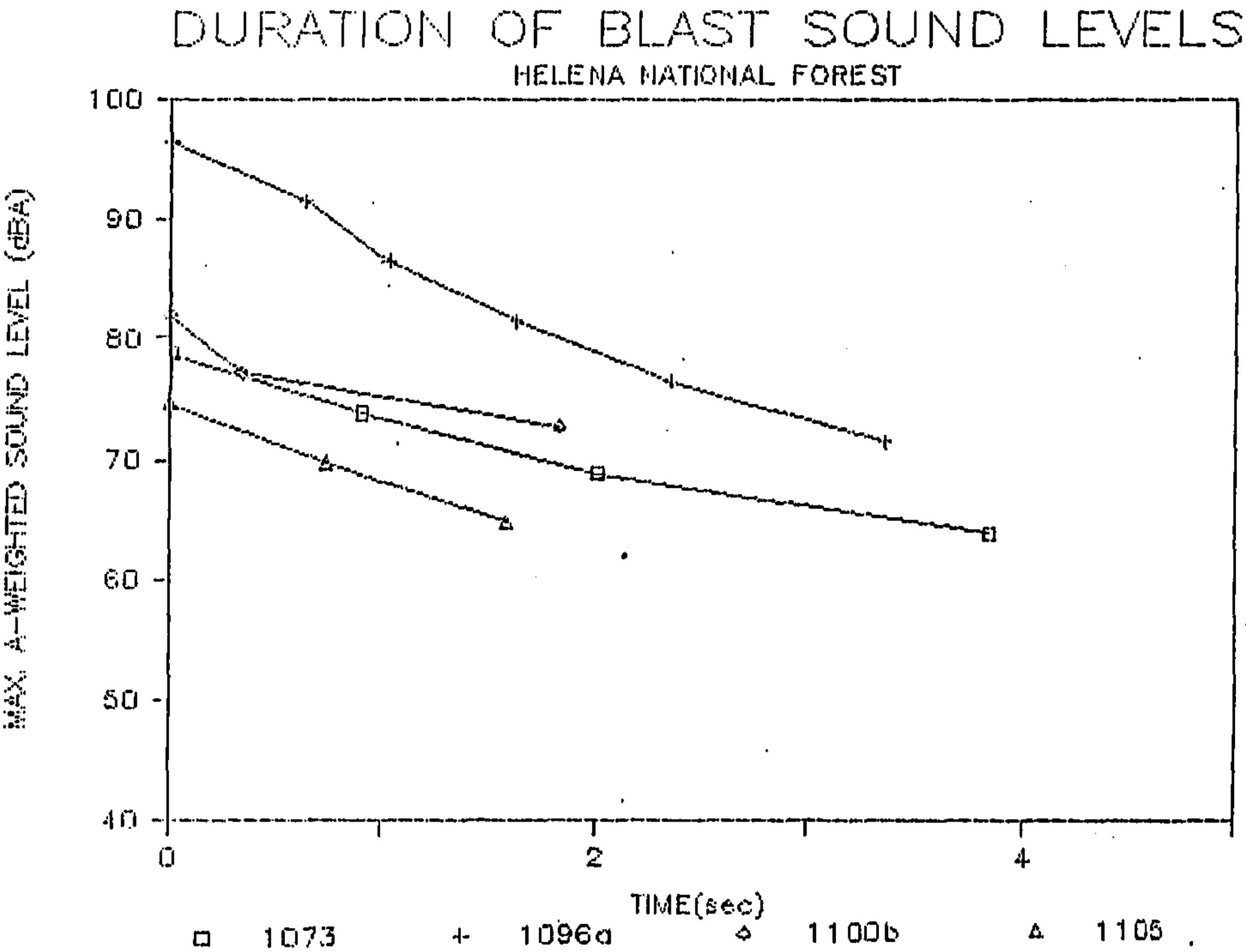
(continued)

TABLE 7 (Continued)

OCTAVE BAND LEVELS Blast 1108 (Helena National Forest)

July 16, 1981 Time : 181000

Filter, Hz	Lmx, dB	time above Lmx - 5 dB (seconds)	time above Lmx - 10 dB	time above Lmx - 15 dB	time above Lmx - 20 dB	time above Lmx - 25 dB
31.5						
63						
125						
250						
500						
1000						
2000						
all pass	78.1					
A-weighted	63.9	1.185	1.813	3.620		



DURATION OF BLAST SOUND LEVELS
HELENA NATIONAL FOREST
MAX. A-WEIGHTED SOUND LEVEL (dBA)
100
90
80
70
60
50
40
0
2
4
TIME(sec)
□ 1073
+ 1096a
◇ 1100b
Δ 1105

FIGURE 16

4.5 OTHER SOURCES

Based on discussions with observers of exploration projects which have taken place in the area, sound from equipment and activities other than helicopters and blasts are apparently important only in the immediate area where they are located (Strathy 1984, Kiefer 1984a). Trucks are driven to and from the base camp providing water, fuel, explosives, and other provisions, but the total number of visits is usually less than one per day, and would only be noticeable by observers near the travelled road.

The cumulative effect of a large number of concurrent seismic projects in the Glacier Park area, including the increased number of support jobs, additional truck travel, and related activities, may result in noticeable increases in the overall sound levels experienced near the Park boundary and in the many areas in the National Forests which are heavily explored. These cumulative increases, however, were not investigated in this study.

CHAPTER 5

PROPAGATION FACTORS

Sound propagation in the open air is influenced by a number of mechanisms. Seven of these factors considered applicable to the Glacier Park area are discussed below (Harris 1979, and Foch 1980). These factors are:

1. Attenuation, A_d, due to geometrical divergence from the source
2. Attenuation, A_b, due to barriers (mountains) between source and receiver
3. Attenuation, A_a, due to atmospheric absorbtion
4. Attenuation, A_g, due to the ground effect
5. Attenuation or enhancement, A_w, due to wind
6. Attenuation or enhancement, A_t, due to temperature gradients
7. Enhancement, A_r, due to reverberation

In this chapter, each factor is considered with respect to propagation of the two primary sources of exploration noise: blasts and helicopters. The factors are used in Chapter 7 to estimate the sound level L at a receiver using the following equation:

$$L = L_o - A_d - A_b - A_a - A_g - A_w - A_t + A_r \qquad (4)$$

where L_o is the sound level of the source at a reference distance.

This equation may be used in either of two ways. The sound level L may be derived for each octave band, in which case the octave band values for L_o and each attenuation factor must be applied consecutively for each band. Then the total value of L is obtained by adding the octave band levels (see Appendix F). Or, in a simplified and somewhat less accurate approach, the sound level L may be based on average A-weighted (see Glossary) values of the attenuation factors, in which case the equation would only be applied once with these factors.

So that the reader may follow either approach, octave band levels and A-weighted levels are provided for L_o in Chapter 4 and, wherever possible, for the attenuation factors below. In most cases, significant limitations restrict the accuracy and applicability of the methods presented for estimating each factor. These limitations are noted where appropriate.

5.1 GEOMETRICAL DIVERGENCE

Limitations

The geometrical divergence factor described below does not take into account the higher than normal decay rate found in Chapter 4 for blasts, or the lower than normal rate found for helicopters. For propagation in heavily forested areas similar to where the measurements were taken, a divergence factor similar to those proposed in Chapter 4 (equations 1-3) should be used, which already takes into account the atmospheric and ground effect factors described below. For propagation over relatively flat, open areas with hard surfaces, the values suggested in this section are probably more appropriate. Since measurements were not conducted under the latter conditions, application of these factors should be made with discretion.

Blasts

Above ground blasts are theoretically non-directional; that is, the sound level of the blast should be equal in each direction if all other factors are equal. With this assumption, this attenuation factor is for propagation over a flat surface given by:

$$A_d = 20 \log (r/r_o) \quad (5)$$

where r is the distance from source to receiver

and r_o is the reference distance, noted in Chapter 4.

If the blast charges are located such that a large cliff or mountain is behind them, relative to the receiver, or if they are located in a valley whose mouth opens toward the receiver, then divergence of the blast sound would not be non-directional. In the extreme case, where charges are set off at the head of a steep valley, propagation would be restricted to one direction, and, therefore, the attenuation rate due to divergence would be given by:

$$A_d = 10 \log (r/r_o) \tag{6}$$

If there is an incline of any sort behind the source which could reflect sound toward the receiver, an intermediate value between equation (5) and (6) might be appropriate. If, on the other hand, the elevation increases immediately in the direction of the receiver, equation (5) should be used, and a barrier attenuation factor, A_b (Section 5.2), should be included.

Helicopters

The normal altitude of helicopters flying in seismic activities is 100 to 1,000 feet, although flights above and below these altitudes commonly occur. At these average altitudes, reflective effects of the ground are only significant in the local vicinity of the helicopter and not at great distances.

The fact that helicopter sound levels are greater at certain angles than others, and the fact that sound may be impinging on the receiver from difference altitudes and points along its path, make estimates of the appropriate divergence attenuation rather difficult. One suggestion, although untested, is to use equation (6) when the helicopter is in sight and the receiver is on a flat hard surface, and to use equations (1) or (5) under other conditions.

5.2 BARRIERS

Attenuation of sound due to mountainous terrain is modeled below based on standard barrier attenuation theory (Harris 1979).

Limitations

Certain limitations restrict the accuracy and applicability of the method for estimating attenuation due to mountains:

1. This procedure is based on a simplification of acoustical propagation theory.

2. The procedure has not been calibrated against actual measurements in the Glacier Park area.

3. The procedure is designed to apply to the case of a single unbroken mountain range between source and receiver under standard (20°C, 1 atmosphere) conditions.

4. Other meteorological conditions, such as inversions and wind may alter these results.

5. Attenuation due to other factors, such as wind, temperature gradients, directivity, and reverberation must be included to estimate the overall level at the receiver.

6. For helicopters, if a mountain range is always between the source and receiver, the lowest difference in altitude between the helicopter and the mountain should be chosen (see Step 2, below). If a mountain range is not always between source and receiver, then $A_b = 0$.

Estimating Procedure

A step-by-step process is described below for estimating attenuation, by octave band levels, due to mountainous terrain.

(1) Determine the plan view (map) distance from the source to the top point on the mountain which is in line with the receiver = ________

(2) Determine the difference in height between the source and the mountain top = ________

(3) Find the slant distance between the source and the mountain point: $[(1)^2 + (2)^2]^{1/2}$ = ________

(4) Determine the map distance from the mountain point to the receiver = ________

(5) Determine the difference in height between the mountain point and the receiver = ________

(6) Find the slant distance from the mountain point to the receiver: $[(4)^2 + (5)^2]^{1/2}$ = ________

(7) Find the slant distance from source to receiver: $\{[(1) + (4)]^2 + [(2) - (5)]^2\}^{1/2}$ = ________

(8) Find the added path difference due to the mountain: (3) + (6) - (7) = ________

(9) Choose an octave band frequency to analyze: 31.5, 63, 125, 250, 500, 1,000, or 2,000 = ________

(10) Find the Fresnel number for this octave band: (8) x (9)/177* = ________

(11) Find the approximate attenuation of this octave band due to the mountain: $2[2 + \log (10)]^2$ = ________

(12) Return to (9) and find the attenuation for the next octave band = ________

---

*Use 564 if measurements are in feet instead of meters.

5.3 ATMOSPHERIC ABSORBTION

Typical Conditions

The closest continuous accurate weather records taken in the Flathead National Forest/Glacier National Park area are complied by the Polebridge Ranger Station in Glacier National Park. These records, which are compiled primarily for use in assessing forest fire risk, include daily observations of temperature, relative humidity, and average wind speed and direction, all at approximately midday. Values of temperature and humidity measured at Polebridge over the past four years are shown in Figures 17 and 18, respectively. Temperature and humidity measured during the noise measurement program are shown in Figures 19 and 20. To determine typical propagation characteristics in the area, temperature and relative humidity data from Polebridge spanning a period of three years were converted to atmospheric absorbtion attenuation coefficients (see Appendix E).

TEMPERATURE -- JUNE/JULY

POLEBRIDGE, MT.

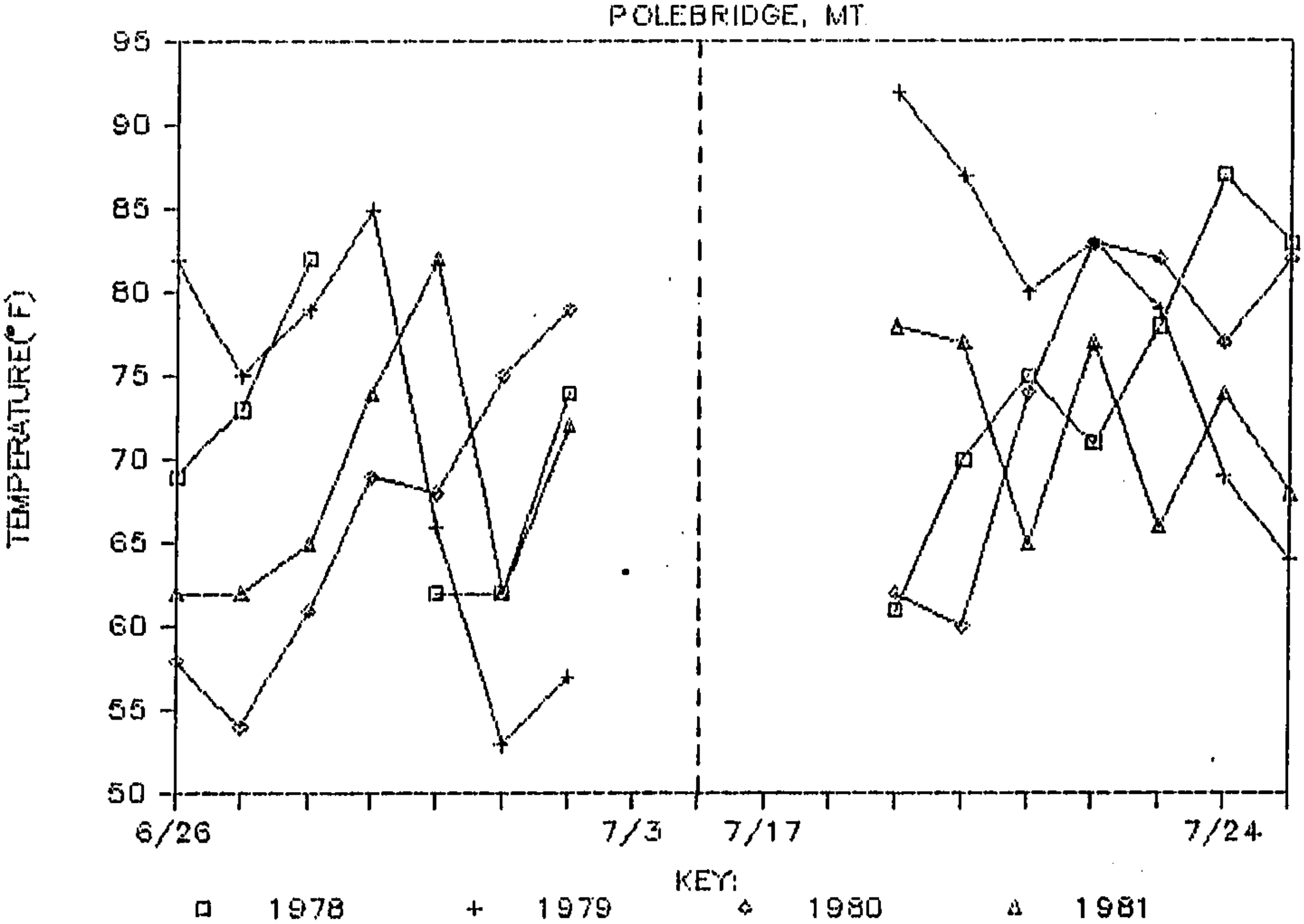


FIGURE 17

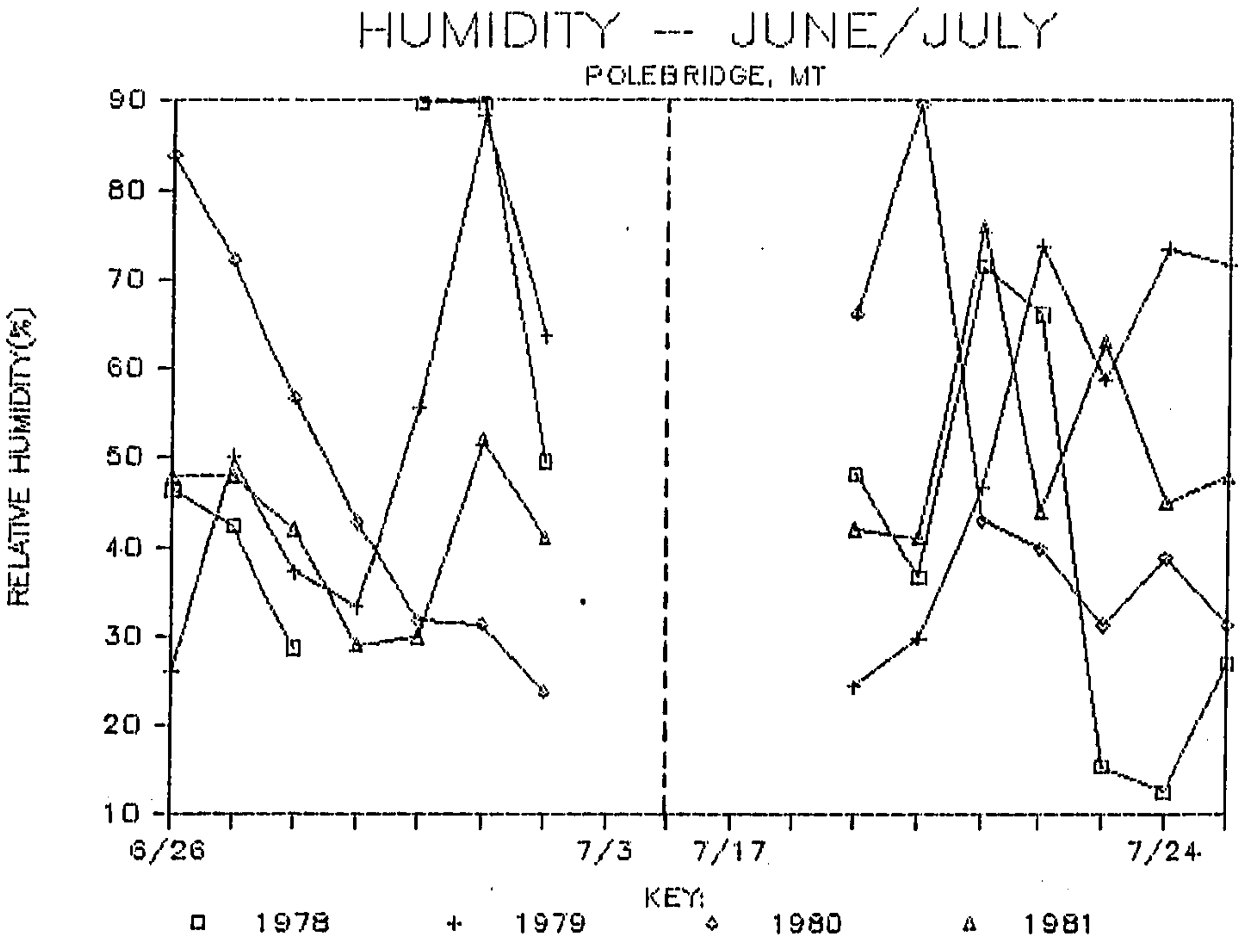

HUMIDITY -- JUNE/JULY
POLEBRIDGE, MT
RELATIVE HUMIDITY(%)
90
80
70
60
50
40
30
20
10
6/26
7/3
7/17
7/24
KEY:
1978
1979
1980
1981

FIGURE 18

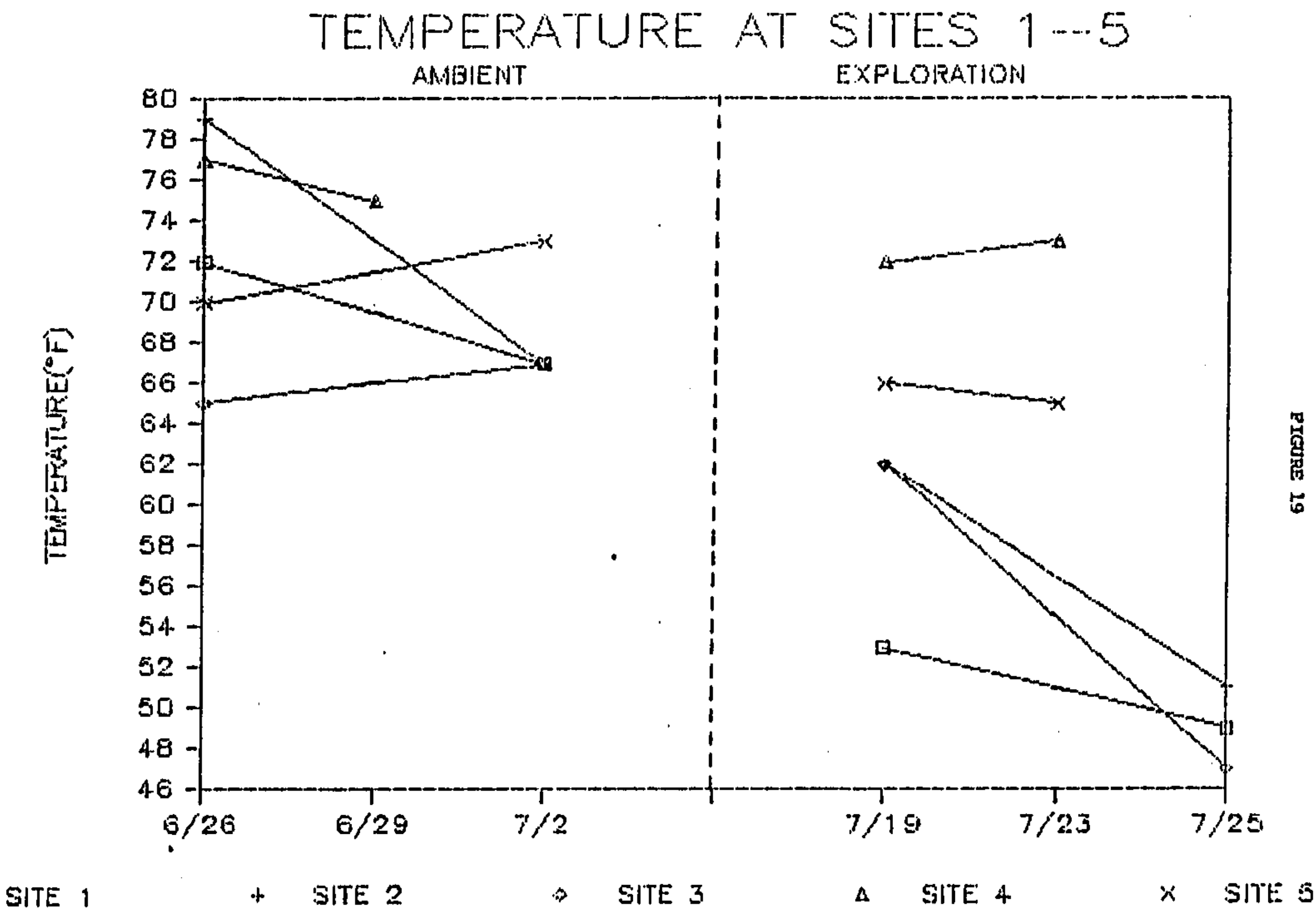

TEMPERATURE AT SITES 1--5
AMBIENT
EXPLORATION
TEMPERATURE(°F)
80
78
76
74
72
70
68
66
64
62
60
58
56
54
52
50
48
46
6/26
6/29
7/2
7/19
7/23
7/25
SITE 1
SITE 2
SITE 3
SITE 4
SITE 5

FIGURE 19

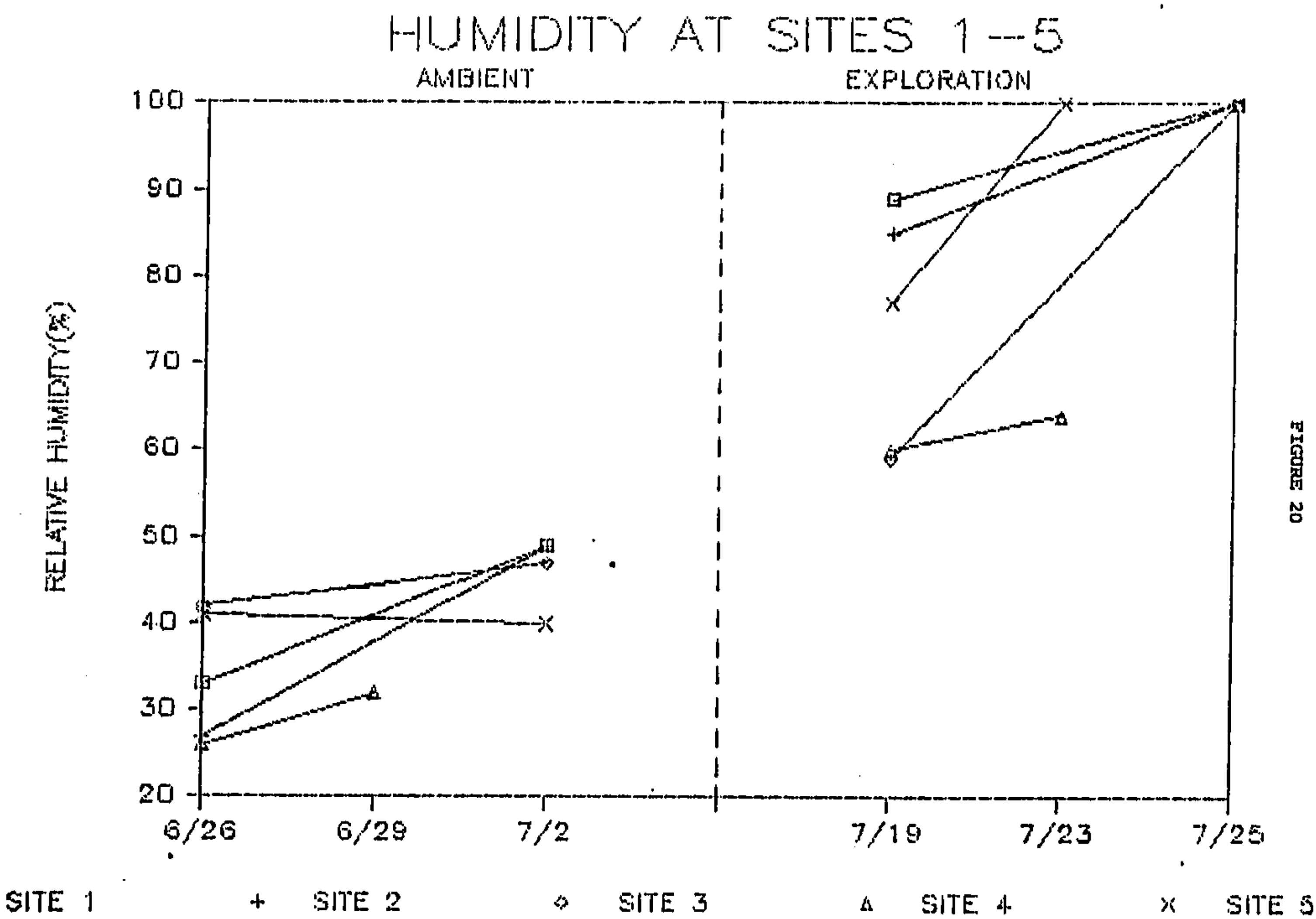

HUMIDITY AT SITES 1—5
AMBIENT
EXPLORATION
RELATIVE HUMIDITY(%)
100
90
80
70
60
50
40
30
20
6/26
6/29
7/2
7/19
7/23
7/25
SITE 1
+ SITE 2
◇ SITE 3
Δ SITE 4
X SITE 5

FIGURE 20

Figure 21 shows these average midday atmospheric attenuation coefficients. The figure shows that the attenuation rates are relatively constant for each frequency during the time of day they were measured. Note that these are average, and not worst-case values.

Table 8 compares temperature and humidity values measured in the North Fork valley at Polebridge with values measured at sound measurement sites in the mountains of Flathead National Forest on the same day. With these limited samples of measurements, no statistically strong correlations can be developed. However, in general, the table shows that when Flathead temperatures are higher than temperatures at Polebridge, the humidity is lower than at Polebridge, and when temperatures are lower at Flathead, the corresponding humidity is higher. This result is typical of areas where the absolute humidity is constant, but where the relative humidity varies inversely with temperature. If valid throughout the summer exploration season, the atmospheric attenuation coefficients would be approximately equal in the two areas (Harris 1979) even though the individual meteorological factors differ. For this reason, values shown in Figure 21 from Polebridge Ranger Station are used to estimate atmospheric attenuation of sound in areas surrounding Glacier National Park.

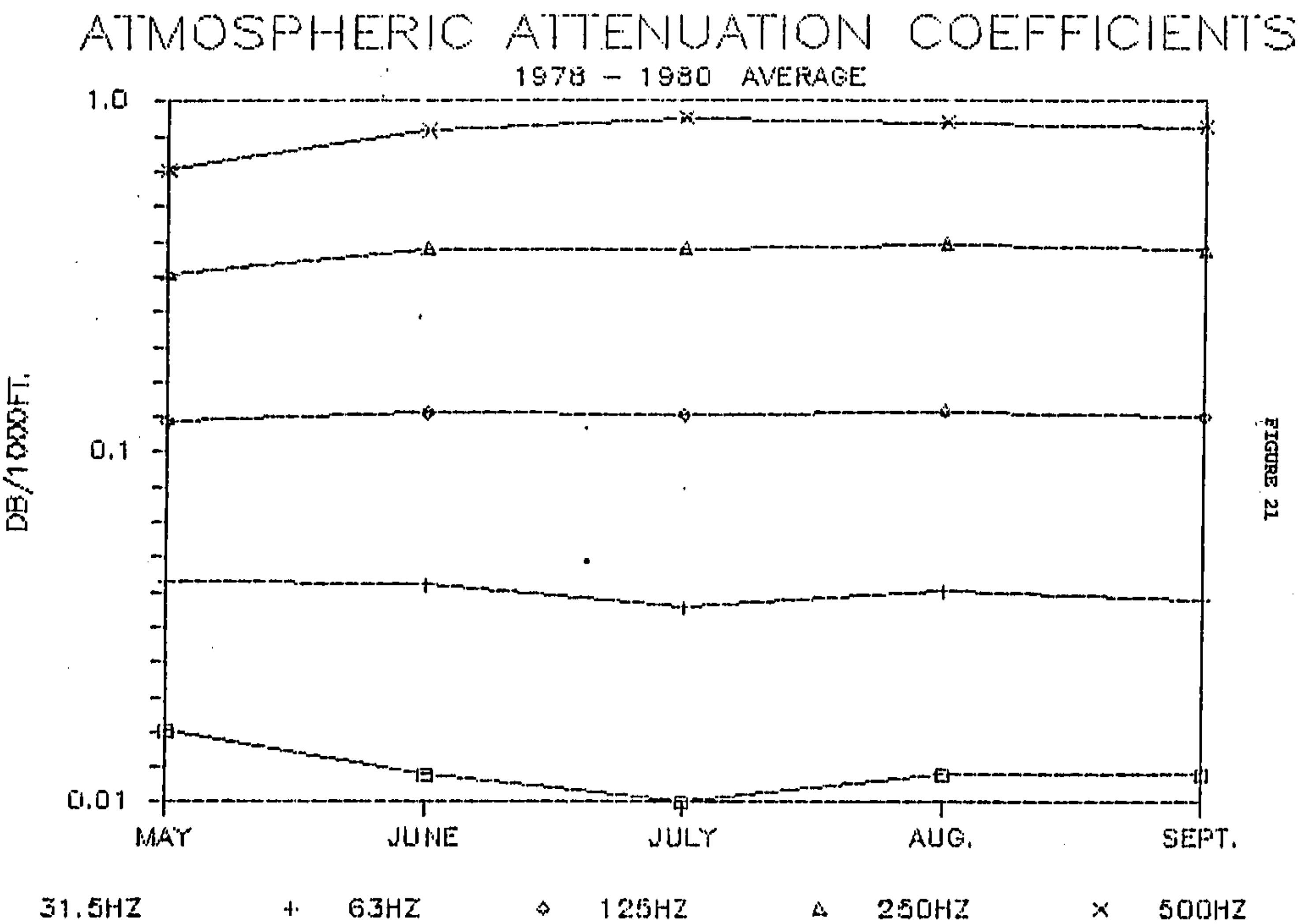
Estimating Procedure

Based on Figure 21 and Harris 1979, the atmospheric attenuation A_a, for each octave band, at a receiver distance r (where r is given in 100 meters) is approximated by:

Octave Band (Hz)	31.5	63	125	250	500	1,000	2,000
A_a (dB)	0.004r	0.01r	0.04r	0.1r	0.2r	0.4r	r

5.4 GROUND EFFECT

Sound is attenuated differently over soft porous ground than over a hard paved surface. The energy reflecting and absorbing properties of the ground and the meteorological conditions close to the ground have a complex role in attenuating, or in some cases enhancing, the propagation of sound, depending on the sound's frequency and the height of the source and receiver above ground.



ATMOSPHERIC ATTENUATION COEFFICIENTS
1978 – 1980 AVERAGE
DB/1000FT.
1.0
0.1
0.01
MAY
JUNE
JULY
AUG.
SEPT.
31.5HZ
+ 63HZ
◇ 125HZ
△ 250HZ
× 500HZ

FIGURE 21

TABLE 8. COMPARISON OF TEMPERATURE AND HUMIDITY AT POLEBRIDGE AND SOUND MEASUREMENTS SITES

Date (1981)	Measured Factor	Polebridge Ranger Station	Sound Measurement Site 1	2	3	4	5
6/26	Temp (°F) Hum (%)	62 48 (13)	72 33 (13)	79 27 (14)	65 42 (16)	77 26 (18)	70 41 (19)
6/29	Temp Hum	74 29 (13)	- -	- -	- -	75 32 (17)	- -
7/2	Temp Hum	72 41 (13)	67 49 (10)	67 49 (11)	67 47 (13)	- -	73 40 (16)
7/19	Temp Hum	78 42 (13)	53 89 (10)	62 85 (11)	62 59 (12)	72 60 (14)	66 77 (15)
7/23	Temp Hum	66 44 (13)	- -	- -	- -	73 63 (10)	65 100 (11)
7/25	Temp Hum	68 48 (13)	49 100 (12)	51 100 (12)	47 100 (9)	- -	- -

Note: Numbers in parentheses indicate hour of sampling.

Limitations

The values given below for octave band and A-weighted ground effect attenuation should only be used in the following cases:

1. Helicopters -- operating on the ground only.

2. Blasts -- only when the propagation path is not broken up by valleys or mountains, and when there are no wind or temperature inversions. When there is rugged terrain to break up the sound of blasts, use equation (2) to predict the combined attenuation due to divergence and ground surface.

Octave Band Levels

The values given below for the excess attenuation due to ground effect, A_g, are derived from measurements over flat grassland, and they are, therefore, only approximate indicators of the attenuation due to ground foliage experienced in the Glacier National Park area. To determine A_g, take the attenuation value shown for the receiver distance and subtract the value shown for the reference distance of the source (see Chapter 4).

Source-to-Receiver Distance (m)	Ground Effect Attenuation, dB Octave Bands, Hz			
	125	250	500	1,000
20	-1	0	1	0
30	-2	0	3	0
50	-3	0	5	0
100	-4	0	7	0
200	-5	1	7	0
300	-6	2	7	0
500	-7	5	6	1
1,000	1	15	4	4

Note: A negative number indicates sound levels would be increased (see equation 4). From Harris 1979.

A-Weighted Levels

At large distances, due to atmospheric absorption, propagated sound levels are dominated by low frequency bands. As a result, the effect of ground attenuation on A-weighted levels is assumed to be similar to the effect on the unweighted sound pressure level. In studies conducted by the Air Force Weapons Laboratory (ANSI 1983), at distances greater than a few kilometers, the total excess attenuation was numerically evaluated to be approximately:

$$a_{excess} = -0.1 \qquad (7)$$

If this excess is entirely assigned to ground effect factor, then:

$$A_g = 20 \log(r/r_o)^{-0.1}$$
$$= 2 \log(r/r_o)$$

where r is the distance to the receiver

and r_o is the reference distance.

5.5 WIND

The effect of wind on sound propagation is independent of frequency, so a single formulation for wind attenuation, A_w, is provided here based on A-weighted levels.

Limitations

The steps shown include factors which are based on wind speeds measured at 8 meters above ground level.

The method is not appropriate in conditions of thunderstorms or gusty winds. Note that when the wind is blowing from the source toward the receiver, the wind attenuation is negative; that is, a positive value will be added to the reference sound level of equation (4).

A-Weighted Levels

Estimate the wind attenuation factor, A_w, with the following steps (from Foch 1980):

(1) Determine the angle in degrees between the wind and source-to-source line* = ________

(2) Determine the wind speed, in miles per hour at approximately 8m (25 ft) above ground = ________

(3) Multiply: Cosine (1) x (2) x 0.53 = ________

(4) Determine the receiver distance = ________

(5) Determine the reference distance = ________

(6) Find the logarithm of the ratio: log[(4)/(5)] = ________

(7) Find the wind attenuation: A_w = (3) x (6) x (-1) = ________

*An angle of 0° indicates the wind is blowing directly from the source to the receiver.

5.6 TEMPERATURE GRADIENTS

Measurements of combined wind and temperature gradient effects on sound levels from blasting have shown that attenuation or enhancement from these factors is related to the increase in the speed of sound between the ground and the height at which the speed ceases to increase

(Foch 1980), that is, the inversion height. This relationship is independent of frequency. Note that if the wind is toward the receiver, the attenuation value will be negative; that is, the reference sound level is increased.

<u>A-Weighted Levels</u>

The attenuation due to temperature gradients, A_t, is found from the following steps:

(1)	Determine the angle between the wind and the source-to-receiver line	= ________
(2)	Determine the increase in wind speed between the ground level and the height at which the speed ceases to increase, in miles per hour	= ________
(3)	Multiply: Cosine (1) x (2) x 0.2	= ________
(4)	Determine the receiver distance	= ________
(5)	Determine the reference distance	= ________
(6)	Find the logarithm of the ratio: log[(4)/(5)]	= ________
(7)	Find the temperature gradient attenuation: A_t = (3) x (6) x (-1)	= ________

5.7 REVERBERATION

The effect of reverberation in increasing sound levels observed at a receiver depends in a complex way upon the topographical features existing near the observer. Virtually all the blast measurements taken in Helena National Forest included reverberant paths, as indicated by the long durations of the sounds. Reverberation may play an even more important role in special cases, such as when an observer is located in a rock-lined canyon while a helicopter passes overhead, or when a blast charge is situated in a similar location. In these cases, the reverberant enhancement may be as much as 5 dB above the values expected under more standard conditions.

Reverberation may play a role in determining the duration of blasts. The observed decay rate of approximately 6 dBA/sec for blasts indicates that, if the maximum A-weighted level of a blast is 90 dBA inside Glacier National Park, then it will take about 11 seconds for the blast to decay to 25 dBA, which represents the limit of audibility for typical ambient conditions in the Park.

CHAPTER 6

ANALYSIS

6.1 PROBABILITY ANALYSIS

At any given location in the study area during the exploration season, sound levels from project activities will vary in a continuous fashion. In some cases these changes depend upon the activities taking place and the distance to the source. At times, meterological factors and other sources affect the observed acoustical environment. One example of how sound levels vary over a one hour period in the study area is shown in Figure 22. This figure indicates the statistical distribution of sound levels at two points over an arbitrarily selected afternoon hour when shallow shot (Portadrill) seismic exploration activities were taking place 1/2 mile away and about 4 miles away. The figure also illustrates how sound levels were distributed over example afternoon and evening hours at the same locations in the absence of any exploration activity.

The quietest sound levels shown in the statistical distribution example were for the nighttime hour, when levels rarely exceeded 30 dBA. In the absence of significant amounts of man-made sources of noise, daytime levels were nearly as quiet, exceeding 30 dBA less than 10 percent of the time. When exploration activity was introduced into the area, however, noise from traffic and helicopters increased the median (L_{50}) and foreground sound levels substantially. In the example shown, for the same afternoon hour at the same site, levels increased by 10 to 15 dBA over most of the period when the exploration activity was introduced at a distance of 4 miles from the site. The increase is particularly noticeable in the highest levels (L_5 and above). This

DISTRIBUTION OF MEASURED SOUND LEVELS

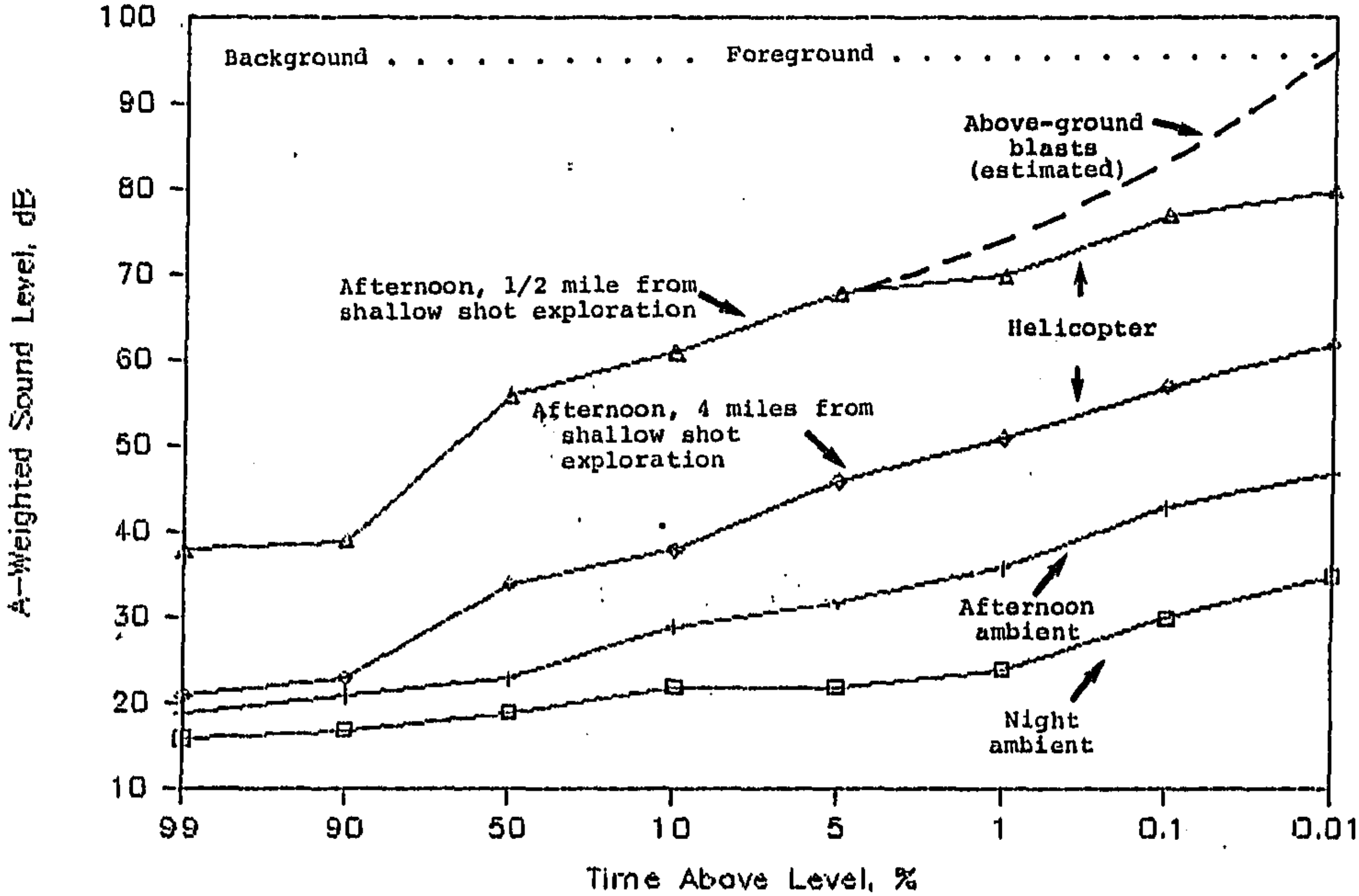


FIGURE 22

result is due to the loud, but interrupted nature of helicopters and other intrusive activities.

At measurement sites closer to a seismic exploration project, the background levels (L_{90}, L_{99}) also experience significant increases (20 dBA) at 1/2 mile. At this short distance, road traffic, seismic drilling and helicopter flights all contribute to the sound level distribution. With median sound levels above 55 dB, the site condition becomes typical of a urban or suburban environment. Maximum levels reach 70 to 80 dB for short periods of time, and rarely drop below 40 dB.

It is important to note that if above-ground blasting were used, instead of the shallow shot activities illustrated in the figure, it is estimated that the maximum levels could rise above 95 dB and beyond, at the 1/2 mile distance. With the above-ground method, the increase in background levels is likely to be similar to that shown in the figure, since similar traffic and helicopter activities would be taking place.

The different sound level distributions shown in the figure demonstrate one example of the broad effect which large scale man made activities have on the ambient sound environment in the Glacier National Park area. In particular, the ease with which a sound generating activity quickly protrudes above the very low existing ambient levels is apparent. To be effective, methods of reducing audibility of such intrusions must provide for control over both the frequent as well as the infrequent incidents of sound generation.

Although the overall ambient sound level may exceed the sound level generated by a particular exploration activity, the activity may still be audible (see discussion on audibility in Appendix F). The sound from helicopters and blasts, after propagating over long distances, may have levels at the low frequencies which exceed ambient levels in the same octave bands, even if the total overall level is lower than the ambient. Such a sound would be audible. The corresponding effect on people or animals is not evaluated here; however, it may be safely assumed that sounds which do not contain octave band levels which exceed corresponding levels in the ambient, have no significant impact.

6.2 EXAMPLE APPLICATION OF SOUND LEVEL ESTIMATE PROCEDURE

In Chapter 5, a procedure was outlined which was designed to provide a preliminary estimate of the sound levels resulting from helicopter flights and blasts which occur during oil and gas exploration activities. This procedure attempts to account for the major meteorological factors influencing sound propagation in the study area, the typical sound emission characteristics of the exploration activities, and the conditions of the ambient environment.

An example application of this preliminary algorithm is provided in this section. In the example, each aspect of the prediction method is exercised to illustrate how the various factors are applied. Not all possible applications are illustrated, nor are all potential inconsistencies and pitfalls illuminated. Nonetheless, the example is a first step at providing a tool for use in assessing potential sound impacts of proposed seismic projects before they occur.

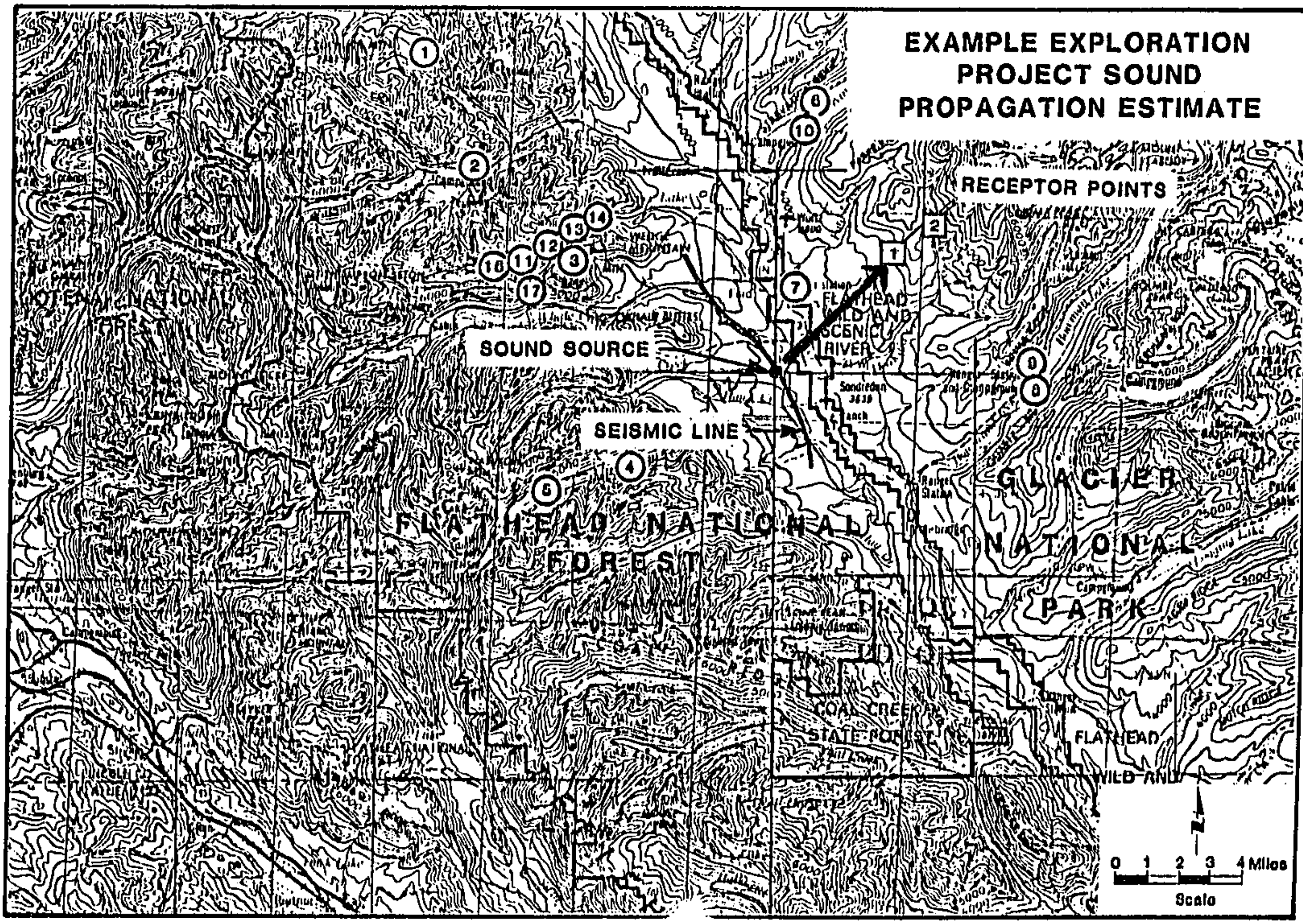
Example

In this example, a seismic line is proposed near the Flathead River as shown in Figure 23. It is desired to estimate sound levels of blasting at Receptor Point 1 and helicopters at Receptor Point 2 inside Glacier National Park. Receptor 1 is 5.0 miles to the northeast of the exploration activity and in line of sight with the sources. Receptor 2 is 6.5 miles away and is hidden behind a promontory located one mile in front of it. The seismic blasts are situated at an elevation of 3,850 feet, Receptor 1 is at 4,500 feet, Receptor 2 is at 4,750 feet, and the elevation of the intervening mountain ridge is 4,900 feet.

For the blast calculation, assume that typical weather conditions prevail: wind is from the southwest at 4 mph, and the estimate is made at midday. For the helicopter calculation, assume that the activity takes place in the morning, during temperature inversion conditions, with the same wind speed.

From Chapter 5, the maximum sound level at a receptor distance, r can be modeled from the simplified formulation:

$$L_{max}(r) = L_{max}(r_o) - A_d - A_g - A_w - A_t - A_a(oct) - A_b(oct) \qquad (8)$$



EXAMPLE EXPLORATION
PROJECT SOUND
PROPAGATION ESTIMATE
RECEPTOR POINTS
SOUND SOURCE
SEISMIC LINE
FLATHEAD NATIONAL FOREST
GLACIER NATIONAL PARK
FLATHEAD WILD AND SCENIC RIVER
COAL CREEK STATE FOREST
0 1 2 3 4 Miles
Scale

Receptor 1

Since there are no barriers between the source and receiver, only the atmospheric attenuation factor, A_a, will require octave band analysis.

For blasts, the propagation will occur in the absence of diffusion by forests or rugged terrain. For this case, it is assumed that the duration of the blasts will be short, on the order of 1/10 of the duration found in forested areas, or about 1 second. Correspondingly the L_{max} should be about 10 dB higher in the open field as it propagates without obstruction. For this reason, from Chapter 4, a value of 10 dB is added to the L_{max} of 111.9, giving L_{ref} (1,000 ft) = 121.9 dB.

From Chapter 5, the values of A_d and A_g are given by:

$$A_d = 20 \log (r/r_o) = 20 \log (\frac{5 \times 5{,}280}{1{,}000}) \quad (9)$$

$$= 28.4 \text{ dB}$$

$$A_g = 2 \log (r/r_o) = 2.8 \text{ dB} \quad (10)$$

With a wind speed of 4 mph:

$$A_w = 20 (-0.0265 \times 4) \log (r/r_o) = -3.0 \quad (11)$$

So far,

$$L = L_{ref} - A_d - A_g - A_w$$

$$= 121.9 - 28.4 - 2.8 + 3.0 = 93.7 \text{ dB} \quad (12)$$

Now, from Chapter 4,

Octave Band, Hz	31.5	63	125	250	500	1,000
$L_{max}(oct)$, dB	90.5	86.6	81.8	78.6	78.2	75.2
From Chapter 5,						
$A_a(oct)$, dB	-0.3	-0.8	-3.1	-7.7	-15.5	-31.0
$L_{max}(oct)$	90.2	85.8	78.7	70.9	62.7	44.2
From Appendix F:						
A-weighting, dB	-39	-26.2	-16.1	-8.6	-3.2	0

After subtracting the A-weighting factors, we have

L_{Amax}(oct), dB 51.2 59.6 62.6 62.3 59.5 44.2

The sum of the octave bands is (see Appendix F for the summation procedure):

$$L_{Amax} = 67.4 \text{ dBA.} \quad (13)$$

Therefore, the maximum sound level at Receptor 1 from blasting under normal weather conditions is estimated to be 67 dBA. This sound level is more than 40 dBA higher than the typical ambient sound level would inside Glacier National Park. The 40 dBA difference corresponds to a 16-fold increase in perceived loudness of the sound over the background. This increase would be easily noticed. The fact that this blast would propagate over unforested and relatively smooth terrain suggests that the duration of this sound above the ambient would be only a few seconds, rather than the 8 to 14 seconds expected from blasts propagating over rugged terrian. However, an instantaneous 40 dB change in sound level, 5 miles inside the Park, is certain to cause a startling response of some kind to both humans and other species with similar hearing characteristics.

This example corroborates reports by many users of the Park, that blasts in the Flathead are audible up to and including locations along the Continental Divide, in the middle of the Park. If effects of inversions were taken into account, the sound levels and estimated impacts would be even greater.

