

2 NOISE¹

2.01 GENERAL DISCUSSION OF NOISE

THE *NOISE ELEMENT GUIDELINES* require that major noise sources be identified and quantified by preparing generalized noise contours for current and projected conditions. Significant noise sources include traffic on major roadways and highways, railroad operations, airports, and representative industrial activities and fixed noise sources. There are many technical terms used in the Noise Element. All are included in the Glossary. The Noise Element is one of the seven mandatory elements required in a General Plan. This Element applies only to the City of Ukiah, and is not applicable in the unincorporated Planning Area. Outside the City limits, the Mendocino County Noise Element applies.

Noise modeling techniques and noise measurements were used to develop generalized L_{dn} noise contours for the major roadways, railroads, the City of Ukiah Municipal Airport and fixed noise sources for existing (1990) conditions. See Figure IV.2-F for the location of noise measuring sites.

Noise modeling techniques use source-specific data including average levels of activity, hours of operation, seasonal fluctuations, and average levels of noise from source operations. Modeling methods have been developed for a number of environmental noise sources including roadways, railroad line operations, railroad yard operations, industrial plants and airports. Such methods produce reliable results as long as data inputs and assumptions are valid. The modeling methods used in this report closely follow recommendations made by the State Office of Noise Control, and were supplemented where appropriate by field measured noise level data to account for local conditions. The noise exposure contours are based upon annual average conditions. Because local topography, vegetation or intervening structures may significantly affect noise exposure at a particular location, the noise contours should not be considered site-specific.

Explanation IV.2-IV: Noise Element definitions

Decibel (dB): dB means a unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure, which is 20 micropascals (20 micronewtons per square meter).

L_{dn}: L_{dn} is a composite 24-hour average noise level. This descriptor applies a +10 dB penalty to noise levels which occur during the nighttime period (10 pm to 7 am). This descriptor is typically considered to provide good correlation for annoyance due to transportation related noise sources (i.e. roadway traffic, aircraft operations, and to a lesser extent railroad operations).

Leq: Leq is also an average noise level. The Leq, or average sound level, can be calculated for any time period. Unlike the L_{dn}, it does not apply a penalty to noise events during the nighttime period.

L₅₀: L₅₀ is the noise level which is exceeded 50% of the time. For instance, an L₅₀ of 60 dB fundamentally states that a noise level of 60 dB is exceeded 50% of the time during the measurement period. The L₅₀ sound level typically represents an average noise level, while discounting occasional louder noise events of short duration.

L_{max}: The L_{max} is the maximum noise level recorded during the noise measurement period.

SEL: SEL (Sound Exposure Level) or SENEL (Single Noise Event Noise Exposures Level) means the level of noise accumulative during a single noise event, such as an aircraft overflight with reference to a duration of one second. It is the time-integrated A-weighted squared sound level for a stated interval or event based on dB.

¹The Noise Element is applicable exclusively to the City of Ukiah and does not apply in the Planning Area.

Policy OC-38.1: Require "clean air" heat sources in new construction.

Implementation Measure OC-38.1(a): Through local building codes or ordinances, the City and County shall require primary heat sources in all new development, room additions, or remodels involving space heating to utilize low/no air emission heat sources. Examples may include solar, natural gas, propane, butane, fuel oil, or electricity. [Timeframe for completion: Ongoing planning period ♦ Measure applies to: City and County ♦ Agency/Department responsible: City and County Building Departments]

Implementation Measure OC-38.1(b): The City and County may restrict or prohibit installation of wood burning appliances in new development. [Timeframe for completion: Ongoing planning period ♦ Measure applies to: City and County ♦ Agency/Department responsible: City and County Building Departments]

Implementation Measure OC-38.1(c): During the short-term planning period, the City and County plan reviews and inspections shall verify that solar access is optimized and primary heat sources come from low-polluting sources. Special exemptions may be made for oil-fired appliances in out-lying areas not served by natural gas. [Timeframe for completion: Short-term planning period ♦ Measure applies to: City and County ♦ Agency/Department responsible: Building Inspection]