Receptor 2

From Chapter 4, the reference A-weighted sound level for helicopters at a reference distance of 300m is 70.0 dB. The spectrum given for helicopters indicates that the unweighted reference level is 7.0 dB higher, or:

$$L_{ref} = 77.0 \text{ dB} \quad (14)$$

The divergence attenuation rate for helicopters is approximately:

$$A_d = 7.5 \log (r/r_o) = 11.5 \text{ dB} \quad (15)$$

The ground and wind attenuation factors are the same as above:

$$A_g = 2 \log (r/r_o) = 3.1 \text{ dB} \quad (16)$$

$$A_w = 20 (-0.0265 \times 4) \log (r/r_o) = -3.3 \text{ dB} \quad (17)$$

The temperature gradient is assumed to be 16.6°C (Holzworth 1979). The relationship between the change in temperature dt and change in wind speed du is approximated by:

$$du = \frac{dt}{2} \times \frac{344 \text{ m/s}}{293 \text{ °K}} \times \frac{3600 \text{ s/hr}}{1609 \text{ m/mi}} = 1.31 \text{ dt} \quad (18)$$

The temperature gradient attenuation factor is therefore from Chapter 5:

$$A_t = 0.2 \times 1.31 \times 16.6 \times \log (r/r_o) = 6.7 \text{ dB} \quad (19)$$

As a subtotal, we have

$$L = 77 - 11.5 - 3.1 + 3.3 + 6.7 = 72.4 \text{ dB}$$

This level is now divided into its component octave band levels, based on Chapter 4:

Octave Band, Hz	31.5	63	125	250	500	1,000
L_{max} (oct), dB	65.7	62.4	65.9	63.3	64.4	61.4

From Section 5.3, the atmospheric attenuation at 10,460 m - 300 m = 10,160 m is:

A_a (oct)	-0.4	-1.0	-4.1	-10.2	-20.3	-40.6
L_{max} (oct)	65.3	61.4	61.8	52.1	44.1	20.8

The barrier attenuation factor is now determined as follows:

(1) Distance from source to ridge = 9265 m

(2) Height of ridge above source: (4900 - 3850) x 0.3048 = 320 m

(3) Slant distance from source: $[(9254)^2 + (320)^2]^{1/2}$ = 9260 m

(4) Distance from ridge to receiver = 1207 m

(5) Height of ridge above receiver: (4900 - 4750 x 0.3048 = 46 m

(6) Slant distance to receiver: $[(1207)^2 + (46)^2]^{1/2}$ = 1208 m

(7) Slant distance from source to receiver:

$[(9254 + 1207)^2 + (320 - 46)^2]^{1/2}$ = 10465 m

(8) Path difference due to ridge: 9260 + 1208 - 10465 = 3 m

(9) Choose octave bands:

Octave band, Hz	31.5	63	125	250	500	1000
(10) Fresnel number 3 x (9)/177 =	0.5	1.1	2.1	4.2	8.5	16.9
(11) Attenuation of each band $2[2 + \log(10)]^2$ =	5.8	8.3	10.8	13.8	17.2	20.8

Then,

L_{max} (oct)	59.5	53.1	51.0	38.3	26.9
A-weighting	-39	-26.2	-16.1	-8.6	-3.2
L_{Amax} (oct)	20.5	26.9	34.9	29.7	23.7

and L_{Amax} = 36.9 dBA. (20)

In this case, the barrier shielded Receptor 2 from the sound of the helicopter, providing a substantial (about 12 dBA) reduction in sound level. In spite of this shielding, however, the resultant sound level remains about 10 to 15 dBA above the background sound level. This increase corresponds to a doubling or more of the perceived loudness of the environment to someone in the Park. The helicopter would be clearly audible for many minutes during its flight along the seismic line.

If the inversion layer were not in effect, the sound level would be reduced to 30.2 dBA, which is much closer to the levels commonly experienced under ambient daytime conditons. If the observer moved closer to the shelter of the mountian, the barrier would have a greater effect, reducing the intrusive sound even lower. The wind direction is almost always from the southwest, but if there were no wind, then the sound level would be about 3 dB lower, rendering the sound nearly inaudible if all these factors worked together.

On the other hand, with typical morning inversions and in the open country, helicopter activity along the border of Glacier National Park should be audible many miles inside the Park, according to this model. This result indicates that under normal conditions this sound source, although producing less dramatic maximum levels than blasts, can still intrude into the ambient sound environment of the Park, many miles inside the border, and maintain the intrusion for even longer periods of time.

CHAPTER 7

AFFECTED POPULATIONS

The sound produced by oil and gas exploration activity has the potential to affect humans as well as wildlife in the Flathead/Glacier area. This report will not attempt to define these effects in detail since other studies contain considerable authoritative information on these topics (Schallenberger and Jonkel 1979, Craighead 1979, Aune 1984, and others). Rather, general descriptions are provided which describe recreational use, grizzly bear activity, and the presence of other species which may be sensitive to sound from seismic exploration projects.

7.1 RECREATIONAL USES

One of the valuable resources of Glacier National Park, like many National Parks, is the natural sound environment, which is characterized by quietude, solitude and the absence of man-made noise. Ambient sound levels monitored by the USEPA Region VIII Noise Program in both Grand Teton and Bryce Canyon National Parks were as low as the background levels found in recording studios. Similar results were found in Glacier. As the pervasiveness and loudness of everyday noise increase in our society, the importance of places where people can seek refuge from these day-to-day noises also increases. The growing numbers of visitors to our National Parks and wilderness areas are indicative of this societal need for quiet and solitude. At Glacier, visitation has increased substantially over the last five years, from 1,446,236 visitors in 1979 to 2,204,131 visitors in 1983. These recreationists engage in activities such as camping, hiking, backpacking, picnicking, wildlife observation, nature study, ski touring and fishing. As a unit of the International Biosphere Reserve System established by the United

Nations Educational, Scientific and Cultural Organization (UNESCO), the Park is also a special resource for researchers, both present and future.

Primarily a seasonal recreational area, Glacier receives its heaviest use from June through September. These are the same months during which seismic activity occurs. Noise from seismic explosions is audible throughout the Park (Haradan 1984). This intrusion alters the recreational experience and is considered intolerable by some.

The Flathead National Forest offers a spectrum of recreational opportunities and areas which include some year-round activities. A few of the main recreational sites are illustrated in Figure 24. Heaviest use patterns occur from June through September, with the majority of use coming between July 4 and Labor Day. In addition, the general big game hunting season brings an increase in use in October and November. The North Fork River, designated as Wild & Scenic, receives heavy use with the majority of use confined largely to the recreational segment from Camas Bridge, south.

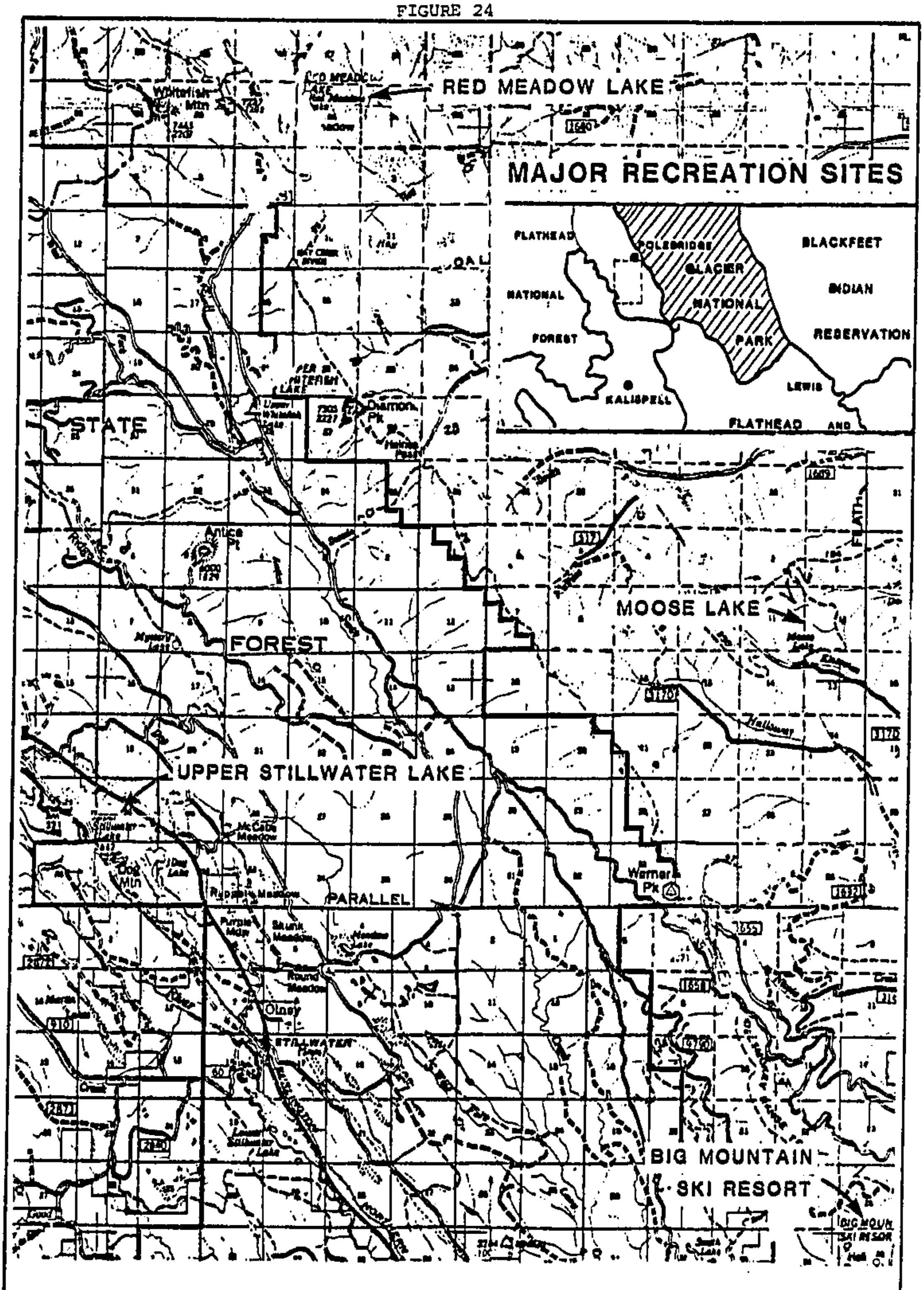
Numerous dispersed camping areas, such as Red Meadow Lake, Moose Lake and Upper Stillwater Lake, are accessable by roads and receive light use. The Whitefish Divide, designated trail from Canyon Creek to Warner Lookout, is a ridgeline trail that separates the North Fork drainage from the Flathead Valley. Current use along the Whitefish Divide is low.

Big Mountain ski area, a major developed recreation site, located along the Whitefish Divide receives a fair amount of summer use. The average operational season runs from June 18 to September 6. This use includes riding the chairlift to the top of the mountain and hiking down on trail or riding the chairlift back down. The chairlift also provides access to the Whitefish Divide trail.

7.2 GRIZZLY BEAR ACTIVITY

The description below of various aspects of grizzly bear activity is taken primarily from one reference (Aune 1984). Other observations have been reported by many authors, and no attempt has been made to

FIGURE 24


RED MEADOW LAKE
MAJOR RECREATION SITES
FLATHEAD
NATIONAL
FOREST
GLACIER
NATIONAL
PARK
BLACKFEET
INDIAN
RESERVATION
KALISPELL
LEWIS
FLATHEAD
STATE
Whitefish Mtn
Diamond Pk
Antice Pt
MOOSE LAKE
FOREST
UPPER STILLWATER LAKE
Dog Mtn
PARALLEL
Werner Pk
Olney
STILLWATER
BIG MOUNTAIN
SKI RESORT

evaluate alternative points of view or to summarize the literature on the subject. Rather, the observations are presented for simple introductory informational purposes only.

Habitat

The area under study provides a habitat that is very important to the grizzly bear, including the Apgar Mountains and various areas in Glacier National Park (USFWS 1982). Figure 25 shows actual sitings of grizzly bears in the Flathead National Forest and expected areas of use based on habitat requirements. Similar data exists for Glacier National Park. This information was obtained from a seismic investigation from Coal Creek north to Thema, in the Flathead National Forest and is not all inclusive (Aune 1984).

Movement

The elevational movement of individual bears varies a great deal, but in general, bears are found at lower elevations during the spring (April to June) and at middle to high elevations in the summer. During October and November, elevations at which bears are located increases as bears move to subalpine and alpine areas.

Seismic activity involves moving over a predetermined geographical line and, therefore, encompasses all elevational levels.

Food

In total, grizzly bears use many different habitat types, depending on the season. Important grizzly foods during the spring come from three major groups including graminoids, forbs and mammals.

In the fall, bears feed almost continuously, and therefore need protection from disturbances which would restrict their activity to nighttime hours (USFWS 1982). Major taxonomic groups from which grizzlies feed include shrubs (for berries), trees (for pine nuts), and mammals. A sharp decline in the importance of graminoids and forbs is prominent during the fall.

During the summer, grizzlies show greater diversity in their food habits than in any other season, and rely heavily on foods from five

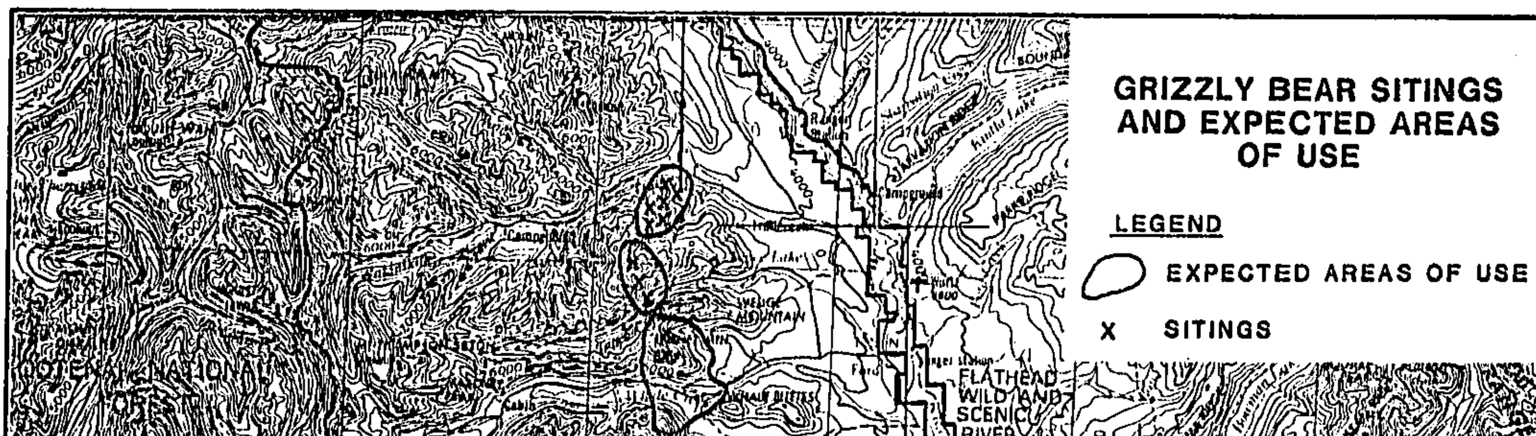

GRIZZLY BEAR SITINGS AND EXPECTED AREAS OF USE
LEGEND
EXPECTED AREAS OF USE
X SITINGS
FLATHEAD NATIONAL FOREST
GLACIER NATIONAL PARK
FLATHEAD WILD AND SCENIC RIVER
COAL CREEK STATE FOREST
FLATHEAD WILD AND SCENIC RIVER

FIGURE 25

major taxonomic groups including shrubs (for berries) graminoids, forbs, mammals and insects.

Denning

Grizzly bears enter their dens from early November to early December. Movement to den sites occurs from early October to late November. Grizzly bears emerge from their dens from early March to the middle of May. Reported den sites in the South Fork of the Flathead River are on the southwestern to southeastern exposures on steep slopes from 29 to 41 degrees and in the elevational range from 5,800 to 6,670 feet.

Impacts of Seismic Activities

It has been determined that grizzly bears are displaced from areas around individual drill sites on seismic exploration projects (Aune 1984).

The impacts of seismic activity on bears was surveyed in the Lewis and Clark National Forest for approximately two months in the late summer and fall of 1983 (Aune 1984). There were six radio collared female grizzly bears in this project area during the exploration. The older bears spent the most time nearest to such activity while the youngest bears spent the least time near to such activity. The author concluded that older adult bears may have more experience with human activities and are most habituated to such. Their responses to activities were thought to be more refined allowing them to exploit habitat with higher human activity levels without reducing survival.

Three major case studies were also conducted in the Lewis and Clark National Forest during the 1983 season (Aune 1984). In the first study two radio collared bears were monitored for two hours during a midday period while seismic activities were being conducted on a line about 6.4 kilometers (4.0 miles) distance. A helicopter landing zone was about 1.6 kilometers (1 mile) from the bears' radio location. The author reported that the bears who were monitored showed no response to seismic activities conducted 6.4 kilometers from their location, nor did they respond to helicopter activity near a landing zone at 1.6 kilometers from their location. However, they did respond to vehicle noise at 200 meters from their location and to a fixed wing fly-over at 50 meters altitude.

In the second case study, a bear was exposed to a low level helicopter flight by a day bed. The bear's response was recorded and evening movements recorded. The author reported that the bear acknowledged helicopter flights at .2 kilometer distance associated with seismic exploration. That evening the bear chose to leave the area traveling in a direction away from the daytime activities of seismic exploration.

In the third and most comprehensive case, two bears were monitored for two days prior to a seismic line survey into a key shrubfield-burn area, one and one-half days during the exploration process, and for one day following the survey. Both grizzly bears were reported to respond to helicopter activity within .8 kilometer of their location and were awakened from inactive status. Both bears moved from their location when the exploration took place. At least three grizzlies and six black bears were present in the canyon before exploration. After the exploration process, which came half way up the drainage, only one grizzly and two black bears were present in the canyon. Neither grizzlies nor black bears moved back into the area near the seismic project for three days after completion of the line.

In a separate study, Kendall found that 82 percent of grizzlies reacted to helicopter flights at 100 to 1,000 feet altitude (Haraden 1984).

Bears also react to noise from seismic blasts, but their response is not as well documented as reaction to noise from aircraft. In one case, a National Geographic camera crew, filming a mother and her two cubs feeding on huckleberries near the boundary of the Park, saw them quit feeding and run for cover about 1/2 mile away when a blast occurred about 2 miles from their feeding site on the Flathead side of the river (Lange 1984).

In a study performed in Alaska, responses of denning grizzly bears to noise associated with winter seismic surveys and small fixed-wing aircraft were studied on the North Slope during 1978 to 1981 (Reynolds 1981). Responses of bears to potential disturbances were measured from changes in signal amplitude and temperature of external radio collars on two grizzly bears in dens within 0.8 kilometer of seismic lines. In addition, heart rates were monitored from implanted transmitters in two grizzly bears; one was subjected to seismic related disturbance, the other was not. Changes in heart rates, radio collar temperatures, and signal amplitude for denning grizzlies which occurred when seismic vehicles were operating near dens suggest that bears may respond to noises associated with these activities.

Mid-winter overflights of dens in small fixed-wing aircraft did not cause a change in the heart rate of two female grizzlies with young cubs. Since bears in this study were repeatedly located by aircraft during 1977 to 1981, there were more habituated to overflights than bears never exposed to this type of disturbance. However, just prior to and after emergence, the bears appeared to be very sensitive to noise disturbance from small aircraft. It was recommended that aircraft overflights be prohibited below 300 meters (1,000 feet) over known dens between 1 May and 15 May. Low level flights in early summer did cause some increase in heart rates, although no behavioral changes were noted. A prohibition of aircraft flying low (<150 meters) over bears was also recommended (Reynolds 1981).

<u>Summary of Findings by Aune (Aune 1984)</u>

Preliminary evidence suggests that some bears may be at least temporarily displaced from key feeding areas by seismic exploration, and bears' activity patterns are affected by seismic activities near their location. Individual bears may vary in their tolerance to seismic-associated activity.

7.3 OTHER WILDLIFE

The study area provides some of the most productive and diverse wildlife habitat in the nation as discussed below (ARCO 1982). The area is home for a number of threatened or endangered species, including the Bald Eagle, Peregrine Falcon, and Grey Wolf. The major effects of the oil and gas seismic prospecting operation on these species and others, as well as bears, are:

a. Placement in a stress situation or adding additional stress because of other ongoing or existing activities, such as timber sales or forcing movement of one animal into the home range of another.

b. Temporary displacement of a listed species from feeding, resting, denning or nesting areas. Permanent displacement from or abandonment of denning or nesting sites is possible in relation to the intensity duration and timing of the disturbance occurring during critical periods in the life cycle pf the species.

c. Habituation and confrontation between species and human entities, which could result in the removal of the individual from the population.

Some occupied bald eagle nests in Flathead and Glacier National Park have failed to produce young in recent years (Haraden 1984). Seismic activity may be one of a number of possible causes.

Other species found in the area which may be sensitive to exploration activities include: moose, elk, mule deer, whitetailed deer, black bear, mountain caribou and cougar.

In a study on the effects of seismic exploration on summering elk in northcentral Montana it was found that elk movements began to follow a pattern of avoidance to helicopters and explosives (Olson 1981). Movement for threatened species may be more difficult due to their more restrictive habitat requirements (Martinka 1985). Summering elk in the area studied apparently have a great affinity for certain habitat types and locations, as is indicated by their willingness to relocate in such areas after seismic work was finished. The data suggests that a few days of activity is tolerated but when that time limit is exceeded elk begin a series of movements to avoid the disturbance.

The quality of forage for wintering elk is directly related to successful reproduction. Energy expenditures during winter months are critical to elk and any additional disturbances result in an energy deficit, both to the cow and her fetus. In severe cases herd productivity suffers with total population levels falling within a few years.

It has been recommended (Aune 1984) that no seismic exploration be allowed on winter foraging areas or adjacent thermal cover from November 1 to May 1. These dates provide flexibility for elk to deal with hunters, winter conditions, and early calving periods. Disturbance of known calving grounds and spring migration zones should be prevented from May 1 to June 30. This would ensure that calving elk and those migrating with calves will be able to establish on summer ranges before seismic activity begins.

CHAPTER 8

CONCLUSIONS

8.1 SUMMARY OF RESULTS

Some of the main findings of this study are summarized below. The list does not include all of the results which have been presented nor does it include many conclusions of an absolute nature. It does note some of the more novel findings, and thereby hopefully provides an impetus for improving the assessment of sound levels from seismic exploration.

<u>General Findings</u>

1. For at least the last five years (1980-1984), a large number of seismic exploration projects (about 15 to 25), have taken place each year over a five-month summer period near the borders of Glacier National Park.

2. Sound levels from seismic exploration activities are audible inside Glacier National Park during the five-month period.

3. Intrusive sound levels from above ground blasts may project 40 dBA or more above the Park's low background levels of 20 to 25 dBA at a distance of five miles inside the Park boundary. Due to the logarithmic nature of decibels, blast levels are thus sixteen or more times louder tha ambient sounds in the park. This estimate does not include the additional enhancement which often results during morning hours due to inversion conditions. Lower levels would be experienced toward the center of the Park, and some blasts are heard even in the most interior portions of the mountains.

4. Sound levels from helicopters are an additional source of intrusive sound from exploration projects which can propagate over five miles into the Park before becoming inaudible.

5. Grizzly bears and other wildlife in the Park and in neighboring forests have been observed to react negatively -- either by heading for cover or fleeing -- to sounds from seismic exploration activities. The response of humans using the Park and neighboring recreational areas to these sounds is not well documented, but is known to be occasionally negative.

6. Seismic blasts using the above ground method would have to be prohibited many miles from the Park boundary for there to be no impact on users and wildlife in the Park. Helicopters could be allowed to operate closer than blasts, and below ground blasting and ground vibration methods could be used even nearer to the Park, without increasing sound levels inside the Park. Additional study would be required to determine appropriate locations for these restrictive boundaries.

<u>Measurement Program</u>

7. Tape recordings of sound measurements collected in the summer of 1981 and stored until the summer of 1984 were verified to be accurate within an average of less than 1 dB when analyses conducted with the tapes in 1981 were repeated in 1984.

8. The collected data contained a great deal of information on ambient, blast, helicopter, and overall seismic activity sound levels in the Flathead, Glacier, and Helena areas.

9. Measurement sites near running streams were dominated by sound from running water during periods of high water runoff (April to June).

<u>Blasts</u>

10. The sudden onset of the blast sound was startling to observers, as was the extremely long duration of the sound (8 to 14 seconds) as it reverberated before becoming inaudible.

11. Reverberation is a conspicuous feature of blast sound levels in the mountainous, forested areas where measurements were taken.

12. It was found in the technical analysis of the data that the decay rate of blast sound levels over distance was dependent upon the location of observers, who were shielded by terrain in varying ways from the blasts.

13. The absolute maximum sound levels measured for the blasts also depended upon the shielding of the observer.

14. The temporal rate of decay of the maximum blast sound level over time was found to be very slow (about 6 dBA/sec) and independent of the distance and terrain between the blast and the observer. It appears that this slow decay rate may be due to the rugged and heavily forested terrain which act to diffuse and delay the sound as it travels outward from the blast.

15. Conversely, the rate of decay of maximum blast sound levels over distance was found to be somewhat greater than expected (about 6 to 13 dB per doubling of distance). This high rate of decay may, again, be due to the action of irregularities in the surface over which the measured blasts propagated although atmospheric absorption must also play a role.

16. Measurements made under different meteorological, terrain, or source/receiver locations, may yield different results than those presented in this report. These findings should therefore be used with caution.

<u>Helicopters</u>

17. Where an underground blasting or ground vibration method is used in seismic exploration, helicopters are likely to be dominant sources of sound.

18. The rate of decay of maximum helicopter sound levels over distance was found to be lower than expected -- about 2 to 3 dBA per doubling of distance. This result is due to unknown factors, which may include directivity and operating mode of the sound source, location of the observers relative to surrounding terrain, or meteorological factors.

19. When the observer is in a valley and a helicopter passes overhead, audibilty is generally limited to the one to two minutes the helicopter is within line of sight, due to the barrier effect of the intervening mountains.

8.2 RECOMMENDATIONS FOR FUTURE STUDIES

Based on the limited results obtained in this study, recommendations for future work are listed below in the areas of measurements, analysis, and impact assessment.

Measurements

1. More accurate estimates of how sound levels propagate in the Park area should be developed using atmospheric testing equipment such as radio and laser ranging devices to better define the propagation medium. The decay of helicopter sound levels in the study area should be tested under controlled flight conditions. The decay of blast sound levels should be tested at a number of observation points which differ in terms of shielding from the blasts by terrain.

2. Additional sound level measurements should be made to document the effect of various seismic activities, meteorological conditions and receptor locations. Conditions measured should include inversions, early morning hours, different types of helicopters, locations deep inside Glacier Park, and other situations of interest for validating sound propagation predictions. Measurement of oil and gas field production activities is also of interest.

3. Additional ambient sound measurements should be made at sites which are not located near running streams, and during periods which are not charactized by high runoff (April to June), in order to further document the low ambient sound level conditions experienced during most of the year in the study area.

Analysis

4. The data in this report and additional collected data should be analyzed to provide a basis for predicting audibility contours. Such analysis should interpret the octave band results (particularly for

blasting) in terms of known terrain and meteorological conditons. The ability to predict sound levels and audibility (see Appendix F) in different situations would be of great value assessing the potential impact of proposed seismic exploration projects.

5. The prediction method outlined in the report should be improved, verified, and prepared for use in project planning and valuation. Specifically a step-by-step procedure should be developed which can be used with a hand-held calculator to provide an order-of-magnitude estimate of sound levels from proposed helicopter and blast activities. This procedure would be used as a screening tool prior to the environmental assessment stage of a proposed project. Secondly, a more detailed mode should be developed for use with a personal computer which would allow a greater quantity of sound level, meteorological, and terrain data to be used as input, and would provide results of greater accuracy for use in estimating distances of audibility and developing appropriate impact mitigation measures.

Impact Assessment

6. The reaction of recreational users of the Park and neighboring areas, as well as residents and other visitors, should be carefully sampled to determine the psychological responses and behavioral reactions which intrusions of blasts and helicopters may produce.

7. The reaction of bears to helicopters appears to be documented in the literature; however, the reaction of bears to blasts is not as well documented. Studies which include field observation of how bears react to blast noise from exploration projects are warranted.

8. The reaction of other threatened or endangered species to blasts and helicopters should be observed and documented. Sufficient activity probably exists during the exploration season for these behavior patterns to be properly identified.

9. Collection of existing and proposed seismic projects, locations, and methods by a single agency or group is needed to provide better documentaton of the extent of sound impacts on the Park. The collection effort must include activities taking place in Canada.

CHAPTER 9

REFERENCES

ANSI, 1983. Estimating Air Blast Charcteristics for Single Point Explosions in Air, with a Guide to Evaluation of Atmospheric Propagation and Effects. American National Standard ANSI S2.20-1983 (ASA 20-1983), published by the American Institute of Physics for the Acoustical Society of America, New York, New York, 1 March 1983.

ARCO, 1982. Arco Mill-Hi Above Ground Shot Seismic Exploration Environmental Assessment. May 1982.

Aune, Keith, 1984. Rocky Mountain Front Grizzly Bear Monitoring and Investigation. March 1984.

Burke, Richard E., 1984. Letter to Leland Ground, Oil and Gas Tax Commission, Blackfeet Indian Reservation, October 15, 1984.

Craighead, Frank and John, 1979. Track of the Grizzly. Sierra Club Books, San Francisco.

Escano, Ronald, 1981. AMOCO/Mountain Geophysical Portable Seismic Investigation from Coal Creek north to Thoma, Flathead National Forest.

Foch, James D., Jr., and Geoff S. Oliver, 1980. Technical Report on Sound Levels in Bryce Canyon National Park and the Noise Impact of Proposed Alton Coal Mine, Noise Technical Assistance Center, Boulder, Colorado, for the U. S. Environmental Protection Agency, October 1980.

Giesey, Ted L., November 19, 1984. Deputy Area Manager, Northwestern Land Office Department of State Lands, State of Montana. Letter to Penny Sisson, Engineering-Science dated November 19, 1984.

Glacier National Park, 1980. Daily Fire Weather Observations, NFDR AFFIRMS, Polebridge Ranger Station, June 1978 - August 1980.

Haraden, Robert C., 1984. Superintendent, Glacier National Park, letter to D. Groh, USEPA, 11 December 1984.

Harris, C.M., 1979. Handbook of Noise Control, Wiley and Sons, New York.

Holzworth, G. C., 1979. Climatological Summaries of the Lower Few Kilometers of Rawinsonde Observations (with Richard W. Fisher) EPA-600/4-79-026, Meteorology and Assessment Division. Environmental Sciences Research Lab, EPA. May 1979.

Johns, W. M., 1968. Oil and Gas Prospect, Northeast Whitefish Range, Flathead County, Montana, 5 April 1968.

Johnson, D.L., 1984. Manager Field Operations, Ministry of Energy, Mines and Petroleum Resources. British Columbia, Canada. Letter to Engineering-Science dated 29 October 1984.

Kiefer, Gary, 1984a. Minerals Administration Flatland National Forest, Communication with D. Groh, US EPA, 10 October 1984.

Kiefer, Gary, 1984b. Minerals Administration Flatland National Forest, Communications with Jon Sims, Engineering-Science, November and December 1984.

Lange, Dave, 1984. Glacier National Park Resource Ranger, Communication with Richard Burke, Engineering-Science, 14 December, 1984.

Martinka, Clifford, 1985. Glacier National Park, Supervisory Research Biologist, Communication with Dianne Groh, 2 January 1985.

Olson, Gary, 1981. Effects of Seismic Exploration on Summering Elk in the Two Medicine-Badger Creek Area, Northcentral Montana. Montana Department of Fish, Wildlife, and Parks. December 1981.

Reynolds, Patricia, 1981. Effects of Seismic Surveys on Denning Grizzly Bears in Northern Alaska, submitted by the U.S. Fish and Wildlife Service, Arctic National Wildlife Refuge.

Schallenberger, A., and C. Jonkel, 1979. Rocky Mountain East Front Grizzly Studies, 978, Annual Report. Border Grizzly Project. School of Forestry, University of Montana, Missoula.

Selcho, Herman, 1984. Mineral Resources, Lease Continuation, Alberta, Canada. Personal communication, 30 October 1984.

Strathy, Robin, 1984. District Ranger, Lewis and Clarke National Forest, Communication with Richard Burke, Engineering-Science, 13 December, 1984.

Swanger, Lloyd, 1984. District Ranger, Lewis and Clark National Forest. Personal communication, 12 October 1984.

US Fish and Wildlife Service, 1982. Grizzly Bear Recovery Plan, with the Montana Department of Fish, Wildlife, and Parks, 29 January 1982.

US Forest Service, 1980. Environmental Assessment, Prospecting Permit Application, Consolidated Georex Geophysics. April 1980.

US Forest Service, 1985. Helena National Forest, Land and Resource Management Plan, Draft Environmental Impact Statement. January 1985.

US Geological Survey, 1968. Mineral and Water Resources of Montana. May 1968.

US Geological Survey, 1984. Water - Discharge Records, British Columbia and Columbia Falls, Montana. 1979-1983.

US National Park Service, 1983. Natural Resource Management Plan and Environmental Assessment, Glacier National Park. 5 May 1983.

US National Park Service, no date. Oil, Gas, and Mining Activities in the Valley of the North Fork of Flathead River, Rocky Mountain Region, Division of Mining and Minerals.

APPENDIX A

EXPLORATION ACTIVITY

A.1 EXPLORATION PROJECTS NEAR GLACIER NATIONAL PARK

As shown in Figure A.1, oil and gas exploration projects have been undertaken or proposed on virtually all lands adjacent to Glacier National Park, including Flathead National Forest, Lewis and Clark National Forest, Coal Creek State Forest, the Blackfeet Indian Reservation, British Columbia, Canada, and private lands. These activities frequently take place within one-half mile from the Park boundary (Haraden 1982). A small sample of some of these seismic activities are discussed below. Not all seismic exploration projects which have occurred in the Park vicinity are included in this discussion. Those which are discussed indicate that a great degree of activity has occurred and will continue to occur in the area for many years to come.

Flathead National Forest. Seismic activities which have taken place in Flathead National Forest are described below based on conversations with the local National Forest Service representative (Keifer 1984b).

1. Previous Activities. About 330,000 acres, or 80 percent of the Glacier View Ranger District (which covers the North Fork watershed), has been leased. An estimated 20 to 25 projects have taken place in the past five years, with the majority of seismic activity occurring between June 1 and October 1. During the 1984 exploration season, there were four projects in Flathead National Forest including a project that started initially in Lewis and Clark National Forest.

2. Proposed Activity. Application for oil and gas explorations are usually submitted to the National Forest Service in February making it difficult to predict future activity at the time of this report;

however, the National Forest Service estimates that activity will be about the same for 1985 as it was in 1984.

Lewis and Clark National Forest. Seismic activities described below are based on conversations with the local National Forest Service representative (Swanger 1984).

1. Previous Activities. Most of the seismic tests have taken place in the summer with very little activity during the winter. An estimated 10 to 20 projects have taken place in the past five years. During 1984, seismographic activity was heavy from the first of May to the beginning of hunting season, October 16, and covered an area consisting of 17,000 acres, as shown Figure A.1. The blasting methods used included deep shot, Vibroseis, Portadrill, and above surface charge (the most used method). During the season, five projects were undertaken.

2. Proposed Activity. An application for drilling a well four to five miles south of the Glacier National Park has been filed by American Petrofina Company with the Forest Service. Drilling depth is expected to be 13,000 feet. The expected starting date for well production is 1 July 1985, and it will be operated for an unknown number of years in the future.

Coal Creek State Forest. Seismic activities described below are based on information from the Deputy Area Manager, Department of State Lands, Montana (Giesey 1984).

1. Previous Activities. Permitting for oil and gas exploration in the Coal Creek State Forest began in 1979 with one project. In 1980 and 1981, no projects took place within a 25-mile range of the Glacier National Park border. In 1982, exploration was performed by Mile Hi in an area bout 28 miles from the Park border. In 1983, exploration was performed by Consolidated Georex Geophysics for Phillips Petroleum and Transcontinental 3 1/3 miles from the Park border. The following projects took place during the summer of 1984.

a. Rocky Mountain Geophysical under contract with Phillips Oil Company performed seismic exploration comprising three miles of seismic line from September 24 to October 15, 1984, using the Modified Poulter method.

b. Seis-Port Exploration, Inc., under contract with Signal of Montana, performed seismic exploration comprising six miles of seismic line from August 17 to October 1, 1984, using the Modified Poulter method.

c. Seis-Port Exploration, Inc., under contact with Signal of Montana, performed seismic exploration comprising one-quarter mile of seismic line from July 16 to August 1, 1984, using the Modified Poulter method.

d. Rocky Mountain Geophysical, under contract with Trans-Con Energy, performed seismic activity comprising 5 1/4 mile of seismic line from September 27 to October 15, 1984, using the Modified Poulter method. This project is scheduled for completion in 1985.

2. Proposed Activities. Synex Corporation has proposed the drilling of a wildcat exploration oil well to a depth of 12,000 feet. With approval from the Department of State Lands, this project could begin as early as July 1985.

Blackfeet Indian Reservation. Seismic activity is taking place throughout the Blackfeet Indian Reservation. In fact, some officials believe nearly the entire reservation is leased to various exploration firms (Keifer 1984). A number of Indian officials were contacted regarding details of these activities (Burke 1984), but no informaton was provided.

Alberta, Canada. According to the Canadian Energy and Resources Department, Public Lands Division, although activity has taken place elsewhere in the province, there has not been any seismic exploration within 25 miles of the United States/Canadian border (Selcho 1984).

British Columbia, Canada. The seismic activities discussed below are based on information supplied by the Manager of Field Operations, Ministry of Energy, Mines and Petroleum Resources (Johnson 1984).

1. Previous Activities.

a. Shell Canada Resources and Norcana Geophysical performed seismic exploration from April 1 to April 14, 1984 using the Vibroseis method.

b. Cantina Energy Corp. and Geophysical Service, Inc. performed seismic explorations from April 1 to April 14, 1984 using the Vibroseis method.

c. Chevron Canada Ltd. and Sefel Geophysical performed seismic exploration from March 29 to April 14, 1984 using the Vibroseis method.

d. Geo Data Corp. and Geophysical Service, Inc. performed seismic exploration from March 20 to September 21, 1984 using the Vibroseis method.

e. Raymond T. Duncan Oil Properties Ltd. and Petty Ray Geophysical performed seismic exploration from June 14 to September 25, 1984 using the Vibroseis method.

f. Shell Canada Resources and Norcana Geophysical performed seismic exploration from July 4 to August 21, 1984 using dynamite.

g. The Cabin Creek coal mine is located six miles from the northwest corner of Glacier National Park. The mine site is about 4,000 acres in size and is expected to produce 2.2 million tons of clean coal over a period of 21 years (National Park Service, no date).

2. Proposed Activities. An open pit coal mine which has been worked in the past and may be operated again in the near future is located 15 miles north of the U.S.-Canada border and 50 miles west of Waterton Park.

Private Lands. Some seismic activity has taken place on private lands surround the National Park, in particular in this area near the town of Columbia Falls, although the acreage involved is not known. ARCO Oil performed seismic exploration in early 1984 on private lands in this area adjacent to Flathead National Forest.

A.2 TYPES OF EXPLORATION ACTIVITY

The following descriptions of exploratory activity are taken from the Glacier National Park Oil, Gas and Mining Activities in the Valley of the North Fork of Flathead River (US National Park Service, no date).

1. Seismic Surveys

These surveys use methods in which shock waves are artificially induced through the subsurface strata and then reflected by the various underlying layers. Seismic surveys involve two basic measurement techniques, the refraction and reflection methods. The basic difference in the two methods lies in the spacing between the shock source and the recorder. In the refraction method, spacing between the shot hole and the recorder ranges from 2 to 8 miles. In the reflection method, instrument spacing is usually less than one mile. Seismic refraction surveying has only limited usefulness for special geophysical problems and is, therefore, not the primary method used today by most seismic crews.

Seismic reflection surveys generally utilize an explosive source to generate shock waves. There are a number of nonexplosive sources including mechanical impactors and vibrating machines presently available. Even with the advent of nonexplosive sources, dynamite detonated in shot holes is the explosive used by more than 60 percent of land-based seismic crews (Dobrin, 1976), and in the area of study, 90 percent of all surveys use above ground explosives (Strathy, 1984, Kiefer, 1984a).

Seismic operations are expensive -- as high as $180,000 per crew month -- and they involve the use of heavy equipment and personnel with specific expertise. The basic components of a typical seismic reflection survey operation in the area of study are helicopters, a portable drill rig, a remote magazine (for storing explosives), a portable (12,000 lb) recording unit, seismometers or geophones, seismometer cables, surveying equipment, and crew personnel. These components may vary under specific terrain conditions (i.e., swamps, marsh, sand, shallow water) where specialized equipment may be needed.

In a typical survey operation using explosives, the dynamite must be planted in holes ranging from 10 feet to several handred feet in depth, with an average hole diameter of 4 inches. The amount of dynamite used may range from as little as one pound to several hundred pounds, depending on the nature of the subsurface material. To maximize the energy transmitted into the earth, the explosive charges are tamped, usually with a heavy drilling mud.

For a description of the most used method in the study area, the above ground blasting technique known as the Modified Poulter method, please see Chapter 3.

For a variety of reasons, including interest in reducing environmental impacts, several nonexplosive techniques have been developed. Three techniques are currently used: mechanical weight dropping (sometimes referred to by its trade name, "Thumper"), the Dinoseis (developed by Sinclair Research Labs), and the Vibroseis.

The Thumper uses a 3-ton slab of iron, mounted on a special truck and dropped to the ground from a height of 6 to 9 feet. For any given shot point, as many as 100 drops may be made at 10-foot intervals every 10 to 12 seconds. Often two trucks may be used in tandem to speed up the operation. The use of the Thumper, which was developed by Burton McCullom in 1956, is not used much in the study area (Strathy, 1984).

The Dinoseis system involves an explosion of gas (propane and oxygen) which is detonated inside a closed chamber. These chambers are mounted beneath special trucks and are lowered to the ground surface during detonation. In normal operations, three or four trucks are used simultaneously. It is also not used often in the study area.

The Vibroseis system induces an oscillatory signal through the earth rather than an impulsive signal as in explosive and other nonexplosive systems. The system, developed in the 1950s by Continental Oil Company, uses a 2-ton mass controlled by a programmed hydraulic vibrator mounted on special trucks. Vibroseis operations usually include four trucks used simultaneously either in parallel lines (for open field operations) or in tandem (where confined to roads). Because the signal from the Vibroseis is spread out over many seconds, it has a much lower amplitude level than the previous systems, which generate their impulse signals within a few milliseconds. This feature makes the Vibroseis more attractive for operation in populated areas or in areas with sensitive environmental characteristics, and is occasionally used in the study area near regularly traveled roads.

2. Core Drilling

Core drilling is sometimes conducted in areas where additional information is needed on the subsurface stratigraphy before decisions can be made for more extensive exploratory drilling programs. Most core drilling is conducted by small truck-mounted rigs to depths of 1,000 feet or less. However, this technique can provide vital information on basins with little developed geologic information. In such cases, "slim-hole" stratigraphic tests can be made by drilling to depths of 10,000 to 12,000 feet in order to obtain the entire stratigraphic profile of a basin. Under such conditions, the drilling operaton becomes quite extensive. Slim-hole drilling involves small diameter rotary drilling techniques and does not usually involve casing the well.

EXPLORATORY DRILLING

Once surface and subsurface geologic data, and information gained from the geophysical surveys is interpreted and a structural trap located, exploratory holes are drilled to test for the actual existence of hydrocarbons. This operation is referred to as "wildcatting."

The following discussion focuses on the techniques of the rotary drilling method. As a detailed discussion of each aspect and component of the drilling operation is beyond the scope of this report, attention will be given only to those aspects that are important to this study.

1. Rotary Drilling

Although comparatively new, rotary drilling rigs now drill over 90 percent of all United States wells. The earlier method, cable tool drilling, is now used primarily in the drilling of small, shallow water wells.

In the rotary method, a rotating drill bit is connected to and rotated by a drill string or pipe added in sections as drilling depth increases. Cuttings from the drilling process are removed by a drilling fluid or "mud," which is continuously circulated through the drill string, out nozzles in the bit and back up to the surface in the annular space between the drill string and the walls of the bore hole. Once back to the surface, the returned fluid is diverted through a series of tanks that remove the drill cuttings and keep the fluid well mixed. In the last of these tanks, the fluid is picked up by a pump and the whole cycle is repeated.

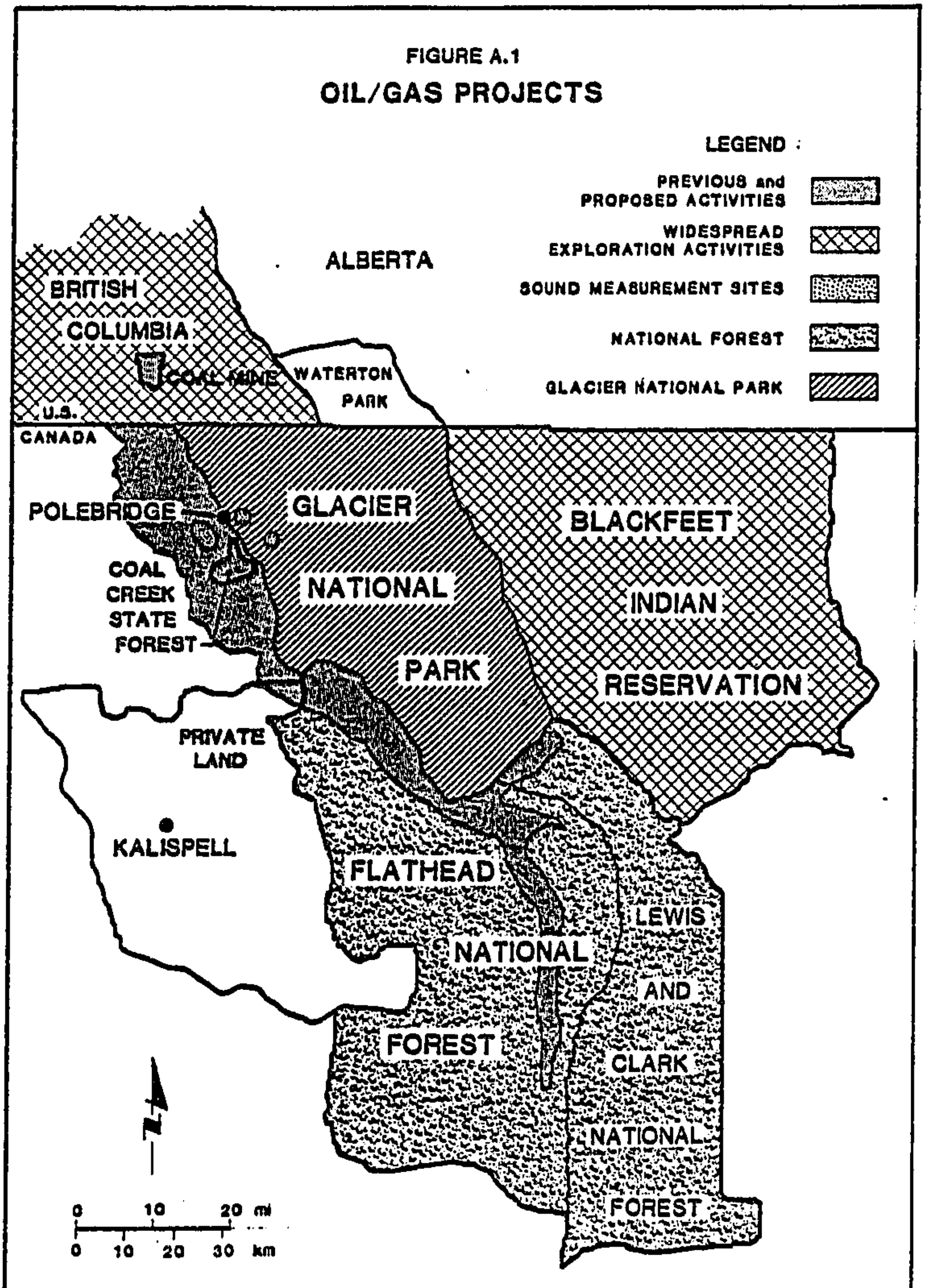


FIGURE A.1
OIL/GAS PROJECTS
LEGEND :
PREVIOUS and PROPOSED ACTIVITIES
WIDESPREAD EXPLORATION ACTIVITIES
SOUND MEASUREMENT SITES
NATIONAL FOREST
GLACIER NATIONAL PARK
ALBERTA
BRITISH COLUMBIA
COAL MINE
WATERTON PARK
U.S.
CANADA
POLEBRIDGE
GLACIER NATIONAL PARK
BLACKFEET INDIAN RESERVATION
COAL CREEK STATE FOREST
PRIVATE LAND
KALISPELL
FLATHEAD NATIONAL FOREST
LEWIS AND CLARK NATIONAL FOREST
N
0 10 20 mi
0 10 20 30 km

APPENDIX B

DESCRIPTION OF MONITORING SITES

FLATHEAD/GLACIER SITES

Noise monitoring took place at 16 sites. Sites 1-5, 11-14, 16, 17 were located in the Flathead National Forest and Sites 6-10 were located in the Glacier National Park. No measurements were conducted at Site 15.

The following are descriptions of the various sites.

<u>Site 1 - Thoma Creek</u>

As shown in Figure B-1, at the end of this appendix, this site was approximately 3 miles south of the Canadian border, approximately 3 miles up Thoma Creek Road from Trail Creek Road. Downslope east from a point along the road .25 mile north of the first switchback, and upslope from the east fork of Thoma Creek, the equipment was set up in a heavily timbered, narrow drainage. The site was 60 to 80 feet from a pack trail heading northeast. The microphone was out in the open.

<u>Site 2 - Trail Creek</u>

As shown in Figure B.2, this site was approximately 5 miles south of the Canadian border, 0.7 mile west of Thoma Creek Road and 75 to 100 yards north of Trail Creek Road, upslope and on the south aspect. The equipment was in a fairly dense forest with dense understory; the microphone was under the canopy.

<u>Site 3 - Hornet Lookout</u>

As shown in Figure B.3, this site was approximately 8 miles south of the Canadian border, on top of Hornet Lookout, which is reached via Whale Creek and Hornet Lookout Roads. The site was 58 paces along a field bearing of 20° from the lookout, on the north aspect of the slope. The trees near the microphone were approximately 5 to 6 feet high; the understory was mainly bear grass and other small grasses. The microphone was in the open.

Site 4 - Red Meadow Creek

As shown in Figure B.4, this site was approximately 14 miles south of the Canadian border, along Red Meadow Creek Road about 2.5 miles west of the first bridge. The site was 150 to 300 yards south of Red Meadow Creek on the north aspect of an approximately 15-year-old clear cut. The understory was heavy and mainly fireweed, small mountain maples, fallen trees, and stumps. The microphone was in the open.

Site 5 - Red Meadow Creek

As shown in Figure B.5, this site was approximately 15.5 miles south of the Canadian border, in an old clear cut at the head of Red Meadow Creek, 4 miles up Red Meadow Creek Road from Site 4 (just above the second bridge). The site was 60 feet south of the road on a south-southwest aspect, at the base of the large avalanche chute approximately 300 yards north of Red Meadow Creek. The microphone was in the open.

Site 6 - Kintla Lake

As shown in Figure B.6, this site was in the western part of Glacier National Park, approximately 15 minutes by Boulder Pass Trail northwest of Kintla Lake Campground. The equipment sat on a dead tree about 3 feet off the trail and approximately 4 yards from the shore of a small cove of Kintla Lake.

Site 7 - Round Prairie

As shown in Figure B.7, this site was in the western part of Glacier National Park, 5 miles south of Kintla Lake and 4 miles east of Trail Creek. The equipment was in a small grove of trees at the north edge of the prairie.

Site 8 - Bowman Lake

As shown in Figure B.8, this site was in the western part of Glacier National Park, approximately 6 miles from Polebridge Ranger

Station, and an approximately 5-minute walk northwest from Bowman Lake Campground along West Lakes Trail. The equipment was in the open on a slight hill about 4 feet upslope from the trail.

Site 9 - Bowman Lake

As shown in Figure B.8, this site was in the western part of Glacier National Park at Bowman Lake Ranger Station, approximately 6 miles from Polebridge Ranger Station and Entrance to the Park. Bowman Lake Ranger Station was along the shore on Bowman Lake Trail, approximately 200 yards from the campground. The equipment was on the back porch which faced northwest.

Site 10 - Kintla Lake

As shown in Figure B.6, this site was in the western part of Glacier National Park on a wooded hill approximately 200 yards northwest and above Kintla Lake Campground. The campground and the lake could be seen from the site.

Site 11 - Tepee Creek

As shown in Figure B.3, this site was in Wedge Canyon along Tepee Creek Road, 21 paces east of Flag 205 on the east-west seismic line. Site 11 was approximately 0.4 mile west of Site 12, which was the intersection of the north-south and east-west seismic lines.

Site 12 - Tepee Creek

As shown in Figure B.3, this site was in Wedge Canyon along Tepee Creek Road at the intersection of the north-south and east-west seismic lines. The site was marked by Flag 185 on the east-west seismic line, which runs along Tepee Creek. The corrected bearing Hornet Lookout was 112 degrees.

Site 13 - Tepee Creek

As shown in Figure B.3, this site was in Wedge Canyon along Tepee Creek Road, 10 paces east of Flag 164 on the east-west seismic line. This site was 0.4 mile east of Site 12.

Site 14 - Tepee Creek

As shown in Figure B.3, this site was in Wedge Canyon along Tepee Creek Road at Flag 222 on the east-west seismic line. This site was 0.8 mile west of Site 12.

Site 15 - None

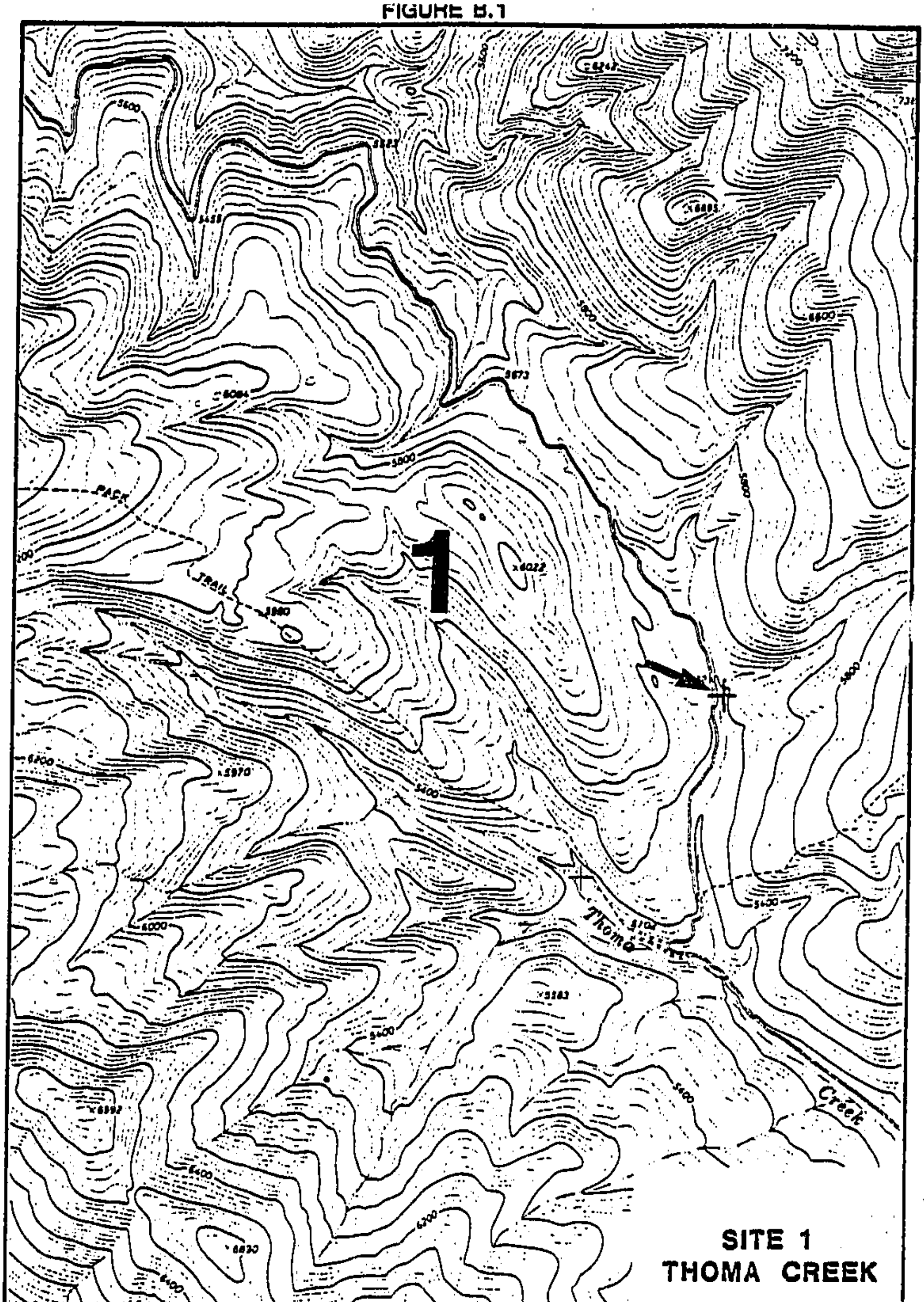
Site 16 - Tepee Creek

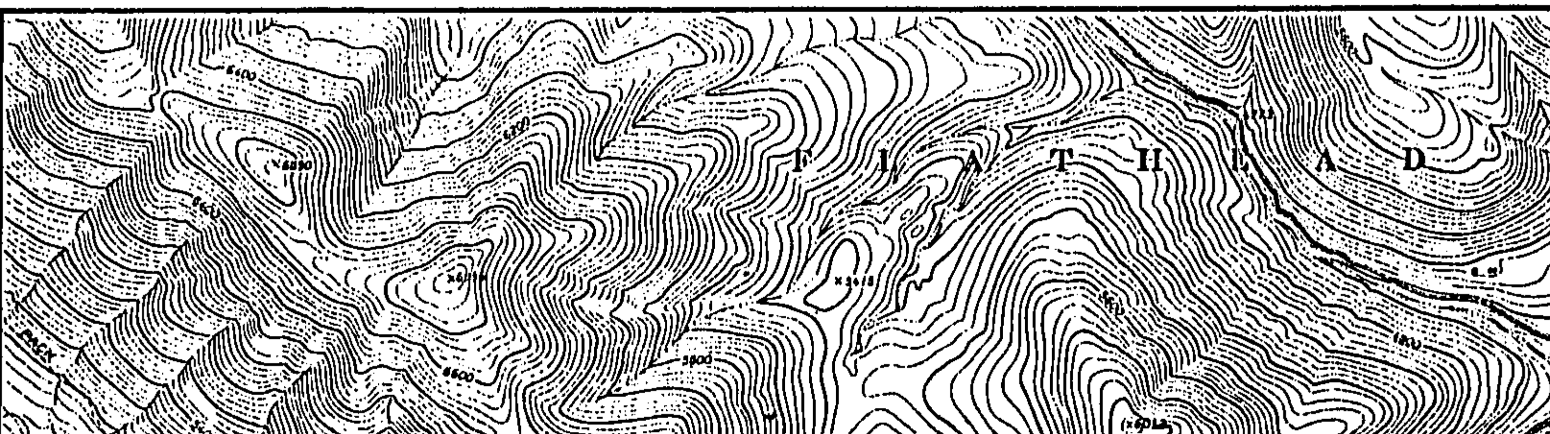
As shown in Figure B.3, this site was in Wedge Canyon along Tepee Creek Road at Flag 233 on the east-west seismic line. This site was 1.05 miles west of Site 12. The corrected bearing to Hornet Lookout was 89 degrees.

Site 17 - Whale Creek

As shown in Figure B.9, this site was approximately 0.2 mile west of the intersection of the north-south seismic line and Whale Creek Road in Flathead National Forest. The site was approximately 1 mile east of the staging site, which was at the junction of Whale Creek Road and the road to Moose Creek. The staging site was approximately 8.7 miles west of North Fork Road and 2.2 miles east of Ninko Creek.

FIGURE B.1

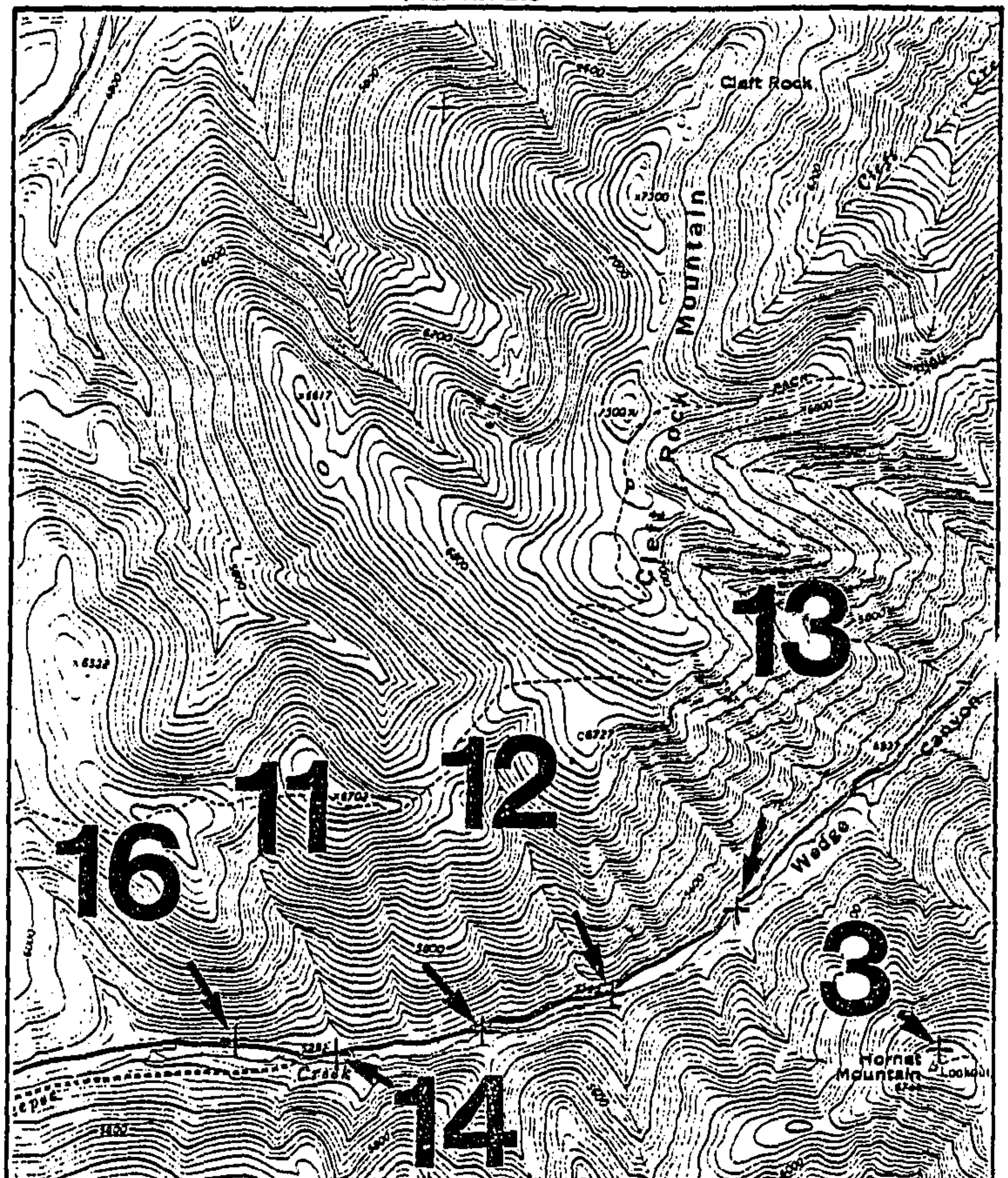




F L A T H E A D
N A T I O N A L F O R E
2
Creek
Tuchuck Campground
Cave
Yakinikak
Creek
Yakinikak
SITE 2
TRAIL CREEK

FIGURE B.2

FIGURE B.3



SITES 3,11,12,13,16
HORNET LOOKOUT
AND
TEEPEE CREEK

FIGURE B.4

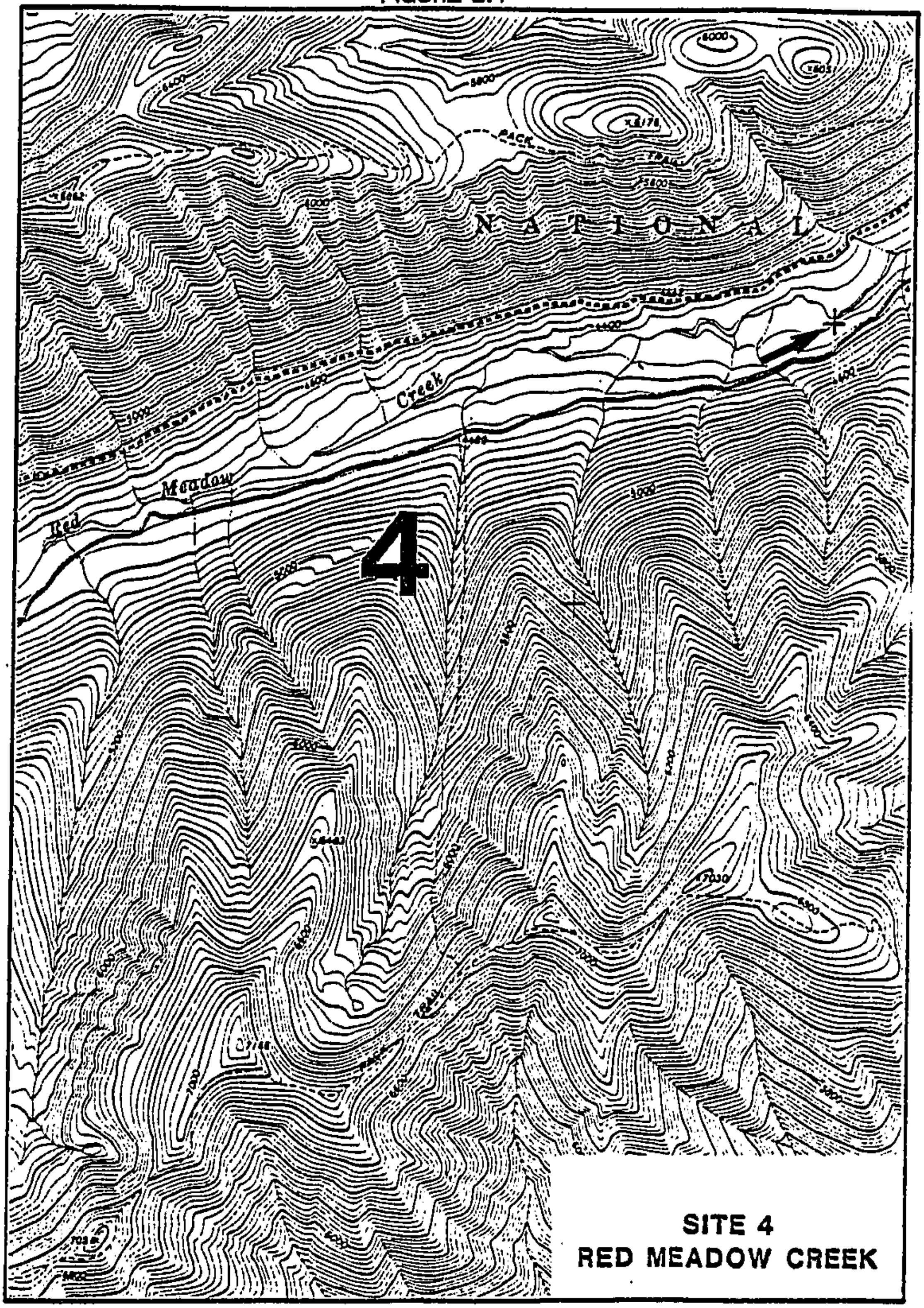
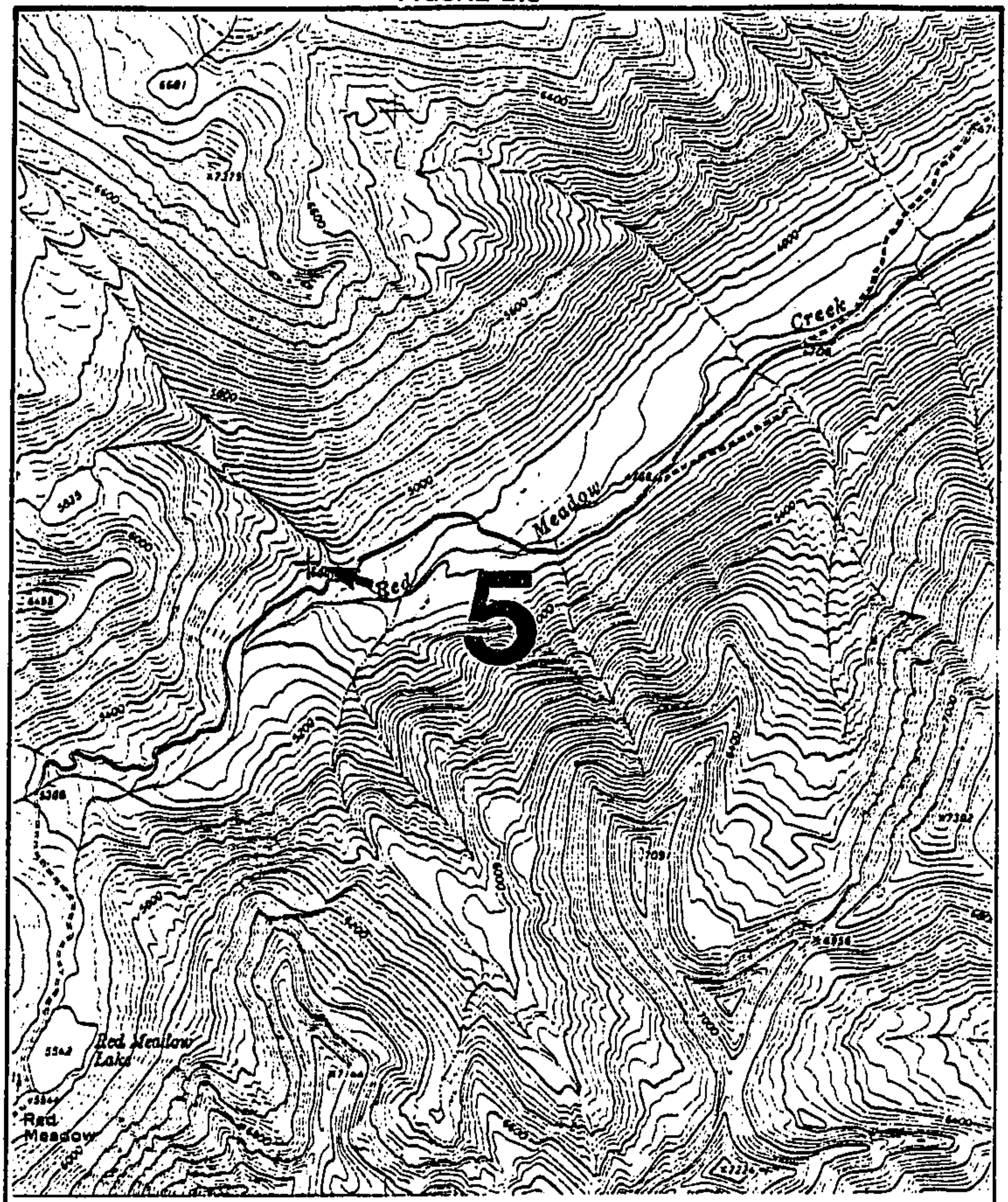
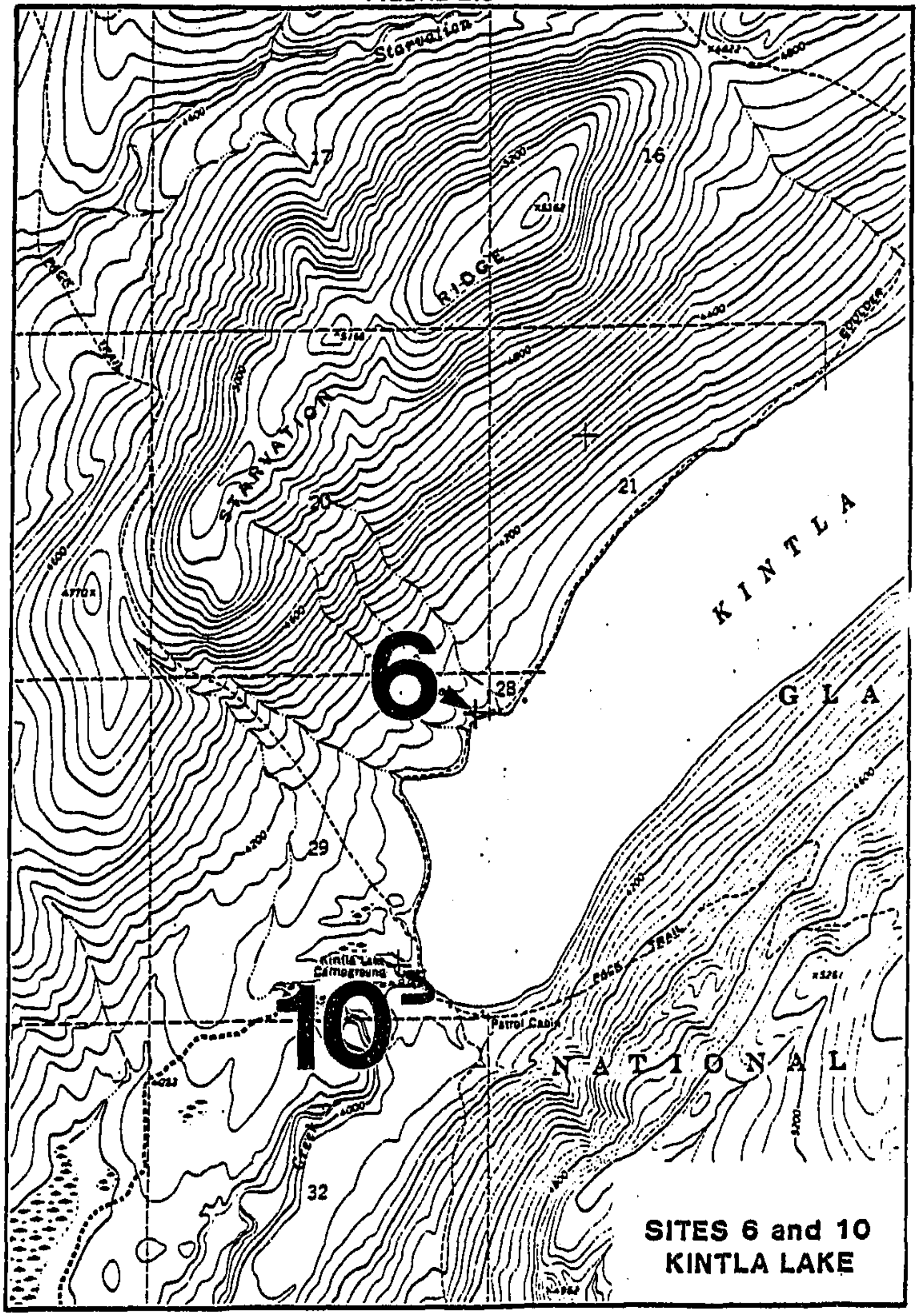


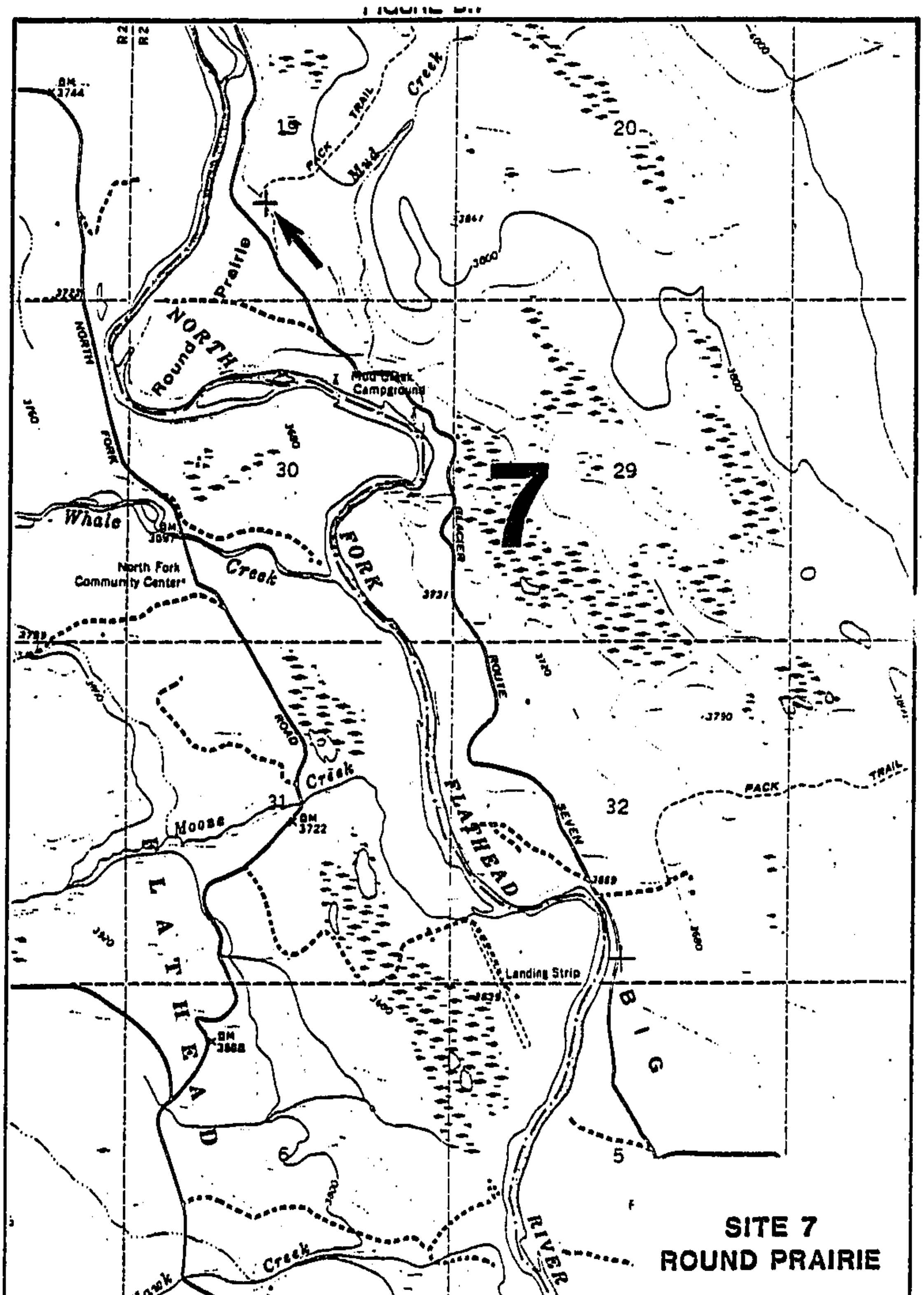
FIGURE B.5



SITE 5
RED MEADOW CREEK

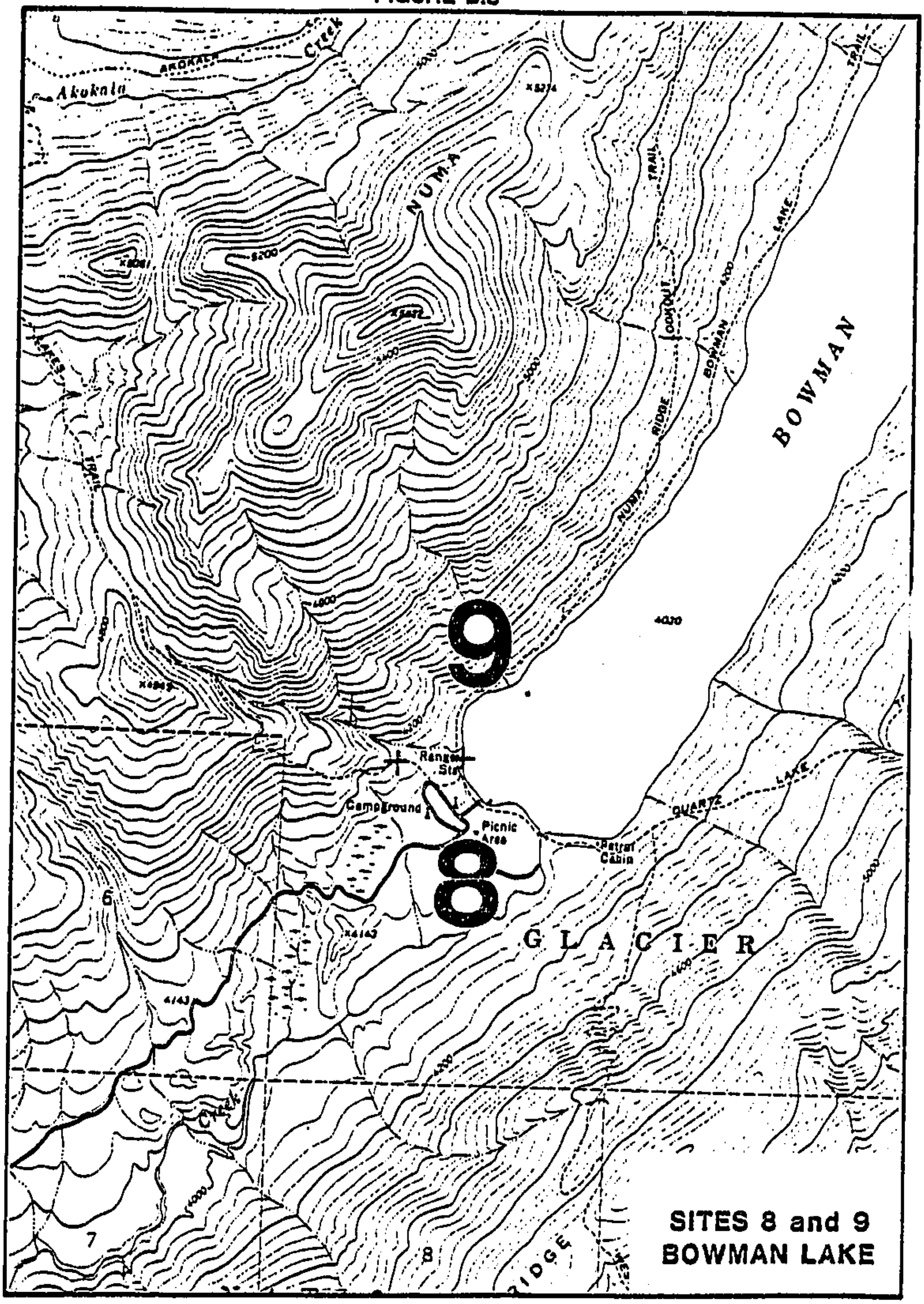
FIGURE B.6


Starvation
17
16
RIDGE
STARVATION
20
21
KINTLA
6
28
GLA
29
Kintla Lake Campground
10
Patrol Cabin
NATIONAL
32
SITES 6 and 10
KINTLA LAKE



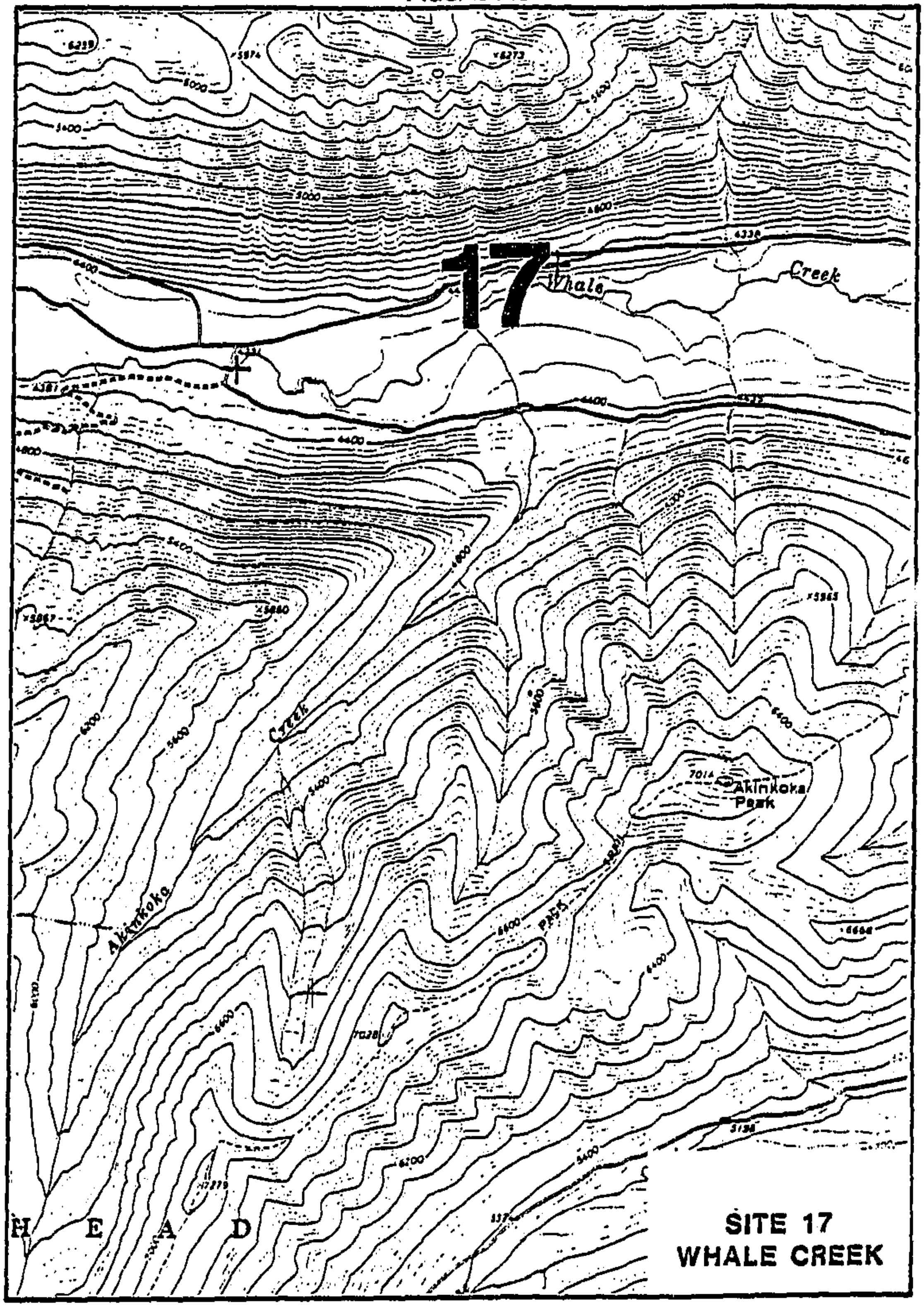
SITE 7
ROUND PRAIRIE
NORTH
FORK
FLATHEAD
RIVER
Round Prairie
Mud Creek
PACK TRAIL
Whale Creek
Moose Creek
Hawk Creek
North Fork Community Center
Landing Strip
ROAD
GLACIER ROUTE
SEVEN
BIG
7
19
20
29
30
31
32
5
6

FIGURE B.8



SITES 8 and 9
BOWMAN LAKE
BOWMAN
GLACIER
NUMA
Campground
Picnic Area
Patrol Cabin
Ranger Sta

FIGURE B.9


17
Whale
Creek
Akinkoka Creek
Akinkoka Peak
Pass
H E A D
SITE 17
WHALE CREEK

APPENDIX C

EQUIPMENT

The following equipment was used in the noise monitoring program.

EQUIPMENT LIST

System	Components
A - E	Digital Acoustics Community Noise Analyzer Model 607-Pv.03 General Radio 1961-9610 1 inch Microphone General Radio 1972-9600 Preamplifier/Adaptor General Radio 1562 Multi-Frequency Sound Level Calibrator Taylor Sling Psychrometer
F	Digital Acoustics Community Noise Analyzer Model 607-Pv.02 General Radio 1961-9610 1 inch Microphone General Radio 1972-9600 Preamplifier/Adaptor General Radio 1567 Sound Level Calibrator Taylor Sling Psychrometer
G	Nagra IV-SJ Scientific Tape Recorder General Radio 1933 Precision Sound Level Meter & Analyzer General Radio 1961-9610 1 inch Microphone Taylor Sling Psychrometer General Radio 1562 Multi-Frequency Calibrator Scotch 176 Low Noise Magnetic Tape
H	Nagra IV-SJ Scientific Tape Recorder General Radio 1933 Precision Sound Level Meter & Analyzer General Radio 1961-9610 1 inch Microphone Taylor Sling Psychrometer General Radio 1562 Multi-Frequency Calibrator Ampex 641 Professional Audio Tapes, 5" and 7" reels
I	Nagra IV-D Scientific Tape Recorder General Radio 1988 Precision Integrating Sound Level Meter & Analyzer General Radio 1962-9610 1/2 inch Microphone General Radio 1987 Minical Sound Level Calibrator General Radio 1560-9642 Preamplifier Taylor Sling Psychrometer Ampex 641 Professional Audio Tapes, 5" and 7" reels

System	Components
J	Digital Acoustics Community Noise Analyzer Model 607-Pv.03 General Radio 1961-9610 1 inch Microphone General Radio 1972-9600 Preamplifier/Adaptor General Radio 1562 Multi-Frequency Calibrator General Radio 1982 Precision Sound Level Meter & Analyzer General Radio 1962-9610 1/2 inch Microphone General Radio 1562 Multi-Frequency Calibrator Taylor Sling Psychrometer Taylor Wind Chill and Wind Speed Meter
K	General Radio 1982 Precision Sound Level Meter & Analyzer General Radio 1962-9610 1/2 inch Microphone General Radio 1972-9600 Preamplifier/Adaptor General Radio 1562 Multi-Frequency Calibrator
L	General Radio 1988 Precision Integrating Sound Level Meter & Analyzer General Radio 1962-9610 1/2 inch Microphone General Radio 1987 Minical Sound Level Calibrator General Radio 1560-9642 Preamplifier Taylor Sling Psychrometer
M	General Radio 1988 Precision Integrating Sound Level Meter & Analyzer General Radio 1962-9610 1/2 inch Microphone General Radio 1987 Minical Sound Level Calibrator General Radio 1560-9642 Preamplifier Taylor Sling Psychrometer Digital Acoustics Community Noise Analyzer Model 607-Pv.03 General Radio 1961-9610 1 inch Microphone General Radio 1972-9600 Preamplifier/Adaptor General Radio 1562 Multi-Frequency Sound Level Calibrator Dwyer Wind Gauge
N	General Radio 1988 Precision Integrating Sound Level Meter & Analyzer General Radio 1962-9610 1/2 inch Microphone General Radio 1987 Minical Sound Level Calibrator General Radio 1560-9642 Preamplifier Taylor Sling Psychrometer Dwyer Wind Gauge
O	General Radio 1985 DC Recorder General Radio 1988 Precision Integrating Sound Level Meter & Analyzer General Radio 1962-9610 1/2 inch Microphone General Radio 1987 Minical Sound Level Calibrator General Radio 1560-9642 Preamplifier Taylor Sling Psychrometer

APPENDIX D

MEASUREMENT RESULTS

This appendix contains most of the 24-hour data and some of the tape recorded sound level data collected from the field. The following key is used in the index to identify the tables in this Appendix:

Sound Source	A	Ambient (no exploration activity)
	E	Exploration activity was occurring
	H	Helicopter
Area (Location of the measurements)	F	Flathead National Forest
	G	Glacier National Park
	H	Helena National Forest
Met	T	Temperature data was taken
	H	Humidity data was taken
	W	Wind data was taken
Equipment	A-M	Systems identified in Appendix C

Data for each site were transcribed from typed copies of equipment readouts onto computer diskettes. The transcription process was reviewed and errors were corrected.

INDEX TO MEASUREMENT DATA TABLES

Table No.	Sound Source	Area	Site	Date	Sound Levels	Std. Dev.	Hours	Met	Equip.
1	A	F	1	6/26	L_{eq} $L_{.1}$, L_1, L_5, L_{10}, L_{33}, L_{50}, L_{90}, L_{99}, L_{max}		1330-0030	T,H	A
2			1	6/27			0030-0030		A
3			1	6/28			0030-0030		A
4			1	6/29			0030-0030		A
5			1	6/30			0030-0030		A
6			1	7/1			0030-0030		A
7			1	7/2			0030-1030		
8			1	7/2	L_{eq} $L_{.01}$, $L_{.1}$, L_1, L_5, L_{10}, L_{50}, L_{90}, L_{99}, L_{max}, L_{min}	X	1051-1059	T,H	I
9	A	F	1	7/2	L_{eq} $L_{.1}$, L_1, L_5, L_{10}, L_{33}, L_{50}, L_{90}, L_{99}, L_{max}		0030-1030		A
10	A	F	2	6/26	L_{eq} $L_{.1}$, L_1, L_5, L_{10}, L_{33}, L_{50}, L_{90}, L_{99}, L_{max}, L_{min}	X	1430-0030	T,H	B
11			2	6/27			0030-0030		B
12			2	6/28			0030-0030		B
13			2	6/29			0030-0030		B
14			2	6/30			0030-0030		B
15			2	7/1			0030-0030		B
16			2	7/2			1152-1201	T,H	I
17			2	7/2			0030--1130		B
18			3	6/26			1620-0030	T,H	C
19			3	6/27			0030-0030		C
20			3	6/28			0030-0030		C
21			3	6/29			0030-0030		C
22			3	6/30			0030-0030		C
23			3	7/1			0030-0030		C
24			3	7/2			0030-1330	T,H	C
25			4	6/26			1820-0030	T,H	D
26			4	6/27			0020-0020		D
27			4	6/28			0020-0020		D
28			4	6/29			0020-1720	T,H	D
29			5	6/26			1905-0005	T,H	E
30			5	6/27			0005-0005		E
31			5	6/28			0005-0005		E

INDEX TO MEASUREMENT DATA TABLES (continued)

Table No.	Sound Source	Area	Site	Date	Sound Levels	Std. Dev.	Hours	Met	Equip.
32			5	6/29			0005-0005		E
33			5	6/30			0005-0005		E
34			5	7/1			0005-0005		E
35			5	7/2			0005-1605	T,H	E
36		G	6	6/27			1248-1308	T	H
37			6	6/28			1539-1557	W	H
38			6	6/30			1053-1213	THW	H
39			6	7/2			1103-1138		H
40			6	7/21			1104-1129		H
41			7	6/29			1301-1341		H
42			7	6/30			1407-1442		H
43			7	7/1			1254-1332		H
44			7	7/2			1250-1325		H
45			8	6/28			1330-1348	TH	I
46			8	6/28			1403-1423	T	I
47			8	6/29			1449-1529	TH	H
48			8	7/1			1004-1126	THW	H
49			8	7/2			1448-1500	THW	H
50			9	6/30			1557-1631	TH	H
51			9	7/2			1533-1609	THW	H
52			10	7/1			1422-1448	TH	H
53	E	F	1	7/19	L_{eq}, $L_{.01}$, $L_{.1}$, L_1, L_5, L_{10}, L_{50}, L_{90}, L_{99}, L_{max}, L_{min}		1000-0000	TH	A
54			1	7/20			0000-0000		A
55			1	7/21			0000-0000		A
56			1	7/22			0000-0000		A
57			1	7/23			0000-0000		A
58			1	7/24			0000-0000		A
59			1	7/25			0000-1200	TH	A
60			2	7/19			1050-0050	TH	B
61			2	7/20			0050-0050		B
62			2	7/21			0050-0050		B

INDEX TO MEASUREMENT DATA TABLES (continued)

Table No.	Sound Source	Area	Site	Date	Sound Levels	Std. Dev.	Hours	Met	Equip.
63			2	7/22			0050-0050		B
64			2	7/23			0050-0050		B
65			2	7/24			0050-0050		B
66			2	7/25			0050-1150	TH	B
67			3	7/19			1250-0050		C
68			3	7/20			0050-0050		C
69			3	7/21			0050-0050		C
70			3	7/22			0050-0050		C
71			3	7/23			0050-0050		C
72			3	7/24			0050-0950	THW	C
73			3	7/25			0050-0950	THW	C
74			4	7/19			1430-0030	TH	D
75			4	7/20			0030-0030		D
76			4	7/21			0030-0030		D
77			4	7/22			0030-0030		D
78			4	7/23			0030-1030	TH	D
79			5	1/19			1500-0000	TH	E
80			5	7/20			0000-0000		E
81			5	7/21			0000-0000		E
82			5	7/22			0000-0000		E
83			5	7/25			0000-1100	TH	E
84			11	7/24			1113-1413		J
85			17	7/24			0750-1450	TH	H
86		G	7	7/18			1955-0055		F
87			7	7/19			0055-0055		F
88			7	7/20			0055-0055		F
89			7	7/21			0055-0055		F
90			7	7/22			0055-0055		F
91			7	7/23			0055-0055		F
92			7	7/24			0055-0055		F
93			7	7/25			0055-0655	THW	F

INDEX TO MEASUREMENT DATA TABLES (continued)

Table No.	Sound Source	Area	Site	Date	Sound Levels	Std. Dev.	Hours	Met	Equip.
94	H	F	1	7/20,7/21,7/23	SEL, L_{max}, Dur.		T_{max}		A
95			2	7/20,7/21,7/22			T_{max}		B
				7/23,7/24			T_{max}		
96			3	7/20,7/23			T_{max}		C
97			11	7/22			T_{max}		J
98			12	7/22	L_{max}		T_{max}		K
99			12	7/24	L_{max}, Dur.		T_{max}		K
100			12	7/24	SEL, L_{max}, TA				J
101			13	7/22	L_{max}				L
102			14	7/22	L_{max}				L
103			16	7/22	L_{max}				K
104			17	7/24	SEL, L_{max}, TA				M
105			17	7/24	SEL, L_{max}, TA				M
105a	H	H	21	7/16	L_{eq}, L_{mx}, L_{mn}, L_{mean}, $L_{.01}$, $L_{.1}$, L_1, L_5, L_{10}, L_{50}, L90, L99	X			M

TABLE	BOUND	AREA	SITE	DATE	HOURS	LEVEL (dBA) Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	H (%)	W (V)	EQUIP
1	A	F	1	6/26	0000-0100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	A	F	1	6/26	0100-0200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	A	F	1	6/26	0200-0300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	A	F	1	6/26	0300-0400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	A	F	1	6/26	0400-0500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	A	F	1	6/26	0500-0600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	A	F	1	6/26	0600-0700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	A	F	1	6/26	0700-0800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	A	F	1	6/26	0800-0900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	A	F	1	6/26	0900-1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	A	F	1	6/26	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	A	F	1	6/26	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	A	F	1	6/26	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	A	F	1	6/26	1300-1400	47	-	54	49	47	47	46	46	46	45	70	-	-	72	33	-	A
1	A	F	1	6/26	1400-1500	47	-	51	50	48	48	46	46	46	45	62	-	-	72	33	-	A
1	A	F	1	6/26	1500-1600	47	-	52	49	48	47	47	46	46	46	55	-	-	72	33	-	A
1	A	F	1	6/26	1600-1700	47	-	53	50	48	47	47	47	46	46	58	-	-	72	33	-	A
1	A	F	1	6/26	1700-1800	47	-	49	48	47	47	47	47	46	46	57	-	-	72	-	-	A
1	A	F	1	6/26	1800-1900	47	-	56	48	47	47	47	47	46	46	63	-	-	72	33	-	A
1	A	F	1	6/26	1900-2000	48	-	53	49	48	47	47	47	47	46	56	-	-	72	33	-	A
1	A	F	1	6/26	2000-2100	48	-	49	48	48	48	47	47	47	47	62	-	-	72	33	-	A
1	A	F	1	6/26	2100-2200	47	-	48	48	47	47	47	47	47	46	50	-	-	72	33	-	A
1	A	F	1	6/26	2200-2300	47	-	47	47	47	47	47	47	46	46	48	-	-	72	33	-	A
1	A	F	1	6/26	2300-0000	47	-	47	47	47	47	47	47	46	46	49	-	-	72	33	-	A
2	A	F	1	6/27	0000-0100	47	-	47	47	47	47	47	47	46	46	48	-	-	-	-	-	A
2	A	F	1	6/27	0100-0200	47	-	47	47	47	47	47	47	46	46	49	-	-	-	-	-	A
2	A	F	1	6/27	0200-0300	47	-	47	47	47	47	47	47	46	46	49	-	-	-	-	-	A
2	A	F	1	6/27	0300-0400	47	-	47	47	47	47	47	47	47	46	48	-	-	-	-	-	A
2	A	F	1	6/27	0400-0500	47	-	49	48	47	47	47	47	47	46	50	-	-	-	-	-	A
2	A	F	1	6/27	0500-0600	47	-	49	47	47	47	47	47	47	46	53	-	-	-	-	-	A
2	A	F	1	6/27	0600-0700	49	-	59	51	48	48	48	48	47	46	64	-	-	-	-	-	A
2	A	F	1	6/27	0700-0800	49	-	57	51	49	49	48	48	48	48	60	-	-	-	-	-	A
2	A	F	1	6/27	0800-0900	49	-	55	51	49	49	49	48	48	48	59	-	-	-	-	-	A
2	A	F	1	6/27	0900-1000	49	-	51	50	49	49	48	48	48	48	56	-	-	-	-	-	A
2	A	F	1	6/27	1000-1100	48	-	55	49	48	48	48	48	48	47	64	-	-	-	-	-	A
2	A	F	1	6/27	1100-1200	49	-	56	52	48	48	48	48	48	47	69	-	-	-	-	-	A
2	A	F	1	6/27	1200-1300	50	-	71	50	49	49	48	48	48	47	80	-	-	-	-	-	A
2	A	F	1	6/27	1300-1400	49	-	50	49	48	48	48	48	48	48	60	-	-	-	-	-	A
2	A	F	1	6/27	1400-1500	53	-	73	57	50	48	48	48	47	47	84	-	-	-	-	-	A
2	A	F	1	6/27	1500-1600	50	-	66	59	54	51	49	48	48	48	75	-	-	-	-	-	A
2	A	F	1	6/27	1600-1700	49	-	50	49	48	48	48	48	48	48	55	-	-	-	-	-	A
2	A	F	1	6/27	1700-1800	49	-	50	49	48	48	48	48	48	48	53	-	-	-	-	-	A
2	A	F	1	6/27	1800-1900	49	-	49	48	48	48	48	48	48	48	53	-	-	-	-	-	A
2	A	F	1	6/27	1900-2000	49	-	49	48	48	48	48	48	48	48	51	-	-	-	-	-	A
2	A	F	1	6/27	2000-2100	49	-	58	49	49	48	48	48	48	48	69	-	-	-	-	-	A
2	A	F	1	6/27	2100-2200	49	-	61	51	50	49	49	48	48	48	73	-	-	-	-	-	A
2	A	F	1	6/27	2200-2300	49	-	49	48	48	48	48	47	47	46	63	-	-	-	-	-	A
2	A	F	1	6/27	2300-0000	48	-	50	49	48	48	48	48	47	46	61	-	-	-	-	-	A

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	T (F)	H (%)	W (V)	EQUIP
						LEVEL (dBA)													MET			
3	A	F	1	6/28	0000-0100	48	-	49	49	48	48	48	48	47	46	60	-	-	-	-	-	A
3	A	F	1	6/28	0100-0200	47	-	47	47	47	47	47	47	46	46	50	-	-	-	-	-	A
3	A	F	1	6/28	0200-0300	48	-	49	49	48	48	48	48	47	46	57	-	-	-	-	-	A
3	A	F	1	6/28	0300-0400	47	-	48	48	47	47	47	47	46	46	55	-	-	-	-	-	A
3	A	F	1	6/28	0400-0500	47	-	52	50	47	47	47	47	46	46	55	-	-	-	-	-	A
3	A	F	1	6/28	0500-0600	47	-	48	47	47	47	47	47	46	46	51	-	-	-	-	-	A
3	A	F	1	6/28	0600-0700	47	-	54	49	48	47	47	47	46	46	59	-	-	-	-	-	A
3	A	F	1	6/28	0700-0800	49	-	53	49	49	49	48	48	47	46	57	-	-	-	-	-	A
3	A	F	1	6/28	0800-0900	49	-	53	50	49	49	49	48	48	48	56	-	-	-	-	-	A
3	A	F	1	6/28	0900-1000	49	-	56	49	49	49	48	48	48	48	66	-	-	-	-	-	A
3	A	F	1	6/28	1000-1100	49	-	55	51	49	49	48	48	48	47	60	-	-	-	-	-	A
3	A	F	1	6/28	1100-1200	48	-	51	49	48	48	48	48	47	46	58	-	-	-	-	-	A
3	A	F	1	6/28	1200-1300	48	-	51	48	48	48	48	47	46	46	56	-	-	-	-	-	A
3	A	F	1	6/28	1300-1400	48	-	53	50	49	48	48	47	46	45	59	-	-	-	-	-	A
3	A	F	1	6/28	1400-1500	47	-	52	49	47	47	46	46	45	45	53	-	-	-	-	-	A
3	A	F	1	6/28	1500-1600	47	-	49	48	47	47	46	46	45	45	56	-	-	-	-	-	A
3	A	F	1	6/28	1600-1700	46	-	47	46	46	46	46	46	45	45	48	-	-	-	-	-	A
3	A	F	1	6/28	1700-1800	46	-	48	47	46	46	46	46	45	45	59	-	-	-	-	-	A
3	A	F	1	6/28	1800-1900	47	-	48	47	46	46	46	46	46	46	59	-	-	-	-	-	A
3	A	F	1	6/28	1900-2000	47	-	49	48	47	47	46	46	46	46	56	-	-	-	-	-	A
3	A	F	1	6/28	2000-2100	48	-	48	48	48	48	48	47	47	47	50	-	-	-	-	-	A
3	A	F	1	6/28	2100-2200	48	-	55	50	48	48	48	47	46	46	58	-	-	-	-	-	A
3	A	F	1	6/28	2200-2300	47	-	48	48	48	47	46	46	46	46	49	-	-	-	-	-	A
3	A	F	1	6/28	2300-0000	47	-	46	46	46	46	46	46	46	46	47	-	-	-	-	-	
4	A	F	1	6/29	0000-0100	46	-	46	46	46*	46	46	46	46	46	47	-	-	-	-	-	A
4	A	F	1	6/29	0100-0200	46	-	46	46	46	46	46	46	46	46	47	-	-	-	-	-	A
4	A	F	1	6/29	0200-0300	46	-	46	46	46	46	46	46	46	46	47	-	-	-	-	-	A
4	A	F	1	6/29	0300-0400	46	-	46	46	46	46	46	46	46	46	47	-	-	-	-	-	A
4	A	F	1	6/29	0400-0500	48	-	55	53	50	48	48	48	46	46	58	-	-	-	-	-	A
4	A	F	1	6/29	0500-0600	48	-	54	50	48	48	48	47	46	46	57	-	-	-	-	-	A
4	A	F	1	6/29	0600-0700	47	-	54	48	48	48	46	46	46	46	59	-	-	-	-	-	A
4	A	F	1	6/29	0700-0800	47	-	50	47	47	46	46	46	46	46	55	-	-	-	-	-	A
4	A	F	1	6/29	0800-0900	47	-	48	47	47	47	47	46	46	46	52	-	-	-	-	-	A
4	A	F	1	6/29	0900-1000	47	-	48	47	47	47	46	46	46	46	55	-	-	-	-	-	A
4	A	F	1	6/29	1000-1100	46	-	48	47	46	46	46	46	46	45	52	-	-	-	-	-	A
4	A	F	1	6/29	1100-1200	47	-	54	49	48	47	46	46	45	45	64	-	-	-	-	-	A
4	A	F	1	6/29	1200-1300	47	-	51	49	48	47	46	46	45	45	56	-	-	-	-	-	A
4	A	F	1	6/29	1300-1400	47	-	52	51	49	48	46	45	45	45	53	-	-	-	-	-	A
4	A	F	1	6/29	1400-1500	47	-	53	51	49	48	46	46	45	45	55	-	-	-	-	-	A
4	A	F	1	6/29	1500-1600	46	-	50	48	46	46	45	45	45	44	59	-	-	-	-	-	A
4	A	F	1	6/29	1600-1700	46	-	48	47	46	46	45	45	45	44	57	-	-	-	-	-	A
4	A	F	1	6/29	1700-1800	46	-	52	49	47	46	46	45	45	45	55	-	-	-	-	-	A
4	A	F	1	6/29	1800-1900	47	-	53	50	48	47	46	45	45	45	57	-	-	-	-	-	A
4	A	F	1	6/29	1900-2000	46	-	47	46	46	46	46	45	45	45	52	-	-	-	-	-	A
4	A	F	1	6/29	2000-2100	46	-	50	48	47	46	46	46	45	45	55	-	-	-	-	-	A
4	A	F	1	6/29	2100-2200	46	-	54	48	46	46	46	46	45	45	56	-	-	-	-	-	A
4	A	F	1	6/29	2200-2300	46	-	47	46	46	46	46	46	45	45	48	-	-	-	-	-	A
4	A	F	1	6/29	2300-0000	46	-	46	46	46	46	[illegible]	46	45	45	47	-	-	-	-	-	A

TABLE	SOUND	AREA	SITE	DATE	HOURS	LEVEL (dBA) Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
5	A	F	1	6/30	0000-0100	46	-	46	46	46	46	46	46	45	45	48	-	-	-	-	-	A
5	A	F	1	6/30	0100-0200	46	-	46	46	46	46	46	46	45	45	47	-	-	-	-	-	A
5	A	F	1	6/30	0200-0300	46	-	46	46	46	46	46	46	45	45	47	-	-	-	-	-	A
5	A	F	1	6/30	0300-0400	46	-	46	46	46	46	46	46	45	45	47	-	-	-	-	-	A
5	A	F	1	6/30	0400-0500	46	-	49	47	46	46	46	46	45	45	52	-	-	-	-	-	A
5	A	F	1	6/30	0500-0600	46	-	48	47	46	46	46	46	45	45	52	-	-	-	-	-	A
5	A	F	1	6/30	0600-0700	46	-	51	47	47	47	46	46	45	45	62	-	-	-	-	-	A
5	A	F	1	6/30	0700-0800	46	-	51	48	46	46	46	46	45	45	53	-	-	-	-	-	A
5	A	F	1	6/30	0800-0900	48	-	57	50	48	48	48	47	46	46	68	-	-	-	-	-	A
5	A	F	1	6/30	0900-1000	48	-	54	48	48	48	48	47	46	46	62	-	-	-	-	-	A
5	A	F	1	6/30	1000-1100	46	-	50	48	47	46	46	46	45	46	56	-	-	-	-	-	A
5	A	F	1	6/30	1100-1200	46	-	47	46	46	46	46	45	45	45	48	-	-	-	-	-	A
5	A	F	1	6/30	1200-1300	46	-	47	46	46	45	45	45	45	45	54	-	-	-	-	-	A
5	A	F	1	6/30	1300-1400	46	-	51	48	46	46	45	45	44	44	53	-	-	-	-	-	A
5	A	F	1	6/30	1400-1500	45	-	48	47	46	45	45	45	44	44	49	-	-	-	-	-	A
5	A	F	1	6/30	1500-1600	46	-	55	51	48	47	45	45	44	44	56	-	-	-	-	-	A
5	A	F	1	6/30	1600-1700	46	-	55	50	46	45	45	45	44	44	63	-	-	-	-	-	A
5	A	F	1	6/30	1700-1800	46	-	54	48	46	46	45	45	45	44	62	-	-	-	-	-	A
5	A	F	1	6/30	1800-1900	46	-	49	47	46	46	45	45	45	44	57	-	-	-	-	-	A
5	A	F	1	6/30	1900-2000	46	-	48	46	46	45	45	45	45	44	63	-	-	-	-	-	A
5	A	F	1	6/30	2000-2100	46	-	50	47	46	45	45	45	45	45	58	-	-	-	-	-	A
5	A	F	1	6/30	2100-2200	46	-	48	46	45	45	45	45	45	45	52	-	-	-	-	-	A
5	A	F	1	6/30	2200-2300	46	-	48	47	47	46	46	46	45	45	50	-	-	-	-	-	A
5	A	F	1	6/30	2300-0000	46	-	47	47	46	46	45	45	45	45	48	-	-	-	-	-	A
6	A	F	1	7/01	0000-0100	46	-	47	46	46	46	45	45	45	45	48	-	-	-	-	-	A
6	A	F	1	7/01	0100-0200	47	-	51	50	48	47	46	46	45	45	59	-	-	-	-	-	A
6	A	F	1	7/01	0200-0300	46	-	51	49	46	46	46	45	45	45	59	-	-	-	-	-	A
6	A	F	1	7/01	0300-0400	46	-	53	50	46	46	46	45	45	45	64	-	-	-	-	-	A
6	A	F	1	7/01	0400-0500	46	-	53	49	46	46	45	45	45	45	57	-	-	-	-	-	A
6	A	F	1	7/01	0500-0600	46	-	50	46	46	46	45	45	45	45	66	-	-	-	-	-	A
6	A	F	1	7/01	0600-0700	46	-	56	49	45	45	45	45	45	45	63	-	-	-	-	-	A
6	A	F	1	7/01	0700-0800	46	-	50	46	45	45	45	45	45	45	58	-	-	-	-	-	A
6	A	F	1	7/01	0800-0900	46	-	48	47	46	46	45	45	45	45	51	-	-	-	-	-	A
6	A	F	1	7/01	0900-1000	46	-	49	46	46	45	45	45	45	45	53	-	-	-	-	-	A
6	A	F	1	7/01	1000-1100	46	-	51	47	46	46	45	45	45	45	68	-	-	-	-	-	A
6	A	F	1	7/01	1100-1200	46	-	50	46	45	45	45	45	45	45	57	-	-	-	-	-	A
6	A	F	1	7/01	1200-1300	45	-	47	45	45	45	45	45	45	45	52	-	-	-	-	-	A
6	A	F	1	7/01	1300-1400	46	-	47	46	45	45	45	45	45	44	49	-	-	-	-	-	A
6	A	F	1	7/01	1400-1500	45	-	47	46	46	45	45	45	44	44	54	-	-	-	-	-	A
6	A	F	1	7/01	1500-1600	45	-	47	46	45	45	45	44	44	44	54	-	-	-	-	-	A
6	A	F	1	7/01	1600-1700	46	-	53	49	47	46	45	44	44	44	58	-	-	-	-	-	A
6	A	F	1	7/01	1700-1800	45	-	53	49	46	46	45	45	44	44	58	-	-	-	-	-	A
6	A	F	1	7/01	1800-1900	45	-	50	46	45	45	45	45	44	44	53	-	-	-	-	-	A
6	A	F	1	7/01	1900-2000	45	-	53	47	45	45	45	45	44	44	66	-	-	-	-	-	A
6	A	F	1	7/01	2000-2100	45	-	51	48	46	45	45	45	44	44	59	-	-	-	-	-	A
6	A	F	1	7/01	2100-2200	45	-	49	47	45	45	45	45	44	44	53	-	-	-	-	-	A
6	A	F	1	7/01	2200-2300	45	-	45	45	45	45	45	44	44	44	46	-	-	-	-	-	A
6	A	F	1	7/01	2300-0000	45	-	45	45	45	45	[illegible]	44	44	44	46	-	-	-	-	-	A