Implementation Measure OC-38.1(d): Where wood burning appliances are permitted, dwellings may be required by local ordinance to (a) incorporate increased insulation or reduced window area sufficient to exceed insulation requirements of Title 24 of the state energy code by 25% or more; (b) install only EPA-certified wood stoves, fireplace inserts and pellet stoves, and (c) provide energy calculations to substantiate that wood-burning is not the primary heat source. [Timeframe for completion: Short-term planning period ♦ Measure applies to: City and County ♦ Agency/Department responsible: Building Inspection]

Implementation Measure OC-38.1(e): The City, County, and the Mendocino County Air Quality Management District shall develop a program to voluntarily retrofit existing homes containing older, highly polluting wood stoves, and fireplaces with Environmental Protection Agency (EPA) certified clean burning appliances. Funding may come from the City, the County, the MCAQMD, developer offset fees, fines or settlements, grants, or other mechanisms. [Timeframe for completion: Ongoing planning period ♦ Measure applies to: City and County ♦ Agency/Department responsible: AQMD, Building Departments]



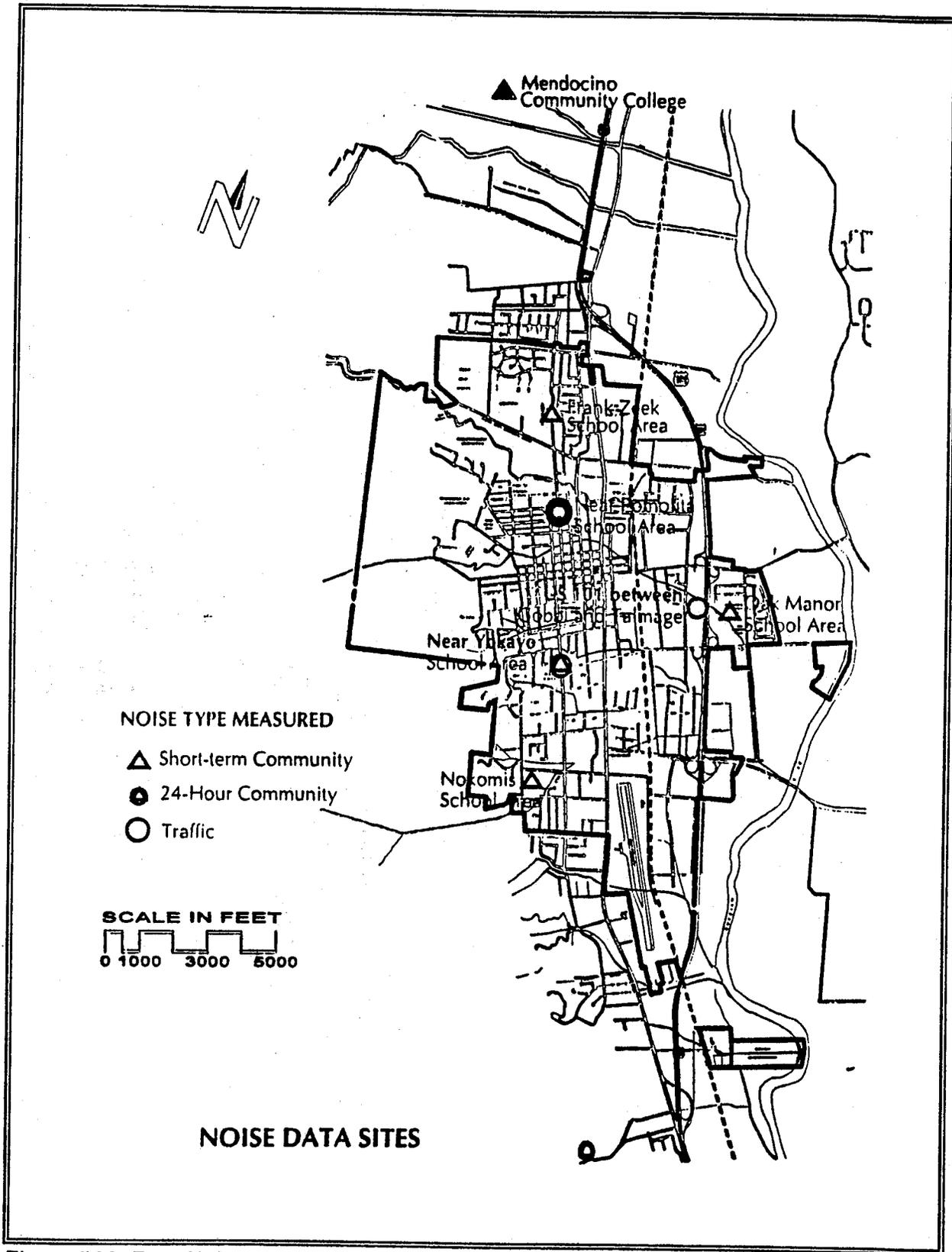


Figure IV.2-F: Noise measurement sites

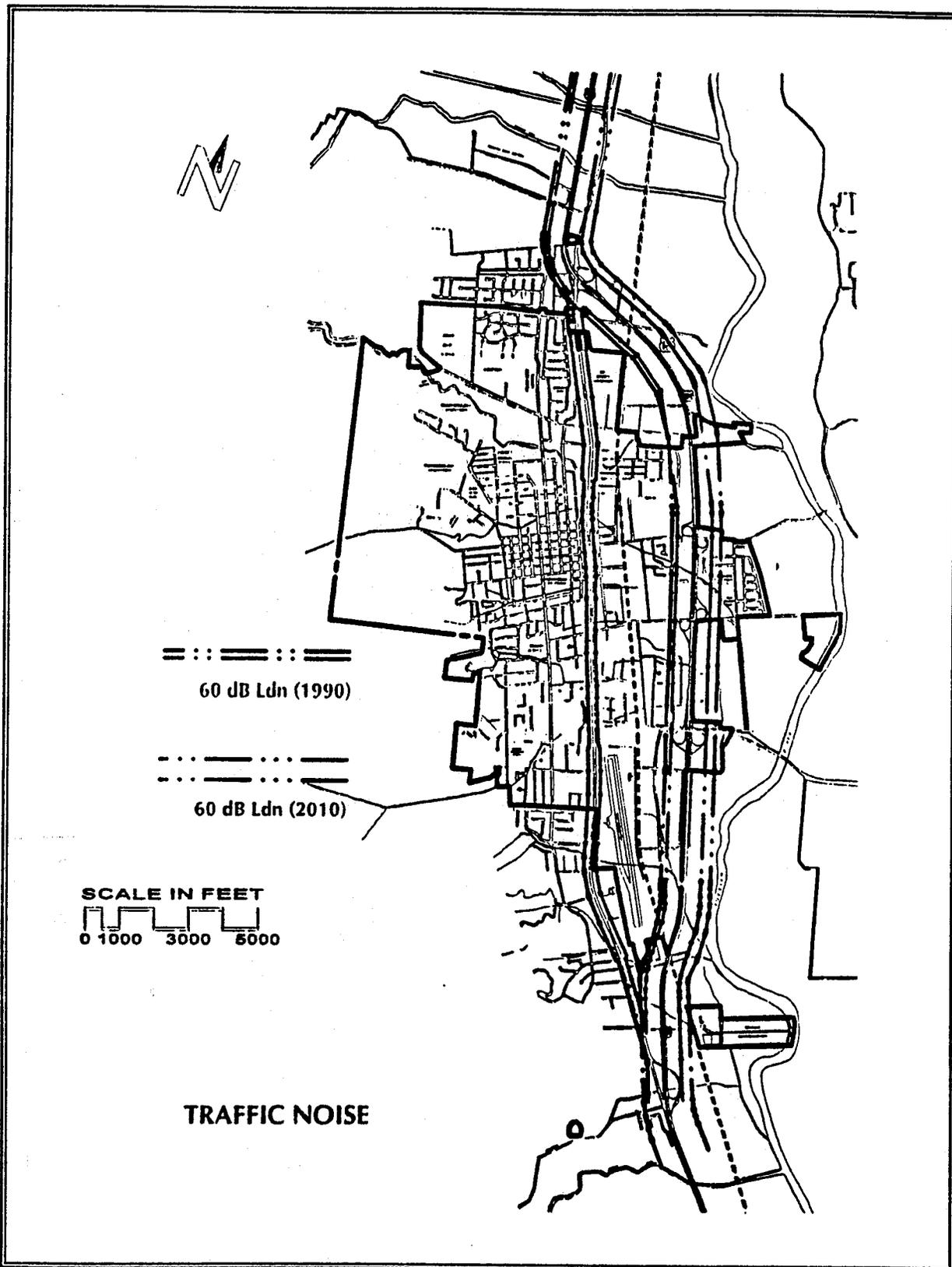


Figure IV.2-G: Traffic noise contours — 1990 and 2010

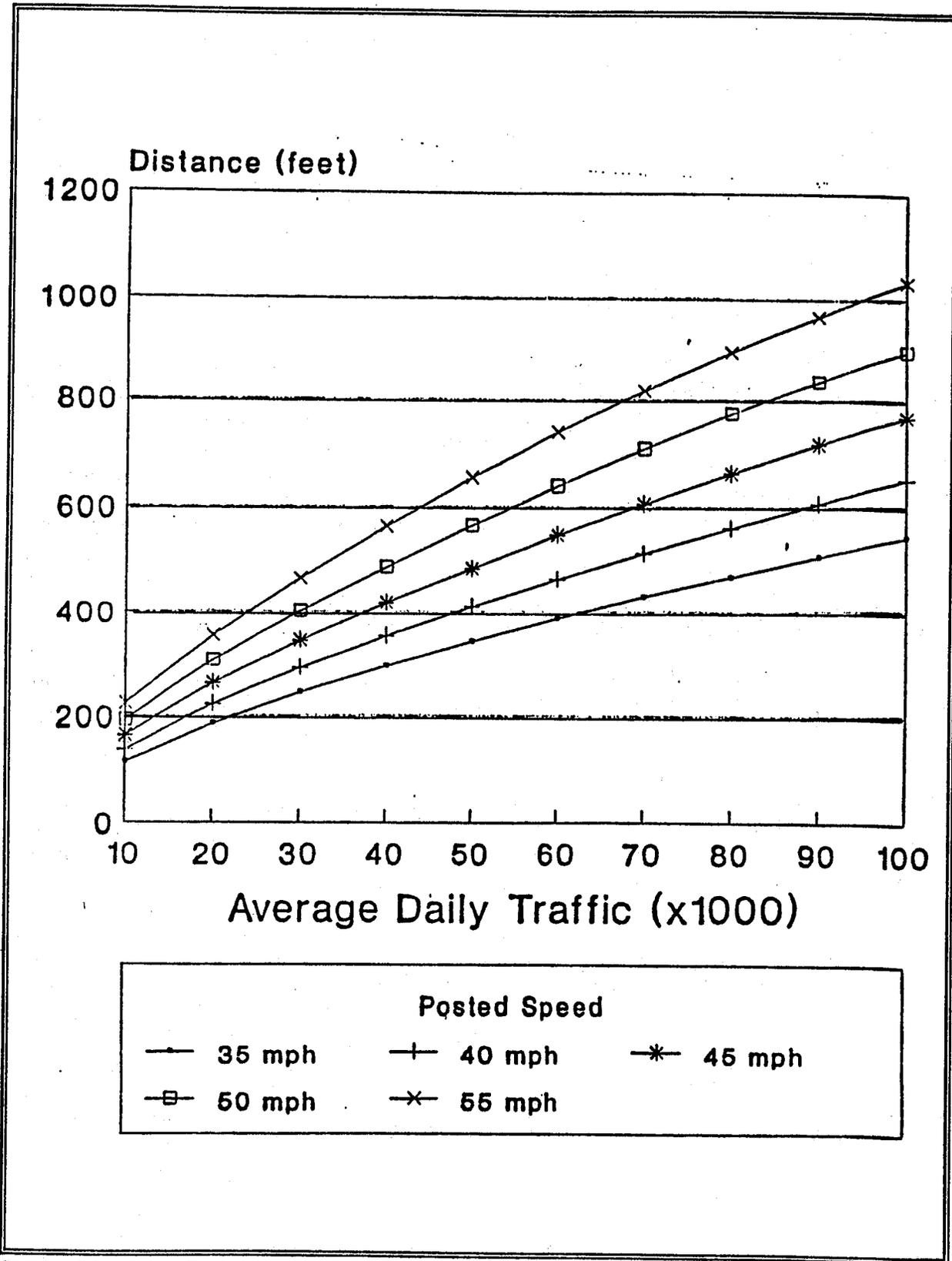


Figure IV.2-H: Distance to 60 dB L_{dn} Contour (Arterial Traffic)