TABLE	SOUND	AREA	SITE	DATE	HOURS	LEVEL (dBA) Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
7	A	F	1	7/02	0000-0100	45	-	45	45	45	45	44	44	44	44	46	-	-	-	-	-	-
7	A	F	1	7/02	0100-0200	45	-	45	45	45	45	44	44	44	44	47	-	-	-	-	-	-
7	A	F	1	7/02	0200-0300	45	-	45	45	45	45	44	44	44	44	46	-	-	-	-	-	-
7	A	F	1	7/02	0300-0400	45	-	45	45	45	45	44	44	44	44	46	-	-	-	-	-	-
7	A	F	1	7/02	0400-0500	45	-	47	45	45	45	45	44	44	44	50	-	-	-	-	-	-
7	A	F	1	7/02	0500-0600	45	-	53	46	45	45	44	44	44	44	60	-	-	-	-	-	-
7	A	F	1	7/02	0600-0700	45	-	47	45	45	45	44	44	44	44	53	-	-	-	-	-	-
7	A	F	1	7/02	0700-0800	45	-	52	46	45	45	45	44	44	44	59	-	-	-	-	-	-
7	A	F	1	7/02	0800-0900	46	-	54	50	47	45	45	45	45	44	57	-	-	-	-	-	-
7	A	F	1	7/02	0900-1000	46	-	52	49	47	46	45	45	45	45	67	-	-	-	-	-	-
7	A	F	1	7/02	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	A	F	1	7/02	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	A	F	1	7/02	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	A	F	1	7/02	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	A	F	1	7/02	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	A	F	1	7/02	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	A	F	1	7/02	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	A	F	1	7/02	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	A	F	1	7/02	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	A	F	1	7/02	1900-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	A	F	1	7/02	2000-2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	A	F	1	7/02	2100-2200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	A	F	1	7/02	2200-2300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	A	F	1	7/02	2300-0000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	1051-1059	45.8	48	47	46	46	46	-	45	45	45	47.8	44.5	0.3	51	82	-	I
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	A	F	1	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
9	A	F	1	7/02	0000-0100	45	-	45	45	45	45	44	44	44	44	46	-	-	-	-	-	A
9	A	F	1	7/02	0100-0200	45	-	45	45	45	45	44	44	44	44	47	-	-	-	-	-	A
9	A	F	1	7/02	0200-0300	45	-	45	45	45	45	44	44	44	44	46	-	-	-	-	-	A
9	A	F	1	7/02	0300-0400	45	-	45	45	45	45	44	44	44	44	46	-	-	-	-	-	A
9	A	F	1	7/02	0400-0500	45	-	47	45	45	45	45	44	44	44	50	-	-	-	-	-	A
9	A	F	1	7/02	0500-0600	45	-	53	46	45	45	44	44	44	44	60	-	-	-	-	-	A
9	A	F	1	7/02	0600-0700	45	-	47	45	45	45	44	44	44	44	53	-	-	-	-	-	A
9	A	F	1	7/02	0700-0800	45	-	52	46	45	45	45	44	44	44	59	-	-	-	-	-	A
9	A	F	1	7/02	0800-0900	46	-	54	50	47	45	45	45	45	44	57	-	-	-	-	-	A
9	A	F	1	7/02	0900-1000	46	-	52	49	47	46	45	45	45	45	67	-	-	-	-	-	A
9	A	F	1	7/02	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	A	F	1	7/02	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	A	F	1	7/02	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	A	F	1	7/02	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	A	F	1	7/02	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	A	F	1	7/02	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	A	F	1	7/02	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	A	F	1	7/02	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	A	F	1	7/02	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	A	F	1	7/02	1900-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	A	F	1	7/02	2000-2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	A	F	1	7/02	2100-2200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	A	F	1	7/02	2200-2300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	A	F	1	7/02	2300-0000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	0000-0100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	0100-0200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	0200-0300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	0300-0400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	0400-0500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	0500-0600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	0600-0700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	0700-0800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	0800-0900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	0900-1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	A	F	2	6/26	1400-1500	46	-	53	52	50	49	46	45	42	42	60	41	2.3	79	27	-	D
10	A	F	2	6/26	1500-1600	45	-	50	49	47	46	44	43	42	42	51	41	1.6	79	27	-	D
10	A	F	2	6/26	1600-1700	45	-	50	50	48	47	45	44	42	42	59	41	1.8	79	27	-	D
10	A	F	2	6/26	1700-1800	45	-	50	48	46	46	44	43	42	42	51	41	1.4	79	27	-	D
10	A	F	2	6/26	1800-1900	44	-	51	48	45	45	43	43	42	42	52	41	1.1	79	27	-	D
10	A	F	2	6/26	1900-2000	44	-	48	45	44	44	43	43	42	42	54	42	0.6	79	27	-	B
10	A	F	2	6/26	2000-2100	43	-	44	44	43	43	43	43	42	42	50	42	0.2	79	27	-	B
10	A	F	2	6/26	2100-2200	44	-	54	48	45	44	43	43	43	42	65	42	1.0	79	27	-	D
10	A	F	2	6/26	2200-2300	44	-	45	44	44	44	44	43	43	43	47	42	0.4	79	27	-	B
10	A	F	2	6/26	2300-0000	44	-	46	44	44	44	43	43	43	43	48	42	0.4	79	27	-	B

LEVEL (dBA)

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
11	A	F	2	6/27	0000-0100	44	-	53	44	44	44	44	43	43	43	60	43	0.6	-	-	-	D
11	A	F	2	6/27	0100-0200	44	-	51	45	44	44	44	44	43	43	55	43	0.5	-	-	-	D
11	A	F	2	6/27	0200-0300	44	-	48	44	44	44	43	43	43	43	54	42	0.4	-	-	-	D
11	A	F	2	6/27	0300-0400	44	-	44	44	44	44	43	43	43	43	45	42	0.3	-	-	-	D
11	A	F	2	6/27	0400-0500	44	-	46	45	45	44	44	44	43	43	50	43	0.5	-	-	-	D
11	A	F	2	6/27	0500-0600	44	-	53	46	44	44	44	44	43	43	58	43	0.8	-	-	-	D
11	A	F	2	6/27	0600-0700	44	-	48	45	44	44	44	44	43	43	73	43	0.5	-	-	-	D
11	A	F	2	6/27	0700-0800	44	-	52	45	44	44	44	44	43	43	56	42	0.6	-	-	-	D
11	A	F	2	6/27	0800-0900	46	-	49	48	47	47	45	45	43	42	53	42	1.4	-	-	-	D
11	A	F	2	6/27	0900-1000	44	-	49	46	45	45	44	44	43	42	57	41	0.9	-	-	-	D
11	A	F	2	6/27	1000-1100	43	-	48	44	43	43	42	42	42	41	57	41	0.5	-	-	-	D
11	A	F	2	6/27	1100-1200	44	-	57	49	46	45	43	43	42	42	65	41	1.4	-	-	-	D
11	A	F	2	6/27	1200-1300	48	-	64	55	50	48	46	45	43	43	74	42	2.5	-	-	-	D
11	A	F	2	6/27	1300-1400	44	-	52	47	45	44	43	43	43	42	58	48	0.8	-	-	-	D
11	A	F	2	6/27	1400-1500	54	-	78	63	52	45	43	43	42	42	82	41	3.9	-	-	-	D
11	A	F	2	6/27	1500-1600	50	-	70	56	53	48	46	46	44	43	76	42	2.8	-	-	-	D
11	A	F	2	6/27	1600-1700	44	-	49	47	45	44	43	43	43	42	58	42	0.8	-	-	-	D
11	A	F	2	6/27	1700-1800	44	-	46	45	45	45	44	44	43	43	53	42	0.6	-	-	-	D
11	A	F	2	6/27	1800-1900	44	-	48	46	45	45	44	43	43	43	51	42	0.8	-	-	-	D
11	A	F	2	6/27	1900-2000	44	-	54	45	43	43	43	44	43	42	57	42	0.6	-	-	-	D
11	A	F	2	6/27	2000-2100	44	-	47	44	43	43	43	43	43	43	50	42	0.3	-	-	-	D
11	A	F	2	6/27	2100-2200	45	-	48	47	47	45	44	43	43	43	55	42	1.1	-	-	-	D
11	A	F	2	6/27	2200-2300	46	-	64	45	44	44	43	43	43	43	78	42	1.1	-	-	-	D
11	A	F	2	6/27	2300-0000	44	-	46	45	44	44	43	43	43	43	53	42	0.5	-	-	-	D
12	A	F	2	6/28	0000-0100	44	-	44	44	44	44	43	43	43	43	54	42	0.3	-	-	-	D
12	A	F	2	6/28	0100-0200	44	-	44	44	44	44	43	43	43	43	46	43	0.4	-	-	-	D
12	A	F	2	6/28	0200-0300	44	-	44	44	44	44	43	43	43	43	47	42	0.3	-	-	-	D
12	A	F	2	6/28	0300-0400	44	-	44	44	44	43	43	43	43	43	49	42	0.3	-	-	-	D
12	A	F	2	6/28	0400-0500	44	-	47	45	44	44	43	43	43	43	54	42	0.6	-	-	-	D
12	A	F	2	6/28	0500-0600	44	-	46	44	44	44	44	43	43	43	48	42	0.4	-	-	-	D
12	A	F	2	6/28	0600-0700	44	-	50	45	44	44	44	44	43	43	68	42	0.5	-	-	-	D
12	A	F	2	6/28	0700-0800	44	-	47	45	44	44	44	44	43	43	51	42	0.5	-	-	-	D
12	A	F	2	6/28	0800-0900	43	-	47	45	43	43	43	43	42	42	54	42	0.4	-	-	-	D
12	A	F	2	6/28	0900-1000	43	-	46	43	43	43	42	42	42	41	48	41	0.3	-	-	-	D
12	A	F	2	6/28	1000-1100	44	-	58	51	45	43	42	42	41	41	63	41	1.6	-	-	-	D
12	A	F	2	6/28	1100-1200	42	-	51	43	42	42	42	42	41	41	60	40	0.6	-	-	-	D
12	A	F	2	6/28	1200-1300	51	-	74	54	47	46	43	42	41	41	81	40	2.7	-	-	-	D
12	A	F	2	6/28	1300-1400	44	-	51	47	46	45	43	43	42	41	55	40	1.5	-	-	-	D
12	A	F	2	6/28	1400-1500	49	-	71	57	47	45	44	43	41	41	78	41	2.7	-	-	-	D
12	A	F	2	6/28	1500-1600	44	-	49	47	46	45	43	43	42	41	50	40	1.4	-	-	-	D
12	A	F	2	6/28	1600-1700	43	-	49	48	46	45	43	42	41	41	54	40	1.4	-	-	-	D
12	A	F	2	6/28	1700-1800	43	-	52	46	45	44	43	42	41	41	58	41	1.2	-	-	-	D
12	A	F	2	6/28	1800-1900	43	-	55	44	43	43	43	42	42	41	58	41	0.7	-	-	-	D
12	A	F	2	6/28	1900-2000	43	-	42	46	43	43	42	42	42	42	56	41	0.8	-	-	-	D
12	A	F	2	6/28	2000-2100	43	-	46	44	43	43	43	43	42	42	48	42	0.3	-	-	-	D
12	A	F	2	6/28	2100-2200	44	-	44	44	43	43	43	43	43	42	45	42	0.2	-	-	-	D
12	A	F	2	6/28	2200-2300	44	-	44	44	44	43	43	43	43	43	45	42	0.3	-	-	-	D
12	A	F	2	6/28	2300-0000	44	-	44	44	44	44	43	43	43	43	45	42	0.3	-	-	-	D

TABLE	SOUND	AREA	SITE	DATE	HOURS	LEVEL (dBA) Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	H (%)	W (V)	EQUIP
13	A	F	2	6/29	0000-0100	44	-	44	44	44	44	43	43	43	43	47	42	0.3	-	-	-	B
13	A	F	2	6/29	0100-0200	44	-	45	44	44	43	43	43	43	43	48	42	0.3	-	-	-	B
13	A	F	2	6/29	0200-0300	44	-	45	44	44	44	44	43	43	43	48	42	0.4	-	-	-	B
13	A	F	2	6/29	0300-0400	45	-	46	45	44	44	44	44	44	44	48	42	0.4	-	-	-	D
13	A	F	2	6/29	0400-0500	45	-	48	46	45	45	45	45	44	44	51	43	0.5	-	-	-	D
13	A	F	2	6/29	0500-0600	46	-	50	48	46	46	46	46	45	44	55	44	0.7	-	-	-	D
13	A	F	2	6/29	0600-0700	47	-	49	47	47	47	46	46	46	45	66	45	0.4	-	-	-	B
13	A	F	2	6/29	0700-0800	46	-	48	47	47	46	46	46	45	44	50	44	0.6	-	-	-	D
13	A	F	2	6/29	0800-0900	45	-	49	48	46	45	45	44	44	43	50	42	0.8	-	-	-	D
13	A	F	2	6/29	0900-1000	45	-	49	48	46	46	44	44	43	42	52	41	1.3	-	-	-	D
13	A	F	2	6/29	1000-1100	46	-	51	49	48	47	45	45	43	42	53	41	1.7	-	-	-	B
13	A	F	2	6/29	1100-1200	48	-	54	53	51	51	49	47	43	43	55	42	2.6	-	-	-	B
13	A	F	2	6/29	1200-1300	45	-	50	49	47	46	45	44	42	41	52	41	1.7	-	-	-	D
13	A	F	2	6/29	1300-1400	45	-	54	49	48	47	45	44	42	41	67	41	1.8	-	-	-	B
13	A	F	2	6/29	1400-1500	46	-	54	52	49	47	45	44	42	41	55	41	2.2	-	-	-	D
13	A	F	2	6/29	1500-1600	43	-	47	46	45	44	43	42	42	41	51	41	1.1	-	-	-	B
13	A	F	2	6/29	1600-1700	44	-	48	47	46	45	43	43	42	41	53	41	1.4	-	-	-	D
13	A	F	2	6/29	1700-1800	44	-	50	49	47	45	43	42	42	41	51	41	1.6	-	-	-	D
13	A	F	2	6/29	1800-1900	45	-	52	49	47	46	44	43	42	42	53	41	1.7	-	-	-	D
13	A	F	2	6/29	1900-2000	43	-	47	45	44	44	43	43	42	42	48	41	0.7	-	-	-	D
13	A	F	2	6/29	2000-2100	43	-	46	44	43	43	42	42	42	42	49	41	0.3	-	-	-	B
13	A	F	2	6/29	2100-2200	43	-	45	44	44	44	43	43	42	42	50	41	0.6	-	-	-	B
13	A	F	2	6/29	2200-2300	45	-	46	45	45	45	45	44	43	43	47	42	0.6	-	-	-	D
13	A	F	2	6/29	2300-0000	44	-	45	45	45	44	44	44	43	43	46	42	0.6	-	-	-	D
14	A	E	2	6/30	0000-0100	44	-	45	44	44.	44	44	43	43	43	46	42	0.4	-	-	-	B
14	A	E	2	6/30	0100-0200	44	-	44	44	44	44	43	43	43	43	46	42	0.3	-	-	-	D
14	A	E	2	6/30	0200-0300	44	-	44	44	44	43	43	43	43	43	46	42	0.3	-	-	-	D
14	A	E	2	6/30	0300-0400	44	-	44	44	43	43	43	43	43	43	54	42	0.3	-	-	-	B
14	A	E	2	6/30	0400-0500	44	-	46	45	44	44	43	43	43	43	48	42	0.5	-	-	-	B
14	A	E	2	6/30	0500-0600	44	-	51	45	44	44	44	44	43	43	59	42	0.6	-	-	-	D
14	A	E	2	6/30	0600-0700	44	-	47	46	44	44	44	44	43	43	50	42	0.6	-	-	-	D
14	A	E	2	6/30	0700-0800	44	-	50	46	44	44	44	44	43	43	56	42	0.6	-	-	-	B
14	A	E	2	6/30	0800-0900	47	-	70	51	45	44	43	43	42	42	72	41	1.8	-	-	-	D
14	A	E	2	6/30	0900-1000	43	-	51	48	44	43	42	42	41	41	63	40	1.2	-	-	-	D
14	A	E	2	6/30	1000-1100	42	-	47	45	44	43	42	41	41	40	63	39	1.0	-	-	-	D
14	A	E	2	6/30	1100-1200	45	-	51	49	48	47	44	43	42	41	54	40	1.9	-	-	-	D
14	A	E	2	6/30	1200-1300	48	-	55	54	53	51	48	46	43	42	58	41	3.1	-	-	-	D
14	A	E	2	6/30	1300-1400	48	-	57	54	52	51	47	46	43	42	58	41	3.1	-	-	-	D
14	A	E	2	6/30	1400-1500	48	-	55	54	51	50	47	46	43	42	56	41	2.6	-	-	-	D
14	A	E	2	6/30	1500-1600	45	-	52	51	48	47	45	44	41	41	54	40	2.3	-	-	-	D
14	A	E	2	6/30	1600-1700	45	-	53	51	48	47	44	43	42	41	54	40	2.1	-	-	-	D
14	A	E	2	6/30	1700-1800	47	-	57	51	49	49	47	46	44	43	61	42	1.9	-	-	-	D
14	A	E	2	6/30	1800-1900	44	-	48	46	45	45	43	43	42	42	49	41	1.0	-	-	-	B
14	A	E	2	6/30	1900-2000	43	-	48	45	44	44	43	43	42	42	52	41	0.8	-	-	-	D
14	A	E	2	6/30	2000-2100	43	-	53	43	43	43	42	42	42	41	56	41	0.6	-	-	-	B
14	A	E	2	6/30	2100-2200	44	-	51	46	45	45	44	43	42	41	56	41	1.4	-	-	-	D
14	A	E	2	6/30	2200-2300	44	-	54	46	45	45	44	44	43	42	61	42	1.0	-	-	-	D
14	A	E	2	6/30	2300-0000	44	-	45	45	45	45	43	43	42	42	46	41	0.8	-	-	-	D

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
15	A	F	2	7/01	0000-0100	45	-	47	47	47	46	44	44	42	42	48	42	1.3	-	-	-	D
15	A	F	2	7/01	0100-0200	45	-	51	49	47	46	45	44	43	43	53	42	1.3	-	-	-	D
15	A	F	2	7/01	0200-0300	44	-	51	48	44	43	43	43	42	42	62	42	1.0	-	-	-	D
15	A	F	2	7/01	0300-0400	43	-	45	43	43	43	43	43	42	42	51	42	0.2	-	-	-	D
15	A	F	2	7/01	0400-0500	44	-	54	48	43	43	43	43	42	42	57	42	0.9	-	-	-	D
15	A	F	2	7/01	0500-0600	44	-	47	45	44	44	43	43	43	42	56	42	0.5	-	-	-	D
15	A	F	2	7/01	0600-0700	45	-	49	46	45	45	45	45	44	44	56	43	0.5	-	-	-	D
15	A	F	2	7/01	0700-0800	45	-	48	46	46	45	45	45	44	44	55	44	0.5	-	-	-	D
15	A	F	2	7/01	0800-0900	47	-	53	49	48	48	47	46	45	44	66	44	1.2	-	-	-	D
15	A	F	2	7/01	0900-1000	47	-	50	48	47	47	46	46	46	46	56	45	0.0	-	-	-	D
15	A	F	2	7/01	1000-1100	47	-	51	47	47	47	46	46	46	46	58	44	0.3	-	-	-	D
15	A	F	2	7/01	1100-1200	47	-	50	48	47	47	46	46	46	46	55	45	0.3	-	-	-	D
15	A	F	2	7/01	1200-1300	47	-	49	48	47	47	47	46	46	46	51	46	0.4	-	-	-	D
15	A	F	2	7/01	1300-1400	47	-	49	48	48	47	47	47	46	46	55	45	0.5	-	-	-	D
15	A	F	2	7/01	1400-1500	47	-	50	48	47	47	46	46	46	46	58	45	0.4	-	-	-	D
15	A	F	2	7/01	1500-1600	47	-	51	50	48	47	46	46	46	44	53	44	0.9	-	-	-	D
15	A	F	2	7/01	1600-1700	46	-	49	49	47	46	45	45	44	44	51	43	1.0	-	-	-	D
15	A	F	2	7/01	1700-1800	45	-	50	47	46	45	45	45	44	43	58	43	0.7	-	-	-	D
15	A	F	2	7/01	1800-1900	46	-	47	46	46	46	45	45	44	44	50	44	0.5	-	-	-	D
15	A	F	2	7/01	1900-2000	46	-	50	46	46	46	46	45	45	45	55	44	0.3	-	-	-	D
15	A	F	2	7/01	2000-2100	47	-	47	46	46	46	46	46	46	46	54	45	0.0	-	-	-	D
15	A	F	2	7/01	2100-2200	47	-	55	47	47	47	46	46	46	46	64	45	0.4	-	-	-	D
15	A	F	2	7/01	2200-2300	47	-	47	47	47	47	47	47	47	46	52	46	0.0	-	-	-	D
15	A	F	2	7/01	2300-0000	47	-	47	47	47	47	47	47	47	47	52	46	0.0	-	-	-	D
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	1158-1201	41.1	46	45	43	42	42	-	42	37	33	45.6	33	2.4	67	49	-	I
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	A	F	2	7/02	- - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
						LEVEL (dBA)																
17	A	F	2	7/02	0000-0100	48	-	47	47	47	47	47	47	47	47	52	46	0.0	-	-	-	D
17	A	F	2	7/02	0100-0200	48	-	47	47	47	47	47	47	47	47	52	46	0.0	-	-	-	D
17	A	F	2	7/02	0200-0300	48	-	48	48	48	48	47	47	47	47	52	47	0.2	-	-	-	D
17	A	F	2	7/02	0300-0400	49	-	49	48	48	48	48	48	48	47	52	47	0.5	-	-	-	D
17	A	F	2	7/02	0400-0500	49	-	49	49	48	48	48	48	48	48	52	47	0.3	-	-	-	D
17	A	F	2	7/02	0500-0600	49	-	50	49	49	49	48	48	48	48	57	45	0.4	-	-	-	D
17	A	F	2	7/02	0600-0700	49	-	49	49	49	49	48	48	48	48	52	47	0.4	-	-	-	D
17	A	F	2	7/02	0700-0800	49	-	52	49	49	49	48	48	48	48	68	45	0.5	-	-	-	D
17	A	F	2	7/02	0800-0900	48	-	49	49	48	48	48	48	47	47	52	47	0.6	-	-	-	D
17	A	F	2	7/02	0900-1000	48	-	49	47	47	47	47	47	47	47	53	46	0.0	-	-	-	D
17	A	F	2	7/02	1000-1100	47	-	48	47	47	47	46	46	46	46	61	45	0.3	-	-	-	D
17	A	F	2	7/02	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D
17	A	F	2	7/02	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D
17	A	F	2	7/02	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D
17	A	F	2	7/02	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D
17	A	F	2	7/02	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D
17	A	F	2	7/02	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D
17	A	F	2	7/02	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D
17	A	F	2	7/02	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D
17	A	F	2	7/02	1900-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D
17	A	F	2	7/02	2000-2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D
17	A	F	2	7/02	2100-2200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D
17	A	F	2	7/02	2200-2300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D
17	A	F	2	7/02	2300-0000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D
18	A	F	3	6/26	0000-0100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	0100-0200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	0200-0300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	0300-0400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	0400-0500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	0500-0600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	0600-0700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	0700-0800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	0800-0900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	0900-1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	A	F	3	6/26	1600-1700	36	-	56	46	40	36	29	27	19	16	68	11	6.7	65	42	-	C
18	A	F	3	6/26	1700-1800	37	-	51	47	42	40	35	33	28	23	59	21	5.0	-	-	-	C
18	A	F	3	6/26	1800-1900	33	-	48	43	38	35	30	28	22	18	55	14	5.2	-	-	-	C
18	A	F	3	6/26	1900-2000	30	-	44	41	36	32	24	22	18	14	51	9	5.8	-	-	-	C
18	A	F	3	6/26	2000-2100	31	-	46	40	35	33	28	27	21	18	53	16	4.4	-	-	-	C
18	A	F	3	6/26	2100-2200	40	-	57	49	46	43	34	31	23	21	69	19	7.3	-	-	-	C
18	A	F	3	6/26	2200-2300	19	-	27	25	22	21	18	17	13	10	36	9	2.9	-	-	-	C
18	A	F	3	6/26	2300-0000	22	-	45	24	20	18	1[illegible]	14	12	9	56	9	3.1	-	-	-	C

TABLE	BOUND	AREA	SITE	DATE	HOURS	LEVEL (dBA) Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	H (%)	W (V)	EQUIP
19	A	F	3	6/27	0000-0100	19	-	39	22	18	17	15	14	10	9	55	9	2.9	-	-	-	C
19	A	F	3	6/27	0100-0200	12	-	23	16	14	13	11	10	9	9	34	9	1.7	-	-	-	C
19	A	F	3	6/27	0200-0300	12	-	23	15	13	13	11	10	9	9	29	9	1.6	-	-	-	C
19	A	F	3	6/27	0300-0400	16	-	24	20	19	18	16	14	11	9	31	9	2.5	-	-	-	C
19	A	F	3	6/27	0400-0500	26	-	45	39	29	24	18	17	15	14	51	12	4.8	-	-	-	C
19	A	F	3	6/27	0500-0600	29	-	47	41	35	31	18	16	14	12	51	10	6.9	-	-	-	C
19	A	F	3	6/27	0600-0700	30	-	47	42	36	30	18	16	14	11	57	9	7.0	-	-	-	C
19	A	F	3	6/27	0700-0800	39	-	61	47	40	36	27	24	18	14	67	9	7.4	-	-	-	C
19	A	F	3	6/27	0800-0900	38	-	48	47	44	42	35	32	25	23	54	22	6.4	-	-	-	C
19	A	F	3	6/27	0900-1000	41	-	64	49	42	40	34	31	22	17	70	13	7.2	-	-	-	C
19	A	F	3	6/27	1000-1100	35	-	57	47	36	30	20	17	12	9	64	9	7.7	-	-	-	C
19	A	F	3	6/27	1100-1200	37	-	59	43	38	34	26	23	19	14	70	9	6.4	-	-	-	C
19	A	F	3	6/27	1200-1300	41	-	55	49	47	45	41	35	21	16	69	13	9.1	-	-	-	C
19	A	F	3	6/27	1300-1400	45	-	66	54	47	45	36	32	25	23	77	22	7.4	-	-	-	C
19	A	F	3	6/27	1400-1500	31	-	48	39	34	32	27	26	22	21	64	20	4.0	-	-	-	C
19	A	F	3	6/27	1500-1600	39	-	66	60	53	51	46	44	28	20	72	19	8.2	-	-	-	C
19	A	F	3	6/27	1600-1700	40	-	49	47	45	43	40	38	32	29	53	25	4.2	-	-	-	C
19	A	F	3	6/27	1700-1800	44	-	61	50	48	46	43	41	36	33	68	31	4.0	-	-	-	C
19	A	F	3	6/27	1800-1900	47	-	49	44	41	40	37	36	33	32	51	30	2.6	-	-	-	C
19	A	F	3	6/27	1900-2000	31	-	40	38	35	34	30	29	24	21	46	20	4.1	-	-	-	C
19	A	F	3	6/27	2000-2100	23	-	33	27	24	24	22	22	20	19	39	19	1.6	-	-	-	C
19	A	F	3	6/27	2100-2200	40	-	62	47	38	36	32	30	21	20	72	18	6.1	-	-	-	C
19	A	F	3	6/27	2200-2300	24	-	32	28	26	25	24	22	19	19	41	18	2.5	-	-	-	C
19	A	F	3	6/27	2300-0000	30	-	37	36	33	32	29	28	25	23	39	21	2.6	-	-	-	C
20	A	F	3	6/28	0000-0100	28	-	40	35	32	31	28	26	22	21	55	20	3.6	-	-	-	C
20	A	F	3	6/28	0100-0200	23	-	30	27	24	24	23	22	21	20	38	20	1.3	-	-	-	C
20	A	F	3	6/28	0200-0300	22	-	27	24	23	22	21	21	20	19	34	19	1.0	-	-	-	C
20	A	F	3	6/28	0300-0400	22	-	30	26	24	23	22	22	20	19	41	17	1.4	-	-	-	C
20	A	F	3	6/28	0400-0500	34	-	53	48	38	30	22	21	20	19	57	18	5.9	-	-	-	C
20	A	F	3	6/28	0500-0600	37	-	55	49	43	39	27	21	19	19	58	17	8.2	-	-	-	C
20	A	F	3	6/28	0600-0700	34	-	50	47	41	36	21	20	18	18	54	17	7.3	-	-	-	C
20	A	F	3	6/28	0700-0800	21	-	35	30	25	21	19	19	18	17	40	15	2.3	-	-	-	C
20	A	F	3	6/28	0800-0900	37	-	62	44	31	24	18	17	14	12	69	9	6.0	-	-	-	C
20	A	F	3	6/28	0900-1000	24	-	46	35	24	21	15	15	13	11	53	9	4.2	-	-	-	C
20	A	F	3	6/28	1000-1100	49	-	68	64	45	38	20	15	12	10	17	9	11.8	-	-	-	C
20	A	F	3	6/28	1100-1200	39	-	62	42	25	19	13	12	9	9	65	9	6.3	-	-	-	C
20	A	F	3	6/28	1200-1300	30	-	49	44	35	28	21	19	11	9	54	9	7.1	-	-	-	C
20	A	F	3	6/28	1300-1400	33	-	57	41	31	29	25	24	21	18	65	16	3.9	-	-	-	C
20	A	F	3	6/28	1400-1500	27	-	40	34	30	28	25	23	20	18	56	16	3.3	-	-	-	C
20	A	F	3	6/28	1500-1600	25	-	37	32	29	27	24	23	18	15	44	11	3.4	-	-	-	C
20	A	F	3	6/28	1600-1700	23	-	33	28	26	25	22	21	18	17	40	14	2.4	-	-	-	C
20	A	F	3	6/28	1700-1800	19	-	29	25	22	22	19	16	12	9	36	9	3.8	-	-	-	C
20	A	F	3	6/28	1800-1900	24	-	41	35	28	26	20	18	13	9	45	9	5.2	-	-	-	C
20	A	F	3	6/28	1900-2000	21	-	38	32	25	22	18	17	13	9	43	9	4.1	-	-	-	C
20	A	F	3	6/28	2000-2100	20	-	38	31	24	21	15	14	9	9	43	9	4.6	-	-	-	C
20	A	F	3	6/28	2100-2200	29	-	50	40	26	19	16	15	12	9	59	9	5.3	-	-	-	C
20	A	F	3	6/28	2200-2300	18	-	30	22	20	19	17	16	13	11	41	9	2.4	-	-	-	C
20	A	F	3	6/28	2300-0000	22	-	33	26	23	22	[illegible]	19	17	15	58	13	2.4	-	-	-	C

TABLE	SOUND	AREA	SITE	DATE	HOURS	LEVEL (dBA) Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	H (%)	W (V)	EQUIP
21	A	F	3	6/29	0000-0100	21	-	31	26	24	23	20	19	17	16	40	13	2.2	-	-	-	C
21	A	F	3	6/29	0100-0200	23	-	32	29	26	25	22	21	18	17	34	15	2.7	-	-	-	C
21	A	F	3	6/29	0200-0300	20	-	30	24	22	22	20	19	17	16	43	14	1.8	-	-	-	C
21	A	F	3	6/29	0300-0400	22	-	31	27	25	24	21	20	18	16	51	14	2.4	-	-	-	C
21	A	F	3	6/29	0400-0500	37	-	58	50	33	29	26	25	22	20	62	19	4.8	-	-	-	C
21	A	F	3	6/29	0500-0600	34	-	56	43	31	30	27	26	23	22	58	20	3.8	-	-	-	C
21	A	F	3	6/29	0600-0700	27	-	42	34	30	28	25	24	22	20	58	19	2.9	-	-	-	C
21	A	F	3	6/29	0700-0800	26	-	43	35	31	29	24	22	18	15	52	13	4.5	-	-	-	C
21	A	F	3	6/29	0800-0900	27	-	39	35	31	30	25	23	19	17	45	15	4.1	-	-	-	C
21	A	F	3	6/29	0900-1000	30	-	44	39	36	33	27	24	20	18	56	16	5.2	-	-	-	C
21	A	F	3	6/29	1000-1100	30	-	50	42	32	29	23	21	18	16	59	14	4.8	-	-	-	C
21	A	F	3	6/29	1100-1200	27	-	42	35	30	28	25	23	21	20	55	17	3.1	-	-	-	C
21	A	F	3	6/29	1200-1300	27	-	42	36	29	27	25	25	22	20	47	18	2.8	-	-	-	C
21	A	F	3	6/29	1300-1400	28	-	46	39	32	29	24	22	19	17	52	13	4.5	-	-	-	C
21	A	F	3	6/29	1400-1500	29	-	43	36	32	29	24	23	21	19	56	17	3.6	-	-	-	C
21	A	F	3	6/29	1500-1600	27	-	42	37	31	28	24	23	20	18	51	16	3.7	-	-	-	C
21	A	F	3	6/29	1600-1700	31	-	49	45	34	26	21	19	16	18	58	9	5.9	-	-	-	C
21	A	F	3	6/29	1700-1800	30	-	47	43	44	46	21	20	17	14	51	9	5.4	-	-	-	C
21	A	F	3	6/29	1800-1900	29	-	46	39	34	31	26	24	20	19	49	17	4.4	-	-	-	C
21	A	F	3	6/29	1900-2000	35	-	50	46	40	35	27	25	21	20	72	18	6.1	-	-	-	C
21	A	F	3	6/29	2000-2100	34	-	50	46	41	36	25	23	20	17	57	15	6.6	-	-	-	C
21	A	F	3	6/29	2100-2200	30	-	51	40	40	26	22	21	18	16	63	13	4.2	-	-	-	C
21	A	F	3	6/29	2200-2300	32	-	48	44	36	33	27	25	21	19	52	17	5.2	-	-	-	C
21	A	F	3	6/29	2300-0000	24	-	38	32	29	26	23	22	18	17	40	16	3.4	-	-	-	C
22	A	F	3	6/30	0000-0100	27	-	36	33	31	29	26	24	20	17	44	15	3.6	-	-	-	C
22	A	F	3	6/30	0100-0200	27	-	37	32	30	29	26	25	22	21	56	19	2.6	-	-	-	C
22	A	F	3	6/30	0200-0300	24	-	31	28	26	25	23	23	20	18	39	17	2.0	-	-	-	C
22	A	F	3	6/30	0300-0400	20	-	26	24	22	21	20	19	17	16	33	14	1.6	-	-	-	C
22	A	F	3	6/30	0400-0500	35	-	54	49	39	34	20	19	17	16	57	13	7.2	-	-	-	C
22	A	F	3	6/30	0500-0600	32	-	51	45	35	29	21	20	17	16	54	13	5.8	-	-	-	C
22	A	F	3	6/30	0600-0700	33	-	58	35	28	23	17	16	12	9	63	9	5.4	-	-	-	C
22	A	F	3	6/30	0700-0800	24	-	45	33	28	25	17	14	9	9	54	9	6.4	-	-	-	C
22	A	F	3	6/30	0800-0900	23	-	43	36	26	23	17	16	12	9	49	10	4.9	-	-	-	C
22	A	F	3	6/30	0900-1000	22	-	40	35	25	23	18	16	14	11	46	9	4.3	-	-	-	C
22	A	F	3	6/30	1000-1100	29	-	49	44	28	24	18	16	12	9	53	9	5.9	-	-	-	C
22	A	F	3	6/30	1100-1200	35	-	55	46	36	32	27	26	22	20	64	18	4.8	-	-	-	C
22	A	F	3	6/30	1200-1300	32	-	49	42	35	33	29	28	26	24	55	23	3.4	-	-	-	C
22	A	F	3	6/30	1300-1400	33	-	53	42	34	32	28	27	25	23	60	21	3.6	-	-	-	C
22	A	F	3	6/30	1400-1500	28	-	40	36	32	29	26	25	22	20	57	18	3.3	-	-	-	C
22	A	F	3	6/30	1500-1600	28	-	44	36	31	28	26	25	21	20	52	18	3.1	-	-	-	C
22	A	F	3	6/30	1600-1700	31	-	47	40	34	32	28	27	24	22	55	21	3.5	-	-	-	C
22	A	F	3	6/30	1700-1800	29	-	40	36	33	31	28	26	23	22	50	20	3.1	-	-	-	C
22	A	F	3	6/30	1800-1900	28	-	45	44	30	29	27	25	23	21	50	19	2.9	-	-	-	C
22	A	F	3	6/30	1900-2000	25	-	38	31	28	27	24	24	22	20	43	19	2.1	-	-	-	C
22	A	F	3	6/30	2000-2100	32	-	44	39	36	35	32	29	20	18	55	15	5.9	-	-	-	C
22	A	F	3	6/30	2100-2200	34	-	45	41	38	37	34	32	28	23	55	21	3.5	-	-	-	C
22	A	F	3	6/30	2200-2300	40	-	52	46	44	43	40	38	30	23	60	21	5.0	-	-	-	C
22	A	F	3	6/30	2300-0000	23	-	31	29	28	27	[illegible]	20	9	9	38	9	6.6	-	-	-	C

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
23	A	F	3	7/01	0000-0100	18	-	30	26	23	21	18	14	9	9	39	10	4.8	-	-	-	C
23	A	F	3	7/01	0100-0200	37	-	47	44	42	41	37	34	22	20	55	18	6.8	-	-	-	C
23	A	F	3	7/01	0200-0300	36	-	49	45	41	39	34	32	25	23	54	22	5.4	-	-	-	C
23	A	F	3	7/01	0300-0400	32	-	50	40	35	34	31	29	24	22	57	21	4.1	-	-	-	C
23	A	F	3	7/01	0400-0500	36	-	51	46	41	39	35	32	25	23	56	22	5.3	-	-	-	C
23	A	F	3	7/01	0500-0600	37	-	58	46	41	37	24	22	19	18	61	17	7.2	-	-	-	C
23	A	F	3	7/01	0600-0700	30	-	49	43	32	29	25	24	21	19	57	18	4.0	-	-	-	C
23	A	F	3	7/01	0700-0800	47	-	65	49	39	34	26	25	22	21	85	19	5.8	-	-	-	C
23	A	F	3	7/01	0800-0900	42	-	64	53	39	36	32	30	23	21	70	20	5.8	-	-	-	C
23	A	F	3	7/01	0900-1000	37	-	51	46	42	40	35	34	31	30	56	29	3.6	-	-	-	C
23	A	F	3	7/01	1000-1100	37	-	47	43	40	39	36	34	30	26	55	25	3.5	-	-	-	C
23	A	F	3	7/01	1100-1200	31	-	47	41	35	32	27	26	23	22	60	20	4.0	-	-	-	C
23	A	F	3	7/01	1200-1300	34	-	52	43	38	35	31	30	25	23	58	22	4.3	-	-	-	C
23	A	F	3	7/01	1300-1400	44	-	66	54	41	38	34	31	26	24	72	22	5.7	-	-	-	C
23	A	F	3	7/01	1400-1500	34	-	51	42	38	36	32	31	26	25	58	24	3.8	-	-	-	C
23	A	F	3	7/01	1500-1600	35	-	54	46	38	35	31	30	25	22	65	20	4.5	-	-	-	C
23	A	F	3	7/01	1600-1700	30	-	42	38	35	33	29	27	23	21	50	19	3.8	-	-	-	C
23	A	F	3	7/01	1700-1800	34	-	54	46	35	32	28	26	23	21	64	19	4.4	-	-	-	C
23	A	F	3	7/01	1800-1900	31	-	47	40	34	32	29	27	24	22	54	20	3.5	-	-	-	C
23	A	F	3	7/01	1900-2000	43	-	66	53	42	36	24	22	16	14	75	11	8.3	-	-	-	C
23	A	F	3	7/01	2000-2100	23	-	44	34	24	20	16	16	14	12	51	9	3.9	-	-	-	C
23	A	F	3	7/01	2100-2200	36	-	58	46	28	21	18	17	15	13	66	9	5.4	-	-	-	C
23	A	F	3	7/01	2200-2300	20	-	29	24	22	21	20	19	17	16	37	14	1.6	-	-	-	C
23	A	F	3	7/01	2300-0000	20	-	27	23	21	21	19	19	17	16	36	15	1.3	-	-	-	C
24	A	F	3	7/02	0000-0100	23	-	30	26	24	24	22	22	20	19	36	18	1.5	67	47	-	C
24	A	F	3	7/02	0100-0200	20	-	26	23	22	21	20	20	18	17	37	10	1.3	67	47	-	C
24	A	F	3	7/02	0200-0300	18	-	25	19	18	18	18	17	16	16	30	14	0.9	67	47	-	C
24	A	F	3	7/02	0300-0400	18	-	27	22	19	19	18	17	17	16	37	14	1.1	67	47	-	C
24	A	F	3	7/02	0400-0500	48	-	70	62	45	34	20	18	17	17	74	16	9.3	67	47	-	C
24	A	F	3	7/02	0500-0600	38	-	58	50	45	37	21	18	17	16	67	14	8.7	67	47	-	C
24	A	F	3	7/02	0600-0700	39	-	58	52	46	39	20	17	14	12	64	9	10.1	67	47	-	C
24	A	F	3	7/02	0700-0800	27	-	46	38	31	27	16	14	10	9	59	9	6.7	67	47	-	C
24	A	F	3	7/02	0800-0900	38	-	57	51	45	39	22	17	9	9	63	9	11.3	67	47	-	C
24	A	F	3	7/02	0900-1000	23	-	42	32	28	26	20	15	9	9	50	9	6.5	67	47	-	C
24	A	F	3	7/02	1000-1100	36	-	56	48	39	31	21	17	9	9	66	9	9.0	67	47	-	C
24	A	F	3	7/02	1100-1200	35	-	50	49	36	27	17	15	9	9	57	9	8.4	67	47	-	C
24	A	F	3	7/02	1200-1300	37	-	54	51	44	39	21	17	12	9	56	9	10.2	67	47	-	C
24	A	F	3	7/02	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	A	F	3	7/02	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	A	F	3	7/02	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	A	F	3	7/02	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	A	F	3	7/02	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	A	F	3	7/02	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	A	F	3	7/02	1900-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	A	F	3	7/02	2000-2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	A	F	3	7/02	2100-2200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	A	F	3	7/02	2200-2300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	A	F	3	7/02	2300-0000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

LEVEL (dBA)

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
25	A	F	4	6/26	0000-0100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	0100-0200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	0200-0300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	0300-0400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	0400-0500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	0500-0600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	0600-0700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	0700-0800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	0800-0900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	0900-1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	A	F	4	6/26	1800-1900	46	-	53	50	48	47	45	45	43	42	55	41	1.5	77	26	-	D
25	A	F	4	6/26	1900-2000	46	-	56	50	47	46	45	45	44	43	66	42	1.4	77	26	-	D
25	A	F	4	6/26	2000-2100	46	-	50	47	46	46	46	45	44	44	55	43	0.7	77	26	-	D
25	A	F	4	6/26	2100-2200	46	-	48	47	47	47	46	46	45	44	49	43	0.7	77	26	-	D
25	A	F	4	6/26	2200-2300	46	-	49	48	47	47	46	46	45	44	50	43	0.9	77	26	-	D
25	A	F	4	6/26	2300-0000	47	-	48	48	47	47	46	46	45	45	49	44	0.7	77	26	-	D
26	A	F	4	6/27	0000-0100	47	-	49	48	48	48	47	47	46	45	50	45	0.5	-	-	-	D
26	A	F	4	6/27	0100-0200	47	-	49	48	48	48	47	47	46	46	51	45	0.5	-	-	-	D
26	A	F	4	6/27	0200-0300	47	-	49	48	48	48	47	47	46	45	50	44	0.5	-	-	-	D
26	A	F	4	6/27	0300-0400	48	-	49	49	48	48	47	47	46	45	51	44	0.7	-	-	-	D
26	A	F	4	6/27	0400-0500	49	-	57	54	51	49	48	48	46	46	63	45	0.5	-	-	-	D
26	A	F	4	6/27	0500-0600	49	-	53	51	50	49	48	48	47	46	56	45	1.1	-	-	-	D
26	A	F	4	6/27	0600-0700	49	-	59	57	50	49	48	48	46	46	63	45	0.7	-	-	-	D
26	A	F	4	6/27	0700-0800	46	-	57	52	47	46	46	45	44	44	65	43	1.3	-	-	-	D
26	A	F	4	6/27	0800-0900	49	-	65	59	52	48	46	46	44	43	71	43	2.8	-	-	-	D
26	A	F	4	6/27	0900-1000	46	-	60	55	47	46	45	44	43	41	73	38	1.8	-	-	-	D
26	A	F	4	6/27	1000-1100	46	-	55	51	47	46	45	45	43	42	61	41	1.6	-	-	-	D
26	A	F	4	6/27	1100-1200	45	-	49	47	46	45	45	44	43	42	57	41	1.0	-	-	-	D
26	A	F	4	6/27	1200-1300	46	-	49	48	47	46	45	45	44	43	53	41	1.0	-	-	-	D
26	A	F	4	6/27	1300-1400	50	-	70	56	51	49	46	46	44	43	84	42	2.5	-	-	-	D
26	A	F	4	6/27	1400-1500	49	-	69	55	49	48	46	45	44	42	83	40	2.4	-	-	-	D
26	A	F	4	6/27	1500-1600	48	-	61	59	52	48	45	44	43	42	71	40	3.1	-	-	-	D
26	A	F	4	6/27	1600-1700	48	-	58	55	51	49	46	46	45	44	76	43	2.1	-	-	-	D
26	A	F	4	6/27	1700-1800	51	-	68	58	54	53	50	48	45	43	75	42	3.3	-	-	-	D
26	A	F	4	6/27	1800-1900	53	-	61	59	58	57	53	51	46	45	64	44	3.9	-	-	-	D
26	A	F	4	6/27	1900-2000	47	-	53	49	47	47	46	46	46	45	57	44	0.7	-	-	-	D
26	A	F	4	6/27	2000-2100	47	-	48	48	47	47	47	47	46	45	52	44	0.5	-	-	-	D
26	A	F	4	6/27	2100-2200	47	-	52	48	47	47	47	46	46	45	58	44	0.5	-	-	-	D
26	A	F	4	6/27	2200-2300	49	-	55	54	53	51	48	48	46	45	60	44	2.1	-	-	-	D
26	A	F	4	6/27	2300-0000	47	-	48	48	47	47	47	47	46	45	51	45	0.4	-	-	-	D

TABLE	SOUND	AREA	SITE	DATE	HOURS	LEVEL (dBA) Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	H (%)	W (V)	EQUIP
27	A	F	4	6/28	0000-0100	47	-	48	48	47	47	47	46	46	45	50	45	0.5	-	-	-	D
27	A	F	4	6/28	0100-0200	47	-	48	48	47	47	47	46	46	45	49	45	0.4	-	-	-	D
27	A	F	4	6/28	0200-0300	47	-	48	48	47	47	47	47	46	45	50	45	0.5	-	-	-	D
27	A	F	4	6/28	0300-0400	48	-	49	49	48	48	47	47	46	46	50	45	0.6	-	-	-	D
27	A	F	4	6/28	0400-0500	49	-	59	56	51	49	48	48	46	45	65	45	1.8	-	-	-	D
27	A	F	4	6/28	0500-0600	48	-	53	51	50	49	47	47	46	45	57	45	1.1	-	-	-	D
27	A	F	4	6/28	0600-0700	47	-	55	50	48	48	47	46	45	44	64	43	1.4	-	-	-	D
27	A	F	4	6/28	0700-0800	47	-	56	49	48	47	46	46	45	44	61	44	1.0	-	-	-	D
27	A	F	4	6/28	0800-0900	46	-	57	50	47	46	45	45	43	43	63	42	1.3	-	-	-	D
27	A	F	4	6/28	0900-1000	46	-	58	48	46	46	45	44	43	42	73	41	1.3	-	-	-	D
27	A	F	4	6/28	1000-1100	46	-	57	53	49	47	45	44	43	42	62	41	2.0	-	-	-	D
27	A	F	4	6/28	1100-1200	45	-	54	48	46	45	44	44	43	42	61	41	1.2	-	-	-	D
27	A	F	4	6/28	1200-1300	45	-	54	49	46	46	45	44	43	41	61	40	1.4	-	-	-	D
27	A	F	4	6/28	1300-1400	44	-	53	48	45	45	44	43	42	39	59	36	1.5	-	-	-	D
27	A	F	4	6/28	1400-1500	44	-	53	48	45	45	43	43	41	40	66	39	1.6	-	-	-	D
27	A	F	4	6/28	1500-1600	52	-	75	61	46	45	43	43	41	38	80	37	3.3	-	-	-	D
27	A	F	4	6/28	1600-1700	44	-	54	46	45	44	43	43	42	41	61	40	1.2	-	-	-	D
27	A	F	4	6/28	1700-1800	49	-	65	61	55	49	44	44	42	42	73	40	3.8	-	-	-	D
27	A	F	4	6/28	1800-1900	44	-	52	48	45	45	44	44	42	42	58	40	1.1	-	-	-	D
27	A	F	4	6/28	1900-2000	45	-	58	46	45	45	45	44	43	43	67	42	1.0	-	-	-	D
27	A	F	4	6/28	2000-2100	46	-	48	47	46	46	46	45	45	44	57	44	0.5	-	-	-	D
27	A	F	4	6/28	2100-2200	47	-	49	48	48	47	46	46	45	44	50	43	0.9	-	-	-	D
27	A	F	4	6/28	2200-2300	47	-	49	48	48	47	47	46	46	45	53	44	0.6	-	-	-	D
27	A	F	4	6/28	2300-0000	47	-	48	47	47	47	46	46	45	45	49	44	0.5	-	-	-	D
28	A	F	4	6/29	0000-0100	47	-	48	47	47	47	46	46	46	45	49	45	0.4	75	32	-	D
28	A	F	4	6/29	0100-0200	47	-	48	48	47	47	46	46	45	45	49	44	0.6	75	32	-	D
28	A	F	4	6/29	0200-0300	48	-	49	49	48	48	48	47	46	45	50	45	0.8	75	32	-	D
28	A	F	4	6/29	0300-0400	48	-	50	49	48	48	47	47	46	45	51	45	0.7	75	32	-	D
28	A	F	4	6/29	0400-0500	49	-	60	54	50	49	49	48	47	46	64	45	1.4	75	32	-	D
28	A	F	4	6/29	0500-0600	50	-	61	56	51	50	49	48	47	46	64	45	1.6	75	32	-	D
28	A	F	4	6/29	0600-0700	48	-	56	53	50	49	48	47	46	45	61	44	1.5	75	32	-	D
28	A	F	4	6/29	0700-0800	47	-	64	50	46	46	45	45	44	43	74	42	1.4	75	32	-	D
28	A	F	4	6/29	0800-0900	45	-	57	52	47	46	44	44	43	42	64	41	1.6	75	32	-	D
28	A	F	4	6/29	0900-1000	45	-	55	51	47	46	44	44	42	41	68	39	1.8	75	32	-	D
28	A	F	4	6/29	1000-1100	44	-	51	47	45	45	44	43	42	41	60	40	1.2	75	32	-	D
28	A	F	4	6/29	1100-1200	45	-	57	50	47	46	45	44	43	42	61	41	1.6	75	32	-	D
28	A	F	4	6/29	1200-1300	45	-	52	49	47	46	45	44	42	41	57	40	1.5	75	32	-	D
28	A	F	4	6/29	1300-1400	44	-	49	47	45	45	44	43	42	41	54	40	1.1	75	32	-	D
28	A	F	4	6/29	1400-1500	44	-	56	48	46	45	44	43	42	39	65	37	1.7	75	32	-	D
28	A	F	4	6/29	1500-1600	60	-	82	70	50	45	44	43	41	40	90	39	4.6	75	32	-	D
28	A	F	4	6/29	1600-1700	44	-	53	47	45	45	44	44	43	42	60	41	1.1	75	32	-	D
28	A	F	4	6/29	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	A	F	4	6/29	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	A	F	4	6/29	1900-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	A	F	4	6/29	2000-2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	A	F	4	6/29	2100-2200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	A	F	4	6/29	2200-2300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	A	F	4	6/29	2300-0000	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-

LEVEL (dBA)

TABLE	GOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
29	A	F	5	6/26	0000-0100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	0100-0200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	0200-0300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	0300-0400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	0400-0500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	0500-0600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	0600-0700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	0700-0800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	0800-0900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	0900-1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	A	F	5	6/26	1900-2000	45	-	53	50	47	46	44	44	42	42	56	41	1.5	70	41	-	E
29	A	F	5	6/26	2000-2100	45	-	49	47	45	45	44	44	43	42	50	41	0.9	70	41	-	E
29	A	F	5	6/26	2100-2200	45	-	49	47	46	46	45	45	44	43	51	42	0.8	70	41	-	E
29	A	F	5	6/26	2200-2300	45	-	46	46	45	45	45	44	43	43	50	42	0.7	70	41	-	E
29	A	F	5	6/26	2300-0000	45	-	47	46	46	45	45	44	43	43	48	42	0.8	70	41	-	E
30	A	F	5	6/27	0000-0100	45	-	46	46	46	46	45	45	44	44	48	43	0.6	-	-	-	E
30	A	F	5	6/27	0100-0200	46	-	46	46	46	46	45	45	45	44	50	43	0.4	-	-	-	E
30	A	F	5	6/27	0200-0300	46	-	47	47	47	46	46	46	45	45	48	44	0.3	-	-	-	E
30	A	F	5	6/27	0300-0400	46	-	47	47	47	46	46	46	44	43	49	43	0.9	-	-	-	E
30	A	F	5	6/27	0400-0500	46	-	48	47	46	46	46	45	45	44	50	44	0.6	-	-	-	E
30	A	F	5	6/27	0500-0600	46	-	51	48	47	47	46	46	45	45	55	44	0.7	-	-	-	E
30	A	F	5	6/27	0600-0700	45	-	47	46	46	46	45	45	44	43	50	43	0.7	-	-	-	E
30	A	F	5	6/27	0700-0800	45	-	50	47	46	46	45	45	43	43	67	42	0.9	-	-	-	E
30	A	F	5	6/27	0800-0900	46	-	54	52	50	46	45	44	44	43	68	42	1.8	-	-	-	E
30	A	F	5	6/27	0900-1000	45	-	54	51	47	46	45	44	43	42	60	42	1.5	-	-	-	E
30	A	F	5	6/27	1000-1100	44	-	56	50	47	46	44	43	41	39	63	38	2.2	-	-	-	E
30	A	F	5	6/27	1100-1200	45	-	50	49	47	46	44	43	42	40	53	38	1.7	-	-	-	E
30	A	F	5	6/27	1200-1300	45	-	53	51	48	46	44	43	40	39	56	39	2.4	-	-	-	E
30	A	F	5	6/27	1300-1400	53	-	77	60	51	47	44	43	40	39	85	38	4.0	-	-	-	E
30	A	F	5	6/27	1400-1500	46	-	62	57	48	46	44	43	41	40	73	39	2.8	-	-	-	E
30	A	F	5	6/27	1500-1600	45	-	53	50	48	46	44	43	42	40	58	39	2.2	-	-	-	E
30	A	F	5	6/27	1600-1700	44	-	56	50	45	45	44	43	41	39	60	38	1.8	-	-	-	E
30	A	F	5	6/27	1700-1800	54	-	70	64	59	57	51	47	41	41	81	41	6.4	-	-	-	E
30	A	F	5	6/27	1800-1900	51	-	57	56	54	53	51	49	46	44	62	43	2.9	-	-	-	E
30	A	F	5	6/27	1900-2000	46	-	55	52	49	47	45	45	44	43	58	43	1.7	-	-	-	E
30	A	F	5	6/27	2000-2100	45	-	54	48	46	46	45	44	43	42	60	42	1.2	-	-	-	E
30	A	F	5	6/27	2100-2200	45	-	52	47	46	46	45	45	44	44	55	44	0.8	-	-	-	E
30	A	F	5	6/27	2200-2300	44	-	48	46	45	45	44	43	42	42	64	42	1.1	-	-	-	E
30	A	F	5	6/27	2300-0000	44	-	44	44	44	44	[illegible]	43	43	42	45	42	0.4	-	-	-	E

TABLE	SOUND	AREA	SITE	DATE	HOURS	LEVEL (dBA) Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
31	A	F	5	6/28	0000-0100	45	-	46	46	45	45	45	44	43	43	52	42	0.7	-	-	-	E
31	A	F	5	6/28	0100-0200	44	-	45	45	44	44	44	43	43	43	46	42	0.4	-	-	-	E
31	A	F	5	6/28	0200-0300	44	-	46	46	46	45	45	44	43	43	47	42	0.8	-	-	-	E
31	A	F	5	6/28	0300-0400	45	-	47	46	46	45	45	45	44	44	48	43	0.5	-	-	-	E
31	A	F	5	6/28	0400-0500	45	-	47	46	45	45	44	44	43	43	56	42	0.8	-	-	-	E
31	A	F	5	6/28	0500-0600	45	-	50	48	46	45	44	44	43	43	65	42	1.2	-	-	-	E
31	A	F	5	6/28	0600-0700	44	-	47	45	45	44	44	43	43	42	51	41	0.7	-	-	-	E
31	A	F	5	6/28	0700-0800	44	-	53	48	44	43	43	43	42	42	59	41	0.9	-	-	-	E
31	A	F	5	6/28	0800-0900	41	-	49	45	43	42	42	40	38	38	58	37	1.8	-	-	-	E
31	A	F	5	6/28	0900-1000	43	-	62	50	43	42	40	39	38	37	75	37	2.4	-	-	-	E
31	A	F	5	6/28	1000-1100	45	-	61	57	50	44	38	38	37	36	66	36	4.2	-	-	-	E
31	A	F	5	6/28	1100-1200	48	-	70	57	45	42	39	38	37	36	80	36	3.8	-	-	-	E
31	A	F	5	6/28	1200-1300	44	-	53	49	46	46	44	43	41	40	66	38	1.8	-	-	-	E
31	A	F	5	6/28	1300-1400	43	-	52	49	46	45	43	42	38	37	57	36	2.6	-	-	-	E
31	A	F	5	6/28	1400-1500	44	-	52	50	47	46	43	42	39	38	56	37	2.5	-	-	-	E
31	A	F	5	6/28	1500-1600	49	-	70	54	48	45	42	41	38	37	80	37	3.6	-	-	-	E
31	A	F	5	6/28	1600-1700	44	-	64	49	45	43	41	40	38	37	73	36	2.6	-	-	-	E
31	A	F	5	6/28	1700-1800	50	-	72	58	46	44	41	40	38	37	81	36	3.7	-	-	-	E
31	A	F	5	6/28	1800-1900	41	-	46	45	43	42	41	40	39	38	48	30	1.3	-	-	-	E
31	A	F	5	6/28	1900-2000	43	-	52	45	43	43	42	42	41	39	55	39	1.1	-	-	-	E
31	A	F	5	6/28	2000-2100	44	-	46	45	45	44	44	44	43	43	47	42	0.6	-	-	-	E
31	A	F	5	6/28	2100-2200	45	-	46	46	45	45	45	45	44	43	54	43	0.6	-	-	-	E
31	A	F	5	6/28	2200-2300	45	-	50	46	46	45	45	45	44	44	52	43	0.6	-	-	-	E
31	A	F	5	6/28	2300-0000	45	-	46	46	45	45	45	45	44	44	54	43	0.4	-	-	-	E
32	A	F	5	6/29	0000-0100	45	-	46	46	45	45	45	45	44	44	47	43	0.4	-	-	-	E
32	A	F	5	6/29	0100-0200	45	-	47	46	46	46	45	45	44	44	48	43	0.6	-	-	-	E
32	A	F	5	6/29	0200-0300	45	-	47	46	46	45	45	45	44	43	48	43	0.7	-	-	-	E
32	A	F	5	6/29	0300-0400	45	-	46	46	45	45	45	45	44	44	47	43	0.5	-	-	-	E
32	A	F	5	6/29	0400-0500	46	-	49	48	47	46	46	45	45	44	51	43	0.7	-	-	-	E
32	A	F	5	6/29	0500-0600	47	-	52	49	47	47	46	46	45	44	61	43	0.8	-	-	-	E
32	A	F	5	6/29	0600-0700	46	-	50	47	47	46	46	46	45	45	52	44	0.5	-	-	-	E
32	A	F	5	6/29	0700-0800	45	-	52	46	46	45	45	45	44	43	57	43	0.7	-	-	-	E
32	A	F	5	6/29	0800-0900	45	-	50	47	45	45	44	44	43	43	54	42	0.8	-	-	-	E
32	A	F	5	6/29	0900-1000	44	-	51	48	46	45	44	43	42	42	53	40	1.3	-	-	-	E
32	A	F	5	6/29	1000-1100	47	-	60	56	51	49	45	44	42	41	66	41	3.0	-	-	-	E
32	A	F	5	6/29	1100-1200	49	-	68	58	52	50	46	45	42	42	76	41	3.4	-	-	-	E
32	A	F	5	6/29	1200-1300	45	-	54	51	47	46	44	43	41	39	59	38	2.3	-	-	-	E
32	A	F	5	6/29	1300-1400	42	-	50	47	44	43	42	41	39	39	53	38	1.6	-	-	-	E
32	A	F	5	6/29	1400-1500	43	-	56	48	45	44	42	42	40	39	65	38	1.7	-	-	-	E
32	A	F	5	6/29	1500-1600	46	-	66	56	47	45	43	42	40	39	75	37	3.0	-	-	-	E
32	A	F	5	6/29	1600-1700	44	-	52	50	48	46	44	43	41	39	56	38	2.0	-	-	-	E
32	A	F	5	6/29	1700-1800	45	-	54	50	47	46	44	44	42	41	57	41	1.9	-	-	-	E
32	A	F	5	6/29	1800-1900	45	-	57	51	47	46	44	43	42	40	66	39	2.0	-	-	-	E
32	A	F	5	6/29	1900-2000	45	-	54	52	47	46	44	44	43	42	56	42	1.6	-	-	-	E
32	A	F	5	6/29	2000-2100	45	-	53	50	47	46	45	45	43	43	59	42	1.3	-	-	-	E
32	A	F	5	6/29	2100-2200	44	-	50	46	45	45	44	44	43	43	54	42	0.8	-	-	-	E
32	A	F	5	6/29	2200-2300	45	-	47	45	45	45	44	44	43	43	56	42	0.6	-	-	-	E
32	A	F	5	6/29	2300-0000	45	-	46	46	45	45	44	44	43	43	47	43	0.6	-	-	-	E

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
33	A	F	5	6/30	0000-0100	45	-	46	46	45	45	45	45	44	44	48	43	0.5	-	-	-	E
33	A	F	5	6/30	0100-0200	45	-	46	46	46	45	45	45	44	43	47	43	0.5	-	-	-	E
33	A	F	5	6/30	0200-0300	46	-	47	46	46	46	45	45	44	44	48	43	0.5	-	-	-	E
33	A	F	5	6/30	0300-0400	46	-	47	46	46	46	46	45	45	44	48	44	0.5	-	-	-	E
33	A	F	5	6/30	0400-0500	46	-	48	47	46	46	46	45	45	44	51	43	0.6	-	-	-	E
33	A	F	5	6/30	0500-0600	47	-	62	50	47	46	46	45	45	44	67	44	1.3	-	-	-	E
33	A	F	5	6/30	0600-0700	47	-	61	55	49	46	45	44	44	43	66	42	2.1	-	-	-	E
33	A	F	5	6/30	0700-0800	45	-	56	49	46	45	45	44	43	43	62	42	1.1	-	-	-	E
33	A	F	5	6/30	0800-0900	45	-	51	48	46	45	44	44	43	42	52	41	1.1	-	-	-	E
33	A	F	5	6/30	0900-1000	45	-	51	49	47	46	45	44	43	42	60	41	1.6	-	-	-	E
33	A	F	5	6/30	1000-1100	45	-	53	51	48	47	45	44	42	41	61	40	2.2	-	-	-	E
33	A	F	5	6/30	1100-1200	45	-	54	52	49	47	44	43	41	39	57	38	2.4	-	-	-	E
33	A	F	5	6/30	1200-1300	45	-	55	52	49	48	44	43	40	38	57	38	2.9	-	-	-	E
33	A	F	5	6/30	1300-1400	50	-	70	64	50	47	43	42	39	37	77	36	4.5	-	-	-	E
33	A	F	5	6/30	1400-1500	47	-	61	57	52	49	45	43	40	38	64	38	3.8	-	-	-	E
33	A	F	5	6/30	1500-1600	47	-	60	56	52	49	45	44	42	40	64	39	3.3	-	-	-	E
33	A	F	5	6/30	1600-1700	46	-	60	55	50	47	43	42	40	38	63	37	3.4	-	-	-	E
33	A	F	5	6/30	1700-1800	48	-	63	57	53	50	47	45	42	41	65	39	3.4	-	-	-	E
33	A	F	5	6/30	1800-1900	47	-	56	54	51	50	47	45	43	42	57	41	2.8	-	-	-	E
33	A	F	5	6/30	1900-2000	45	-	55	51	48	47	44	43	42	41	57	40	2.1	-	-	-	E
33	A	F	5	6/30	2000-2100	43	-	46	45	44	44	43	42	41	41	50	40	0.8	-	-	-	E
33	A	F	5	6/30	2100-2200	44	-	46	45	45	45	44	44	43	43	49	42	0.6	-	-	-	E
33	A	F	5	6/30	2200-2300	44	-	49	45	45	45	44	44	43	43	52	42	0.7	-	-	-	E
33	A	F	5	6/30	2300-0000	43	-	45	45	44	44	43	43	42	42	46	41	0.7	-	-	-	E
34	A	F	5	7/1	0000-0100	44	-	45	45	45	44	44	44	43	43	47	43	0.6	-	-	-	E
34	A	F	5	7/1	0100-0200	50	-	60	58	56	55	46	44	43	43	64	42	4.5	-	-	-	E
34	A	F	5	7/1	0200-0300	52	-	64	63	59	54	48	46	45	44	71	43	4.4	-	-	-	E
34	A	F	5	7/1	0300-0400	47	-	59	51	48	47	45	45	44	44	64	43	1.5	-	-	-	E
34	A	F	5	7/1	0400-0500	46	-	55	51	48	47	46	45	44	44	57	43	1.4	-	-	-	E
34	A	F	5	7/1	0500-0600	46	-	57	52	48	47	45	45	44	43	61	42	1.7	-	-	-	E
34	A	F	5	7/1	0600-0700	46	-	56	49	47	46	45	45	44	44	60	43	1.1	-	-	-	E
34	A	F	5	7/1	0700-0800	47	-	57	52	50	48	46	45	44	44	59	43	1.9	-	-	-	E
34	A	F	5	7/1	0800-0900	49	-	59	56	53	51	48	46	44	43	64	42	2.8	-	-	-	E
34	A	F	5	7/1	0900-1000	49	-	59	55	53	52	49	46	45	44	63	43	3.0	-	-	-	E
34	A	F	5	7/1	1000-1100	48	-	54	53	51	50	48	47	45	44	59	44	2.1	-	-	-	E
34	A	F	5	7/1	1100-1200	47	-	53	51	48	48	46	46	45	44	55	43	1.3	-	-	-	E
34	A	F	5	7/1	1200-1300	45	-	51	48	46	46	45	45	44	43	57	42	1.0	-	-	-	E
34	A	F	5	7/1	1300-1400	45	-	51	49	47	46	45	44	43	42	54	42	1.4	-	-	-	E
34	A	F	5	7/1	1400-1500	47	-	62	53	50	48	45	44	43	42	70	42	2.4	-	-	-	E
34	A	F	5	7/1	1500-1600	45	-	56	50	46	45	44	44	43	42	63	42	1.4	-	-	-	E
34	A	F	5	7/1	1600-1700	44	-	52	48	45	44	43	43	42	42	50	41	1.2	-	-	-	E
34	A	F	5	7/1	1700-1800	50	-	71	61	48	45	44	43	42	41	76	41	3.1	-	-	-	E
34	A	F	5	7/1	1800-1900	44	-	56	50	44	44	43	43	42	41	66	40	1.3	-	-	-	E
34	A	F	5	7/1	1900-2000	44	-	58	50	45	44	43	43	42	41	63	41	1.5	-	-	-	E
34	A	F	5	7/1	2000-2100	45	-	54	49	45	44	44	44	43	42	60	42	1.1	-	-	-	E
34	A	F	5	7/1	2100-2200	45	-	56	52	45	44	44	44	43	43	63	42	1.4	-	-	-	E
34	A	F	5	7/1	2200-2300	44	-	48	45	44	44	44	44	43	43	53	42	0.5	-	-	-	E
34	A	F	5	7/1	2300-0000	44	-	45	45	44	44	[illegible]	43	43	42	46	42	0.6	-	-	-	E

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
						LEVEL (dBA)																
35	A	F	5	7/2	0000-0100	45	-	46	45	45	45	44	44	43	43	47	42	0.6	73	40	-	E
35	A	F	5	7/2	0100-0200	45	-	46	45	45	45	44	44	44	43	47	43	0.5	73	40	-	E
35	A	F	5	7/2	0200-0300	45	-	46	45	45	45	44	44	43	43	47	42	0.6	73	40	-	E
35	A	F	5	7/2	0300-0400	45	-	45	45	45	45	44	44	44	43	48	42	0.5	73	40	-	E
35	A	F	5	7/2	0400-0500	45	-	48	47	46	45	45	45	44	44	49	43	0.6	73	40	-	E
35	A	F	5	7/2	0500-0600	48	-	59	55	52	49	46	45	44	43	64	42	2.7	73	40	-	E
35	A	F	5	7/2	0600-0700	45	-	57	51	46	45	44	44	44	43	63	43	1.3	73	40	-	E
35	A	F	5	7/2	0700-0800	44	-	56	50	45	44	44	43	42	41	60	41	1.4	73	40	-	E
35	A	F	5	7/2	0800-0900	43	-	56	50	44	43	42	42	41	41	64	38	1.6	73	40	-	E
35	A	F	5	7/2	0900-1000	40	-	52	49	42	41	39	38	37	36	56	36	2.2	73	40	-	E
35	A	F	5	7/2	1000-1100	56	-	77	69	50	40	37	36	35	35	87	34	5.9	73	40	-	E
35	A	F	5	7/2	1100-1200	40	-	57	49	43	40	36	36	35	34	68	33	2.9	73	40	-	E
35	A	F	5	7/2	1200-1300	42	-	60	51	43	41	39	39	38	36	78	35	2.4	73	40	-	E
35	A	F	5	7/2	1300-1400	39	-	49	44	41	40	39	38	37	36	52	36	1.5	73	40	-	E
35	A	F	5	7/2	1400-1500	41	-	56	51	42	41	39	39	37	37	64	36	2.2	73	40	-	E
35	A	F	5	7/2	1500-1600	40	-	55	45	41	40	39	38	37	37	61	36	1.6	73	40	-	E
35	A	F	5	7/2	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	A	F	5	7/2	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	A	F	5	7/2	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	A	F	5	7/2	1900-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	A	F	5	7/2	2000-2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	A	F	5	7/2	2100-2200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	A	F	5	7/2	2200-2300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	A	F	5	7/2	2300-0000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	1248-1300	29.5	49	42	37	34	33	-	26	22	20	48	17.4	4.8	58	-	-	H
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	A	G	6	6/27	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

LEVEL (dBA)

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	1039-1557	30.9	43	41	38	35	34	-	28	25	22	42.9	18.3	3.6	-	-	-	H
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	A	B	6	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	1053-1213	42.1	56	53	51	47	45	-	38	33	31	47.2	29.4	4.6	89	17	-	H
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	A	B	6	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	1103-1138	26.6	43	39	36	31	29	-	23	21	20	43.4	17	8.3	70	55	-	H
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	A	G	6	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	1104-1129	30.3	55	51	39	31	30	-	26	24	24	55.1	23.4	2.8	64	85	-	H
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	A	G	6	7/21	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

LEVEL (dBA)

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	1301-1341	39.7	57	49	46	43	42	-	38	34	32	57.5	25.4	3.1	74	40	-	H
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	A	G	7	6/29	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	1407-1442	40.3	55	51	49	46	44	-	37	32	30	55.6	28.3	4.3	77	36	-	H
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	A	G	7	6/30	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE	BOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	T (F)	H (%)	W (V)	EQUIP
						LEVEL (dBA)													MET			
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	1254-1332	33.9	55	51	44	39	34	-	29	27	27	55.7	25.4	8.7	58	69	-	H
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	A	G	7	7/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	1250-1325	40.3	58	56	50	47	42	-	31	28	27	50.6	26.2	6.4	81	51	-	H
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	A	G	7	7/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TADLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	1330-1348	32.0	46	44	37	34	33	-	31	30	30	45.2	29.5	1.4	63	42	-	I
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	1403-1423	36.1	57	51	46	40	38	-	32	30	30	56.2	29.3	3.5	61	-	-	I
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	A	B	B	6/28	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Columns Leq through Lmn are LEVEL (dBA).

LEVEL (dBA)

TABLE	BOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	1449-1529	35.7	47	47	44	40	39	-	33	29	25	48	20	3.8	71	45	-	H
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	A	G	B	6/29	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE	BOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	1004-1126	36.4	49	47	44	41	40	-	33	27	26	50	23	4.9	53	83	-	H
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	A	G	B	7/1	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	1448-1500	26.3	44	41	36	29	27	-	24	23	22	53.2	29.5	2.4	76	65	-	H
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	A	B	8	7/2	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	1557-1631	36.5	59	40	45	41	39	-	33	29	26	59.8	19.5	4.1	80	41	-	H
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	A	B	9	6/30	- - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	1533-1609	32.0	55	47	39	35	33	-	30	28	27	55.0	26.4	2.4	75	54	-	H
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	A	F	9	7/2	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	1422-1448	36.2	49	48	45	41	37	-	33	33	32	49.9	28.0	2.7	56	73	-	H
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	A	F	10	7/1	------	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

LEVEL (dBA)

TABLE	SOUND	AREA	SITE	DATE	HOURS	LEVEL (dBA) Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
53	E	F	1	7/19	0000-0100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	E	F	1	7/19	0100-0200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	E	F	1	7/19	0200-0300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	E	F	1	7/19	0300-0400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	E	F	1	7/19	0400-0500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	E	F	1	7/19	0500-0600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	E	F	1	7/19	0600-0700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	E	F	1	7/19	0700-0800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	E	F	1	7/19	0800-0900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	E	F	1	7/19	0900-1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	E	F	1	7/19	1000-1100	31	48	40	34	33	28	-	25	22	21	54	20	4.5	53	89	-	A
53	E	F	1	7/19	1100-1200	34	45	42	39	37	33	-	31	24	22	48	21	5.0	53	89	-	A
53	E	F	1	7/19	1200-1300	33	51	44	37	34	30	-	28	23	22	58	21	4.6	53	89	-	A
53	E	F	1	7/19	1300-1400	36	50	47	42	39	33	-	31	23	21	60	20	6.1	53	89	-	A
53	E	F	1	7/19	1400-1500	36	48	44	41	40	35	-	32	25	23	50	22	5.2	53	89	-	A
53	E	F	1	7/19	1500-1600	35	46	42	39	37	34	-	32	26	23	53	22	4.2	53	89	-	A
53	E	F	1	7/19	1600-1700	29	38	36	34	33	28	-	26	23	22	44	20	3.7	53	89	-	A
53	E	F	1	7/19	1700-1800	29	44	37	34	33	27	-	25	22	21	47	20	4.2	53	89	-	A
53	E	F	1	7/19	1800-1900	29	42	38	35	33	26	-	24	20	19	52	18	5.0	53	89	-	A
53	E	F	1	7/19	1900-2000	25	39	32	28	27	24	-	22	20	19	44	18	3.0	53	89	-	A
53	E	F	1	7/19	2000-2100	27	42	37	33	30	23	-	21	19	18	46	18	4.5	53	89	-	A
53	E	F	1	7/19	2100-2200	39	49	46	45	45	33	-	26	21	19	51	18	8.8	53	89	-	A
53	E	F	1	7/19	2200-2300	44	47	46	45	45	44	-	44	39	36	48	32	2.2	53	89	-	A
53	E	F	1	7/19	2300-0000	44	46	46	46	45	45	-	44	38	31	47	25	3.5	53	89	-	A
54	E	F	1	7/20	0000-0100	39	-	47	45	44	43	37	36	31	28	50	23	3.9	-	-	-	A
54	E	F	1	7/20	0100-0200	34	-	39	37	36	36	34	33	28	23	41	21	3.2	-	-	-	A
54	E	F	1	7/20	0200-0300	31	-	36	35	34	33	32	31	22	20	38	19	4.5	-	-	-	A
54	E	F	1	7/20	0300-0400	29	-	43	33	32	31	29	25	19	19	52	18	4.6	-	-	-	A
54	E	F	1	7/20	0400-0500	22	-	32	30	28	26	19	19	18	18	35	17	3.1	-	-	-	A
54	E	F	1	7/20	0500-0600	33	-	49	44	38	36	30	26	19	18	54	18	6.2	-	-	-	A
54	E	F	1	7/20	0600-0700	47	-	71	54	35	31	24	21	19	19	79	18	8.3	-	-	-	A
54	E	F	1	7/20	0700-0800	54	-	76	67	43	41	34	32	20	19	78	19	9.1	-	-	-	A
54	E	F	1	7/20	0800-0900	30	-	51	40	32	29	23	22	20	19	56	19	4.3	-	-	-	A
54	E	F	1	7/20	0900-1000	39	-	56	49	44	41	35	33	27	22	57	20	5.5	-	-	-	A
54	E	F	1	7/20	1000-1100	33	-	53	42	39	37	26	23	20	20	61	19	6.1	-	-	-	A
54	E	F	1	7/20	1100-1200	34	-	55	47	36	33	28	26	22	21	57	20	4.9	-	-	-	A
54	E	F	1	7/20	1200-1300	43	-	61	56	47	41	33	31	25	23	66	21	6.9	-	-	-	A
54	E	F	1	7/20	1300-1400	44	-	64	58	47	42	31	28	23	22	71	21	7.8	-	-	-	A
54	E	F	1	7/20	1400-1500	31	-	42	39	36	34	30	28	23	22	46	21	3.9	-	-	-	A
54	E	F	1	7/20	1500-1600	32	-	44	40	38	36	31	28	21	20	52	19	5.4	-	-	-	A
54	E	F	1	7/20	1600-1700	39	-	58	51	43	39	31	29	24	21	64	20	6.2	-	-	-	A
54	E	F	1	7/20	1700-1800	29	-	43	38	33	31	28	26	22	20	48	19	3.6	-	-	-	A
54	E	F	1	7/20	1800-1900	48	-	67	61	54	46	30	26	21	19	71	18	10.2	-	-	-	A
54	E	F	1	7/20	1900-2000	32	-	47	45	38	31	23	21	19	19	51	18	5.7	-	-	-	A
54	E	F	1	7/20	2000-2100	27	-	44	38	30	27	23	22	20	19	52	18	3.7	-	-	-	A
54	E	F	1	7/20	2100-2200	32	-	52	41	34	32	29	27	23	21	60	20	3.9	-	-	-	A
54	E	F	1	7/20	2200-2300	48	-	55	54	52	51	49	40	32	28	57	23	8.1	-	-	-	A
54	E	F	1	7/20	2300-0000	43	-	49	45	34	34	32	31	27	24	51	21	3.3	-	-	-	A

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
						LEVEL (dBA)																
55	E	F	1	7/21	0000-0100	28	41	33	30	30	28	-	27	21	20	47	18	3.5	-	-	-	A
55	E	F	1	7/21	0100-0200	25	36	30	28	27	26	-	23	19	18	38	18	3.3	-	-	-	A
55	E	F	1	7/21	0200-0300	21	37	27	24	22	19	-	19	19	18	40	17	2.1	-	-	-	A
55	E	F	1	7/21	0300-0400	20	28	25	23	21	19	-	19	18	18	35	17	1.4	-	-	-	A
55	E	F	1	7/21	0400-0500	19	24	20	19	19	19	-	19	18	18	33	15	0.5	-	-	-	A
55	E	F	1	7/21	0500-0600	28	43	36	33	31	26	-	23	19	19	50	18	4.7	-	-	-	A
55	E	F	1	7/21	0600-0700	28	47	38	31	29	22	-	21	19	19	53	18	4.2	-	-	-	A
55	E	F	1	7/21	0700-0800	51	72	62	47	34	26	-	22	20	19	78	18	8.9	-	-	-	A
55	E	F	1	7/21	0800-0900	23	35	32	28	25	21	-	20	19	19	39	18	2.7	-	-	-	A
55	E	F	1	7/21	0900-1000	46	63	59	54	48	30	-	26	21	20	65	19	10.0	-	-	-	A
55	E	F	1	7/21	1000-1100	29	38	34	32	31	28	-	27	23	22	52	21	3.0	-	-	-	A
55	E	F	1	7/21	1100-1200	28	43	36	31	29	26	-	24	21	20	48	20	3.6	-	-	-	A
55	E	F	1	7/21	1200-1300	25	41	34	29	27	24	-	22	20	20	46	19	2.9	-	-	-	A
55	E	F	1	7/21	1300-1400	30	48	37	34	32	29	-	27	22	21	52	20	4.0	-	-	-	A
55	E	F	1	7/21	1400-1500	44	70	49	36	34	31	-	29	23	22	73	21	5.1	-	-	-	A
55	E	F	1	7/21	1500-1600	57	79	70	60	48	38	-	36	30	26	85	24	9.0	-	-	-	A
55	E	F	1	7/21	1600-1700	39	58	50	42	40	33	-	31	25	23	61	22	5.8	-	-	-	A
55	E	F	1	7/21	1700-1800	29	46	39	33	31	27	-	25	22	20	48	19	3.8	-	-	-	A
55	E	F	1	7/21	1800-1900	27	40	35	33	30	25	-	23	19	19	56	18	4.3	-	-	-	A
55	E	F	1	7/21	1900-2000	44	62	53	50	47	37	-	24	19	18	73	17	11.5	-	-	-	A
55	E	F	1	7/21	2000-2100	36	49	46	41	39	35	-	32	27	24	56	23	4.8	-	-	-	A
55	E	F	1	7/21	2100-2200	30	44	39	36	33	28	-	26	22	21	52	19	4.4	-	-	-	A
55	E	F	1	7/21	2200-2300	32	41	37	35	34	32	-	31	26	22	50	20	3.2	-	-	-	A
55	E	F	1	7/21	2300-0000	32	39	37	35	34	31	-	30	26	23	50	20	3.0	-	-	-	A
56	E	F	1	7/22	0000-0100	31	39	37	36	35	29	-	26	20	19	52	18	5.4	-	-	-	A
56	E	F	1	7/22	0100-0200	24	36	31	28	26	23	-	21	20	19	50	18	2.8	-	-	-	A
56	E	F	1	7/22	0200-0300	23	35	29	25	24	21	-	20	19	19	49	18	2.2	-	-	-	A
56	E	F	1	7/22	0300-0400	21	34	27	23	22	20	-	20	19	19	42	18	1.7	-	-	-	A
56	E	F	1	7/22	0400-0500	21	32	26	23	22	20	-	20	19	19	44	18	1.5	-	-	-	A
56	E	F	1	7/22	0500-0600	31	47	42	37	34	28	-	24	20	19	51	18	5.7	-	-	-	A
56	E	F	1	7/22	0600-0700	31	45	36	31	27	22	-	21	20	19	65	19	3.7	-	-	-	A
56	E	F	1	7/22	0700-0800	28	51	36	31	27	22	-	21	20	19	55	18	3.7	-	-	-	A
56	E	F	1	7/22	0800-0900	36	56	52	35	32	23	-	21	20	20	59	19	6.0	-	-	-	A
56	E	F	1	7/22	0900-1000	40	60	54	42	34	26	-	23	20	20	64	19	7.0	-	-	-	A
56	E	F	1	7/22	1000-1100	26	40	35	31	39	23	-	22	21	20	43	19	3.4	-	-	-	A
56	E	F	1	7/22	1100-1200	30	47	42	31	28	25	-	24	21	21	50	20	3.9	-	-	-	A
56	E	F	1	7/22	1200-1300	30	45	42	35	33	25	-	24	21	20	52	19	4.7	-	-	-	A
56	E	F	1	7/22	1300-1400	30	42	40	36	32	25	-	23	21	21	56	20	4.7	-	-	-	A
56	E	F	1	7/22	1400-1500	31	48	43	36	33	27	-	25	22	21	56	20	4.6	-	-	-	A
56	E	F	1	7/22	1500-1600	32	43	40	38	37	29	-	25	21	20	55	19	5.9	-	-	-	A
56	E	F	1	7/22	1600-1700	29	44	41	33	29	25	-	24	21	20	47	20	4.0	-	-	-	A
56	E	F	1	7/22	1700-1800	52	69	65	58	49	30	-	25	21	20	72	19	11.5	-	-	-	A
56	E	F	1	7/22	1800-1900	35	55	46	37	35	30	-	26	19	18	59	17	6.4	-	-	-	A
56	E	F	1	7/22	1900-2000	26	37	33	31	30	24	-	23	20	19	40	18	3.5	-	-	-	A
56	E	F	1	7/22	2000-2100	23	41	33	26	24	21	-	19	18	18	45	16	3.2	-	-	-	A
56	E	F	1	7/22	2100-2200	42	52	51	50	50	29	-	24	18	18	56	17	10.9	-	-	-	A
56	E	F	1	7/22	2200-2300	50	54	53	52	52	51	-	50	34	32	57	29	6.6	-	-	-	A
56	E	F	1	7/22	2300-0000	49	53	53	53	53	48	-	43	31	29	54	22	8.8	-	-	-	A

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
						LEVEL (dBA)																
57	E	F	1	7/23	0000-0100	43	46	46	45	45	44	-	44	29	23	47	20	7.0	-	-	-	A
57	E	F	1	7/23	0100-0200	32	39	36	34	34	33	-	29	23	20	42	19	4.1	-	-	-	A
57	E	F	1	7/23	0200-0300	30	43	35	34	34	29	-	28	21	19	45	18	4.5	-	-	-	A
57	E	F	1	7/23	0300-0400	26	42	36	29	27	24	-	21	19	18	45	17	3.9	-	-	-	A
57	E	F	1	7/23	0400-0500	21	29	27	24	22	19	-	19	18	18	31	17	1.9	-	-	-	A
57	E	F	1	7/23	0500-0600	27	42	37	32	30	24	-	22	19	18	47	18	4.6	-	-	-	A
57	E	F	1	7/23	0600-0700	26	44	38	30	26	21	-	20	19	19	51	18	3.9	-	-	-	A
57	E	F	1	7/23	0700-0800	35	56	49	33	29	21	-	20	19	19	59	18	5.5	-	-	-	A
57	E	F	1	7/23	0800-0900	25	43	32	27	24	20	-	20	19	19	57	16	2.7	-	-	-	A
57	E	F	1	7/23	0900-1000	44	65	57	45	34	22	-	21	20	19	71	19	8.2	-	-	-	A
57	E	F	1	7/23	1000-1100	41	62	55	33	31	23	-	21	20	20	68	19	6.8	-	-	-	A
57	E	F	1	7/23	1100-1200	25	36	33	30	28	23	-	22	20	20	41	19	3.2	-	-	-	A
57	E	F	1	7/23	1200-1300	36	58	45	36	34	30	-	24	20	19	64	18	6.1	-	-	-	A
57	E	F	1	7/23	1300-1400	56	79	66	50	48	41	-	38	26	22	88	20	9.1	-	-	-	A
57	E	F	1	7/23	1400-1500	34	47	43	39	37	33	-	31	24	22	55	21	5.0	-	-	-	A
57	E	F	1	7/23	1500-1600	25	39	33	27	25	23	-	22	20	20	51	19	2.4	-	-	-	A
57	E	F	1	7/23	1600-1700	29	49	41	31	29	24	-	22	21	20	53	19	3.9	-	-	-	A
57	E	F	1	7/23	1700-1800	31	41	39	37	35	29	-	25	20	19	45	19	5.5	-	-	-	A
57	E	F	1	7/23	1800-1900	28	45	35	27	24	20	-	20	19	19	64	18	3.1	-	-	-	A
57	E	F	1	7/23	1900-2000	22	37	28	23	22	20	-	20	19	19	45	18	1.7	-	-	-	A
57	E	F	1	7/23	2000-2100	24	42	34	26	23	20	-	20	19	19	48	18	2.8	-	-	-	A
57	E	F	1	7/23	2100-2200	26	42	36	29	26	22	-	20	19	19	45	18	3.6	-	-	-	A
57	E	F	1	7/23	2200-2300	28	41	32	31	31	29	-	27	22	20	45	19	3.5	-	-	-	A
57	E	F	1	7/23	2300-0000	23	33	30	25	24	22	-	21	20	19	40	19	2.8	-	-	-	A
58	E	F	1	7/24	0000-0100	21	25	23	22	21.	20	-	20	19	19	30	19	0.8	-	-	-	A
58	E	F	1	7/24	0100-0200	21	24	22	22	21	20	-	20	20	19	32	18	0.7	-	-	-	A
58	E	F	1	7/24	0200-0300	21	23	22	21	20	20	-	20	20	19	28	19	0.5	-	-	-	A
58	E	F	1	7/24	0300-0400	20	23	21	20	20	20	-	20	19	19	28	19	0.5	-	-	-	A
58	E	F	1	7/24	0400-0500	20	23	21	20	20	20	-	20	19	19	28	18	0.5	-	-	-	A
58	E	F	1	7/24	0500-0600	26	45	33	30	28	22	-	21	20	19	52	18	3.6	-	-	-	A
58	E	F	1	7/24	0600-0700	27	44	39	29	26	21	-	21	20	19	51	19	3.6	-	-	-	A
58	E	F	1	7/24	0700-0800	24	45	32	25	23	21	-	20	20	19	53	19	2.3	-	-	-	A
58	E	F	1	7/24	0800-0900	23	42	30	25	23	21	-	21	20	20	48	19	2.0	-	-	-	A
58	E	F	1	7/24	0900-1000	29	50	40	30	27	24	-	23	21	21	53	20	3.5	-	-	-	A
58	E	F	1	7/24	1000-1100	26	41	31	29	28	25	-	24	22	22	44	21	2.3	-	-	-	A
58	E	F	1	7/24	1100-1200	31	49	41	34	31	28	-	28	23	22	54	21	3.9	-	-	-	A
58	E	F	1	7/24	1200-1300	34	54	47	34	29	24	-	23	21	20	59	19	4.9	-	-	-	A
58	E	F	1	7/24	1300-1400	29	42	37	33	31	27	-	25	21	20	52	20	3.8	-	-	-	A
58	E	F	1	7/24	1400-1500	28	44	35	32	30	27	-	25	21	21	48	20	3.8	-	-	-	A
58	E	F	1	7/24	1500-1600	33	54	41	34	32	29	-	27	23	22	59	21	3.9	-	-	-	A
58	E	F	1	7/24	1600-1700	32	42	40	36	34	31	-	29	23	21	44	20	4.3	-	-	-	A
58	E	F	1	7/24	1700-1800	35	43	41	38	37	34	-	33	30	27	46	26	2.7	-	-	-	A
58	E	F	1	7/24	1800-1900	38	55	44	41	40	37	-	35	32	30	71	29	3.1	-	-	-	A
58	E	F	1	7/24	1900-2000	40	51	46	43	42	40	-	38	33	30	71	29	3.6	-	-	-	A
58	E	F	1	7/24	2000-2100	31	44	39	35	33	30	-	28	23	22	50	21	3.8	-	-	-	A
58	E	F	1	7/24	2100-2200	26	39	34	29	27	24	-	23	22	21	54	20	2.6	-	-	-	A
58	E	F	1	7/24	2200-2300	33	53	42	32	31	29	-	28	23	21	55	20	3.6	-	-	-	A
58	E	F	1	7/24	2300-0000	28	36	32	31	30	28	-	27	23	21	45	20	2.5	-	-	-	A

LEVEL (dBA) / MET

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	T (F)	H (%)	W (V)	EQUIP
59	E	F	1	7/25	0000-0100	28	34	32	31	30	28	-	27	21	21	43	20	3.2	49	100	-	A
59	E	F	1	7/25	0100-0200	24	34	30	27	26	24	-	22	21	21	39	20	2.3	49	100	-	A
59	E	F	1	7/25	0200-0300	22	31	26	24	23	21	-	21	21	20	39	20	1.1	49	100	-	A
59	E	F	1	7/25	0300-0400	22	31	24	22	21	21	-	21	20	20	41	20	0.7	49	100	-	A
59	E	F	1	7/25	0400-0500	22	30	24	22	22	21	-	21	21	20	40	20	0.6	49	100	-	A
59	E	F	1	7/25	0500-0600	25	42	32	29	28	23	-	21	21	20	49	20	3.0	49	100	-	A
59	E	F	1	7/25	0600-0700	26	43	36	28	25	22	-	22	21	21	48	20	2.9	49	100	-	A
59	E	F	1	7/25	0700-0800	35	47	42	39	38	35	-	33	22	21	57	21	5.9	49	100	-	A
59	E	F	1	7/25	0800-0900	34	45	41	38	36	32	-	31	27	25	54	23	3.5	49	100	-	A
59	E	F	1	7/25	0900-1000	32	44	40	35	33	30	-	30	26	25	54	24	3.0	49	100	-	A
59	E	F	1	7/25	1000-1100	36	52	47	40	38	33	-	30	24	23	56	22	5.5	49	100	-	A
59	E	F	1	7/25	1100-1200	40	51	47	43	42	40	-	38	35	34	61	32	2.7	49	100	-	A
59	E	F	1	7/25	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	E	F	1	7/25	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	E	F	1	7/25	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	E	F	1	7/25	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	E	F	1	7/25	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	E	F	1	7/25	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	E	F	1	7/25	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	E	F	1	7/25	1900-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	E	F	1	7/25	2000-2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	E	F	1	7/25	2100-2200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	E	F	1	7/25	2200-2300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	E	F	1	7/25	2300-0000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	E	F	2	7/19	0000-0100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	E	F	2	7/19	0100-0200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	E	F	2	7/19	0200-0300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	E	F	2	7/19	0300-0400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	E	F	2	7/19	0400-0500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	E	F	2	7/19	0500-0600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	E	F	2	7/19	0600-0700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	E	F	2	7/19	0700-0800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	E	F	2	7/19	0800-0900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	E	F	2	7/19	0900-1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	E	F	2	7/19	1000-1100	40.5	49	45	42	42	40	-	39	38	37	56.3	36.2	1.6	62	85	-	D
60	E	F	2	7/19	1100-1200	39.1	51	45	41	40	38	-	38	37	36	59.8	36.0	1.7	62	85	-	D
60	E	F	2	7/19	1200-1300	41.5	51	47	44	43	41	-	40	37	37	57.1	36.2	2.4	62	85	-	D
60	E	F	2	7/19	1300-1400	41.6	58	45	43	42	40	-	39	37	37	71.4	36.2	2.1	62	85	-	D
60	E	F	2	7/19	1400-1500	42.8	50	48	46	45	43	-	41	38	37	56.4	36.2	2.7	62	85	-	D
60	E	F	2	7/19	1500-1600	40.9	48	45	43	42	41	-	40	38	37	53.2	36.2	1.7	62	85	-	D
60	E	F	2	7/19	1600-1700	38.8	48	43	40	39	38	-	38	37	37	54.8	36.1	1.1	62	85	-	D
60	E	F	2	7/19	1700-1800	39.2	47	43	41	40	39	-	38	37	37	50.5	36.0	1.4	62	85	-	D
60	E	F	2	7/19	1800-1900	39.0	51	42	40	39	38	-	38	37	37	55.2	36.2	1.1	62	85	-	D
60	E	F	2	7/19	1900-2000	38.2	44	40	39	38	38	-	38	37	37	46.5	37.0	0.5	62	85	-	D
60	E	F	2	7/19	2000-2100	39.3	48	42	40	40	39	-	38	38	37	54.3	37.2	1.0	62	85	-	D
60	E	F	2	7/19	2100-2200	38.9	40	39	39	39	39	-	38	38	37	41.1	37.2	0.5	62	85	-	D
60	E	F	2	7/19	2200-2300	39.0	40	39	39	39	39	-	39	38	38	40.6	37.2	0.4	62	85	-	D
60	E	F	2	7/19	2300-0000	39.0	40	39	39	39	39	-	39	38	38	51.7	37.2	0.4	62	85	-	D

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
61	E	F	2	7/20	0000-0100	38.3	39	39	39	39	38	-	38	38	38	40.4	37.2	0.3	-	-	-	D
61	E	F	2	7/20	0100-0200	39.0	39	39	39	39	39	-	39	38	38	40.7	38.1	0.3	-	-	-	D
61	E	F	2	7/20	0200-0300	39.2	40	39	39	39	39	-	39	38	38	40.8	38.2	0.3	-	-	-	D
61	E	F	2	7/20	0300-0400	39.0	39	39	39	39	39	-	38	38	38	40.3	38.0	0.3	-	-	-	D
61	E	F	2	7/20	0400-0500	39.2	42	41	40	39	39	-	39	38	38	50.2	37.2	0.6	-	-	-	D
61	E	F	2	7/20	0500-0600	39.1	45	41	39	39	39	-	39	38	38	49.6	38.0	0.6	-	-	-	D
61	E	F	2	7/20	0600-0700	55.4	76	69	59	46	40	-	39	38	38	79.6	38.2	6.4	-	-	-	D
61	E	F	2	7/20	0700-0800	47.6	67	62	47	41	39	-	39	38	38	70.5	37.2	4.0	-	-	-	D
61	E	F	2	7/20	0800-0900	41.6	53	49	45	42	40	-	40	39	38	57.3	38.1	2.1	-	-	-	D
61	E	F	2	7/20	0900-1000	56.9	80	68	59	51	39	-	39	38	38	84.1	37.2	6.8	-	-	-	D
61	E	F	2	7/20	1000-1100	60.8	79	74	65	61	50	-	40	37	37	83.3	37.1	10.2	-	-	-	D
61	E	F	2	7/20	1100-1200	62.2	78	73	68	65	59	-	49	38	37	80.4	37.2	11.0	-	-	-	D
61	E	F	2	7/20	1200-1300	55.7	73	68	63	58	40	-	39	38	38	74.9	37.2	8.0	-	-	-	D
61	E	F	2	7/20	1300-1400	59.5	76	76	65	62	51	-	41	39	38	81.1	37.2	9.9	-	-	-	D
61	E	F	2	7/20	1400-1500	62.9	78	74	69	66	57	-	50	41	39	81.9	38.2	10.1	-	-	-	D
61	E	F	2	7/20	1500-1600	62.0	81	75	67	61	46	-	42	39	39	84.3	38.0	9.0	-	-	-	D
61	E	F	2	7/20	1600-1700	52.7	72	66	57	50	41	-	40	39	38	77.2	37.2	5.8	-	-	-	D
61	E	F	2	7/20	1700-1800	61.7	81	74	66	61	44	-	38	37	37	84.0	36.2	10.2	-	-	-	D
61	E	F	2	7/20	1800-1900	59.0	80	69	63	58	49	-	42	37	37	86.9	36.2	9.0	-	-	-	D
61	E	F	2	7/20	1900-2000	39.4	50	44	41	40	39	-	38	38	38	50.2	37.2	1.2	-	-	-	D
61	E	F	2	7/20	2000-2100	39.0	46	41	40	39	38	-	38	38	38	52.4	37.2	0.7	-	-	-	D
61	E	F	2	7/20	2100-2200	38.8	43	39	39	39	38	-	38	38	38	52.8	37.2	0.4	-	-	-	D
61	E	F	2	7/20	2200-2300	38.8	43	39	39	39	38	-	38	38	38	53.5	37.2	0.4	-	-	-	D
61	E	F	2	7/20	2300-0000	38.8	42	39	39	39	38	-	38	38	38	53.6	38.0	0.4	-	-	-	D
62	E	F	2	7/21	0000-0100	39.0	40	39	39	39	39	-	38	38	38	42.9	38.0	0.4	-	-	-	D
62	E	F	2	7/21	0100-0200	39.2	40	39	39	39	39	-	39	38	38	50.0	38.2	0.4	-	-	-	D
62	E	F	2	7/21	0200-0300	39.2	40	39	39	39	39	-	39	38	38	45.7	38.2	0.3	-	-	-	D
62	E	F	2	7/21	0300-0400	39.1	40	39	39	39	39	-	39	38	38	53.3	38.0	0.3	-	-	-	D
62	E	F	2	7/21	0400-0500	39.3	46	41	40	39	39	-	39	38	38	50.7	38.2	0.6	-	-	-	D
62	E	F	2	7/21	0500-0600	39.8	55	44	40	39	39	-	39	38	38	62.1	38.1	1.1	-	-	-	D
62	E	F	2	7/21	0600-0700	59.7	79	72	65	58	39	-	39	38	38	81.4	38.0	8.7	-	-	-	D
62	E	F	2	7/21	0700-0800	39.1	44	41	40	39	39	-	38	38	38	49.4	38.0	0.7	-	-	-	D
62	E	F	2	7/21	0800-0900	59.8	78	73	65	60	41	-	39	38	38	80.8	38.2	9.1	-	-	-	D
62	E	F	2	7/21	0900-1000	59.1	74	71	60	63	42	-	39	38	38	76.9	38.0	9.9	-	-	-	D
62	E	F	2	7/21	1000-1100	55.0	72	68	51	53	40	-	40	38	38	74.8	38.0	7.0	-	-	-	D
62	E	F	2	7/21	1100-1200	60.8	77	71	66	63	57	-	44	39	38	82.2	37.2	10.3	-	-	-	D
62	E	F	2	7/21	1200-1300	58.1	78	69	63	60	41	-	40	38	37	80.4	37.8	8.8	-	-	-	D
62	E	F	2	7/21	1300-1400	58.9	74	70	65	62	53	-	43	40	39	77.5	38.4	9.5	-	-	-	D
62	E	F	2	7/21	1400-1500	59.4	77	72	64	61	51	-	44	41	39	80.7	39.2	8.4	-	-	-	D
62	E	F	2	7/21	1500-1600	65.0	80	77	70	68	61	-	56	39	38	83.1	37.2	11.1	-	-	-	D
62	E	F	2	7/21	1600-1700	60.9	74	71	68	65	56	-	49	38	37	77.6	37.2	10.1	-	-	-	D
62	E	F	2	7/21	1700-1800	59.0	78	69	65	62	53	-	41	38	38	82.6	37.2	9.8	-	-	-	D
62	E	F	2	7/21	1800-1900	58.7	79	70	62	57	43	-	40	38	37	84.0	37.2	8.6	-	-	-	D
62	E	F	2	7/21	1900-2000	39.1	48	44	41	39	38	-	38	38	37	61.6	37.2	1.2	-	-	-	D
62	E	F	2	7/21	2000-2100	39.2	50	45	40	39	38	-	38	38	37	57.3	37.2	1.3	-	-	-	D
62	E	F	2	7/21	2100-2200	38.8	47	39	39	39	38	-	38	38	38	51.8	37.2	0.4	-	-	-	D
62	E	F	2	7/21	2200-2300	38.9	39	39	39	39	39	-	38	38	38	40.4	37.2	0.3	-	-	-	D
62	E	F	2	7/21	2300-0000	38.8	39	39	39	39	38		38	38	38	40.3	37.2	0.3	-	-	-	D

LEVEL (dBA)

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
63	E	F	2	7/22	0000-0100	38.8	39	39	39	39	38	-	38	38	38	40.6	37.2	0.3	-	-	-	D
63	E	F	2	7/22	0100-0200	38.9	39	39	39	39	38	-	38	38	38	42.7	37.2	0.3	-	-	-	D
63	E	F	2	7/22	0200-0300	39.6	39	39	39	39	38	-	38	38	38	40.2	37.2	0.3	-	-	-	D
63	E	F	2	7/22	0300-0400	38.9	39	39	39	39	38	-	38	38	38	40.1	38.0	0.3	-	-	-	D
63	E	F	2	7/22	0400-0500	39.0	42	40	39	39	39	-	38	38	38	44.9	37.2	0.5	-	-	-	D
63	E	F	2	7/22	0500-0600	39.9	55	44	40	39	39	-	39	38	38	61.3	37.2	1.2	-	-	-	D
63	E	F	2	7/22	0600-0700	57.9	79	71	62	58	39	-	39	38	38	81.6	38.2	8.0	-	-	-	D
63	E	F	2	7/22	0700-0800	43.3	60	57	41	39	39	-	39	39	38	63.3	38.2	2.7	-	-	-	D
63	E	F	2	7/22	0800-0900	66.8	82	80	73	66	54	-	41	39	38	84.2	37.2	12.1	-	-	-	D
63	E	F	2	7/22	0900-1000	64.1	81	76	70	67	51	-	41	38	37	84.1	36.2	11.8	-	-	-	D
63	E	F	2	7/22	1000-1100	62.0	80	73	67	65	57	-	50	38	37	82.4	37.0	10.6	-	-	-	D
63	E	F	2	7/22	1100-1200	56.5	77	69	60	56	41	-	38	37	37	79.8	36.2	7.9	89	17	-	D
63	E	F	2	7/22	1200-1300	42.7	61	54	45	42	39	-	38	37	36	63.7	36.1	3.8	-	-	-	D
63	E	F	2	7/22	1300-1400	55.8	68	65	62	60	54	-	43	37	36	71.1	36.1	9.4	-	-	-	D
63	E	F	2	7/22	1400-1500	47.0	67	59	47	43	40	-	39	37	36	71.2	35.2	4.2	-	-	-	D
63	E	F	2	7/22	1500-1600	58.7	76	70	64	61	55	-	52	38	37	78.3	36.2	8.5	-	-	-	D
63	E	F	2	7/22	1600-1700	60.1	79	72	64	61	55	-	52	38	37	80.9	36.2	9.0	-	-	-	D
63	E	F	2	7/22	1700-1800	58.8	77	70	65	61	51	-	44	37	37	79.7	36.2	9.8	-	-	-	D
63	E	F	2	7/22	1800-1900	61.0	82	70	64	59	42	-	39	37	37	98.7	36.2	9.3	-	-	-	D
63	E	F	2	7/22	1900-2000	38.0	46	40	38	38	38	-	37	37	37	51.2	36.2	0.6	-	-	-	D
63	E	F	2	7/22	2000-2100	39.0	52	45	40	39	38	-	38	37	37	56.5	37.0	1.4	-	-	-	D
63	E	F	2	7/22	2100-2200	39.3	51	44	39	39	39	-	33	38	37	58.3	37.2	1.2	-	-	-	D
63	E	F	2	7/22	2200-2300	39.4	40	40	40	40	39	-	39	38	38	41.5	37.2	0.6	-	-	-	D
63	E	F	2	7/22	2300-0000	38.7	40	40	39	39	38	-	38	38	37	41.7	37.2	0.5	-	-	-	D
																						D
64	E	F	2	7/23	0000-0100	38.6	39	39	39	38	38	-	38	38	38	40.4	37.2	0.3	-	-	-	D
64	E	F	2	7/23	0100-0200	38.6	39	39	39	38	38	-	38	38	37	40.8	37.2	0.3	-	-	-	D
64	E	F	2	7/23	0200-0300	38.5	39	39	38	38	38	-	38	38	37	40.7	37.2	0.1	-	-	-	D
64	E	F	2	7/23	0300-0400	38.6	39	39	39	38	38	-	38	38	38	42.7	37.2	0.3	-	-	-	D
64	E	F	2	7/23	0400-0500	39.0	47	41	39	39	38	-	38	38	38	51.8	37.8	0.7	-	-	-	D
64	E	F	2	7/23	0500-0600	38.9	43	40	39	39	38	-	38	38	38	47.0	37.2	0.5	-	-	-	D
64	E	F	2	7/23	0600-0700	46.7	64	60	46	40	38	-	38	38	38	67.8	37.2	4.1	-	-	-	D
64	E	F	2	7/23	0700-0800	53.6	75	68	50	39	38	-	38	38	38	77.9	37.2	5.3	-	-	-	D
64	E	F	2	7/23	0800-0900	49.7	68	62	55	50	38	-	38	37	37	70.1	36.2	5.8	-	-	-	D
64	E	F	2	7/23	0900-1000	57.7	79	70	60	58	48	-	38	37	37	82.3	36.2	8.8	-	-	-	D
64	E	F	2	7/23	1000-1100	52.3	70	65	58	55	38	-	37	37	36	74.6	35.2	7.8	-	-	-	D
64	E	F	2	7/23	1100-1200	56.4	77	67	61	57	49	-	45	38	37	84.2	36.2	7.9	-	-	-	D
64	E	F	2	7/23	1200-1300	56.5	77	67	62	58	43	-	39	38	37	84.1	37.2	8.5	-	-	-	D
64	E	F	2	7/23	1300-1400	68.1	84	82	71	62	56	-	49	39	38	88.9	38.2	10.7	-	-	-	D
64	E	F	2	7/23	1400-1500	48.8	66	60	58	40	39	-	38	38	37	71.1	67.2	5.3	-	-	-	D
64	E	F	2	7/23	1500-1600	39.2	43	41	40	39	39	-	39	38	37	52.0	37.8	0.7	-	-	-	D
64	E	F	2	7/23	1600-1700	38.8	43	41	40	39	38	-	38	38	37	47.7	37.2	0.7	-	-	-	D
64	E	F	2	7/23	1700-1800	38.6	40	39	39	38	38	-	38	38	37	43.0	37.2	0.3	-	-	-	D
64	E	F	2	7/23	1800-1900	42.1	65	42	38	38	38	-	38	38	38	60.9	37.2	1.5	-	-	-	D
64	E	F	2	7/23	1900-2000	38.6	44	41	39	38	38	-	38	38	37	47.3	37.2	0.6	-	-	-	D
64	E	F	2	7/23	2000-2100	38.7	44	40	39	39	38	-	38	38	38	53.7	37.2	0.6	-	-	-	D
64	E	F	2	7/23	2100-2200	38.7	39	39	39	39	38	-	38	38	38	43.2	37.2	0.3	-	-	-	D
64	E	F	2	7/23	2200-2300	38.8	41	39	39	39	38	-	38	38	38	44.6	37.2	0.3	-	-	-	D
64	E	F	2	7/23	2300-0000	39.7	43	41	40	40	40	-	39	38	38	45.2	37.2	0.8	-	-	-	D

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
65	E	F	2	7/24	0000-0100	41.3	44	42	42	42	41	-	41	40	38	45.7	38.2	0.7	-	-	-	D
65	E	F	2	7/24	0100-0200	43.0	45	44	44	44	43	-	42	41	41	45.9	38.2	0.9	-	-	-	D
65	E	F	2	7/24	0200-0300	44.5	45	44	44	44	44	-	44	44	44	47.0	41.2	0.2	-	-	-	D
65	E	F	2	7/24	0300-0400	44.8	45	45	45	44	44	-	44	44	44	47.0	43.2	0.2	-	-	-	D
65	E	F	2	7/24	0400-0500	44.9	46	45	45	45	44	-	44	44	44	48.0	44.1	0.0	-	-	-	B
65	E	F	2	7/24	0500-0600	45.0	51	46	45	45	44	-	44	44	44	57.0	43.2	0.0	-	-	-	B
65	E	F	2	7/24	0600-0700	45.0	48	45	45	45	44	-	44	44	44	51.7	44.2	0.0	-	-	-	B
65	E	F	2	7/24	0700-0800	57.5	75	71	63	52	45	-	54	44	44	77.4	44.2	5.9	-	-	-	B
65	E	F	2	7/24	0800-0900	47.1	65	57	45	45	45	-	44	44	44	69.5	42.2	2.0	-	-	-	B
65	E	F	2	7/24	0900-1000	50.8	66	61	57	54	44	-	42	41	40	70.8	40.2	5.2	-	-	-	D
65	E	F	2	7/24	1000-1100	48.6	64	60	55	52	40	-	39	38	37	65.9	36.2	5.8	-	-	-	D
65	E	F	2	7/24	1100-1200	44.4	62	57	46	42	38	-	38	37	37	68.6	36.2	3.8	-	-	-	D
65	E	F	2	7/24	1200-1300	47.8	63	60	55	50	39	-	38	37	37	67.1	36.2	5.6	-	-	-	B
65	E	F	2	7/24	1300-1400	46.7	62	58	54	50	39	-	37	36	36	65.5	35.2	5.5	-	-	-	B
65	E	F	2	7/24	1400-1500	49.1	65	60	55	53	42	-	37	36	36	69.2	34.2	6.9	-	-	-	B
65	E	F	2	7/24	1500-1600	61.2	83	72	63	58	54	-	51	38	36	86.8	36.2	8.2	-	-	-	B
65	E	F	2	7/24	1600-1700	46.8	62	58	53	50	40	-	39	37	37	66.4	36.2	5.3	-	-	-	B
65	E	F	2	7/24	1700-1800	57.3	76	68	62	57	51	-	49	41	39	81.4	38.2	6.8	-	-	-	D
65	E	F	2	7/24	1800-1900	53.3	73	66	57	52	40	-	39	38	38	77.8	37.2	6.4	-	-	-	B
65	E	F	2	7/24	1900-2000	40.8	55	45	41	41	40	-	40	38	38	58.1	37.2	1.5	-	-	-	B
65	E	F	2	7/24	2000-2100	42.2	54	46	43	42	42	-	41	40	40	60.3	40.1	1.2	-	-	-	D
65	E	F	2	7/24	2100-2200	43.3	46	44	44	44	43	-	43	42	41	53.1	41.2	0.8	-	-	-	D
65	E	F	2	7/24	2200-2300	44.5	46	44	44	44	44	-	44	44	43	58.7	42.2	0.0	-	-	-	D
65	E	F	2	7/24	2300-0000	44.6	45	44	44	44	44	-	44	44	44	53.1	43.2	0.2	-	-	-	B
66	E	F	2	7/25	0000-0100	44.6	45	44	44	44	44	-	44	44	44	52.6	43.2	0.2	51	100	-	B
66	E	F	2	7/25	0100-0200	44.6	45	44	44	44	44	-	44	44	44	53.6	43.2	0.7	51	100	-	D
66	E	F	2	7/25	0200-0300	44.7	45	44	44	44	44	-	44	44	44	52.7	43.2	0.7	51	100	-	B
66	E	F	2	7/25	0300-0400	44.8	45	44	44	44	44	-	44	44	44	51.1	44.1	0.7	51	100	-	B
66	E	F	2	7/25	0400-0500	44.8	46	45	44	44	44	-	44	44	44	55.1	44.0	0.7	51	100	-	D
66	E	F	2	7/25	0500-0600	45.1	50	46	46	46	44	-	44	44	44	53.4	44.0	0.4	51	100	-	D
66	E	F	2	7/25	0600-0700	45.4	51	47	46	46	45	-	45	44	44	54.7	44.1	0.6	51	100	-	D
66	E	F	2	7/25	0700-0800	45.5	51	47	46	46	45	-	45	44	44	57.8	44.0	0.7	51	100	-	D
66	E	F	2	7/25	0800-0900	45.5	53	48	46	46	45	-	45	44	44	58.7	44.0	0.7	51	100	-	B
66	E	F	2	7/25	0900-1000	45.6	54	50	46	46	45	-	45	44	44	58.3	43.2	0.9	51	100	-	B
66	E	F	2	7/25	1000-1100	47.6	64	53	48	48	46	-	46	45	45	70.8	43.2	1.6	51	100	-	B
66	E	F	2	7/25	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	E	F	2	7/25	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	E	F	2	7/25	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	E	F	2	7/25	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	E	F	2	7/25	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	E	F	2	7/25	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	E	F	2	7/25	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	E	F	2	7/25	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	E	F	2	7/25	1900-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	E	F	2	7/25	2000-2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	E	F	2	7/25	2100-2200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	E	F	2	7/25	2200-2300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	E	F	2	7/25	2300-0000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Column group "LEVEL (dBA)" spans L.01 through Lmn.