A community noise survey was conducted to determine existing noise levels in noise-sensitive areas within the City of Ukiah General Plan Planning Area. The results of the survey were used to develop noise level performance standards in order to maintain an acceptable noise environment.

In conjunction with the technical noise analysis and General Plan Guidelines requirements, the community direction associated with noise levels and noise impacts centered on the definition of a "Discomfort Threshold Contour" (DTC). This is defined as the 60 dB contour that is used to separate noise sensitive receptors from noise sources.

2.02 Transportation noise

2.02.01 Summary of major findings

Transportation Noise can adversely impact adjacent residential and recreation areas. The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) was used to develop L_{dn} contours for U.S. 101 and North and South State streets in the City of Ukiah General Plan Planning Area. The FHWA Model is the analytical method presently favored for traffic noise prediction by most state and local agencies, including Caltrans. The current version of the model is based upon the California Vehicle Noise (CALVENO) noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver and the acoustical characteristics of the site. The FHWA Model predicts hourly L_{eq} values for free flowing traffic conditions, and is generally considered to be accurate within 1.5 dB. To predict L_{dn} values, it is necessary to determine the hourly distribution of traffic for a typical 24-hour day and to adjust the traffic volume input data to yield an equivalent hourly traffic volume.

Short-term (15-minute) traffic noise measurements and concurrent traffic counts were conducted for traffic on U.S. 101 (See Figure IV.2-G). The measurements were made to evaluate the noise exposure due to traffic on U.S. 101.

The purpose of the traffic noise level measurements was to determine the accuracy of the FHWA model in describing the existing noise environment at the project site. Noise measurement results were compared to the FHWA model results by entering the observed traffic volumes, speed and distance as inputs to the FHWA model. Based upon the modeled versus measured traffic noise levels, the FHWA model was found to accurately predict U.S. 101 noise levels at the measurement site.

Traffic data representing annual average traffic volumes for existing conditions were obtained from Caltrans and KD Anderson traffic consultants. Day/night traffic distribution and truck mix were based upon Caltrans and Brown-Buntin Associates (BBA) file data. Using these data and the FHWA methodology, traffic noise levels as defined by L_{dn} were calculated for 1990 traffic volumes. Distances from the centerline of selected roadways to the L_{dn} contours are summarized in Table IV.2-1 and shown on Figure IV.2-H. Contours were developed for U.S. 101 for the years 1990 and 2010. The year 2010 traffic noise contours are based upon traffic volumes contained in the Caltrans Highway 101 Route Concept Report. The traffic volumes contained in the Route Concept Report are based upon general historical trends in traffic growth along U.S. 101, and are not based upon buildout of the City of Ukiah General Plan Update. However, the 2010 traffic noise level data contained in Table IV.2-1 is useful in developing the Land Use Element of the General Plan.

Table IV.2-6: Traffic Noise Contour Data distance (feet) from center of roadway to L_{dn} contours

Segment	Description	60 dB L_{dn}	
		1990	2010
U.S. 101			
1	River Road to East Perkins Street	451	635
2	East Perkins St. to North State Street	496	635
3	North State St. to Lake Mendocino Dr.	462	635
North State Street			
4	Central Ave. to Parducci Road	57	N/A
5	Parducci Road to Hensley Creek Road	98	N/A
6	Hensley Creek Rd. to KUKI Lane	121	N/A
7	KUKI Lane to Garrett Dr.	178	N/A
8	Garrett Dr. to Clara Ave.	168	N/A
9	Clara Ave. to Seminary Ave.	113	N/A
South State Street			
10	Seminary Ave. to Freitas Ave	102	N/A
11	Freitas Ave. to Washington Ave.	113	N/A
12	Washington Ave. to Meadow Brook Dr.	145	N/A
13	Meadow Brook Dr. to S.R. 253	80	N/A

These calculations do not include consideration of shielding caused by local buildings or topographical features, so the distances reported in Table IV.2-1 are worst-case estimates of noise exposure along roadways in the community.