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
67	E	F	3	7/19	0000-0100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	E	F	3	7/19	0100-0200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	E	F	3	7/19	0200-0300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	E	F	3	7/19	0300-0400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	E	F	3	7/19	0400-0500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	E	F	3	7/19	0500-0600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	E	F	3	7/19	0600-0700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	E	F	3	7/19	0700-0800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	E	F	3	7/19	0800-0900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	E	F	3	7/19	0900-1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	E	F	3	7/19	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	E	F	3	7/19	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	E	F	3	7/19	1200-1300	27.3	39	35	30	29	26	-	25	24	23	47.2	22.1	2.4	62	59	-	C
67	E	F	3	7/19	1300-1400	33.3	49	43	38	36	30	-	28	24	23	54.8	22.0	4.7	62	59	-	C
67	E	F	3	7/19	1400-1500	29.5	42	37	33	31	28	-	27	25	23	47.1	22.1	2.8	62	59	-	C
67	E	F	3	7/19	1500-1600	28.3	41	38	31	29	26	-	25	24	23	50.9	22.1	2.8	62	59	-	C
67	E	F	3	7/19	1600-1700	28.9	41	37	32	30	28	-	26	25	24	50.7	23.1	2.7	62	59	-	C
67	E	F	3	7/19	1700-1800	35.3	51	45	40	38	33	-	31	27	25	57.2	25.0	4.2	62	59	-	C
67	E	F	3	7/19	1800-1900	37.2	48	44	41	39	36	-	35	32	31	55.7	29.1	2.7	62	59	-	C
67	E	F	3	7/19	1900-2000	33.7	42	39	37	36	33	-	32	27	25	53.9	24.1	3.4	62	59	-	C
67	E	F	3	7/19	2000-2100	35.1	46	42	39	37	35	-	33	30	27	53.3	26.1	3.0	62	59	-	C
67	E	F	3	7/19	2100-2200	39.8	50	47	45	44	38	-	37	32	27	54.4	25.1	4.2	62	59	-	C
67	E	F	3	7/19	2200-2300	42.4	50	48	46	45	43	-	41	28	23	58.3	22.1	6.7	62	59	-	C
67	E	F	3	7/19	2300-0000	41.7	54	51	47	44	41	-	39	29	24	53.8	23.0	6.4	62	59	-	C
68	E	F	3	7/20	0000-0100	43.3	54	50	46	46	44	-	43	29	25	55.8	23.1	6.8	-	-	-	C
68	E	F	3	7/20	0100-0200	42.1	51	49	47	46	43	-	38	27	25	52.8	23.1	7.3	-	-	-	C
68	E	F	3	7/20	0200-0300	29.6	44	35	33	31	29	-	28	25	24	50.2	23.1	2.6	-	-	-	C
68	E	F	3	7/20	0300-0400	24.2	32	29	27	26	24	-	23	22	22	36.0	21.1	1.7	-	-	-	C
68	E	F	3	7/20	0400-0500	39.3	61	51	36	28	23	-	22	22	22	69.7	21.7	5.5	-	-	-	C
68	E	F	3	7/20	0500-0600	26.7	43	36	31	27	23	-	23	22	22	52.5	21.1	3.0	-	-	-	C
68	E	F	3	7/20	0600-0700	50.1	72	63	49	42	34	-	31	23	22	76.4	22.1	8.1	-	-	-	C
68	E	F	3	7/20	0700-0800	37.7	58	52	38	28	23	-	23	22	22	65.7	22.0	5.6	-	-	-	C
68	E	F	3	7/20	0800-0900	44.5	63	57	48	45	38	-	35	22	22	66.9	21.1	8.4	-	-	-	C
68	E	F	3	7/20	0900-1000	41.5	60	53	46	42	36	-	34	25	23	65.9	22.1	6.8	-	-	-	C
68	E	F	3	7/20	1000-1100	42.9	60	55	49	45	28	-	25	23	22	64.2	22.3	9.1	-	-	-	C
68	E	F	3	7/20	1100-1200	41.0	57	53	48	44	31	-	25	23	22	62.2	22.1	8.6	-	-	-	C
68	E	F	3	7/20	1200-1300	44.2	63	56	49	45	36	-	34	31	28	72.5	27.1	6.0	-	-	-	C
68	E	F	3	7/20	1300-1400	42.8	60	55	49	44	34	-	32	28	25	63.4	24.1	6.6	-	-	-	C
68	E	F	3	7/20	1400-1500	41.0	61	52	42	40	35	-	33	26	25	68.2	23.1	5.5	-	-	-	C
68	E	F	3	7/20	1500-1600	43.9	62	55	48	45	40	-	37	31	29	67.2	26.0	6.1	-	-	-	C
68	E	F	3	7/20	1600-1700	42.0	60	54	48	43	32	-	29	23	22	66.9	20.1	7.8	-	-	-	C
68	E	F	3	7/20	1700-1800	39.1	58	53	44	36	26	-	24	19	17	63.7	16.1	7.5	-	-	-	C
68	E	F	3	7/20	1800-1900	44.5	62	56	51	46	34	-	31	25	23	70.8	21.1	8.0	-	-	-	C
68	E	F	3	7/20	1900-2000	32.1	45	41	37	35	30	-	29	24	22	53.5	21.0	4.1	-	-	-	C
68	E	F	3	7/20	2000-2100	35.3	50	42	39	37	35	-	34	28	34	55.8	22.1	3.7	-	-	-	C
68	E	F	3	7/20	2100-2200	34.8	45	42	38	37	34	-	33	28	24	49.4	22.1	3.7	-	-	-	C
68	E	F	3	7/20	2200-2300	31.3	40	37	35	34	31	-	29	25	22	51.5	20.1	3.4	-	-	-	C
68	E	F	3	7/20	2300-0000	26.4	38	33	30	29	26	-	25	18	16	44.3	13.0	4.1	-	-	-	C

LEVEL (dBA)

LEVEL (dBA)

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
69	E	F	3	7/21	0000-0100	19.8	26	24	22	21	20	-	19	17	15	29.3	13.0	1.9	-	-	-	C
69	E	F	3	7/21	0100-0200	18.2	25	23	21	20	18	-	17	14	12	36.3	9.0	2.4	-	-	-	C
69	E	F	3	7/21	0200-0300	18.9	26	23	21	21	19	-	18	15	13	34.1	10.0	2.4	-	-	-	C
69	E	F	3	7/21	0300-0400	17.2	24	21	20	19	17	-	16	14	13	30.1	11.0	2.0	-	-	-	C
69	E	F	3	7/21	0400-0500	41.6	60	47	30	25	21	-	19	15	13	79.0	10.0	5.8	-	-	-	C
69	E	F	3	7/21	0500-0600	19.2	28	24	22	21	19	-	18	15	14	37.4	12.0	2.2	-	-	-	C
69	E	F	3	7/21	0600-0700	39.9	58	53	46	39	21	-	17	15	13	64.2	11.0	10.1	-	-	-	C
69	E	F	3	7/21	0700-0800	22.1	42	35	23	19	16	-	15	13	12	47.9	9.0	3.9	-	-	-	C
69	E	F	3	7/21	0800-0900	40.2	57	52	47	43	30	-	24	15	12	65.5	9.0	10.6	-	-	-	C
69	E	F	3	7/21	0900-1000	39.5	58	52	45	38	26	-	24	20	18	66.5	16.1	7.8	-	-	-	C
69	E	F	3	7/21	1000-1100	31.8	51	45	34	29	23	-	21	18	17	55.7	14.0	5.3	-	-	-	C
69	E	F	3	7/21	1100-1200	36.8	54	49	43	36	24	-	22	19	17	61.5	13.0	7.3	-	-	-	C
69	E	F	3	7/21	1200-1300	41.5	59	53	48	45	28	-	25	18	15	61.8	9.0	9.9	-	-	-	C
69	E	F	3	7/21	1300-1400	39.6	56	52	47	42	25	-	22	18	15	60.9	13.0	9.1	-	-	-	C
69	E	F	3	7/21	1400-1500	45.0	62	57	51	46	38	-	34	23	21	66.4	20.1	8.7	-	-	-	C
69	E	F	3	7/21	1500-1600	40.9	59	53	47	41	29	-	27	23	22	66.3	21.1	7.3	-	-	-	C
69	E	F	3	7/21	1600-1700	36.2	54	50	42	31	22	-	21	17	15	61.8	12.0	7.2	-	-	-	C
69	E	F	3	7/21	1700-1800	42.5	60	55	49	43	31	-	28	17	14	66.2	9.0	9.7	-	-	-	C
69	E	F	3	7/21	1800-1900	43.0	62	55	48	42	33	-	30	21	18	69.0	16.1	8.2	-	-	-	C
69	E	F	3	7/21	1900-2000	33.1	47	43	39	36	31	-	28	23	21	54.5	19.1	5.2	-	-	-	C
69	E	F	3	7/21	2000-2100	24.9	32	30	28	27	25	-	23	21	19	36.4	17.1	2.4	-	-	-	C
69	E	F	3	7/21	2100-2200	27.3	48	32	27	26	24	-	23	19	17	60.6	14.0	3.1	-	-	-	C
69	E	F	3	7/21	2200-2300	27.0	39	35	30	29	26	-	25	22	19	45.9	18.1	2.9	-	-	-	C
69	E	F	3	7/21	2300-0000	31.4	40	39	36	35	31	-	28	22	18	44.1	14.0	4.9	-	-	-	C
70	E	F	3	7/22	0000-0100	26.5	34	32	31	30	27	-	24	18	16	37.3	13.0	4.4	-	-	-	C
70	E	F	3	7/22	0100-0200	25.6	37	34	32	31	21	-	19	16	14	40.4	12.0	5.4	-	-	-	C
70	E	F	3	7/22	0200-0300	18.5	31	25	23	21	17	-	16	14	12	37.5	9.0	2.9	-	-	-	C
70	E	F	3	7/22	0300-0400	20.7	42	27	22	20	15	-	14	13	11	51.5	9.0	3.4	-	-	-	C
70	E	F	3	7/22	0400-0500	17.0	34	25	19	17	15	-	14	13	11	44.3	9.0	2.4	-	-	-	C
70	E	F	3	7/22	0500-0600	17.9	36	27	19	17	15	-	14	13	12	41.3	10.0	2.6	-	-	-	C
70	E	F	3	7/22	0600-0700	42.6	60	56	48	44	26	-	19	14	13	64.3	11.0	11.6	-	-	-	C
70	E	F	3	7/22	0700-0800	32.2	52	46	32	26	19	-	17	15	14	58.4	12.0	6.1	-	-	-	C
70	E	F	3	7/22	0800-0900	43.1	59	55	50	47	27	-	22	18	16	63.0	12.0	10.9	-	-	-	C
70	E	F	3	7/22	0900-1000	41.7	59	54	48	44	24	-	21	16	13	65.7	9.0	10.5	-	-	-	C
70	E	F	3	7/22	1000-1100	40.7	58	53	47	42	25	-	22	16	13	63.0	9.0	9.9	-	-	-	C
70	E	F	3	7/22	1100-1200	38.1	56	51	44	37	25	-	23	18	16	62.1	14.0	7.7	-	-	-	C
70	E	F	3	7/22	1200-1300	27.8	42	35	31	30	27	-	26	22	20	50.3	18.1	3.0	-	-	-	C
70	E	F	3	7/22	1300-1400	36.2	55	49	40	34	30	-	28	24	22	62.6	20.1	5.0	-	-	-	C
70	E	F	3	7/22	1400-1500	42.3	57	53	49	46	36	-	30	26	24	60.0	22.1	7.8	-	-	-	C
70	E	F	3	7/22	1500-1600	33.7	50	45	37	35	31	-	29	24	21	50.4	19.1	4.6	-	-	-	C
70	E	F	3	7/22	1600-1700	39.7	58	53	45	39	31	-	29	25	22	61.3	21.1	6.3	-	-	-	C
70	E	F	3	7/22	1700-1800	44.9	60	56	51	47	41	-	40	26	20	66.1	18.1	7.7	-	-	-	C
70	E	F	3	7/22	1800-1900	42.3	60	55	48	44	32	-	29	20	16	66.9	14.0	8.8	-	-	-	C
70	E	F	3	7/22	1900-2000	28.8	37	35	33	32	28	-	26	21	17	42.6	15.1	4.1	-	-	-	C
70	E	F	3	7/22	2000-2100	24.1	42	31	24	23	20	-	19	13	9	60.0	9.0	4.1	-	-	-	C
70	E	F	3	7/22	2100-2200	27.8	43	33	30	29	27	-	26	21	15	54.3	9.0	3.6	-	-	-	C
70	E	F	3	7/22	2200-2300	27.8	33	32	31	30	28	-	27	22	18	35.5	13.0	3.0	-	-	-	C
70	E	F	3	7/22	2300-0000	33.4	43	41	38	37	33	-	30	20	16	45.6	10.0	6.5	-	-	-	C

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
						LEVEL (dBA)																
71	E	F	3	7/23	0000-0100	36.9	45	44	43	42	35	-	32	22	17	47.4	13.0	7.4	-	-	-	C
71	E	F	3	7/23	0100-0200	34.6	43	42	40	39	34	-	29	18	14	44.6	9.0	8.1	-	-	-	C
71	E	F	3	7/23	0200-0300	34.2	41	41	40	39	33	-	24	14	10	42.7	9.0	9.6	-	-	-	C
71	E	F	3	7/23	0300-0400	22.5	40	35	30	17	14	-	13	10	9	42.8	9.0	5.2	-	-	-	C
71	E	F	3	7/23	0400-0500	33.8	56	46	27	18	13	-	13	11	9	62.7	9.0	6.4	-	-	-	C
71	E	F	3	7/23	0500-0600	15.7	30	22	18	17	15	-	14	12	11	36.3	9.0	2.1	-	-	-	C
71	E	F	3	7/23	0600-0700	41.7	60	55	48	41	24	-	21	17	15	64.7	10.0	9.5	-	-	-	C
71	E	F	3	7/23	0700-0800	30.5	52	43	25	21	17	-	16	13	11	56.3	9.0	5.3	-	-	-	C
71	E	F	3	7/23	0800-0900	42.1	57	53	49	46	33	-	22	16	14	66.9	10.0	11.8	-	-	-	C
71	E	F	3	7/23	0900-1000	42.2	59	54	49	46	26	-	19	12	9	63.7	9.0	12.8	-	-	-	C
71	E	F	3	7/23	1000-1100	43.7	69	49	41	33	21	-	19	12	9	74.1	9.0	8.7	-	-	-	C
71	E	F	3	7/23	1100-1200	61.7	82	71	63	60	56	-	54	23	16	96.1	10.0	14.0	-	-	-	C
71	E	F	3	7/23	1200-1300	47.6	69	59	48	44	34	-	30	19	17	79.0	15.1	9.9	-	-	-	C
71	E	F	3	7/23	1300-1400	54.8	78	59	52	50	45	-	41	24	19	89.0	17.1	9.7	-	-	-	C
71	E	F	3	7/23	1400-1500	31.7	53	45	30	24	19	-	18	16	15	58.3	13.0	5.2	-	-	-	C
71	E	F	3	7/23	1500-1600	23.5	43	34	26	22	19	-	18	15	14	51.2	12.0	3.8	-	-	-	C
71	E	F	3	7/23	1600-1700	27.3	37	35	33	31	26	-	23	19	18	38.2	16.1	4.5	-	-	-	C
71	E	F	3	7/23	1700-1800	33.3	55	44	30	28	23	-	20	16	15	60.5	14.0	5.4	-	-	-	C
71	E	F	3	7/23	1800-1900	21.8	36	31	27	24	19	-	18	16	16	41.9	13.0	3.3	-	-	-	C
71	E	F	3	7/23	1900-2000	23.3	39	32	28	26	22	-	19	17	16	44.6	13.0	3.8	-	-	-	C
71	E	F	3	7/23	2000-2100	28.3	44	37	32	31	26	-	25	21	18	51.3	17.1	4.0	-	-	-	C
71	E	F	3	7/23	2100-2200	32.6	41	39	37	36	32	-	30	23	20	42.1	18.1	4.8	-	-	-	C
71	E	F	3	7/23	2200-2300	37.8	45	43	41	40	38	-	37	32	26	45.9	23.1	3.4	-	-	-	C
71	E	F	3	7/23	2300-0000	37.5	44	42	41	40	37	-	36	32	25	44.8	24.0	3.5	-	-	-	C
72	E	F	3	7/24	0000-0100	38.3	43	42	41	41	38	-	37	33	28	44.5	24.1	3.0	-	-	-	C
72	E	F	3	7/24	0100-0200	38.1	45	43	41	40	38	-	36	33	31	45.6	29.1	2.8	-	-	-	C
72	E	F	3	7/24	0200-0300	36.1	43	41	39	38	36	-	35	32	30	43.7	28.1	2.5	-	-	-	C
72	E	F	3	7/24	0300-0400	32.1	39	37	35	34	32	-	31	26	23	41.8	21.1	3.1	-	-	-	C
72	E	F	3	7/24	0400-0500	36.0	53	36	34	33	31	-	30	25	23	72.7	21.1	3.2	-	-	-	C
72	E	F	3	7/24	0500-0600	32.1	43	37	35	34	32	-	30	27	24	50.4	21.1	2.9	-	-	-	C
72	E	F	3	7/24	0600-0700	27.7	35	32	31	30	27	-	26	23	21	38.1	19.1	2.6	-	-	-	C
72	E	F	3	7/24	0700-0800	39.3	57	53	45	32	27	-	26	23	21	62.3	19.1	6.4	-	-	-	C
72	E	F	3	7/24	0800-0900	26.8	41	36	31	29	25	-	23	20	19	49.4	17.1	3.8	-	-	-	C
72	E	F	3	7/24	0900-1000	37.3	54	49	44	40	25	-	23	19	17	60.0	15.1	7.8	-	-	-	C
72	E	F	3	7/24	1000-1100	39.1	54	50	46	43	29	-	24	19	16	58.0	14.0	9.2	-	-	-	C
72	E	F	3	7/24	1100-1200	37.5	57	50	44	31	23	-	22	20	18	61.3	17.1	6.9	-	-	-	C
72	E	F	3	7/24	1200-1300	38.5	56	51	44	40	27	-	26	22	21	62.9	19.1	7.0	-	-	-	C
72	E	F	3	7/24	1300-1400	37.6	56	50	43	38	24	-	22	20	18	62.9	17.1	7.4	-	-	-	C
72	E	F	3	7/24	1400-1500	36.4	57	49	37	28	24	-	22	20	18	64.3	16.1	5.8	-	-	-	C
72	E	F	3	7/24	1500-1600	31.5	51	43	34	32	28	-	26	21	19	57.5	16.1	4.6	-	-	-	C
72	E	F	3	7/24	1600-1700	36.0	54	47	39	36	32	-	30	23	21	63.2	19.1	5.4	-	-	-	C
72	E	F	3	7/24	1700-1800	44.6	59	55	50	47	43	-	40	28	23	65.5	18.1	7.6	-	-	-	C
72	E	F	3	7/24	1800-1900	45.8	56	52	49	48	45	-	44	40	37	62.2	33.2	3.1	-	-	-	C
72	E	F	3	7/24	1900-2000	45.6	52	51	49	48	46	-	44	39	34	53.4	31.2	3.5	-	-	-	C
72	E	F	3	7/24	2000-2100	45.7	50	49	48	48	46	-	45	41	38	53.3	33.2	2.6	-	-	-	C
72	E	F	3	7/24	2100-2200	44.5	50	49	47	47	45	-	43	40	36	53.5	32.2	2.6	-	-	-	C
72	E	F	3	7/24	2200-2300	44.9	50	49	48	47	45	-	44	40	37	51.5	34.2	2.5	-	-	-	C
72	E	F	3	7/24	2300-0000	42.2	48	46	45	44	42	-	[illegible]	38	34	49.2	31.0	2.6	-	-	-	C

TABLE	SOUND	AREA	SITE	DATE	HOURS	LEVEL (dBA) Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	H (%)	W (V)	EQUIP
73	E	F	3	7/25	0000-0100	40.1	45	44	43	42	40	-	39	36	33	46.4	31.2	2.4	47	100	-	C
73	E	F	3	7/25	0100-0200	41.1	46	45	44	43	41	-	40	37	33	47.3	31.2	2.5	47	100	-	C
73	E	F	3	7/25	0200-0300	37.0	43	42	40	39	37	-	36	32	28	44.7	23.1	2.9	47	100	-	C
73	E	F	3	7/25	0300-0400	38.0	44	43	41	41	38	-	37	32	28	45.7	23.0	3.4	47	100	-	C
73	E	F	3	7/25	0400-0500	37.2	45	43	40	39	37	-	36	32	29	47.1	25.1	2.8	47	100	-	C
73	E	F	3	7/25	0500-0600	35.5	46	41	39	37	35	-	34	31	24	57.5	21.1	3.0	47	100	-	C
73	E	F	3	7/25	0600-0700	35.0	42	40	38	37	35	-	34	30	26	50.3	2.9	24.1	47	100	-	C
73	E	F	3	7/25	0700-0800	33.3	40	38	37	36	33	-	32	28	24	42.1	23.1	3.1	47	100	-	C
73	E	F	3	7/25	0800-0900	28.2	37	36	33	31	27	-	25	20	18	38.4	17.1	4.4	47	100	-	C
73	E	F	3	7/25	0900-1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	E	F	3	7/25	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	E	F	3	7/25	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	E	F	3	7/25	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	E	F	3	7/25	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	E	F	3	7/25	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	E	F	3	7/25	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	E	F	3	7/25	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	E	F	3	7/25	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	E	F	3	7/25	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	E	F	3	7/25	1900-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	E	F	3	7/25	2000-2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	E	F	3	7/25	2100-2200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	E	F	3	7/25	2200-2300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	E	F	3	7/25	2300-0000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	0000-0100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	0100-0200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	0200-0300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	0300-0400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	0400-0500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	0500-0600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	0600-0700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	0700-0800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	0800-0900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	0900-1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	E	F	4	7/19	1400-1500	41.3	46	44	43	42	41	-	40	39	38	48.8	37.2	1.2	72	60	-	D
74	E	F	4	7/19	1500-1600	42.5	48	46	45	44	42	-	42	40	39	51.9	38.2	1.6	72	60	-	D
74	E	F	4	7/19	1600-1700	43.2	51	48	46	45	43	-	42	40	39	54.0	38.1	1.9	72	60	-	D
74	E	F	4	7/19	1700-1800	43.8	51	48	46	45	44	-	43	41	39	53.7	38.2	1.9	72	60	-	D
74	E	F	4	7/19	1800-1900	44.2	52	50	47	46	44	-	43	41	40	54.2	39.2	2.1	72	60	-	D
74	E	F	4	7/19	1900-2000	41.7	44	43	42	48	41	-	41	40	40	48.8	39.1	0.6	72	60	-	D
74	E	F	4	7/19	2000-2100	43.3	54	50	46	45	42	-	41	40	40	58.5	39.2	2.1	72	60	-	D
74	E	F	4	7/19	2100-2200	42.4	44	43	43	43	42	-	42	41	41	47.9	40.2	0.5	72	60	-	D
74	E	F	4	7/19	2200-2300	42.2	43	43	43	42	42	-	42	41	40	47.7	39.2	0.5	72	60	-	D
74	E	F	4	7/19	2300-0000	42.5	44	43	43	43	42	-	42	41	41	49.1	40.2	0.6	72	60	-	D

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
						LEVEL (dBA)																
75	E	F	4	7/20	0000-0100	42.8	45	44	44	43	42	-	42	41	41	45.9	40.2	0.7	-	-	-	D
75	E	F	4	7/20	0100-0200	43.1	45	44	44	44	43	-	43	42	41	45.8	40.1	0.7	-	-	-	D
75	E	F	4	7/20	0200-0300	42.5	44	44	43	43	42	-	42	41	40	45.2	39.2	0.9	-	-	-	D
75	E	F	4	7/20	0300-0400	43.2	47	46	44	44	43	-	42	41	41	49.6	40.2	0.9	-	-	-	D
75	E	F	4	7/20	0400-0500	43.4	58	46	44	43	42	-	42	42	41	61.1	40.2	1.3	-	-	-	D
75	E	F	4	7/20	0500-0600	43.3	52	46	44	43	43	-	43	42	41	61.5	41.0	0.9	-	-	-	D
75	E	F	4	7/20	0600-0700	45.6	61	56	49	45	43	-	43	42	41	65.8	41.0	2.6	-	-	-	D
75	E	F	4	7/20	0700-0800	47.0	65	61	44	43	42	-	42	41	40	67.6	39.2	2.8	-	-	-	D
75	E	F	4	7/20	0800-0900	46.8	67	58	48	42	41	-	41	40	39	74.6	39.0	3.4	-	-	-	D
75	E	F	4	7/20	0900-1000	43.7	53	49	47	46	43	-	41	40	38	63.1	37.2	2.5	-	-	-	D
75	E	F	4	7/20	1000-1100	43.1	49	46	43	42	41	-	41	39	37	56.2	36.2	1.4	-	-	-	D
75	E	F	4	7/20	1100-1200	40.3	45	42	41	41	40	-	40	38	37	62.8	36.2	1.1	-	-	-	D
75	E	F	4	7/20	1200-1300	50.5	71	58	51	49	46	-	44	40	39	80.5	38.2	4.2	-	-	-	D
75	E	F	4	7/20	1300-1400	41.6	48	46	43	43	41	-	41	39	38	52.7	36.0	1.5	-	-	-	D
75	E	F	4	7/20	1400-1500	43.7	51	49	47	46	43	-	42	40	39	62.0	37.2	2.4	-	-	-	D
75	E	F	4	7/20	1500-1600	43.1	51	52	45	43	41	-	41	40	39	61.8	38.2	2.1	-	-	-	D
75	E	F	4	7/20	1600-1700	41.9	56	50	44	41	40	-	40	39	38	67.8	37.2	2.1	-	-	-	D
75	E	F	4	7/20	1700-1800	41.6	55	50	44	42	40	-	40	38	37	62.3	36.2	2.2	-	-	-	D
75	E	F	4	7/20	1800-1900	48.1	68	60	49	45	41	-	41	39	38	75.5	37.2	3.7	-	-	-	D
75	E	F	4	7/20	1900-2000	41.5	48	43	42	42	41	-	41	40	39	51.7	38.2	0.7	-	-	-	D
75	E	F	4	7/20	2000-2100	42.2	47	43	43	42	42	-	42	41	40	53.2	39.2	0.7	-	-	-	D
75	E	F	4	7/20	2100-2200	42.6	52	43	43	43	42	-	42	41	41	55.6	40.2	0.7	-	-	-	D
75	E	F	4	7/20	2200-2300	42.5	44	44	43	43	42	-	42	41	41	45.9	40.2	0.6	-	-	-	D
75	E	F	4	7/20	2300-0000	42.2	43	43	43	42	42	-	42	41	41	48.2	40.2	0.5	-	-	-	D
76	E	F	4	7/21	0000-0100	42.0	43	43	42	42.	42	-	41	41	40	44.3	40.2	0.4	-	-	-	D
76	E	F	4	7/21	0100-0200	42.5	44	43	43	43	42	-	42	41	40	45.5	40.2	0.6	-	-	-	D
76	E	F	4	7/21	0200-0300	42.7	44	44	43	43	42	-	42	41	41	45.3	40.2	0.6	-	-	-	D
76	E	F	4	7/21	0300-0400	42.5	44	43	43	43	42	-	42	41	41	44.8	40.2	0.6	-	-	-	D
76	E	F	4	7/21	0400-0500	42.7	47	44	44	43	42	-	42	41	41	53.1	40.2	0.8	-	-	-	D
76	E	F	4	7/21	0500-0600	43.7	52	48	44	44	43	-	43	42	41	65.2	41.1	1.2	-	-	-	D
76	E	F	4	7/21	0600-0700	46.7	64	60	48	43	43	-	42	41	41	66.8	41.1	2.9	-	-	-	D
76	E	F	4	7/21	0700-0800	42.3	52	44	43	42	42	-	42	41	40	56.9	40.2	0.8	-	-	-	D
76	E	F	4	7/21	0800-0900	41.7	50	45	42	42	41	-	41	40	40	61.2	39.2	0.9	-	-	-	D
76	E	F	4	7/21	0900-1000	40.6	52	45	42	41	40	-	40	38	37	57.6	36.2	1.5	-	-	-	D
76	E	F	4	7/21	1000-1100	40.6	50	45	42	41	40	-	40	38	37	61.2	36.0	1.5	-	-	-	D
76	E	F	4	7/21	1100-1200	41.6	46	44	43	42	41	-	41	39	38	61.2	36.2	1.2	-	-	-	D
76	E	F	4	7/21	1200-1300	41.3	48	44	42	42	41	-	41	40	39	52.4	37.2	1.0	-	-	-	D
76	E	F	4	7/21	1300-1400	43.3	57	51	47	45	42	-	41	39	38	63.0	37.2	2.6	-	-	-	D
76	E	F	4	7/21	1400-1500	42.0	51	45	43	43	42	-	41	40	39	54.1	37.2	1.4	-	-	-	D
76	E	F	4	7/21	1500-1600	45.8	62	58	48	43	42	-	41	40	39	65.7	38.2	3.1	-	-	-	D
76	E	F	4	7/21	1600-1700	41.0	52	47	42	41	40	-	40	38	38	58.0	36.2	1.6	-	-	-	D
76	E	F	4	7/21	1700-1800	43.6	61	56	42	41	40	-	40	39	38	66.9	37.2	2.6	-	-	-	D
76	E	F	4	7/21	1800-1900	47.0	68	57	43	42	41	-	41	40	39	72.0	38.0	3.0	-	-	-	D
76	E	F	4	7/21	1900-2000	43.5	51	49	46	45	42	-	42	41	40	59.3	39.2	1.8	-	-	-	D
76	E	F	4	7/21	2000-2100	43.1	53	49	46	45	42	-	41	41	40	56.9	39.2	1.9	-	-	-	D
76	E	F	4	7/21	2100-2200	42.2	52	43	43	42	42	-	41	41	40	58.0	40.0	0.8	-	-	-	D
76	E	F	4	7/21	2200-2300	42.1	43	43	43	42	42	-	42	41	40	46.2	40.2	0.5	-	-	-	D
76	E	F	4	7/21	2300-0000	42.2	44	43	43	43	42	-	42	41	40	45.0	40.0	0.6	-	-	-	D

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
77	E	F	4	7/22	0000-0100	42.4	44	44	43	43	42	-	42	41	40	46.6	40.0	0.8	-	-	-	D
77	E	F	4	7/22	0100-0200	42.5	44	43	43	43	42	-	42	41	41	47.6	40.2	0.6	-	-	-	D
77	E	F	4	7/22	0200-0300	42.7	45	44	43	43	42	-	42	41	41	46.7	40.2	0.7	-	-	-	D
77	E	F	4	7/22	0300-0400	42.6	44	44	43	43	42	-	42	41	41	47.1	40.2	0.6	-	-	-	D
77	E	F	4	7/22	0400-0500	42.8	44	44	43	43	42	-	42	41	41	46.0	40.2	0.5	-	-	-	D
77	E	F	4	7/22	0500-0600	42.9	53	47	44	43	42	-	42	41	41	60.4	40.2	1.1	-	-	-	D
77	E	F	4	7/22	0600-0700	47.6	62	60	48	44	43	-	43	42	41	65.8	40.2	3.3	-	-	-	D
77	E	F	4	7/22	0700-0800	43.1	55	52	44	43	42	-	42	40	39	56.9	38.2	1.2	-	-	-	D
77	E	F	4	7/22	0800-0900	40.5	46	42	41	41	40	-	40	39	38	56.7	37.0	1.0	-	-	-	D
77	E	F	4	7/22	0900-1000	40.3	45	43	42	41	40	-	40	38	37	53.7	36.2	1.2	-	-	-	D
77	E	F	4	7/22	1000-1100	39.9	44	42	41	41	40	-	39	38	37	51.2	36.2	1.1	-	-	-	D
77	E	F	4	7/22	1100-1200	41.4	54	50	43	41	40	-	39	38	37	59.4	36.2	2.1	-	-	-	D
77	E	F	4	7/22	1200-1300	39.1	50	42	41	40	39	-	38	36	33	59.0	31.2	1.8	-	-	-	D
77	E	F	4	7/22	1300-1400	39.3	44	42	40	40	39	-	39	37	36	51.9	35.2	1.1	-	-	-	D
77	E	F	4	7/22	1400-1500	41.8	49	47	45	44	41	-	40	38	38	63.1	36.2	2.1	-	-	-	D
77	E	F	4	7/22	1500-1600	47.2	63	59	51	47	44	-	43	40	39	67.8	38.1	3.8	-	-	-	D
77	E	F	4	7/22	1600-1700	41.6	58	46	43	42	40	-	40	39	38	63.4	37.2	1.8	-	-	-	D
77	E	F	4	7/22	1700-1800	40.6	48	43	42	41	40	-	40	39	38	56.6	37.2	1.0	-	-	-	D
77	E	F	4	7/22	1800-1900	43.1	57	53	45	42	41	-	41	39	38	59.3	37.2	2.5	-	-	-	D
77	E	F	4	7/22	1900-2000	45.4	64	58	43	42	41	-	41	40	40	66.7	39.2	2.4	-	-	-	D
77	E	F	4	7/22	2000-2100	42.9	49	47	45	44	42	-	42	41	40	53.0	39.2	1.5	-	-	-	D
77	E	F	4	7/22	2100-2200	41.9	46	44	43	43	42	-	41	40	40	50.7	39.2	0.9	-	-	-	D
77	E	F	4	7/22	2200-2300	41.8	43	43	43	42	42	-	41	40	40	45.4	39.2	0.7	-	-	-	D
77	E	F	4	7/22	2300-0000	42.1	43	43	43	42	42	-	42	41	40	44.8	39.2	0.6	-	-	-	D
78	E	F	4	7/23	0000-0100	42.2	44	43	43	42	42	-	42	41	40	44.8	40.1	0.6	73	64	-	D
78	E	F	4	7/23	0100-0200	42.6	44	44	43	43	42	-	42	41	41	47.1	41.0	0.5	73	64	-	D
78	E	F	4	7/23	0200-0300	42.1	44	43	43	42	42	-	42	41	40	45.1	40.1	0.6	73	64	-	D
78	E	F	4	7/23	0300-0400	42.3	44	44	43	42	42	-	42	41	41	45.9	40.1	0.5	73	64	-	D
78	E	F	4	7/23	0400-0500	42.4	53	43	43	42	42	-	42	41	40	56.6	40.1	0.9	73	64	-	D
78	E	F	4	7/23	0500-0600	43.6	59	49	44	43	42	-	42	42	41	68.9	41.0	1.4	73	64	-	D
78	E	F	4	7/23	0600-0700	44.0	56	52	46	44	43	-	42	42	41	60.0	40.2	1.8	73	64	-	D
78	E	F	4	7/23	0700-0800	45.6	64	58	44	42	41	-	41	40	40	69.2	39.2	2.8	73	64	-	D
78	E	F	4	7/23	0800-0900	40.5	46	42	41	41	40	-	40	38	37	54.2	36.2	1.1	73	64	-	D
78	E	F	4	7/23	0900-1000	39.0	45	41	40	40	39	-	38	37	36	54.3	35.2	1.1	73	64	-	D
78	E	F	4	7/23	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	E	F	4	7/23	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	E	F	4	7/23	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	E	F	4	7/23	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	E	F	4	7/23	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	E	F	4	7/23	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	E	F	4	7/23	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	E	F	4	7/23	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	E	F	4	7/23	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	E	F	4	7/23	1900-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	E	F	4	7/23	2000-2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	E	F	4	7/23	2100-2200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	E	F	4	7/23	2200-2300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78	E	F	4	7/23	2300-0000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Level columns L.01–Lmn are LEVEL (dBA).

06-Feb-85

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
79	E	F	5	7/19	0000-0100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	0100-0200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	0200-0300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	0300-0400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	0400-0500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	0500-0600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	0600-0700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	0700-0800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	0800-0900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	0900-1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79	E	F	5	7/19	1500-1600	41.8	53	49	46	44	40	-	39	37	36	55.0	35.1	2.9	66	77	-	E
79	E	F	5	7/19	1600-1700	43.6	54	51	48	46	42	-	41	38	38	56.9	37.1	3.1	66	77	-	E
79	E	F	5	7/19	1700-1800	43.1	54	51	48	46	42	-	40	38	36	56.0	34.2	3.3	66	77	-	E
79	E	F	5	7/19	1800-1900	45.7	54	52	50	48	45	-	43	40	38	59.4	37.2	3.2	66	77	-	E
79	E	F	5	7/19	1900-2000	40.5	48	45	43	42	40	-	39	38	37	52.5	37.2	1.7	66	77	-	E
79	E	F	5	7/19	2000-2100	43.1	48	44	41	40	39	-	39	38	37	54.4	37.0	1.3	66	77	-	E
79	E	F	5	7/19	2100-2200	45.3	65	53	47	45	42	-	41	39	38	73.3	38.0	3.1	66	77	-	E
79	E	F	5	7/19	2200-2300	41.0	46	43	42	42	41	-	40	39	39	50.4	38.2	1.0	66	77	-	E
79	E	F	5	7/19	2300-0000	40.2	42	41	41	40	40	-	40	39	38	42.7	38.1	0.7	66	77	-	E
80	E	F	5	7/20	0000-0100	41.0	42	42	41	41.	41	-	40	40	39	43.7	38.2	0.5	-	-	-	E
80	E	F	5	7/20	0100-0200	40.2	42	41	41	40	40	-	40	39	38	44.9	38.2	0.6	-	-	-	E
80	E	F	5	7/20	0200-0300	40.3	42	41	41	41	40	-	40	39	39	42.8	36.2	1.1	-	-	-	E
80	E	F	5	7/20	0300-0400	39.2	41	41	40	40	39	-	39	37	37	42.8	36.2	1.1	-	-	-	E
80	E	F	5	7/20	0400-0500	38.9	41	40	40	40	39	-	38	37	37	42.5	36.2	0.8	-	-	-	E
80	E	F	5	7/20	0500-0600	42.1	47	44	43	43	42	-	42	40	39	57.0	39.3	1.0	-	-	-	E
80	E	F	5	7/20	0600-0700	45.8	65	56	48	43	42	-	42	41	41	69.4	39.1	2.7	-	-	-	E
80	E	F	5	7/20	0700-0800	42.3	53	50	47	45	41	-	39	37	36	61.8	35.2	3.2	-	-	-	E
80	E	F	5	7/20	0800-0900	41.5	57	50	45	43	40	-	37	35	34	62.5	34.2	3.6	-	-	-	E
80	E	F	5	7/20	0900-1000	44.6	53	50	48	47	44	-	43	41	39	57.1	38.2	2.3	-	-	-	E
80	E	F	5	7/20	1000-1100	42.3	53	52	49	44	39	-	38	37	36	57.5	35.2	3.5	-	-	-	E
80	E	F	5	7/20	1100-1200	40.8	51	49	44	42	39	-	38	37	36	56.5	36.1	2.5	-	-	-	E
80	E	F	5	7/20	1200-1300	45.9	59	58	52	48	40	-	39	37	36	61.2	35.2	4.8	-	-	-	E
80	E	F	5	7/20	1300-1400	56.3	79	60	51	48	42	-	41	37	36	89.4	36.1	5.1	-	-	-	E
80	E	F	5	7/20	1400-1500	42.9	53	50	46	45	42	-	41	38	37	55.2	37.2	2.7	-	-	-	E
80	E	F	5	7/20	1500-1600	43.0	54	51	47	46	41	-	40	38	36	55.7	35.2	3.3	-	-	-	E
80	E	F	5	7/20	1600-1700	39.6	44	42	41	40	39	-	39	38	37	53.2	36.2	1.0	-	-	-	E
80	E	F	5	7/20	1700-1800	39.4	51	44	41	40	39	-	38	37	36	57.6	36.2	1.5	-	-	-	E
80	E	F	5	7/20	1800-1900	39.1	45	42	40	40	39	-	38	37	36	50.2	35.2	1.2	-	-	-	E
80	E	F	5	7/20	1900-2000	41.2	50	46	43	42	41	-	40	39	38	54.7	37.2	1.5	-	-	-	E
80	E	F	5	7/20	2000-2100	41.2	49	45	43	42	41	-	40	39	38	54.4	37.2	1.5	-	-	-	E
80	E	F	5	7/20	2100-2200	43.5	60	50	44	43	42	-	41	40	39	68.5	38.2	2.1	-	-	-	E
80	E	F	5	7/20	2200-2300	44.0	59	48	46	45	43	-	43	41	41	61.6	40.2	1.6	-	-	-	E
80	E	F	5	7/20	2300-0000	42.4	50	47	45	44	42	-	41	40	39	51.7	38.2	1.8	-	-	-	E

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
81	E	F	5	7/21	0000-0100	40.6	46	45	42	42	40	-	40	38	36	52.6	36.1	1.6	-	-	-	E
81	E	F	5	7/21	0100-0200	38.1	40	39	39	39	38	-	38	36	36	42.6	35.2	0.9	-	-	-	E
81	E	F	5	7/21	0200-0300	39.4	41	40	40	40	39	-	39	38	37	42.0	37.2	0.7	-	-	-	E
81	E	F	5	7/21	0300-0400	40.1	42	42	41	41	40	-	40	38	38	43.6	37.2	1.1	-	-	-	E
81	E	F	5	7/21	0400-0500	40.8	43	42	42	41	41	-	40	39	39	43.7	38.2	0.8	-	-	-	E
81	E	F	5	7/21	0500-0600	47.3	65	59	51	45	43	-	42	40	40	70.1	39.0	3.6	-	-	-	E
81	E	F	5	7/21	0600-0700	45.3	63	55	48	46	42	-	42	41	38	68.7	37.2	3.0	-	-	-	E
81	E	F	5	7/21	0700-0800	42.6	54	48	44	43	42	-	42	39	38	58.1	38.1	1.7	-	-	-	E
81	E	F	5	7/21	0800-0900	40.7	50	47	44	42	41	-	39	37	35	59.8	35.0	2.4	-	-	-	E
81	E	F	5	7/21	0900-1000	41.6	54	49	45	44	42	-	39	35	34	58.1	34.1	3.7	-	-	-	E
81	E	F	5	7/21	1000-1100	42.9	59	48	45	44	42	-	41	39	38	63.9	38.0	2.2	-	-	-	E
81	E	F	5	7/21	1100-1200	41.2	49	47	44	43	41	-	40	38	37	50.8	37.2	1.9	-	-	-	E
81	E	F	5	7/21	1200-1300	39.5	49	45	42	41	39	-	38	37	36	53.7	35.2	1.7	-	-	-	E
81	E	F	5	7/21	1300-1400	41.7	59	51	44	42	39	-	39	37	35	63.6	35.0	2.7	-	-	-	E
81	E	F	5	7/21	1400-1500	47.2	64	56	52	51	43	-	40	38	36	67.8	35.2	5.2	-	-	-	E
81	E	F	5	7/21	1500-1600	59.3	50	43	41	40	39	-	38	37	35	53.7	35.1	1.5	-	-	-	E
81	E	F	5	7/21	1600-1700	38.3	49	43	40	39	38	-	37	36	35	55.2	35.0	1.4	-	-	-	E
81	E	F	5	7/21	1700-1800	37.7	47	42	39	38	37	-	37	36	35	53.3	35.2	1.3	-	-	-	E
81	E	F	5	7/21	1800-1900	43.1	62	54	44	41	39	-	38	36	35	69.6	35.1	3.0	-	-	-	E
81	E	F	5	7/21	1900-2000	39.2	48	44	40	39	38	-	38	37	37	62.6	36.2	1.2	-	-	-	E
81	E	F	5	7/21	2000-2100	46.8	58	55	53	52	44	-	39	37	36	60.7	35.2	5.7	-	-	-	E
81	E	F	5	7/21	2100-2200	40.7	59	51	41	38	38	-	37	36	36	64.0	35.2	2.4	-	-	-	E
81	E	F	5	7/21	2200-2300	39.5	57	42	39	38	38	-	38	37	36	61.3	36.2	1.5	-	-	-	E
81	E	F	5	7/21	2300-0000	40.3	42	42	42	41	40	-	39	39	38	54.3	37.2	1.1	-	-	-	E
82	E	F	5	7/22	0000-0100	39.7	42	41	41	40.	39	-	39	38	38	52.2	37.2	0.9	-	-	-	E
82	E	F	5	7/22	0100-0200	39.2	41	41	40	40	39	-	39	38	37	42.6	37.0	0.8	-	-	-	E
82	E	F	5	7/22	0200-0300	40.4	43	42	42	42	40	-	39	38	37	60.1	37.2	1.4	-	-	-	E
82	E	F	5	7/22	0300-0400	39.5	41	40	40	40	39	-	39	38	38	42.2	38.0	0.6	-	-	-	E
82	E	F	5	7/22	0400-0500	39.7	41	41	40	40	39	-	39	38	38	42.6	38.0	0.7	-	-	-	E
82	E	F	5	7/22	0500-0600	44.6	60	55	48	45	42	-	42	39	38	68.9	38.0	3.1	-	-	-	E
82	E	F	5	7/22	0600-0700	45.7	61	57	50	46	42	-	42	41	38	67.6	37.2	3.4	-	-	-	E
82	E	F	5	7/22	0700-0800	43.6	57	53	48	45	42	-	41	37	36	63.0	36.2	3.6	-	-	-	E
82	E	F	5	7/22	0800-0900	39.1	56	46	.42	39	37	-	37	35	34	62.3	34.2	2.3	-	-	-	E
82	E	F	5	7/22	0900-1000	41.3	60	53	44	38	35	-	35	34	34	65.7	33.2	3.7	-	-	-	E
82	E	F	5	7/22	1000-1100	36.4	49	42	38	37	36	-	35	33	33	56.1	33.0	1.9	-	-	-	E
82	E	F	5	7/22	1100-1200	39.0	48	44	41	40	38	-	38	36	35	57.7	34.2	1.9	-	-	-	E
82	E	F	5	7/22	1200-1300	42.3	50	48	46	45	42	-	40	38	36	55.6	35.2	2.7	-	-	-	E
82	E	F	5	7/22	1300-1400	43.0	54	51	48	46	42	-	40	37	36	55.5	35.2	3.6	-	-	-	E
82	E	F	5	7/22	1400-1500	41.7	53	49	45	44	41.	-	40	37	35	53.8	35.0	2.9	-	-	-	E
82	E	F	5	7/22	1500-1600	43.5	53	49	48	47	42	-	41	38	36	57.4	35.1	3.3	-	-	-	E
82	E	F	5	7/22	1600-1700	38.9	51	43	42	41	39	-	38	35	34	52.8	33.2	2.4	-	-	-	E
82	E	F	5	7/22	1700-1800	38.9	52	45	41	40	38	-	37	34	33	67.2	32.2	2.6	-	-	-	E
82	E	F	5	7/22	1800-1900	38.2	55	44	39	38	37	-	36	35	34	69.0	34.0	1.8	-	-	-	E
82	E	F	5	7/22	1900-2000	37.5	52	41	38	38	37	-	36	35	35	62.0	34.2	1.4	-	-	-	E
82	E	F	5	7/22	2000-2100	39.1	50	48	42	41	38	-	36	35	34	51.7	33.2	2.8	-	-	-	E
82	E	F	5	7/22	2100-2200	42.8	62	53	44	40	38	-	38	36	35	73.5	35.2	3.1	-	-	-	E
82	E	F	5	7/22	2200-2300	38.3	40	39	39	39	38	-	38	37	36	42.8	36.2	0.7	-	-	-	E
82	E	F	5	7/22	2300-0000	39.6	42	41	40	40	39	-	39	38	37	42.9	37.2	0.7	-	-	-	E

TABLE	SOUND	AREA	SITE	DATE	HOURS	LEVEL(dBA) Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	H (%)	W (V)	EQUIP
83	E	F	5	7/23	0000-0100	39.4	41	40	40	40	39	-	39	38	38	41.9	37.2	0.6	65	100	-	E
83	E	F	5	7/23	0100-0200	39.8	41	41	40	40	40	-	39	39	38	42.3	37.2	0.6	65	100	-	E
83	E	F	5	7/23	0200-0300	39.7	41	41	40	40	39	-	39	38	38	44.4	37.8	0.7	65	100	-	E
83	E	F	5	7/23	0300-0400	38.6	40	40	39	39	39	-	38	36	36	41.1	36.2	0.9	65	100	-	E
83	E	F	5	7/23	0400-0500	39.1	41	40	40	39	39	-	39	38	37	42.3	36.2	0.7	65	100	-	E
83	E	F	5	7/23	0500-0600	46.7	67	57	49	45	42	-	41	39	38	77.8	37.2	3.7	65	100	-	E
83	E	F	5	7/23	0600-0700	42.7	54	49	45	43	42	-	41	39	38	62.0	38.2	1.9	65	100	-	E
83	E	F	5	7/23	0700-0800	42.3	55	50	45	43	41	-	41	37	37	62.2	36.2	2.6	65	100	-	E
83	E	F	5	7/23	0800-0900	40.0	57	49	41	39	37	-	36	34	33	68.1	33.2	2.6	65	100	-	E
83	E	F	5	7/23	0900-1000	38.3	53	49	42	39	35	-	35	34	33	60.4	32.2	3.0	65	100	-	E
83	E	F	5	7/23	1000-1100	38.4	56	48	40	37	34	-	33	32	31	69.6	30.1	3.0	65	100	-	E
83	E	F	5	7/23	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	E	F	5	7/23	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	E	F	5	7/23	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	E	F	5	7/23	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	E	F	5	7/23	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	E	F	5	7/23	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	E	F	5	7/23	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	E	F	5	7/23	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	E	F	5	7/23	1900-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	E	F	5	7/23	2000-2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	E	F	5	7/23	2100-2200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	E	F	5	7/23	2200-2300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83	E	F	5	7/23	2300-0000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	0000-0100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	0100-0200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	0200-0300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	0300-0400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	0400-0500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	0500-0600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	0600-0700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	0700-0800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	0800-0900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	0900-1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	1100-1200	56.1	73	69	63	56	38		36	35	35	80.5	35.2	8.7	-	-	-	J
84	E	F	11	7/24	1200-1300	55.3	72	68	63	48	37		36	35	35	76.8	35.1	8.0	-	-	-	J
84	E	F	11	7/24	1300-1400	53.0	70	66	60	49	39		37	35	35	74.1	35.0	7.1	-	-	-	J
84	E	F	11	7/24	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	1900-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	2000-2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	2100-2200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	2200-2300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84	E	F	11	7/24	2300-0000	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
85	E	F	17	7/24	0000-0100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	0100-0200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	0200-0300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	0300-0400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	0400-0500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	0500-0600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	0600-0700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	0700-0800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	0800-0900	52.3	68	64	59	56	38	-	34	33	33	69.7	32.2	7.6	80	82	-	M
85	E	F	17	7/24	0900-1000	53.4	77	64	55	50	34	-	33	32	32	79.3	31.5	5.2	80	82	-	M
85	E	F	17	7/24	1000-1100	57.7	74	71	65	57	36	-	35	33	32	76.6	32.6	9.5	80	82	-	M
85	E	F	17	7/24	1100-1200	60.2	75	72	67	65	44	-	36	33	33	77.6	31.3	11.2	80	82	-	M
85	E	F	17	7/24	1200-1300	59.3	76	72	66	62	40	-	33	32	31	83.0	30.6	10.8	80	82	-	M
85	E	F	17	7/24	1300-1400	57.8	76	71	64	59	36	-	33	31	30	78.7	29.3	10.6	80	82	-	M
85	E	F	17	7/24	1400-1500	51.6	70	68	62	56	35	-	33	30	30	72.7	29.1	8.9	80	82	-	M
85	E	F	17	7/24	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	1900-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	2000-2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	2100-2200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	2200-2300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85	E	F	17	7/24	2300-0000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	0000-0100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	0100-0200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	0200-0300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	0300-0400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	0400-0500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	0500-0600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	0600-0700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	0700-0800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	0800-0900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	0900-1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86	E	G	7	7/18	1900-2000	37.3	61	57	49	40	35	-	30	29	28	65.1	27.1	4.0	-	-	-	F
86	E	G	7	7/18	2000-2100	52.9	80	73	65	55	51	-	38	30	29	81.7	28.1	8.4	-	-	-	F
86	E	G	7	7/18	2100-2200	39.1	64	60	46	43	39	-	32	30	29	65.9	28.1	4.1	-	-	-	F
86	E	G	7	7/18	2200-2300	43.3	76	65	49	39	36	-	31	29	27	77.1	26.1	4.0	-	-	-	F
86	E	G	7	7/18	2300-0000	31.8	41	37	35	33	33	-	31	29	28	41.9	27.1	1.6	-	-	-	F

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
87	E	G	7	7/19	0000-0100	32.4	40	36	34	33	33	-	32	30	29	41.9	28.1	1.2	-	-	-	F
87	E	G	7	7/19	0100-0200	32.0	40	35	34	33	33	-	31	30	29	40.2	29.1	1.2	-	-	-	F
87	E	G	7	7/19	0200-0300	31.0	37	34	33	32	32	-	30	29	28	39.6	27.1	1.1	-	-	-	F
87	E	G	7	7/19	0300-0400	28.8	41	38	34	31	30	-	28	27	26	41.4	26.0	1.6	-	-	-	F
87	E	G	7	7/19	0400-0500	30.0	48	41	36	32	31	-	29	28	27	49.0	26.1	1.7	-	-	-	F
87	E	G	7	7/19	0500-0600	28.8	41	40	37	30	29	-	27	26	26	41.9	25.1	1.8	-	-	-	F
87	E	G	7	7/19	0600-0700	27.9	49	42	34	29	28	-	26	25	25	49.0	24.1	1.7	-	-	-	F
87	E	G	7	7/19	0700-0800	27.5	46	42	34	30	28	-	25	24	24	46.5	24.1	2.1	-	-	-	F
87	E	G	7	7/19	0800-0900	28.1	46	44	39	29	27	-	25	25	24	46.7	24.1	2.3	-	-	-	F
87	E	G	7	7/19	0900-1000	29.5	49	47	38	31	29	-	27	26	25	49.7	24.1	2.3	-	-	-	F
87	E	G	7	7/19	1000-1100	30.4	48	42	38	33	31	-	29	27	27	48.6	26.1	2.1	-	-	-	F
87	E	G	7	7/19	1100-1200	32.4	50	47	43	37	33	-	28	27	26	50.1	25.1	3.3	-	-	-	F
87	E	G	7	7/19	1200-1300	34.0	48	47	43	38	36	-	32	29	28	48.1	27.1	3.0	-	-	-	F
87	E	G	7	7/19	1300-1400	38.0	54	51	47	42	40	-	35	31	29	55.6	28.1	3.7	-	-	-	F
87	E	G	7	7/19	1400-1500	37.7	51	48	45	42	41	-	35	29	28	54.6	26.1	4.2	-	-	-	F
87	E	G	7	7/19	1500-1600	40.0	56	51	47	44	43	-	38	34	32	57.9	31.1	3.4	-	-	-	F
87	E	G	7	7/19	1600-1700	41.9	59	57	51	48	45	-	37	31	30	59.9	29.1	5.2	-	-	-	F
87	E	G	7	7/19	1700-1800	33.0	51	47	41	37	35	-	31	28	27	51.8	27.0	2.8	-	-	-	F
87	E	G	7	7/19	1800-1900	32.0	49	43	40	37	35	-	30	28	27	49.9	26.1	3.0	-	-	-	F
87	E	G	7	7/19	1900-2000	30.2	46	40	36	33	31	-	29	28	27	46.6	27.1	1.7	-	-	-	F
87	E	G	7	7/19	2000-2100	33.0	49	43	39	37	35	-	31	29	28	49.4	27.1	2.6	-	-	-	F
87	E	G	7	7/19	2100-2200	44.8	53	51	49	48	47	-	44	37	31	53.1	27.1	4.8	-	-	-	F
87	E	G	7	7/19	2200-2300	44.2	49	48	48	48	47	-	41	34	29	49.9	27.1	5.2	-	-	-	F
87	E	G	7	7/19	2300-0000	44.6	48	47	45	42	41	-	37	30	28	48.2	27.1	4.4	-	-	-	F
88	E	G	7	7/20	0000-0100	38.2	46	45	44	43.	42	-	32	29	28	46.6	27.1	5.1	-	-	-	F
88	E	G	7	7/20	0100-0200	36.0	48	48	47	44	36	-	29	27	27	48.8	26.1	4.7	-	-	-	F
88	E	G	7	7/20	0200-0300	28.3	34	31	29	29	29	-	28	27	26	37.6	26.0	0.7	-	-	-	F
88	E	G	7	7/20	0300-0400	28.0	41	39	32	30	29	-	28	27	27	41.9	26.1	1.1	-	-	-	F
88	E	G	7	7/20	0400-0500	28.6	46	41	33	29	29	-	28	27	26	46.9	26.0	1.2	-	-	-	F
88	E	G	7	7/20	0500-0600	29.7	49	41	37	32	30	-	28	27	26	49.9	26.0	1.8	-	-	-	F
88	E	G	7	7/20	0600-0700	32.5	61	57	34	30	29	-	27	26	25	61.9	25.1	2.1	-	-	-	F
88	E	G	7	7/20	0700-0800	35.4	54	50	47	41	38	-	28	26	26	54.9	25.1	5.1	-	-	-	F
88	E	G	7	7/20	0800-0900	41.1	64	54	53	48	42	-	31	26	26	64.2	25.1	6.6	-	-	-	F
88	E	G	7	7/20	0900-1000	34.0	52	49	45	41	36	-	28	26	26	52.8	25.1	4.4	-	-	-	F
88	E	G	7	7/20	1000-1100	33.6	56	52	45	36	33	-	28	26	26	56.9	25.1	3.7	-	-	-	F
88	E	G	7	7/20	1100-1200	40.1	65	62	52	41	36	-	29	27	26	65.8	26.0	4.8	-	-	-	F
88	E	G	7	7/20	1200-1300	40.3	57	55	52	47	42	-	33	26	26	58.1	25.1	5.9	-	-	-	F
88	E	G	7	7/20	1300-1400	35.8	62	58	44	36	34	-	28	27	26	62.3	25.1	3.7	-	-	-	F
88	E	G	7	7/20	1400-1500	33.2	50	47	41	37	36	-	31	26	25	50.6	25.0	3.9	-	-	-	F
88	E	G	7	7/20	1500-1600	38.6	53	52	49	45	42	-	31	27	27	54.5	26.1	5.9	-	-	-	F
88	E	G	7	7/20	1600-1700	33.8	54	51	42	39	36	-	29	27	27	54.4	26.1	3.9	-	-	-	F
88	E	G	7	7/20	1700-1800	34.3	47	44	41	38	37	-	32	28	27	47.7	27.1	3.3	-	-	-	F
88	E	G	7	7/20	1800-1900	30.3	43	41	39	35	31	-	28	27	26	45.3	26.0	2.5	-	-	-	F
88	E	G	7	7/20	1900-2000	29.0	43	41	34	30	29	-	28	27	27	45.8	26.1	1.3	-	-	-	F
88	E	G	7	7/20	2000-2100	31.8	51	49	40	34	32	-	29	28	28	52.8	27.1	2.2	-	-	-	F
88	E	G	7	7/20	2100-2200	37.8	47	44	42	41	40	-	37	30	28	47.2	27.1	4.6	-	-	-	F
88	E	G	7	7/20	2200-2300	35.9	44	43	42	40	39	-	32	29	27	44.2	26.1	4.3	-	-	-	F
88	E	G	7	7/20	2300-0000	32.9	41	40	39	38	37	-	29	27	26	41.9	25.1	3.6	-	-	-	F

LEVEL (dBA)

TABLE	BOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
						LEVEL (dBA)																
89	E	B	7	7/21	0000-0100	30.5	41	37	35	32	31	-	30	28	27	41.8	27.0	1.5	-	-	-	F
89	E	B	7	7/21	0100-0200	28.6	33	31	31	30	29	-	28	27	26	35.9	26.0	1.0	-	-	-	F
89	E	B	7	7/21	0200-0300	29.7	34	33	32	31	30	-	29	28	27	34.3	27.0	1.1	-	-	-	F
89	E	B	7	7/21	0300-0400	28.7	47	41	32	29	29	-	28	27	26	48.3	26.0	1.3	-	-	-	F
89	E	B	7	7/21	0400-0500	29.1	51	45	36	30	29	-	27	26	26	52.1	25.1	1.8	-	-	-	F
89	E	B	7	7/21	0500-0600	28.7	37	36	33	30	29	-	28	27	26	37.9	26.0	1.2	-	-	-	F
89	E	B	7	7/21	0600-0700	28.1	46	39	34	31	29	-	27	26	25	46.2	25.0	1.8	-	-	-	F
89	E	B	7	7/21	0700-0800	28.7	49	44	37	33	30	-	26	25	24	50.4	24.1	2.7	-	-	-	F
89	E	B	7	7/21	0800-0900	31.5	57	48	42	35	32	-	27	25	25	57.6	24.1	3.4	-	-	-	F
89	E	B	7	7/21	0900-1000	31.9	51	49	41	33	33	-	30	28	27	51.8	26.3	2.4	-	-	-	F
89	E	B	7	7/21	1000-1100	32.1	47	41	36	34	33	-	31	29	29	47.8	28.1	1.6	-	-	-	F
89	E	B	7	7/21	1100-1200	36.5	46	43	41	39	38	-	35	32	30	46.7	28.1	2.4	-	-	-	F
89	E	B	7	7/21	1200-1300	36.1	53	50	44	40	38	-	34	30	29	53.4	28.1	3.2	-	-	-	F
89	E	B	7	7/21	1300-1400	35.7	54	52	43	39	38	-	33	29	28	54.2	27.1	3.5	-	-	-	F
89	E	B	7	7/21	1400-1500	35.1	50	46	41	38	37	-	33	30	28	51.3	27.1	2.9	-	-	-	F
89	E	B	7	7/21	1500-1600	31.5	50	45	41	36	34	-	28	26	25	51.6	25.1	3.4	-	-	-	F
89	E	B	7	7/21	1600-1700	30.6	54	48	41	34	31	-	26	25	25	57.1	24.1	3.2	-	-	-	F
89	E	B	7	7/21	1700-1800	29.9	49	46	38	32	30	-	28	26	25	49.9	24.1	2.4	-	-	-	F
89	E	B	7	7/21	1800-1900	42.9	70	68	47	35	31	-	28	28	27	71.2	26.1	3.7	-	-	-	F
89	E	B	7	7/21	1900-2000	33.0	47	42	40	37	36	-	29	28	27	48.2	26.1	3.3	-	-	-	F
89	E	B	7	7/21	2000-2100	32.8	49	48	44	39	32	-	28	27	27	50.5	26.2	3.4	-	-	-	F
89	E	B	7	7/21	2100-2200	50.1	58	57	56	55	53	-	48	32	28	58.5	27.1	7.9	-	-	-	F
89	E	B	7	7/21	2200-2300	49.7	56	55	54	54	54	-	43	29	27	56.6	26.1	9.3	-	-	-	F
89	E	B	7	7/21	2300-0000	33.1	44	44	43	43	42	-	29	28	27	44.9	26.1	6.3	-	-	-	F
90	E	B	7	7/22	0000-0100	31.4	42	41	41	39	30	-	28	27	26	42.6	26.1	3.1	-	-	-	F
90	E	B	7	7/22	0100-0200	28.4	32	31	30	29	29	-	28	27	26	32.5	26.1	0.7	-	-	-	F
90	E	B	7	7/22	0200-0300	28.1	33	32	29	28	28	-	28	27	26	33.3	26.1	0.6	-	-	-	F
90	E	B	7	7/22	0300-0400	28.5	45	41	33	29	29	-	27	27	26	46.4	26.0	1.3	-	-	-	F
90	E	B	7	7/22	0400-0500	27.9	49	41	33	30	28	-	27	26	25	49.4	25.1	1.5	-	-	-	F
90	E	B	7	7/22	0500-0600	27.9	41	38	32	29	28	-	27	26	26	41.9	25.1	1.2	-	-	-	F
90	E	B	7	7/22	0600-0700	32.5	48	46	43	39	35	-	27	26	25	49.1	24.1	4.2	-	-	-	F
90	E	B	7	7/22	0700-0800	47.8	78	74	42	31	29	-	27	26	25	78.6	25.1	3.5	-	-	-	F
90	E	B	7	7/22	0800-0900	30.7	57	49	39	34	31	-	27	26	26	57.9	25.1	2.7	-	-	-	F
90	E	B	7	7/22	0900-1000	31.8	51	49	42	34	32	-	28	26	26	51.6	25.1	3.1	-	-	-	F
90	E	B	7	7/22	1000-1100	30.7	46	44	40	33	31	-	28	27	26	47.6	25.1	2.5	-	-	-	F
90	E	B	7	7/22	1100-1200	31.7	47	45	41	37	34	-	28	26	25	47.4	24.1	3.5	-	-	-	F
90	E	B	7	7/22	1200-1300	29.1	47	43	37	33	30	-	27	26	25	47.4	24.1	2.4	-	-	-	F
90	E	B	7	7/22	1300-1400	33.4	49	47	41	38	36	-	31	27	25	49.9	24.1	3.3	-	-	-	F
90	E	B	7	7/22	1400-1500	42.0	70	66	48	37	34	-	28	26	25	70.1	24.1	4.5	-	-	-	F
90	E	B	7	7/22	1500-1600	35.8	48	43	42	40	38	-	34	31	29	49.5	28.1	3.0	-	-	-	F
90	E	B	7	7/22	1600-1700	34.3	52	46	42	39	38	-	30	28	27	52.0	27.0	3.7	-	-	-	F
90	E	B	7	7/22	1700-1800	42.0	56	55	52	49	46	-	34	29	28	56.4	27.1	6.4	-	-	-	F
90	E	B	7	7/22	1800-1900	30.8	45	41	39	34	33	-	28	26	26	46.2	25.1	2.9	-	-	-	F
90	E	B	7	7/22	1900-2000	31.1	56	48	38	33	31	-	28	27	27	56.3	26.1	2.3	-	-	-	F
90	E	B	7	7/22	2000-2100	30.1	47	41	38	33	30	-	28	28	27	49.9	26.1	2.0	-	-	-	F
90	E	B	7	7/22	2100-2200	47.6	52	52	52	51	50	-	46	29	28	52.9	26.1	7.6	-	-	-	F
90	E	B	7	7/22	2200-2300	51.4	55	55	54	54	54	-	52	34	29	55.9	28.1	8.0	-	-	-	F
90	E	B	7	7/22	2300-0000	41.6	54	54	53	52	41	-	29	29	27	54.9	27.1	6.5	-	-	-	F

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
91	E	B	7	7/23	0000-0100	28.7	39	33	30	30	29	-	28	27	26	41.9	26.1	0.9	-	-	-	F
91	E	B	7	7/23	0100-0200	28.8	37	32	30	29	29	-	27	26	26	40.9	26.0	0.9	-	-	-	F
91	E	B	7	7/23	0200-0300	28.0	36	31	30	29	29	-	27	27	26	40.6	26.1	0.8	-	-	-	F
91	E	B	7	7/23	0300-0400	28.1	49	41	31	28	28	-	27	26	26	49.9	26.0	1.1	-	-	-	F
91	E	B	7	7/23	0400-0500	29.1	44	39	34	31	30	-	28	27	27	45.2	26.1	1.4	-	-	-	F
91	E	B	7	7/23	0500-0600	28.8	45	39	35	30	29	-	28	27	26	47.2	26.1	1.4	-	-	-	F
91	E	B	7	7/23	0600-0700	30.1	48	45	39	32	30	-	28	27	26	48.6	26.1	2.1	-	-	-	F
91	E	B	7	7/23	0700-0800	30.4	48	44	40	34	31	-	27	27	26	49.8	26.0	2.6	-	-	-	F
91	E	B	7	7/23	0800-0900	30.3	49	46	41	33	30	-	27	26	26	49.2	25.1	2.9	-	-	-	F
91	E	B	7	7/23	0900-1000	28.2	46	41	36	31	29	-	26	25	25	48.6	24.1	2.1	-	-	-	F
91	E	B	7	7/23	1000-1100	30.7	51	46	40	34	32	-	27	25	25	51.0	24.1	3.2	-	-	-	F
91	E	B	7	7/23	1100-1200	40.2	69	61	51	43	38	-	29	27	26	71.5	25.1	5.3	-	-	-	F
91	E	B	7	7/23	1200-1300	42.7	69	64	54	45	41	-	31	28	27	69.6	26.1	6.0	-	-	-	F
91	E	B	7	7/23	1300-1400	41.5	70	64	48	41	39	-	36	29	28	71.2	27.1	4.6	-	-	-	F
91	E	B	7	7/23	1400-1500	34.3	51	46	42	40	38	-	29	27	26	52.3	25.1	4.5	-	-	-	F
91	E	B	7	7/23	1500-1600	29.4	44	42	39	33	29	-	27	26	26	44.9	25.1	2.3	-	-	-	F
91	E	B	7	7/23	1600-1700	36.4	48	45	42	40	39	-	35	31	26	49.1	26.0	3.3	-	-	-	F
91	E	B	7	7/23	1700-1800	33.7	44	43	41	38	26	-	31	29	27	44.9	26.1	3.0	-	-	-	F
91	E	B	7	7/23	1800-1900	30.0	46	44	38	32	30	-	28	27	26	47.0	26.1	2.0	-	-	-	F
91	E	B	7	7/23	1900-2000	37.1	66	62	43	33	30	-	28	27	27	66.8	26.1	3.0	-	-	-	F
91	E	B	7	7/23	2000-2100	29.8	45	43	38	32	30	-	28	27	27	45.8	26.1	1.9	-	-	-	F
91	E	B	7	7/23	2100-2200	31.1	41	38	36	35	34	-	30	28	28	41.9	27.1	2.1	-	-	-	F
91	E	B	7	7/23	2200-2300	31.3	38	36	35	35	34	-	30	28	27	41.9	27.1	2.1	-	-	-	F
91	E	B	7	7/23	2300-0000	29.5	33	32	31	30	30	-	29	28	27	33.6	26.1	0.7	-	-	-	F
92	E	B	7	7/24	0000-0100	29.3	35	32	31	30	30	-	29	28	27	39.0	27.1	0.7	-	-	-	F
92	E	B	7	7/24	0100-0200	30.0	35	32	31	31	30	-	29	29	28	36.0	27.1	0.6	-	-	-	F
92	E	B	7	7/24	0200-0300	30.9	37	34	33	32	32	-	30	29	29	38.8	28.1	0.9	-	-	-	F
92	E	B	7	7/24	0300-0400	30.5	39	36	33	32	31	-	30	29	28	40.2	28.1	1.0	-	-	-	F
92	E	B	7	7/24	0400-0500	32.2	49	41	35	33	33	-	31	30	28	49.8	27.1	1.4	-	-	-	F
92	E	B	7	7/24	0500-0600	35.9	46	43	37	33	33	-	30	29	28	47.2	28.1	1.6	-	-	-	F
92	E	B	7	7/24	0600-0700	35.3	43	39	35	33	32	-	30	28	28	43.6	27.1	1.7	-	-	-	F
92	E	B	7	7/24	0700-0800	35.0	47	45	39	31	29	-	28	27	27	47.1	26.1	2.0	-	-	-	F
92	E	B	7	7/24	0800-0900	29.3	46	43	37	32	30	-	27	26	26	46.6	25.1	2.0	-	-	-	F
92	E	B	7	7/24	0900-1000	41.6	72	65	42	34	30	-	26	25	25	73.6	24.1	3.7	-	-	-	F
92	E	B	7	7/24	1000-1100	32.2	57	51	43	34	32	-	26	25	24	57.9	24.1	3.5	-	-	-	F
92	E	B	7	7/24	1100-1200	32.1	45	43	38	35	34	-	31	29	27	45.3	26.1	2.1	-	-	-	F
92	E	B	7	7/24	1200-1300	33.6	46	44	39	36	35	-	32	29	28	46.5	27.1	2.6	-	-	-	F
92	E	B	7	7/24	1300-1400	31.2	51	47	39	33	32	-	29	27	26	51.8	26.1	2.4	-	-	-	F
92	E	B	7	7/24	1400-1500	33.4	49	44	39	36	35	-	32	30	28	49.6	28.0	2.2	-	-	-	F
92	E	B	7	7/24	1500-1600	36.0	52	49	44	40	38	-	34	31	29	53.0	28.1	3.1	-	-	-	F
92	E	B	7	7/24	1600-1700	42.0	78	62	43	37	35	-	30	27	26	78.6	25.1	3.8	-	-	-	F
92	E	B	7	7/24	1700-1800	30.0	55	49	39	31	29	-	26	25	24	55.8	23.1	2.6	-	-	-	F
92	E	B	7	7/24	1800-1900	30.9	46	43	37	34	33	-	29	27	26	46.3	25.1	2.4	-	-	-	F
92	E	B	7	7/24	1900-2000	33.3	60	55	41	35	33	-	28	27	26	63.4	26.0	3.2	-	-	-	F
92	E	B	7	7/24	2000-2100	33.2	60	55	41	32	30	-	28	27	26	60.7	26.1	2.5	-	-	-	F
92	E	B	7	7/24	2100-2200	38.8	47	46	46	45	45	-	30	28	27	47.9	26.1	6.1	-	-	-	F
92	E	B	7	7/24	2200-2300	35.8	47	47	46	45	32	-	30	27	26	47.8	25.1	4.6	-	-	-	F
92	E	B	7	7/24	2300-0000	30.8	50	49	36	31	31	-	29	26	25	50.7	24.1	2.2	-	-	-	F

LEVEL (dBA)

TABLE	BOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
93	E	G	7	7/25	0000-0100	30.2	34	34	33	32	31	-	30	27	26	34.8	25.1	1.2	50	100	-	F
93	E	G	7	7/25	0100-0200	35.3	35	35	34	34	33	-	31	30	29	35.3	29.1	1.2	50	100	-	F
93	E	G	7	7/25	0200-0300	30.3	38	34	34	33	33	-	28	27	26	40.6	26.0	2.2	50	100	-	F
93	E	G	7	7/25	0300-0400	27.8	38	33	29	29	28	-	27	26	26	39.6	25.1	0.9	50	100	-	F
93	E	G	7	7/25	0400-0500	31.0	46	41	35	32	32	-	30	28	28	47.2	27.1	1.5	50	100	-	F
93	E	G	7	7/25	0500-0600	28.3	43	39	31	30	29	-	27	27	26	43.2	26.0	1.1	50	100	-	F
93	E	G	7	7/25	0600-0700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	0700-0800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	0800-0900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	0900-1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	1000-1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	1100-1200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	1200-1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	1300-1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	1400-1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	1500-1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	1600-1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	1700-1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	1800-1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	1900-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	2000-2100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	2100-2200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	2200-2300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
93	E	G	7	7/25	2300-0000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE	BOUND	AREA	SITE	DATE	HOURS	LEVEL (dBA) Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	7/20	---	-	-	-	-	-	-	-	-	-	87.3	77.7	15.25	-	-	-	-	A
94	H	F	1	7/21	---	-	-	-	-	-	-	-	-	-	89.4	85.2	12.5	-	-	-	-	A
94	H	F	1	7/23	---	-	-	-	-	-	-	-	-	-	86.2	84.0	3.9	-	-	-	-	A
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
94	H	F	1	--	---	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE	SOUND	AREA	SITE	DATE	HOURS	LEVEL (dBA) Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
95	H	F	2	7/20	- - -	-	-	-	-	-	-	-	-	-	88.7	84.1	5.50	-	-	-	-	D
95	H	F	2	7/20	- - -	-	-	-	-	-	-	-	-	-	86.5	82.6	4.87	-	-	-	-	D
95	H	F	2	7/20	- - -	-	-	-	-	-	-	-	-	-	90.3	84.3	7.37	-	-	-	-	D
95	H	F	2	7/20	- - -	-	-	-	-	-	-	-	-	-	88.8	82.8	7.00	-	-	-	-	D
95	H	F	2	7/20	- - -	-	-	-	-	-	-	-	-	-	89.1	84.0	7.00	-	-	-	-	D
95	H	F	2	7/20	- - -	-	-	-	-	-	-	-	-	-	89.0	82.8	6.87	-	-	-	-	D
95	H	F	2	7/21	- - -	-	-	-	-	-	-	-	-	-	88.1	81.4	6.75	-	-	-	-	D
95	H	F	2	7/21	- - -	-	-	-	-	-	-	-	-	-	84.8	80.8	3.62	-	-	-	-	D
95	H	F	2	7/21	- - -	-	-	-	-	-	-	-	-	-	86.7	81.7	5.25	-	-	-	-	D
95	H	F	2	7/21	- - -	-	-	-	-	-	-	-	-	-	87.6	81.8	5.62	-	-	-	-	D
95	H	F	2	7/21	- - -	-	-	-	-	-	-	-	-	-	85.7	82.6	3.75	-	-	-	-	D
95	H	F	2	7/21	- - -	-	-	-	-	-	-	-	-	-	87.6	84.0	4.50	-	-	-	-	D
95	H	F	2	7/22	- - -	-	-	-	-	-	-	-	-	-	86.8	81.6	4.87	-	-	-	-	D
95	H	F	2	7/22	- - -	-	-	-	-	-	-	-	-	-	89.0	83.4	7.00	-	-	-	-	D
95	H	F	2	7/22	- - -	-	-	-	-	-	-	-	-	-	97.1	84.2	40.12	-	-	-	-	D
95	H	F	2	7/22	- - -	-	-	-	-	-	-	-	-	-	88.7	83.2	7.12	-	-	-	-	D
95	H	F	2	7/22	- - -	-	-	-	-	-	-	-	-	-	87.6	82.7	4.37	-	-	-	-	D
95	H	F	2	7/22	- - -	-	-	-	-	-	-	-	-	-	89.0	82.2	7.62	-	-	-	-	D
95	H	F	2	7/22	- - -	-	-	-	-	-	-	-	-	-	89.7	83.2	7.37	-	-	-	-	D
95	H	F	2	7/22	- - -	-	-	-	-	-	-	-	-	-	92.0	84.1	12.25	-	-	-	-	D
95	H	F	2	7/22	- - -	-	-	-	-	-	-	-	-	-	91.2	82.4	13.50	-	-	-	-	D
95	H	F	2	7/22	- - -	-	-	-	-	-	-	-	-	-	86.8	80.9	5.37	-	-	-	-	D
95	H	F	2	7/22	- - -	-	-	-	-	-	-	-	-	-	92.2	92.7	3.87	-	-	-	-	D
95	H	F	2	7/22	- - -	-	-	-	-	-	-	-	-	-	86.6	83.2	3.62	-	-	-	-	D
95	H	F	2	7/23	- - -	-	-	-	-	-	-	-	-	-	87.1	82.3	4.75	-	-	-	-	D
95	H	F	2	7/23	- - -	-	-	-	-	-	-	-	-	-	90.1	83.1	9.12	-	-	-	-	D
95	H	F	2	7/23	- - -	-	-	-	-	-	-	-	-	-	90.7	84.1	9.12	-	-	-	-	D
95	H	F	2	7/23	- - -	-	-	-	-	-	-	-	-	-	101.8	85.8	90.75	-	-	-	-	D
95	H	F	2	7/23	- - -	-	-	-	-	-	-	-	-	-	88.2	84.3	6.75	-	-	-	-	D
95	H	F	2	7/24	- - -	-	-	-	-	-	-	-	-	-	92.7	86.8	8.00	-	-	-	-	D

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
96	H	F	3	7/20	- - -	-	-	-	-	-	-	-	-	-	79.5	76.4	4.12	-	-	-	-	C
96	H	F	3	7/23	- - -	-	-	-	-	-	-	-	-	-	92.9	96.1	7.25	-	-	-	-	C
96	H	F	3	7/23	- - -	-	-	-	-	-	-	-	-	-	85.9	86.1	5.62	-	-	-	-	C
96	H	F	3	7/23	- - -	-	-	-	-	-	-	-	-	-	85.2	84.0	6.00	-	-	-	-	C
96	H	F	3	7/23	- - -	-	-	-	-	-	-	-	-	-	88.8	89.0	4.75	-	-	-	-	C
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	71.7	70.3	15.37	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	66.2	58.2	24.00	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	76.1	67.8	64.00	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	74.9	65.2	67.25	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	78.8	68.2	79.25	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	79.4	71.3	66.50	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	72.3	66.7	45.00	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	69.0	60.8	68.50	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	75.4	66.7	82.00	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	65.3	55.7	51.62	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	71.5	65.1	51.75	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	70.5	65.3	82.87	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	72.1	62.6	71.87	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	69.0	59.0	58.62	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	68.6	61.2	55.00	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	73.9	67.0	75.25	-	-	-	-	J
97	H	F	11	- -	- - -	-	-	-	-	-	-	-	-	-	70.2	59.4	51.25	-	-	-	-	J
98	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	89.1	-	-	-	-	-	K
98	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	80.6	-	-	-	-	-	K
98	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	83.6	-	-	-	-	-	K
98	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	83.6	-	-	-	-	-	K
98	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	91.0	-	-	-	-	-	K
98	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	89.3	-	-	-	-	-	K
98	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	93.0	-	-	-	-	-	K
98	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	76.6	-	-	-	-	-	K
98	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	74.9	-	-	-	-	-	K
98	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	87.8	-	-	-	-	-	K
98	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	88.0	-	-	-	-	-	K
99	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	71.3	-	-	-	-	-	K
99	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	72.4	-	-	-	-	-	K
99	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	76.8	-	-	-	-	-	K
99	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	72.1	-	-	-	-	-	K
99	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	70.8	-	-	-	-	-	K
99	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	69.3	-	-	-	-	-	K
99	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	72.4	-	-	-	-	-	K
99	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	71.9	-	-	-	-	-	K
99	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	78.8	-	-	-	-	-	K
99	H	F	12	- -	- - -	-	-	-	-	-	-	-	-	-	-	74.2	-	-	-	-	-	K

LEVEL (dBA) applies to columns Leq through Lmn.

TABLE	SOUND	AREA	SITE	DATE	HOURS	Leq	L.01	L.1	L1	L5	L10	L33	L50	L90	L99	Lmx	Lmn	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	85.5	76.9	42.87	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	80.3	70.5	37.00	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	83.0	71.1	57.37	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	82.8	74.0	49.62	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	82.8	71.6	46.12	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	81.2	70.5	40.25	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	77.9	67.3	39.25	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	83.1	76.2	55.12	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	80.8	73.7	38.12	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	86.1	80.5	51.75	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	80.9	72.1	50.50	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	82.9	73.6	55.50	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	82.3	75.0	44.75	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	79.9	69.1	37.75	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	85.0	76.8	52.75	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	83.8	73.5	51.00	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	81.7	71.7	47.87	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	81.7	71.4	44.00	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	81.8	72.1	41.12	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	81.1	72.1	44.37	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	80.3	72.5	41.50	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	82.2	72.7	41.12	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	80.2	74.1	53.62	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	79.5	69.8	47.00	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	81.3	73.2	55.00	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	80.7	70.0	44.75	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	86.1	78.0	54.75	-	-	-	-	J
100	H	F	12	--	---	-	-	-	-	-	-	-	-	-	80.7	70.6	42.37	-	-	-	-	J

LEVEL (dBA)

TABLE	SOUND	AREA	SITE	DATE		LEVEL (dBA)									MET			EQUIP
					HOURS	L5	L10	L33	L50	L90	SEL	Lmx	Dur	STD DEV	T (F)	H (%)	H (V)	
101	H	F	13	7/22	- - -	-	-	-	-	-	-	72.9	(dB)	-	-	-	-	L
101	H	F	13	7/22	- - -	-	-	-	-	-	-	93.2	"	-	-	-	-	L
101	H	F	13	7/22	- - -	-	-	-	-	-	-	87.6	"	-	-	-	-	L
101	H	F	13	7/22	- - -	-	-	-	-	-	-	84.0	"	-	-	-	-	L
101	H	F	13	7/22	- - -	-	-	-	-	-	-	79.5	"	-	-	-	-	L
101	H	F	13	7/22	- - -	-	-	-	-	-	-	81.0		-	-	-	-	L
101	H	F	13	7/22	- - -	-	-	-	-	-	-	81.1	"	-	-	-	-	L
101	H	F	13	7/22	- - -	-	-	-	-	-	-	75.2	"	-	-	-	-	L
101	H	F	13	7/22	- - -	-	-	-	-	-	-	72.7	"	-	-	-	-	L
101	H	F	13	7/22	- - -	-	-	-	-	-	-	76.4		-	-	-	-	L
101	H	F	13	7/22	- - -	-	-	-	-	-	-	98.0	"	-	-	-	-	L
102	H	F	14	7/22	- - -	-	-	-	-	-	-	63.1	-	-	-	-	-	L
102	H	F	14	7/22	- - -	-	-	-	-	-	-	63.6	-	-	-	-	-	L
102	H	F	14	7/22	- - -	-	-	-	-	-	-	66.6	-	-	-	-	-	L
102	H	F	14	7/22	- - -	-	-	-	-	-	-	62.9	-	-	-	-	-	L
102	H	F	14	7/22	- - -	-	-	-	-	-	-	63.0	-	-	-	-	-	L
102	H	F	14	7/22	- - -	-	-	-	-	-	-	66.7	-	-	-	-	-	L
102	H	F	14	7/22	- - -	-	-	-	-	-	-	66.3	-	-	-	-	-	L
102	H	F	14	7/22	- - -	-	-	-	-	-	-	60.8	-	-	-	-	-	L
102	H	F	14	7/22	- - -	-	-	-	-	-	-	63.6	-	-	-	-	-	L
102	H	F	14	7/22	- - -	-	-	-	-	-	-	60.3	-	-	-	-	-	L
102	H	F	14	7/22	- - -	-	-	-	-	-	-	63.6	-	-	-	-	-	L
103	H	F	16	7/22	- - -	-	-	-	-	-	-	90.4	(dB)	-	-	-	-	K
103	H	F	16	7/22	- - -	-	-	-	-	-	-	71.5	-	-	-	-	-	K
103	H	F	16	7/22	- - -	-	-	-	-	-	-	63.1	-	-	-	-	-	K
103	H	F	16	7/22	- - -	-	-	-	-	-	-	70.1	-	-	-	-	-	K
103	H	F	16	7/22	- - -	-	-	-	-	-	-	66.2	-	-	-	-	-	K
103	H	F	16	7/22	- - -	-	-	-	-	-	-	60.7	-	-	-	-	-	K
103	H	F	16	7/22	- - -	-	-	-	-	-	-	69.8	-	-	-	-	-	K
103	H	F	16	7/22	- - -	-	-	-	-	-	-	69.1	-	-	-	-	-	K
103	H	F	16	7/22	- - -	-	-	-	-	-	-	61.8	-	-	-	-	-	K
103	H	F	16	7/22	- - -	-	-	-	-	-	-	63.3	-	-	-	-	-	K
103	H	F	16	7/22	- - -	-	-	-	-	-	-	70.0	-	-	-	-	-	K
103	H	F	16	7/22	- - -	-	-	-	-	-	-	72.9	-	-	-	-	-	K

TABLE	SOUND	AREA	SITE	DATE	HOURS	LEVEL (dBA) L5	L10	L33	L50	L90	SEL	Lmx	Dur	STD DEV	MET T (F)	H (%)	W (V)	EQUIP
104	H	F	17	7/84	- - -	-	-	-	-	-	79.9	69.0	52.12	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	75.8	66.2	31.37	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	72.2	66.7	16.37	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	74.7	67.6	21.87	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	85.2	73.5	78.75	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	86.1	76.7	60.12	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	71.4	65.7	10.62	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	72.5	67.1	18.25	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	82.4	72.0	37.00	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	86.2	75.4	84.00	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	82.4	72.3	36.87	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	88.0	76.4	98.75	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	83.2	74.7	36.37	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	87.9	78.5	88.00	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	81.7	75.9	44.00	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	88.8	78.9	92.62	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	80.3	74.8	30.12	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	90.5	80.4	96.25	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	89.1	77.6	96.12	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	83.7	73.6	65.62	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	70.1	63.7	10.37	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	80.0	71.1	41.85	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	88.4	79.0	78.12	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	90.9	87.1	65.87	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	86.8	75.9	79.62	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	87.4	81.7	61.75	-	-	-	-	M
104	H	F	17	7/84	- - -	-	-	-	-	-	87.5	79.9	76.37	-	-	-	-	M
105	H	F	17	7/84	- - -	-	-	-	-	-	82.1	73.6	52.25	-	-	-	-	M
105	H	F	17	7/84	- - -	-	-	-	-	-	87.8	79.9	63.62	-	-	-	-	M
105	H	F	17	7/84	- - -	-	-	-	-	-	81.5	72.9	45.37	-	-	-	-	M
105	H	F	17	7/84	- - -	-	-	-	-	-	85.3	75.7	67.12	-	-	-	-	M
105	H	F	17	7/84	- - -	-	-	-	-	-	81.2	73.2	41.12	-	-	-	-	M
105	H	F	17	7/84	- - -	-	-	-	-	-	84.9	74.3	85.12	-	-	-	-	M
105	H	F	17	7/84	- - -	-	-	-	-	-	77.2	70.1	29.50	-	-	-	-	M
105	H	F	17	7/84	- - -	-	-	-	-	-	79.7	71.8	45.25	-	-	-	-	M
105	H	F	17	7/84	- - -	-	-	-	-	-	87.6	75.2	89.75	-	-	-	-	M
105	H	F	17	7/84	- - -	-	-	-	-	-	77.1	70.1	24.62	-	-	-	-	M

TABLE 106

Helicopter Sound Levels

HELICOPTER OCTAVE BAND LEVELS SITE 21 (Helena National Forest)

July 16, 1981 Time : 124543-124733
(Helicopter Passby)

filter	Leq	Lmx	Lmn
31.5	67.5	72.5	62.5
63	71.4	77.4	60.5
125	64.8	72.5	49.5
250	63.3	76.9	48.5
500	64.0	77.6	48.4
1000	57.3	70.3	43.4
2000	46.9	91.0	38.4
4000	38.2	44.3	34.4
8000	38.5	42.5	38.0
16000	37.7	41.5	37.2
All pass	75.1	81.1	68.6
A-weighted	63.1	76.0	50.5

HELICOPTER OCTAVE BAND LEVELS SITE 21 (Helena National Forest)

July 16, 1981 Time : 161053-161653
(Helicopter hovering at 5100 ft. distance)

filter	Leq	Lmx	Lmn	Lmean	L.01	L.1	L1	L5	L10	L50	L90	L99	S.D.
31.5	59.2	64.6	37.2	58.2	65	63	63	61	61	59	53	40	4.1
63	54.0	60.9	37.5	53.0	61	60	59	57	56	53	49	40	3.4
125	42.0	50.8	25.1	40.3	51	50	48	46	44	41	34	27	4.2
250	31.2	38.7	24.4	30.5	39	37	36	34	33	30	27	25	2.3
500	31.9	40.6	25.3	30.9	41	40	39	38	34	30	28	26	2.5
1000	28.8	37.4	22.4	27.9	38	37	36	33	31	27	25	23	2.4
2000	22.8	27.5	20.1	22.7	28	27	26	24	24	22	21	20	1.0
4000	19.8	28.7	18.3	19.6	29	28	25	21	20	19	18	18	1.2
8000	16.6	25.6	15.4	16.5	27	26	19	17	17	16	16	15	0.8
16000	13.1	16.5	12.3	13.1	17	16	14	13	13	13	12	12	0.4
All pass	62.1	66.4	41.5	61.1	67	66	65	64	63	62	57	43	4.1
A-weighted	33.0	39.8	27.3	32.5	40	39	39	36	35	32	29	27	2.1

(continued)

Table 106 (continued)

HELICOPTER OCTAVE BAND LEVELS SITE 21 (Helena National Forest)

July 16, 1981 Time : 154283-152353
(Helicopter Passby)

filter	Leq	Lmx	Lmn
31.5	71.0	76.0	60.5
63	69.2	75.4	58.4
125	60.0	65.3	52.4
250	64.1	71.0	48.4
500	61.5	69.2	49.8
1000	56.8	65.3	47.4
2000	50.1	57.4	45.4
4000	46.2	49.3	45.4
8000	46.4	46.9	46.2
16000	46.0	46.4	45.3
All pass	74.2	78.5	65.5
A-weighted	60.6	67.8	49.4

HELICOPTER OCTAVE BAND LEVELS SITE 21 (Helena National Forest)

July 16, 1981 Time : 154318-154418
(Helicopter Passby)

filter	Leq	Lmx	Lmn
31.5	70.5	78.2	55.5
63	69.5	79.0	54.5
125	58.3	66.2	43.4
250	56.2	67.2	42.4
500	56.6	65.7	42.2
1000	50.3	57.9	37.4
2000	41.6	48.1	35.3
4000	36.1	37.7	35.1
8000	35.9	37.5	35.4
16000	35.1	37.5	34.4
All pass	73.8	81.4	61.0
A-weighted	54.6	63.5	41.4

(continued)

Table 106 (continued)

HELICOPTER OCTAVE BAND LEVELS SITE 21 (Helena National Forest)

July 16, 1981 Time : 154850-155005
(Helicopter passby with load)

filter	Leq	Lmx	Lmn
31.5	83.5	91.5	66.5
63	81.9	88.9	69.3
125	70.9	77.9	61.5
250	68.6	75.7	55.4
500	67.9	76.0	56.1
1000	62.9	70.2	52.4
2000	55.3	65.4	46.4
4000	46.4	49.3	45.4
8000	45.9	48.3	45.2
16000	45.0	47.7	44.4
All pass	86.8	93.9	75.6
A-weighted	66.7	74.0	55.4

HELICOPTER OCTAVE BAND LEVELS SITE 21 (Helena National Forest)

July 16, 1981 Time : 163114-163204
(Helicopter Passby)

filter	Leq	Lmx	Lmn
31.5	73.1	84.4	49.5
63	70.9	79.6	48.4
125	67.5	77.1	41.0
250	69.5	80.8	41.1
500	69.7	82.5	40.1
1000	61.8	72.9	38.0
2000	55.2	65.6	34.4
4000	47.1	59.4	35.1
8000	37.6	45.9	35.4
16000	35.4	37.7	33.4
All pass	77.8	86.7	63.5
A-weighted	67.4	79.3	41.2

APPENDIX E

PROPAGATION FACTORS

The propagation factors listed below were obtained from meteorological data supplied by the Polebridge Ranger Station, Montana. These data were entered into a computer program to determine atmospheric attenuation factors, by octave band, for each day for which data was available. The results were transcribed by hand onto computer diskettes. The transcription process was reviewed and errors were corrected.

The following key is used in the index to identify the tables in this Appendix:

Source	P	Polebridge Ranger Station
Area	G	Glacier National Park
Met	T	Temperature
	H	Humidity
	W	Wind

INDEX TO PROPAGATION FACTOR TABLES

Table No.	Sound Source	Area	Site	Date	Sound Levels	Met
106	-	G	P	6/3-28/78	Propagation Factors	T,H
107	-	G	P	6/29/78-7/24/78	Propagation Factors	T,H
108	-	G	P	7/25/78-8/19/78	Propagation Factors	T,H
109	-	G	P	8/20/78-6/25/79	Propagation Factors	T,H
110	-	G	P	6/26/79-7/21/79	Propagation Factors	T,H
111	-	G	P	7/22/79-8/16/79	Propagation Factors	T,H
112	-	G	P	8/17/79-5/29-80	Propagation Factors	T,H
113	-	G	P	5/30/80-6/24/80	Propagation Factors	T,H
114	-	G	P	6/25/80-7/20/80	Propagation Factors	T,H
115	-	G	P	7/21/80-8/15/80	Propagation Factors	T,H
116	-	G	P	8/16/80-8/31/80	Propagation Factors	T,H

TABLE	NOISE	AREA	SITE	DATE	HOURS	ATMOSPHERIC ATTENUATION COEFFICIENTS (DB/1000FT) 16	31.5	63	125	250	500	STD DEV	MET T (F)	H (%)	W (V)	EQUIP
106	-	F	P	6/ 1 /78	- - -	0.003	0.011	0.038	0.132	0.418	1.006	-	77	41.9	-	-
106	-	F	P	6/ 2 /78	- - -	0.002	0.009	0.036	0.131	0.426	1.042	-	79	40.2	-	-
106	-	F	P	6/ 3 /78	- - -	-0.001	0.005	0.032	0.143	0.481	1.105	-	83	32.0	-	-
106	-	F	P	6/ 4 /78	- - -	0.005	0.013	0.038	0.116	0.360	0.936	-	75	56.9	-	-
106	-	F	P	6/ 5 /78	- - -	0.004	0.012	0.040	0.135	0.414	0.956	-	74	43.0	-	-
106	-	F	P	6/ 6 /78	- - -	-0.001	0.001	0.015	0.074	0.292	0.883	-	75	79.1	-	-
106	-	F	P	6/ 7 /78	- - -	0.005	0.015	0.043	0.133	0.371	0.748	-	62	53.2	-	-
106	-	F	P	6/ 8 /78	- - -	0.007	0.017	0.044	0.119	0.314	0.669	-	54	77.5	-	-
106	-	F	P	6/ 9 /78	- - -	0.000	0.003	0.020	0.088	0.304	0.753	-	60	89.5	-	-
106	-	F	P	6/10 /78	- - -	0.004	0.011	0.036	0.114	0.347	0.829	-	67	64.3	-	-
106	-	F	P	6/11 /78	- - -	0.000	0.004	0.021	0.090	0.299	0.700	-	55	100.0	-	-
106	-	F	P	6/12 /78	- - -	0.005	0.013	0.039	0.120	0.349	0.785	-	64	62.9	-	-
106	-	F	P	6/13 /78	- - -	0.008	0.018	0.046	0.122	0.308	0.611	-	49	81.4	-	-
106	-	F	P	6/14 /78	- - -	0.005	0.013	0.037	0.110	0.315	0.724	-	58	78.9	-	-
106	-	F	P	6/15 /78	- - -	0.005	0.013	0.038	0.112	0.312	0.676	-	54	83.0	-	-
106	-	F	P	6/16 /78	- - -	0.004	0.011	0.033	0.105	0.314	0.751	-	60	79.5	-	-
106	-	F	P	6/17 /78	- - -	0.006	0.017	0.050*	0.153	0.405	0.755	-	61	36.0	-	-
106	-	F	P	6/18 /78	- - -	0.004	0.013	0.042	0.137	0.408	0.906	-	71	44.2	-	-
106	-	F	P	6/19 /78	- - -	0.001	0.008	0.036	0.138	0.446	1.023	-	78	36.6	-	-
106	-	F	P	6/20 /78	- - -	0.012	0.027	0.070	0.191	0.463	0.794	-	71	24.9	-	-
106	-	F	P	6/21 /78	- - -	0.003	0.010	0.032	0.105	0.328	0.807	-	65	72.0	-	-
106	-	F	P	6/22 /78	- - -	0.002	0.010	0.039	0.143	0.441	0.951	-	74	36.7	-	-
106	-	F	P	6/23 /78	- - -	0.006	0.014	0.040	0.120	0.340	0.744	-	61	65.7	-	-
106	-	F	P	6/24 /78	- - -	0.005	0.014	0.043	0.137	0.400	0.870	-	69	46.4	-	-
106	-	F	P	6/25 /78	- - -	0.004	0.012	0.040	0.137	0.416	0.940	-	73	42.3	-	-
106	-	F	P	6/26 /78	- - -	0.000	0.006	0.038	0.157	0.502	1.058	-	82	28.7	-	-

TABLE	NOISE	AREA	SITE	DATE	HOURS	ATMOSPHERIC ATTENUATION COEFFICIENTS (DB/1000FT) 16	31.5	63	125	250	500	STD DEV	MET T (F)	H (%)	W (V)	EQUIP
107	-	F	P	6/29 /78	- - -	DRY BULB	TEMP. IS LESS THAN	WET BULB	TEMP.			-				
107	-	F	P	6/30 /78	- - -	-0.001	0.002	0.180	0.083	0.298	0.775	-	62	89.8	-	-
107	-	F	P	7/ 1 /78	- - -	-0.001	0.002	0.018	0.083	0.298	0.775	-	62	89.8	-	-
107	-	F	P	7/ 2 /78	- - -	0.006	0.014	0.042	0.129	0.387	0.942	-	74	49.6	-	-
107	-	F	P	7/ 3 /78	- - -	0.004	0.011	0.035	0.112	0.339	0.804	-	65	67.6	-	-
107	-	F	P	7/ 4 /78	- - -	0.004	0.011	0.033	0.108	0.329	0.794	-	64	71.6	-	-
107	-	F	P	7/ 5 /78	- - -	DRY BULB	TEMP. IS LESS THAN	WET BULB	TEMP.			-	0		-	-
107	-	F	P	7/ 6 /78	- - -	0.004	0.011	0.036	0.114	0.347	0.829	-	67	64.3	-	-
107	-	F	P	7/ 7 /78	- - -	-0.001	0.001	0.014	0.070	0.275	0.808	-	65	95.1	-	-
107	-	F	P	7/ 8 /78	- - -	-0.001	0.003	0.019	0.086	0.301	0.764	-	61	89.7	-	-
107	-	F	P	7/ 9 /78	- - -	0.000	0.002	0.015	0.071	0.275	0.833	-	68	90.6	-	-
107	-	F	P	7/10 /78	- - -	0.006	0.015	0.042	0.129	0.376	0.859	-	69	53.7	-	-
107	-	F	P	7/11 /78	- - -	0.004	0.014	0.045	0.149	0.421	0.822	-	66	36.8	-	-
107	-	F	P	7/12 /78	- - -	0.005	0.014	0.043	0.135	0.389	0.849	-	68	49.3	-	-
107	-	F	P	7/13 /78	- - -	0.003	0.010	0.036	0.134	0.421	0.991	-	76	41.2	-	-
107	-	F	P	7/14 /78	- - -	0.001	0.008	0.035	0.135	0.443	1.042	-	79	37.3	-	-
107	-	F	P	7/15 /78	- - -	DRY BULB	TEMP. IS LESS THAN	WET BULB	TEMP.			-	0		-	-
107	-	F	P	7/16 /78	- - -	0.005	0.014	0.039	0.119	0.363	0.926	-	74	56.4	-	-
107	-	F	P	7/17 /78	- - -	0.004	0.011	0.035	0.112	0.339	0.804	-	65	67.6	-	-
107	-	F	P	7/18 /78	- - -	0.001	0.006	0.025	0.097	0.307	0.681	-	54	94.2	-	-
107	-	F	P	7/19 /78	- - -	0.005	0.014	0.044	0.138	0.382	0.739	-	61	48.2	-	-
107	-	F	P	7/20 /78	- - -	0.003	0.012	0.042	0.147	0.432	0.884	-	78	36.7	-	-
107	-	F	P	7/21 /78	- - -	0.000	0.004	0.021	0.087	0.317	0.902	-	75	71.4	-	-
107	-	F	P	7/22 /78	- - -	0.003	0.009	0.030	0.105	0.340	0.878	-	71	66.1	-	-
107	-	F	P	7/23 /78	- - -	0.028	0.056	0.119	0.258	0.542	1.017	-	78	15.4	-	-
107	-	F	P	7/24 /78	- - -	0.005	0.052	0.118	0.275	0.616	1.141	-	87	12.6	-	-

TABLE	NOISE	AREA	SITE	DATE	HOURS	ATMOSPHERIC ATTENUATION COEFFICIENTS (DB/1000FT) 16	31.5	63	125	250	500	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
108	-	F	P	7/20 /78	- - -	0.000	0.007	0.039	0.163	0.516	1.063	-	83	27.0	-	-
108	-	F	P	7/21 /78	- - -	0.002	0.008	0.033	0.127	0.429	1.094	-	82	39.3	-	-
108	-	F	P	7/22 /78	- - -	0.005	0.013	0.038	0.117	0.359	0.896	-	72	59.0	-	-
108	-	F	P	7/23 /78	- - -	0.001	0.008	0.036	0.138	0.446	1.023	-	78	36.6	-	-
108	-	F	P	7/24 /78	- - -	0.003	0.011	0.038	0.132	0.418	1.006	-	77	41.9	-	-
108	-	F	P	7/25 /78	- - -	0.002	0.009	0.036	0.131	0.426	1.042	-	79	40.2	-	-
108	-	F	P	7/26 /78	- - -	DRY BULB TEMP. IS LESS THAN WET BULB TEMP.						-			-	-
108	-	F	P	8/ 1 /78	- - -	0.006	0.014	0.041	0.122	0.375	0.977	-	77	51.3	-	-
108	-	F	P	8/ 2 /78	- - -	0.006	0.015	0.043	0.131	0.378	0.844	-	68	53.1	-	-
108	-	F	P	8/ 3 /78	- - -	0.005	0.016	0.054	0.178	0.492	0.903	-	76	26.6	-	-
108	-	F	P	8/ 4 /78	- - -	0.003	0.009	0.035	0.126	0.416	1.071	-	81	41.4	-	-
108	-	F	P	8/ 5 /78	- - -	0.001	0.006	0.030	0.123	0.431	1.146	-	85	30.4	-	-
108	-	F	P	8/ 6 /78	- - -	0.001	0.008	0.035	0.135	0.443	1.042	-	79	37.3	-	-
108	-	F	P	8/ 7 /78	- - -	0.004	0.011	0.037	0.125	0.404	1.048	-	80	43.7	-	-
108	-	F	P	8/ 8 /78	- - -	0.000	0.006	0.032	0.132	0.448	1.097	-	82	36.6	-	-
108	-	F	P	8/ 9 /78	- - -	-0.001	0.003	0.031	0.143	0.490	1.142	-	85	30.9	-	-
108	-	F	P	8/10 /78	- - -	0.001	0.008	0.041 *	0.163	0.505	1.027	-	81	28.0	-	-
108	-	F	P	8/11 /78	- - -	0.004	0.012	0.040	0.131	0.407	0.906	-	76	44.3	-	-
108	-	F	P	8/12 /78	- - -	0.002	0.007	0.027	0.096	0.316	0.820	-	66	76.7	-	-
108	-	F	P	8/13 /78	- - -	0.005	0.012	0.035	0.109	0.322	0.759	-	61	75.0	-	-
108	-	F	P	8/14 /78	- - -	0.005	0.014	0.043	0.135	0.381	0.798	-	65	51.1	-	-
108	-	F	P	8/15 /78	- - -	0.000	0.004	0.022	0.093	0.309	0.729	-	58	89.2	-	-
108	-	F	P	8/16 /78	- - -	0.006	0.015	0.043	0.131	0.359	0.716	-	60	56.2	-	-
108	-	F	P	8/17 /78	- - -	0.003	0.009	0.031	0.108	0.316	0.640	-	51	87.9	-	-
108	-	F	P	8/18 /78	- - -	0.006	0.014	0.039	0.117	0.331	0.738	-	60	69.9	-	-
108	-	F	P	8/19 /78	- - -	0.000	0.015	0.041	0.119	0.330	0.722	-	59	69.4	-	-

ATMOSPHERIC ATTENUATION COEFFICIENTS (DB/1000FT)

TABLE	NOISE	AREA	SITE	DATE	HOURS	16	31.5	63	125	250	500	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
109	-	F	P	8/20 /78	- - -	0.003	0.010	0.033	0.110	0.315	0.627	-	50	87.7	-	-
109	-	F	P	8/21 /78	- - -	0.005	0.013	0.039	0.118	0.340	0.760	-	62	66.2	-	-
109	-	F	P	8/22 /78	- - -	0.005	0.013	0.037	0.110	0.315	0.724	-	58	70.9	-	-
109	-	F	P	8/23 /78	- - -	0.006	0.015	0.042	0.129	0.360	0.748	-	62	57.4	-	-
109	-	F	P	8/24 /78	- - -	0.006	0.016	0.043	0.125	0.338	0.696	-	58	64.1	-	-
109	-	F	P	8/25 /78	- - -	0.006	0.014	0.039	0.117	0.331	0.730	-	60	69.9	-	-
109	-	F	P	8/26 /78	- - -	0.005	0.014	0.043	0.136	0.391	0.833	-	67	48.6	-	-
109	-	F	P	8/27 /78	- - -	0.005	0.014	0.040	0.124	0.365	0.857	-	69	57.5	-	-
109	-	F	P	8/28 /78	- - -	0.005	0.014	0.041	0.125	0.367	0.842	-	68	56.9	-	-
109	-	F	P	8/29 /78	- - -	0.005	0.014	0.043	0.134	0.396	0.900	-	71	47.7	-	-
109	-	F	P	8/30 /78	- - -	0.006	0.015	0.042	0.129	0.376	0.859	-	69	53.7	-	-
109	-	F	P	8/31 /78	- - -	0.000	0.004	0.022	0.093	0.309	0.729	-	58	89.8	-	-
109	-	F	P	9/ 1 /78	- - -	0.005	0.014	0.040	0.122	0.350	0.769	-	63	62.3	-	-
109	-	F	P	9/ 2 /78	- - -	0.003	0.011	0.038	0.132	0.418	1.006	-	77	41.9	-	-
109	-	F	P	9/ 3 /78	- - -	0.003	0.010	0.032	0.107	0.342	0.867	-	70	65.7	-	-
109	-	F	P	9/ 4 /78	- - -	0.000	0.006	0.036	0.146	0.474	1.045	-	80	32.5	-	-
109	-	F	P	8/16 /79	- - -	0.004	0.013	0.045	0.152	0.430	0.844	-	68	35.0	-	-
109	-	F	P	8/17 /79	- - -	0.005	0.013	0.043	0.138	0.401	0.855	-	68	45.6	-	-
109	-	F	P	8/18 /79	- - -	0.005	0.014	0.043	0.139	0.393	0.789	-	64	46.5	-	-
109	-	F	P	8/19 /79	- - -	0.004	0.010	0.033	0.105	0.311	0.716	-	57	83.8	-	-
109	-	F	P	8/20 /79	- - -	0.005	0.014	0.044	0.135	0.370	0.717	-	60	51.8	-	-
109	-	F	P	8/21 /79	- - -	0.004	0.012	0.042	0.144	0.422	0.874	-	69	39.3	-	-
109	-	F	P	8/22 /79	- - -	0.004	0.012	0.043	0.146	0.423	0.856	-	68	38.5	-	-
109	-	F	P	8/23 /79	- - -	0.003	0.012	0.041	0.142	0.422	0.891	-	70	40.1	-	-
109	-	F	P	8/24 /79	- - -	0.003	0.011	0.043	0.156	0.466	0.938	-	75	31.4	-	-
109	-	F	P	8/25 /79	- - -	0.002	0.010	0.039	0.143	0.441	0.951	-	74	36.7	-	-

TABLE	NOISE	AREA	SITE	DATE	HOURS	ATMOSPHERIC ATTENUATION COEFFICIENTS (DB/1000FT) 16	31.5	63	125	250	500	STD DEV	MET T (F)	H (%)	W (V)	EQUIP
110	-	F	P	6/26 /79	- - -	0.001	0.009	0.043	0.170	0.519	1.032	-	82	26.2	-	-
110	-	F	P	6/27 /79	- - -	0.006	0.015	0.042	0.127	0.383	0.954	-	75	50.2	-	-
110	-	F	P	6/28 /79	- - -	0.001	0.008	0.035	0.135	0.443	1.042	-	79	37.3	-	-
110	-	F	P	6/29 /79	- - -	0.000	0.004	0.030	0.135	0.471	1.152	-	85	33.3	-	-
110	-	F	P	6/30 /79	- - -	0.006	0.014	0.042	0.129	0.369	0.811	-	66	55.7	-	-
110	-	F	P	7/ 1 /79	- - -	0.002	0.007	0.028	0.104	0.315	0.626	-	53	88.3	-	-
110	-	F	P	7/ 2 /79	- - -	0.007	0.016	0.044	0.126	0.337	0.600	-	57	63.6	-	-
110	-	F	P	7/ 3 /79	- - -	0.004	0.012	0.042	0.144	0.422	0.874	-	69	39.3	-	-
110	-	F	P	7/ 4 /79	- - -	0.006	0.014	0.039	0.116	0.365	0.996	-	79	52.3	-	-
110	-	F	P	7/ 5 /79	- - -	0.004	0.011	0.037	0.127	0.409	1.035	-	79	43.1	-	-
110	-	F	P	7/ 6 /79	- - -	0.002	0.009	0.035	0.128	0.421	1.057	-	80	40.8	-	-
110	-	F	P	7/ 7 /79	- - -	0.006	0.014	0.042	0.129	0.387	0.942	-	74	49.6	-	-
110	-	F	P	7/ 8 /79	- - -	0.003	0.009	0.030	0.102	0.338	0.919	-	75	64.0	-	-
110	-	F	P	7/ 9 /79	- - -	0.001	0.004	0.022	0.090	0.320	0.896	-	74	71.1	-	-
110	-	F	P	7/10 /79	- - -	0.000	0.003	0.018	0.083	0.308	0.888	-	74	74.9	-	-
110	-	F	P	7/11 /79	- - -	-0.001	0.002	0.018	0.083	0.298	0.775	-	62	89.8	-	-
110	-	F	P	7/12 /79	- - -	0.005	0.014	0.043	0.135	0.381	0.798	-	65	51.1	-	-
110	-	F	P	7/13 /79	- - -	0.004	0.012	0.043	0.146	0.423	0.856	-	68	38.5	-	-
110	-	F	P	7/14 /79	- - -	0.000	0.003	0.020	0.085	0.311	0.883	-	73	74.7	-	-
110	-	F	P	7/15 /79	- - -	0.006	0.015	0.041	0.124	0.375	0.933	-	74	53.0	-	-
110	-	F	P	7/16 /79	- - -	0.006	0.014	0.041	0.123	0.369	0.901	-	72	55.4	-	-
110	-	F	P	7/17 /79	- - -	0.005	0.013	0.039	0.124	0.393	1.024	-	79	46.1	-	-
110	-	F	P	7/18 /79	- - -	-0.002	0.002	0.027	0.130	0.474	1.213	-	88	32.8	-	-
110	-	F	P	7/19 /79	- - -	-0.004	-0.001	0.026	0.146	0.536	1.257	-	92	24.4	-	-
110	-	F	P	7/20 /79	- - -	-0.002	0.002	0.029	0.141	0.498	1.181	-	87	29.8	-	-
110	-	F	P	7/21 /79	- - -	0.005	0.013	0.038	0.121	0.388	1.035	-	80	46.7	-	-

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TABLE	NOISE	AREA	SITE	DATE	HOURS	16	31.5	63	125	250	500	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
						ATMOSPHERIC ATTENUATION COEFFICIENTS (DB/1000FT)										
111	-	F	P	7/22 /79	- - -	-0.001	0.001	0.014	0.071	0.282	0.897	-	83	73.7	-	-
111	-	F	P	7/23 /79	- - -	0.004	0.011	0.033	0.105	0.342	0.967	-	79	58.8	-	-
111	-	F	P	7/24 /79	- - -	0.001	0.006	0.025	0.095	0.322	0.852	-	69	73.4	-	-
111	-	F	P	7/25 /79	- - -	0.004	0.011	0.033	0.108	0.329	0.794	-	64	71.6	-	-
111	-	F	P	7/26 /79	- - -	0.001	0.008	0.038	0.149	0.464	0.989	-	77	33.8	-	-
111	-	F	P	7/27 /79	- - -	0.002	0.008	0.033	0.127	0.429	1.094	-	82	39.3	-	-
111	-	F	P	7/28 /79	- - -	0.000	0.004	0.020	0.082	0.294	0.818	-	66	85.7	-	-
111	-	F	P	7/29 /79	- - -	-0.001	0.002	0.016	0.075	0.288	0.865	-	72	82.5	-	-
111	-	F	P	7/30 /79	- - -	0.004	0.010	0.031	0.099	0.331	0.975	-	81	59.6	-	-
111	-	F	P	7/31 /79	- - -	0.001	0.003	0.014	0.056	0.234	0.858	-	78	91.6	-	-
111	-	F	P	8/ 1 /79	- - -	0.000	0.004	0.018	0.076	0.208	0.923	-	85	67.6	-	-
111	-	F	P	8/ 2 /79	- - -	0.001	0.008	0.035	0.135	0.443	1.042	-	79	37.3	-	-
111	-	F	P	8/ 3 /79	- - -	0.002	0.009	0.036	0.131	0.426	1.042	-	79	40.2	-	-
111	-	F	P	8/ 4 /79	- - -	0.006	0.015	0.041	0.124	0.379	0.966	-	76	50.7	-	-
111	-	F	P	8/ 5 /79	- - -	0.005	0.012	0.036	0.112	0.369	1.059	-	83	48.3	-	-
111	-	F	P	8/ 6 /79	- - -	0.001	0.009	0.042	0.161	0.492	0.995	-	79	29.0	-	-
111	-	F	P	8/ 7 /79	- - -	0.000	0.006	0.036*	0.146	0.474	1.045	-	80	32.5	-	-
111	-	F	P	8/ 8 /79	- - -	0.007	0.020	0.063	0.203	0.560	1.048	-	84	20.7	-	-
111	-	F	P	8/ 9 /79	- - -	0.006	0.018	0.059	0.191	0.522	0.943	-	79	23.8	-	-
111	-	F	P	8/10 /79	- - -	-0.001	0.005	0.036	0.157	0.512	1.094	-	84	27.7	-	-
111	-	F	P	8/11 /79	- - -	0.001	0.007	0.035	0.142	0.459	1.035	-	79	34.5	-	-
111	-	F	P	8/12 /79	- - -	0.002	0.009	0.039	0.147	0.453	0.959	-	75	34.4	-	-
111	-	F	P	8/13 /79	- - -	0.002	0.009	0.037	0.138	0.436	0.990	-	76	30.1	-	-
111	-	F	P	8/14 /79	- - -	0.005	0.014	0.040	0.122	0.350	0.769	-	63	62.3	-	-
111	-	F	P	8/15 /79	- - -	0.014	0.032	0.078	0.203	0.477	0.808	-	72	22.9	-	-
111	-	F	P	8/16 /79	- - -	0.005	0.015	0.054	0.182	0.508	0.935	-	78	25.6	-	-

TABLE	NOISE	AREA	SITE	DATE	HOURS	ATMOSPHERIC ATTENUATION COEFFICIENTS (DB/1000FT) 16	31.5	63	125	250	500	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
112	-	F	P	8/17 /79	- - -	0.001	0.008	0.039	0.156	0.490	1.025	-	80	29.8	-	-
112	-	F	P	8/18 /79	- - -	0.001	0.007	0.035	0.142	0.459	1.035	-	79	34.5	-	-
112	-	F	P	8/19 /79	- - -	0.005	0.013	0.038	0.116	0.340	0.775	-	63	66.7	-	-
112	-	F	P	8/20 /79	- - -	0.006	0.014	0.042	0.127	0.374	0.874	-	70	54.3	-	-
112	-	F	P	8/21 /79	- - -	0.005	0.014	0.041	0.130	0.396	0.964	-	75	46.9	-	-
112	-	F	P	8/22 /79	- - -	0.005	0.014	0.041	0.128	0.393	0.977	-	76	47.5	-	-
112	-	F	P	8/23 /79	- - -	0.002	0.009	0.038	0.141	0.439	0.971	-	75	37.4	-	-
112	-	F	P	8/24 /79	- - -	0.005	0.012	0.036	0.113	0.330	0.767	-	62	70.8	-	-
112	-	F	P	8/25 /79	- - -	0.003	0.009	0.030	0.101	0.319	0.797	-	64	76.1	-	-
112	-	F	P	8/26 /79	- - -	0.005	0.014	0.043	0.134	0.396	0.990	-	71	47.7	-	-
112	-	F	P	8/27 /79	- - -	0.005	0.014	0.043	0.134	0.398	0.885	-	70	47.0	-	-
112	-	F	P	8/28 /79	- - -	0.002	0.009	0.038	0.141	0.439	0.971	-	75	37.4	-	-
112	-	F	P	8/29 /79	- - -	0.003	0.010	0.038	0.136	0.425	0.974	-	75	40.5	-	-
112	-	F	P	8/30 /79	- - -	0.001	0.008	0.035	0.135	0.443	1.042	-	79	37.3	-	-
112	-	F	P	8/31 /79	- - -	0.000	0.004	0.022	0.093	0.309	0.729	-	58	89.2	-	-
112	-	F	P	9/ 1 /79	- - -	0.006	0.015	0.043	0.131	0.378	0.844	-	68	53.1	-	-
112	-	F	P	9/ 2 /79	- - -	0.003	0.012	0.041	0.140	0.420	0.908	-	71	40.9	-	-
112	-	F	P	9/ 3 /79	- - -	0.002	0.008	0.028	0.097	0.308	0.753	-	60	84.5	-	-
112	-	F	P	9/ 4 /79	- - -	0.006	0.015	0.044	0.132	0.357	0.685	-	58	54.8	-	-
112	-	F	P	9/ 5 /79	- - -	0.006	0.015	0.042	0.125	0.349	0.737	-	61	61.2	-	-
112	-	F	P	5/24 /80	- - -	0.010	0.022	0.052	0.130	0.308	0.586	-	49	69.6	-	-
112	-	F	P	5/25 /80	- - -	0.008	0.017	0.045	0.120	0.309	0.623	-	50	81.7	-	-
112	-	F	P	5/26 /80	- - -	0.005	0.013	0.039	0.117	0.310	0.579	-	46	86.8	-	-
112	-	F	P	5/27 /80	- - -	0.009	0.020	0.049	0.126	0.315	0.628	-	52	71.2	-	-
112	-	F	P	5/28 /80	- - -	0.006	0.015	0.044	0.133	0.354	0.656	-	56	53.3	-	-
112	-	F	P	5/29 /80	- - -	0.003	0.009	0.031	0.108	0.316	0.640	-	51	87.9	-	-

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TABLE	NOISE	AREA	SITE	DATE	HOURS	ATMOSPHERIC ATTENUATION COEFFICIENTS (DB/1000FT) 16	31.5	63	125	250	500	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
113	-	F	P	5/30 /80	- - -	0.007	0.016	0.043	0.118	0.310	0.637	-	51	82.1	-	-
113	-	F	P	5/31 /80	- - -	0.005	0.014	0.040	0.122	0.350	0.769	-	63	68.3	-	-
113	-	F	P	6/ 1 /80	- - -	0.008	0.018	0.046	0.125	0.326	0.660	-	55	67.4	-	-
113	-	F	P	6/ 2 /80	- - -	0.008	0.018	0.045	0.121	0.294	0.526	-	41	85.4	-	-
113	-	F	P	6/ 3 /80	- - -	0.007	0.016	0.043	0.120	0.302	0.546	-	43	86.0	-	-
113	-	F	P	6/ 4 /80	- - -	0.006	0.015	0.044	0.130	0.353	0.643	-	55	52.5	-	-
113	-	F	P	6/ 5 /80	- - -	0.004	0.010	0.034	0.112	0.314	0.615	-	49	87.5	-	-
113	-	F	P	6/ 6 /80	- - -	0.005	0.014	0.044	0.137	0.365	0.650	-	55	47.7	-	-
113	-	F	P	6/ 7 /80	- - -	0.005	0.015	0.046	0.145	0.390	0.719	-	58	41.4	-	-
113	-	F	P	6/ 8 /80	- - -	0.003	0.012	0.046	0.164	0.479	0.936	-	76	29.4	-	-
113	-	F	P	6/ 9 /80	- - -	0.003	0.010	0.039	0.138	0.427	0.957	-	74	39.8	-	-
113	-	F	P	6/10 /80	- - -	NO DATA WAS RECORDED BY THE NATIONAL PARK SERVICE										
113	-	F	P	6/11 /80	- - -	0.006	0.015	0.042	0.127	0.349	0.720	-	60	60.6	-	-
113	-	F	P	6/12 /80	- - -	0.003	0.012	0.041	0.142	0.422	0.891	-	70	40.1	-	-
113	-	F	P	6/13 /80	- - -	DRY BULB TEMP. LESS THAN WET BULB TEMP.										
113	-	F	P	6/14 /80	- - -	0.006	0.015	0.043	0.131	0.370	0.779	-	64	54.5	-	-
113	-	F	P	6/15 /80	- - -	0.006	0.015	0.048	0.132	0.386	0.879	-	70	50.6	-	-
113	-	F	P	6/16 /80	- - -	0.005	0.013	0.039	0.122	0.363	0.871	-	70	58.0	-	-
113	-	F	P	6/17 /80	- - -	0.006	0.015	0.043	0.132	0.386	0.879	-	70	50.6	-	-
113	-	F	P	6/18 /80	- - -	0.003	0.011	0.043	0.156	0.466	0.938	-	70	31.4	-	-
113	-	F	P	6/19 /80	- - -	0.005	0.014	0.043	0.134	0.396	0.900	-	71	47.7	-	-
113	-	F	P	6/20 /80	- - -	0.004	0.013	0.042	0.137	0.408	0.906	-	71	44.2	-	-
113	-	F	P	6/21 /80	- - -	0.003	0.011	0.043	0.156	0.466	0.938	-	75	31.4	-	-
113	-	F	P	6/22 /80	- - -	0.005	0.013	0.037	0.111	0.322	0.745	-	60	74.7	-	-
113	-	F	P	6/23 /80	- - -	0.005	0.015	0.043	0.133	0.371	0.740	-	62	53.2	-	-
113	-	F	P	6/24 /80	- - -	0.005	0.014	0.045	0.147	0.412	0.797	-	64	38.7	-	-

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TABLE	NOISE	AREA	SITE	DATE	HOURS	ATMOSPHERIC ATTENUATION COEFFICIENTS (DB/1000FT) 16	31.5	63	125	250	500	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
114	-	F	P	6/25 /80	- - -	0.006	0.015	0.043	0.132	0.371	0.763	-	63	53.8	-	-
114	-	F	P	6/26 /80	- - -	0.003	0.009	0.031	0.102	0.311	0.728	-	58	84.0	-	-
114	-	F	P	6/27 /80	- - -	0.008	0.018	0.046	0.124	0.318	0.658	-	54	72.1	-	-
114	-	F	P	6/28 /80	- - -	0.006	0.015	0.043	0.130	0.359	0.732	-	61	56.8	-	-
114	-	F	P	6/29 /80	- - -	0.004	0.012	0.042	0.140	0.412	0.874	-	69	42.8	-	-
114	-	F	P	6/30 /80	- - -	0.006	0.017	0.051	0.161	0.435	0.819	-	68	31.7	-	-
114	-	F	P	7/ 1 /80	- - -	0.003	0.011	0.043	0.156	0.466	0.938	-	75	31.4	-	-
114	-	F	P	7/ 2 /80	- - -	0.006	0.018	0.059	0.191	0.522	0.943	-	79	23.8	-	-
114	-	F	P	7/ 3 /80	- - -	0.006	0.017	0.054	0.174	0.476	0.876	-	74	27.7	-	-
114	-	F	P	7/ 4 /80	- - -	0.005	0.014	0.044	0.137	0.382	0.767	-	63	49.7	-	-
114	-	F	P	7/ 5 /80	- - -	0.005	0.014	0.044	0.136	0.382	0.782	-	64	50.4	-	-
114	-	F	P	7/ 6 /80	- - -	0.006	0.017	0.052	0.165	0.447	0.836	-	70	30.2	-	-
114	-	F	P	7/ 7 /80	- - -	0.001	0.009	0.038	0.149	0.464	0.989	-	77	33.0	-	-
114	-	F	P	7/ 8 /80	- - -	0.000	0.005	0.034	0.147	0.485	1.000	-	82	31.3	-	-
114	-	F	P	7/ 9 /80	- - -	0.002	0.009	0.036	0.131	0.426	1.042	-	79	40.2	-	-
114	-	F	P	7/10 /80	- - -	0.005	0.013	0.037	0.111	0.322	0.745	-	60	74.7	-	-
114	-	F	P	7/11 /80	- - -	0.005	0.015	0.047	0.152	0.419	0.885	-	65	35.9	-	-
114	-	F	P	7/12 /80	- - -	0.006	0.015	0.042	0.123	0.339	0.712	-	59	64.7	-	-
114	-	F	P	7/13 /80	- - -	0.001	0.006	0.025	0.097	0.307	0.681	-	54	94.2	-	-
114	-	F	P	7/14 /80	- - -	0.001	0.006	0.026	0.100	0.309	0.688	-	53	94.1	-	-
114	-	F	P	7/15 /80	- - -	0.003	0.009	0.030	0.101	0.319	0.797	-	64	76.1	-	-
114	-	F	P	7/16 /80	- - -	0.005	0.014	0.043	0.135	0.389	0.849	-	68	49.3	-	-
114	-	F	P	7/17 /80	- - -	0.005	0.014	0.043	0.135	0.398	0.885	-	70	47.0	-	-
114	-	F	P	7/18 /80	- - -	0.003	0.012	0.041	0.140	0.420	0.908	-	71	48.9	-	-
114	-	F	P	7/19 /80	- - -	0.005	0.013	0.039	0.118	0.340	0.760	-	62	66.2	-	-
114	-	F	P	7/20 /80	- - -	0.000	0.003	0.020	0.088	0.304	0.753	-	60	89.5	-	-

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ATMOSPHERIC ATTENUATION COEFFICIENTS (DB/1000FT)

TABLE	NOISE	AREA	SITE	DATE	HOURS	16	31.5	63	125	250	500	STD DEV	MET T (F)	MET H (%)	MET W (V)	EQUIP
115	-	F	P	7/21 /80	- - -	0.004	0.012	0.040	0.135	0.414	0.956	-	74	43.0	-	-
115	-	F	P	7/22 /80	- - -	0.002	0.008	0.033	0.144	0.423	1.108	-	83	39.9	-	-
115	-	F	P	7/23 /80	- - -	0.000	0.005	0.034	0.147	0.485	1.080	-	82	31.3	-	-
115	-	F	P	7/24 /80	- - -	0.002	0.009	0.037	0.136	0.433	1.008	-	77	38.8	-	-
115	-	F	P	7/25 /80	- - -	0.000	0.005	0.034	0.147	0.405	1.000	-	82	31.3	-	-
115	-	F	P	7/26 /80	- - -	0.000	0.006	0.036	0.152	0.408	1.053	-	81	30.6	-	-
115	-	F	P	7/27 /80	- - -	0.001	0.008	0.034	0.133	0.439	1.061	-	80	38.0	-	-
115	-	F	P	7/28 /80	- - -	-0.001	0.005	0.035	0.152	0.499	1.007	-	83	29.5	-	-
115	-	F	P	7/29 /80	- - -	0.020	0.043	0.100	0.246	0.571	1.089	-	82	16.7	-	-
115	-	F	P	7/30 /80	- - -	0.008	0.022	0.066	0.199	0.521	0.918	-	78	22.9	-	-
115	-	F	P	7/31 /80	- - -	0.006	0.017	0.058	0.193	0.535	0.903	-	81	23.0	-	-
115	-	F	P	8/ 1 /80	- - -	0.004	0.012	0.040	0.131	0.407	0.906	-	76	44.3	-	-
115	-	F	P	8/ 2 /80	- - -	0.004	0.012	0.040	0.137	0.416	0.940	-	73	42.3	-	-
115	-	F	P	8/ 3 /80	- - -	0.005	0.013	0.038	0.115	0.331	0.753	-	61	70.3	-	-
115	-	F	P	8/ 4 /80	- - -	0.004	0.012	0.044	0.149	0.432	0.864	-	69	35.9	-	-
115	-	F	P	8/ 5 /80	- - -	0.004	0.012	0.043	0.146	0.483	0.856	-	68	38.5	-	-
115	-	F	P	8/ 6 /80	- - -	0.005	0.014	0.044	0.137	0.382	0.767	-	63	49.7	-	-
115	-	F	P	8/ 7 /80	- - -	0.006	0.015	0.042	0.125	0.349	0.737	-	61	61.2	-	-
115	-	F	P	8/ 8 /80	- - -	0.002	0.010	0.039	0.143	0.441	0.951	-	74	36.7	-	-
115	-	F	P	8/ 9 /80	- - -	0.005	0.013	0.039	0.121	0.358	0.827	-	67	60.3	-	-
115	-	F	P	8/10 /80	- - -	0.006	0.014	0.039	0.117	0.331	0.738	-	60	69.9	-	-
115	-	F	P	8/11 /80	- - -	0.003	0.010	0.038	0.136	0.425	0.974	-	75	40.5	-	-
115	-	F	P	8/12 /80	- - -	0.005	0.014	0.043	0.135	0.389	0.849	-	68	49.3	-	-
115	-	F	P	8/13 /80	- - -	0.004	0.012	0.040	0.137	0.416	0.940	-	73	42.3	-	-
115	-	F	P	8/14 /80	- - -	0.005	0.014	0.040	0.121	0.367	0.914	-	73	55.9	-	-
115	-	F	P	8/15 /80	- - -	0.006	0.015	0.043	0.134	0.388	0.864	-	69	50.0	-	-

TABLE	NOISE	AREA	SITE	DATE	HOURS	ATMOSPHERIC ATTENUATION COEFFICIENTS (DB/1000FT) 16	31.5	63	125	250	500	STD DEV	MET T (F)	H (%)	W (V)	EQUIP
116	-	F	P	8/16 /80	- - -	0.006	0.015	0.042	0.129	0.376	0.859	-	69	53.7	-	-
116	-	F	P	8/17 /80	- - -	0.005	0.013	0.043	0.130	0.401	0.855	-	68	45.6	-	-
116	-	F	P	8/18 /80	- - -	0.001	0.006	0.026	0.099	0.307	0.646	-	51	100.0	-	-
116	-	F	P	8/19 /80	- - -	0.006	0.015	0.041	0.016	0.311	0.650	-	52	82.4	-	-
116	-	F	P	8/20 /80	- - -	0.005	0.014	0.040	0.122	0.350	0.769	-	63	62.3	-	-
116	-	F	P	8/21 /80	- - -	0.005	0.013	0.037	0.110	0.315	0.724	-	58	78.9	-	-
116	-	F	P	8/22 /80	- - -	0.006	0.015	0.043	0.132	0.371	0.763	-	63	53.8	-	-
116	-	F	P	8/23 /80	- - -	0.004	0.012	0.042	0.141	0.413	0.859	-	60	42.0	-	-
116	-	F	P	8/24 /80	- - -	0.006	0.015	0.043	0.132	0.379	0.829	-	67	52.4	-	-
116	-	F	P	8/25 /80	- - -	0.006	0.014	0.043	0.130	0.370	0.795	-	65	55.1	-	-
116	-	F	P	8/26 /80	- - -	0.003	0.012	0.041	0.142	0.422	0.891	-	70	40.1	-	-
116	-	F	P	8/27 /80	- - -	0.006	0.015	0.043	0.132	0.358	0.700	-	59	55.5	-	-
116	-	F	P	8/28 /80	- - -	0.007	0.017	0.046	0.129	0.332	0.633	-	54	61.7	-	-
116	-	F	P	8/29 /80	- - -	0.008	0.018	0.046	0.125	0.326	0.660	-	55	67.4	-	-
116	-	F	P	8/30 /80	- - -	0.006	0.015	0.043	0.132	0.371	0.763	-	63	53.8	-	-
116	-	F	P	8/31 /80	- - -	0.007	0.016	0.044	0.126	0.337	0.680	-	57	63.6	-	-
-	-	-	-	- - -	- - -	-	-	-	-	-	-	-	-	-	-	-
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APPENDIX F

ADDITIONAL ANALYSIS

This appendix contains additional analyses of sound level data which supplement the technical procedures presented in the text. The following topics are considered:

1. Audibility of Sounds
2. A-Weighting
3. Logarithmic Addition of Sound Levels
4. Ground Effect
5. Wind Speed
6. Barrier Attenuation

AUDIBILITY OF SOUNDS

Complex sounds, such as blasting sounds and indigenous sounds in Glacier National Park, have acoustic energy distributed in varying amounts among constituent frequencies, as the octave band results in this report indicate. From the existance of these varying distributions follows an almost paradoxical conclusion: a blasting sound whose sound level is less than the sound level of indigenous sounds may, nevertheless, be audible.

A complex sound will be audible in a background of masking sound if it satisfies this test: the complex sound must have more acoustic energy in some (any) critical band than the masking sound does. "Critical band" has technical significance, but for our purposes, it is approximately the same as a one-third octave band. As long as the complex sound and masking sound are smoothly varying over an octave (as the data indicate they are), the test referred to above may be applied using octave bands rather than critical bands.

It is quite possible, even likely after long range propagation, for a blasting sound to have more acoustic energy in a low frequency octave band than indigenous sounds do. This may occur even though the overall blasting sound level is less than the overall indigenous sound level, due to the presence of relatively large amounts of acoustic energy in high frequency octave bands of the indigenous sound.

It is as if the octave bands vied against one another. All indigenous octave bands must win for the blasting sound to become inaudible; only one blasting octave band need win for the blasting sound to remain audible.

In applying these ideas, which are known as the critical band plus threshold method, we have tacitly assumed that the resultant sound level in an octave band is above the hearing threshold for that octave band. This tacit assumption is seldom, if ever, violated when assessing audibility of blasting and other seismic exploration activiites in a national park.

Audibility thus depends on a comparison of octave band levels. In the case of a sound due to blasting far away, it is important to assess meteorological and terrain effects on each octave band separately, since one typically finds the highest octave bands reduced most rapidly with distance.

In general, the indigenous sound will have statistical variations within its octave bands. Data elsewhere in this report, for example, can be used to estimate the probability that indigenous levels in the 250 Hz octave band are less than, say, 27 decibels under certain specified conditions. If, as a further example, the predicted blasting sound has a 250 Hz octave band level of 27 decibels under the same specified conditions, then we may say the blasting sound would be audible 50 percent of the time among health, young adults.

A-WEIGHTING

A correction is made to the un-weighted octave band level of a sound using the A-weighted scale to account for the particular hearing properties of the human ear. These correction factors are listed below:

Octave Band, Hz	31.5	63	125	250	500	1000	2000
A-weighted correction, dB	-39	-26.2	-16.1	-8.6	-3.2	0	+1.2

LOGARITHMIC ADDITION OF SOUND LEVELS

Two sound levels are added together in the following way:

$$L_{total} = 10 \log (10^{L1/10} + 10^{L2/10}) \qquad (21)$$

GENERAL FORM OF THE ALGORITHM

The general form of the equation which gives the amplitude of sound pressure, p, for a given octave band at a distance, d, (neglecting the effect of terrain barriers for the moment) is the following:

$$p/p_o = (d_o/d^n)e^{-a(d-d_o)} \qquad (21)$$

where p_o and d_o are the reference pressure and distance, respectively

n is a factor representing the overall attenuation rate

and a is the atmospheric absorbtion for the octave band

The factor n is influenced by three other factors, ground effect, temperature inversion, and wind, in the following way (Foch 1980):

$$n = 1 + g + 0.01\,dt - (0.0265u)(\text{Cos } w) \qquad (23)$$

where g is a factor which accounts for the effect of ground reflection and surface discontinuities

dt is the difference in degrees Kelvin, between the temperature at the height of the source and of the inversion layer u is the wind speed in miles per hour

and w is the angle between the wind direction and the receiver

GROUND EFFECT

In Chapter 5, the value of the attenuation level, Ag, is derived as follows:

$$L - Ag = 20 \log (d_o/d^{(1+0.1)})$$

$$= 20 \log d_o/d - 20\log(d^{0.1}/d_o) \quad (24)$$

$$Ag = 2 \log (d/d_o) \quad (25)$$

where 0.1 is the correction factor to geometric divergence due to the ground effect.

WIND SPEED

The empirically determined values for wind attenuation given in Foch 1980 can be converted to an attenuation level, A_w, as follows:

$$-A_w = 20 \log (d_o/d^{(-0.0265u \text{ Cos } w)})$$

$$A_w = -20 (0.0265u \text{ Cos } w) \log(r/r_o)$$

$$= -0.53(u \text{ Cos } w) \log(r/r_o) \quad (26)$$

BARRIER ATTENUATION

To calculate the attenuation of sound from a point source due to a very long barrier, first determine the Fresnel number, N (Harris, 1979):

$$N = (2/w)(d_1 + d_2 - d) \quad (27)$$

where w is the wavelength of the sound,

d_1 is the slant (direct) distance from the source to the top of the barrier,

d_2 is the slant (direct) distance from the top of the barrier to the receiver,

and d is the distance from the source to receiver.

With some limitation, this formula can be transformed for use in estimating attenuation of a sound source due to a mountain ridge. The formula can be simplified to address individual octave bands by noting:

$$w = c/f \tag{28}$$

where f is the average frequency of the appropriate octave band

and c is the speed of sound

The speed of sound in air is approximately 344m/sec (1127 ft/sec) at a temperature of 20°C (68°F). The speed increases at about 0.61 m/sec for each 1°C increase in temperature. The temperature during seismic exploration, which occurs during summer daytime hours, is fairly represented by a value of 20°C (68°F). With this choice of sound speed, in metric units equation 1 becomes:

$$N = (f/177)(d_1 + d_2 - d) \tag{29}$$

Next, the formula needs to be transformed to known field quantities, such as mountain top elevation, source height, and receiver location. The following equations illustrate the appropriate relationships.

$$d_1 = (r_1^2 + h_1^2)^{1/2} \tag{30}$$

$$d_2 = ((h_1 - h_2)^2 + r_2^2)^{1/2} \tag{31}$$

$$d = ((r_1 + r_2)^2 + h_2^2)^{1/2} \tag{32}$$

where r_1 is the plainview (map) distance from the source to the mountain top

r_2 is the plainview (map) distance from the mountain top to the receiver

h_1 is the difference in elevation between the mountain and the source

and h_2 is the difference in elevation between the source and the receiver

After the appropriate value of N is found for each octave band from the above equations, it remains to use these values in estimating barrier attenuation. The appropriate relationship is illustrated in other acoustical treatises (Harris 1979), and is moded here by a simplified formula:

$$A_b = 2(\log N + 2)^2 \qquad (33)$$

where A_b is the barrier attenuation, in decibels, of the appropriate octave band

GLOSSARY OF ACOUSTIC TERMS[1]

ambient noise: All-encompassing noise associated with a given environment, being usually a composite of sounds from many sources, near and far. No particular sound is dominant.

audible frequency: Any frequency of a normally audible sound wave. (Audible frequencies generally lie bewteen 20 and 20,000 Hz.)

audible sound: Sensation of hearing excited by an acoustic oscillation.

A-weighted sound level: The sound level obtained by use of A-weighting. The unit is the decibel; unit symbol, dB. Often, the unit symbol is followed by the letter A, i.e., dBA to indicate that A-weighting has been used.

background noise: Noise from all sources other than a particular sound that is of interest (e.g., other than the sound being measured)

continous spectrum: A sound whose components are continuously distributed over a range of frequencies.

[1] Modified from Harris, 1979.

cycle per second (cps): A unit of frequency, same as hertz (Hz); see frequency.

decay rate: The rate at which sound pressure level decreases (at a given point and at a given frequency) after a source of sound has stopped; the unit is the decibel per second. Decay rate may vary with time.

decibel: A unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels corresponding to this ratio is 10 times the logarithm (to the base 10) of this ratio. In many sound fields, the sound pressure ratios are not proportional to the corresponding power ratios, but it is common practice to extend the use of the unit to such cases. Unit symbol: dB.

divergence loss: the part of the transmission loss due to the (divergence) spreading of the sound rays in accordance with the configuration of the system, e.g., spherical waves emitted by a point source.

equivalent continuous sound level (L_{eq}): The level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.

far field: That portion of the radiation field of a noise source in which the sound pressure level decreases by 6 dB for each doubling of distance from the source.

fast response: A standardized metering circuit and meter response which has a time constant of about 1/8 second.

filter: A device for separating components of a signal on the basis of their frequencies.

free field: A sound field in a homogeneous isotropic medium whose boundaries exert a negligible effect on the sound waves. In practice, it is a field in which the effects of the boundaries are negligible over the frequency range of interest.

frequency: Of a periodic phenomenon, such as a sound wave, the number of times in 1 sec (i.e., the number of cycles per sound) that the phenomenon repeats itself. The unit of frequency is the hertz (Hz), which corresponds to 1 cycle per second.

hertz (Hz): See <u>frequency</u>.

hourly average sound level (L_{1h}): The equivalent continuous sound level, i.e., the time-averaged A-weighted sound level, over a 1-hour time period. Usually calculated between integral hours. It may be identified by the beginning and ending times, or by the ending time only.

instantaneous sound pressure: At a point in a medium, the difference between the pressure existing at the instant considered and the static pressure.

level: The logarithm of the ratio of a given quantity to a reference quantity of the same kind. The base of the logarithm, the reference quantity, and the kind of level must be indicated. (The kind of level is indicated by use of a compound term such as sound power level or sound pressure level. The reference quantity remains unchanged, whether the given quantity is peak, root-mean-square. or otherwise. The base of the logarithm is usually indicated by use of a unit of level associated with that base.)

microbar: A unit of pressure equal to 1 dyne/cm^2 (one millionth the pressure of the atmosphere).

near field: That portion of the radiation field of a noise source which lies between the source and the far field.

noise: (1) Unwanted sound. (2) Sound, generally of random nature, the spectrum of which does not exhibit clearly defined frequency components.

noise exposure: The integral of the squared, A-weighted sound pressure over the time which sound energy is received.

octave: The frequency interval between two sounds whose basic frequency ratio is 2.

octave-band spectrum: A spectrum which is one octave in width.

overall sound level: The total sound level resulting from adding together the individual sound levels in each octave band.

pascal: A unit of pressure. Unit symbol: Pa; 1 Pa = 1 N/m^2 = 10 $dynes/cm^2$.

peak sound pressure level: The maximum instantaneous sound pressure level during a stated time period or event.

point source: A source that radiates sound as if it were radiated from a single point.

receiver: A person (or persons) or equipment affected by noise.

reflected sound: Sound that persists in a space as a result of repeated reflection or scattering.

reflection: The phenomenon by which a sound wave is returned from a surface separating two media, at an angle to the normal equal to the angle of incidence.

refraction: The phenomenon by which the direction of propagation of a sound wave is changed due to spatial variation in the speed of sound.

refraction loss: In the transmission of sound through air, that part of the transmission loss due to refraction resulting from non-uniformity of the medium.

reverberation: The sound that persists in an enclosed space, as a result of repeated reflection and/or scattering, after the source of the sound has stopped.

scattering: The irregular diffraction of sound in many directions.

sound: (1) An oscillation in pressure in an elastic medium which is capable of evoking the sensation of hearing. (2) The sensation of hearing excited by the acoustic oscillation, described above.

sound analyzer: An apparatus for the determination of a sound spectrum.

sound level: The quantity, in decibels, measured by a instrument satisfying a standard requirement, e.g., the American National Standard Specification for Sound Level Meters S1.4-1971. Fast time-averaging and A-frequency weighting are usually understood, but it is good practice to specify both the frequency weighting and time-averaging. The sound level meter with A-weighting is progressivly less sensitive to sounds of frequency below 1000 Hz, somewhat as is the ear. With fast time-averaging, the sound level meter responds (particularly to recent sounds) almost as quickly as does the ear in judging the loudness of a sound. Sound level in decibels is 20 times the logarithm to the base 10 of the ratio of a given sound pressure to the reference sound pressure of 20 micropascals.

spectrum: A description of a quantity as a function of frequency. The term may be used to signify a continuous range of components usually wide in extent, which have some common characteristics, for example, the audio-frequency spectrum.

wavelength: Of a period wave, the distance measured perpendicular to the wave front in the direction of propagation, between two successive points on the wave which are separated by one period.

weighting: A prescribed frequency response provided in a sound level meter.

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(Please read Instructions on the reverse before completing)

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7. AUTHOR(S) James D. Foch, Jr., and Richard E. Burke		8. PERFORMING ORGANIZATION REPORT NO. R111
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16. ABSTRACT

Data from a sound measurement survey conducted in 1981 within and in the vicinity of Glacier National Park are analyzed and presented. Measurements were made of oil and gas seismic exploration activities in the Flathead National Forest and Helena National Forest, including sounds from above ground blasting, helicopters and associated activities. Typical reference sound levels are identified for above ground blasts and helicopters, and theoretical procedures for estimating their propagation are developed considering the terrain and meteorological conditions characteristic of the Glacier Park area. A sample application of the prediction method shows that sound levels from above ground blasts outside the Park remain significantly above ambient levels at locations inside the Park for long durations. These results corroborate anecdotal reports and several biological studies which indicate that sound from oil and gas exploration activities can be heard well inside the Park, and could be affecting sensitive wildlife populations in the area. Recommendations for additional monitoring and modeling are outlined.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS		b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Sound levels	National parks	Flathead National Forest, MT	
Noise levels	Wilderness areas	Helena National Forest, MT	
Oil fields	Grizzly bears	Glacier National Park, MT	
Natural gas	Bears	Montana	
Blasting	Wildlife		
Helicopters			
Sound propagation			

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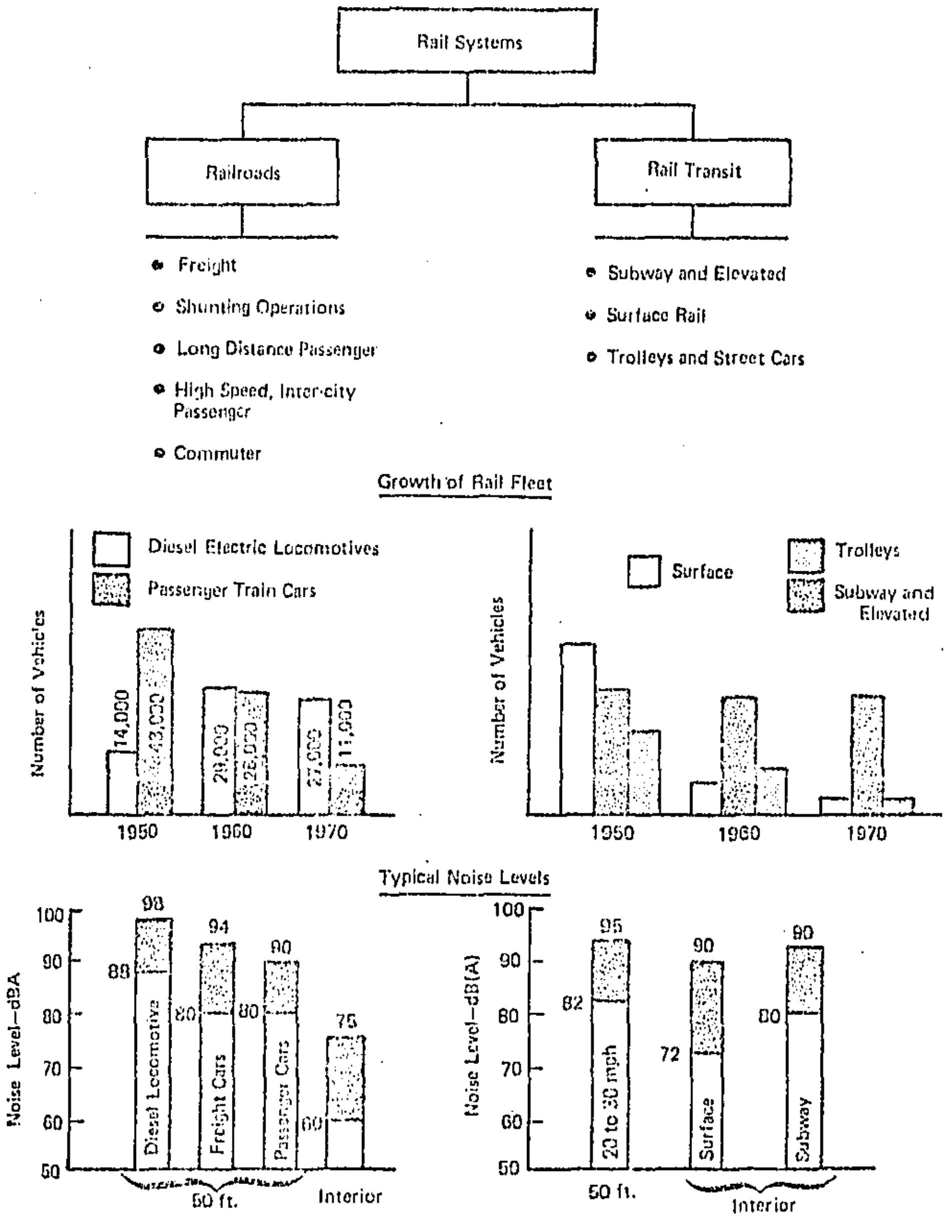

Figure 2-25. Characteristics of Rail Systems

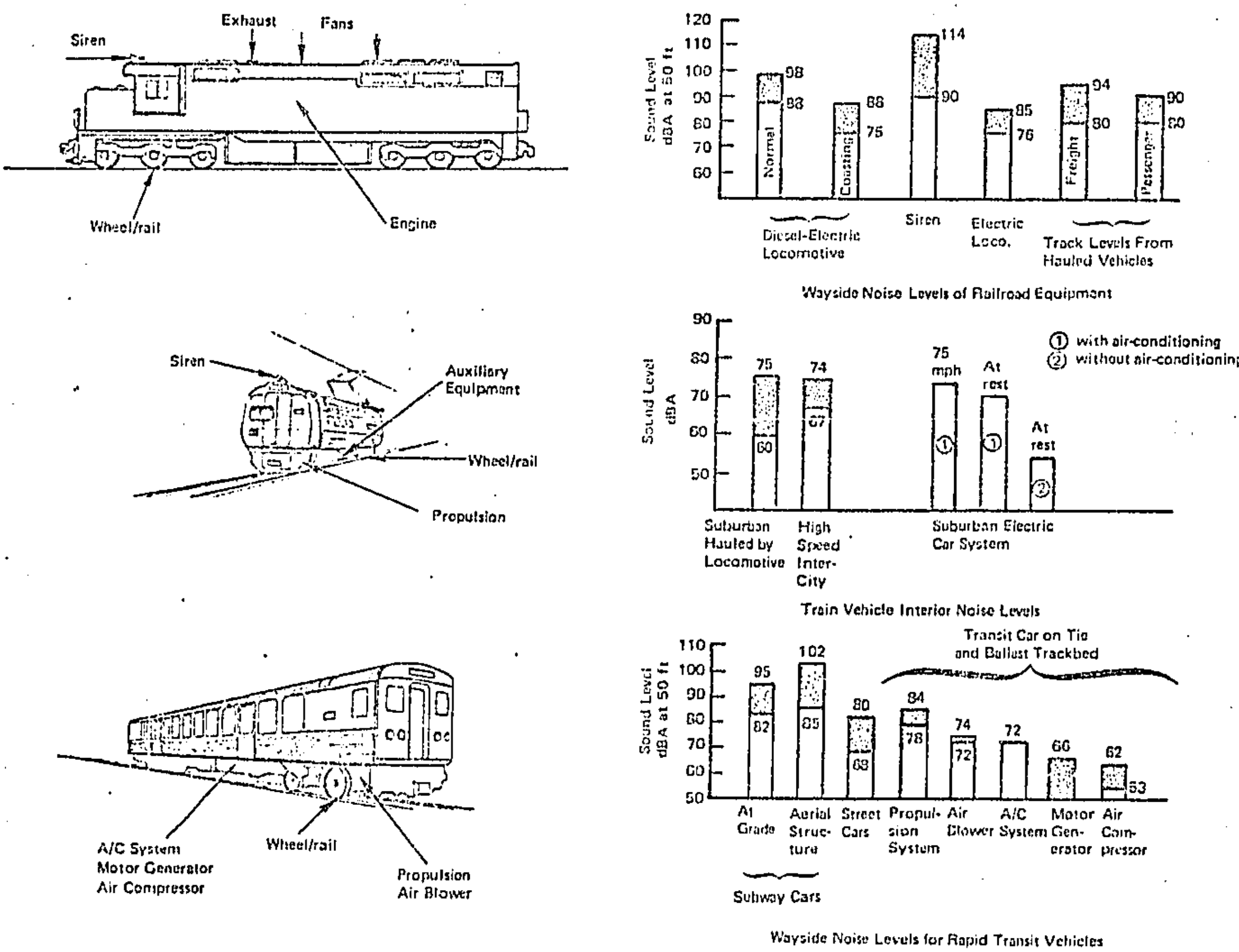

Figure 2-26. Rail Vehicle Noise Sources

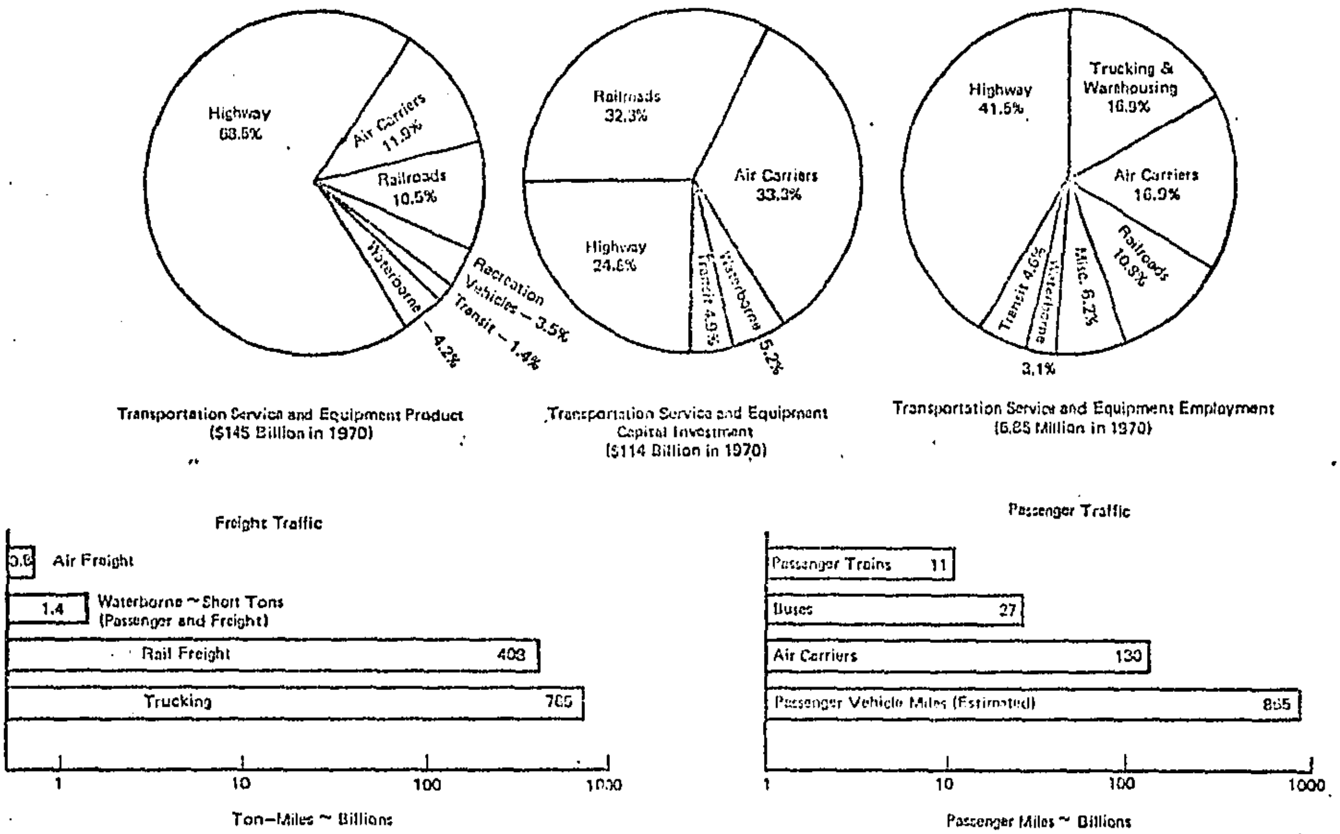

Figure 2-15. General Characteristics of the Transportation Industry in 1970

Table 2-11

RANK ORDERING OF SURFACE TRANSPORTATION SYSTEM ACCORDING TO A-WEIGHTED NOISE LEVEL

	Typical A-Weighted Noise Levels at 50 ft(1) dB re: 20μN/m²	Estimated Vehicle-Miles in Urban Areas Billions
HIGHWAY		
Medium and Heavy Trucks	84 (88)	19
Motorcycles	82 (88)	NA(2)
Garbage Trucks	82 (88)	0.5
Highway Buses	82 (86)	0.1
Automobiles (Sport, etc.)	75 (86)	21
City Buses	73 (85)	2.2
Light Trucks	72 (86)	77
Automobiles (Standard)	69 (84)	335
RAIL		
Freight and Passenger Trains	94	NA(2)
Rapid Transit	86	0.33
Trolley Cars*	80	0.03
Trolley Cars**	68	0.03
RECREATIONAL VEHICLES		
Off-Road Motorcycles	85	
Snowmobiles	85	
Inboard Motorboats	80	
Outboard Motorboats	80	

(1) Values inside parentheses are typical for maximum acceleration. All other values are for normal cruising speeds. Variations of 5 dB can be expected.

* Pre-WWII
** Post-WWII

(2) Not available.

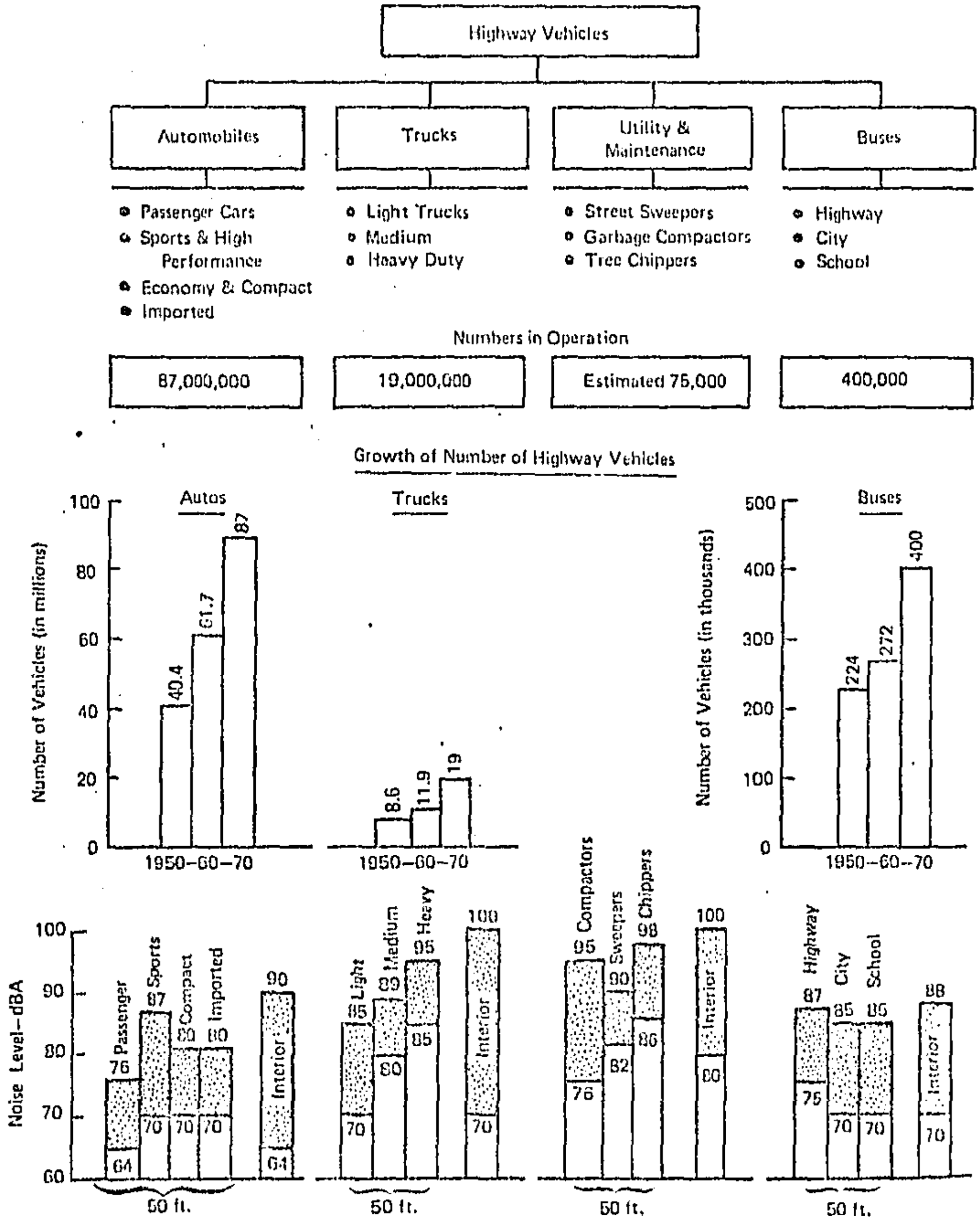

Figure 2-20. Characteristics of Highway Vehicles