Traffic noise contours were not calculated for all roadways within the City of Ukiah plan area. However, Figure IV.2-H, prepared using the FHWA Model, may be used to estimate the distance to the 60 dB L_{dn} contour for projected volumes of arterial traffic. For arterial traffic, the predicted distance to the 60 dB L_{dn} contour is determined by the Average Daily Traffic Volume (ADT) and the posted speed limit. L_{dn} contours derived from Figure IV.2-H are only indicators of potential noise conflicts. A more detailed analysis is required to determine traffic noise levels at any given location.

Railroad activity in the City of Ukiah includes freight activity on the Southern Pacific Transportation Company (SPTCo) line which travels north/south through the City of Ukiah.

SPTCo officials at San Francisco Operations Office report that one scheduled local freight train operates through Ukiah 6 days per week. The scheduled operation generally occurs during the nighttime hours. According to SPTCo officials, the average speed of the local freight train is 19-20 mph.

The operational information was used as inputs to the "Simplified Procedure for Assessment of Noise Emitted by On-Line Railroad Operations", prepared by Wyle Laboratories in 1974. This methodology for

predicting railroad noise exposure is recommended by the State Office of Noise Control, and is considered to be reasonably accurate for generalized noise contour development.

To ensure accuracy of the Wyle method for determining railroad operations noise levels, BBA used file data for slow moving trains and the above-described number and distribution of daily train operations to calculate noise levels associated with the local freight train operation. The L_{dn} contribution from a single nighttime train operation may be calculated with the following formula: $L_{dn} = SEL + 10 \log N_{eq} - 49.4 \text{ dB}$, where: $SEL + 10 \log N_{eq} - 49.4 \text{ dB}$ is the mean SEL of the number of events, N_{eq} is the sum of the number of daytime events (7 a.m. to 10 p.m.) per day plus ten times the number of nighttime events (10 p.m. to 7 a.m.) per day, and 49.4 is 10 times the logarithm of the number of seconds per day. Based upon the above-described noise level data and methods of calculation, the L_{dn} for the freight train operations can be determined. Operational information and estimated L_{dn} values are shown in Table IV.2-2.

Table IV.2-7: Railroad line operational information and estimated noise levels

Reported Train Operations	Speed (mph)	L_{dn} dB @ 100 feet		Estimated Distance to 60 dB L_{dn}
		Wyle Method	Computed by BBA	
1	20	63	54	160 feet

The data contained in Table IV.2-2 indicate that the Wyle Laboratories method for predicting railroad line operations noise levels yields values approximately 9 dB higher than the computed L_{dn} values. The computed L_{dn} values were based upon single event noise level data collected by BBA for slow moving trains, which included the use of warning horns. The difference between the L_{dn} value estimated with the Wyle method and the calculated L_{dn} value is assumed to be due to the fact that actual train speeds in the City of Ukiah are slower than those which are assumed in the Wyle method.

As a conservative estimate, the Wyle Laboratories method was used for predicting the distance to the 60 dB L_{dn} railroad line noise contours. Figure IV.2-1 shows the location of the railroad line operations noise contours.

Future use of the SPTCo line through the City of Ukiah is not certain. Presently there is discussion regarding promoting commuter and recreational passenger service along the line. The Mendocino Council of Governments (COG) is currently drafting policies which promote increased use of the rail corridor. The North Coast Railroad Authority is in the process of acquiring the rail right-of-way through Ukiah, and will be involved in developing an operations plan for future use of the rail corridor.

Based on the state's Cal Rail usage projections, near term future use of the rail corridor is expected to increase. However, the increase is expected to be related to freight activity, and is anticipated to result in an increased number of rail cars, but not an increase in the number of trains.

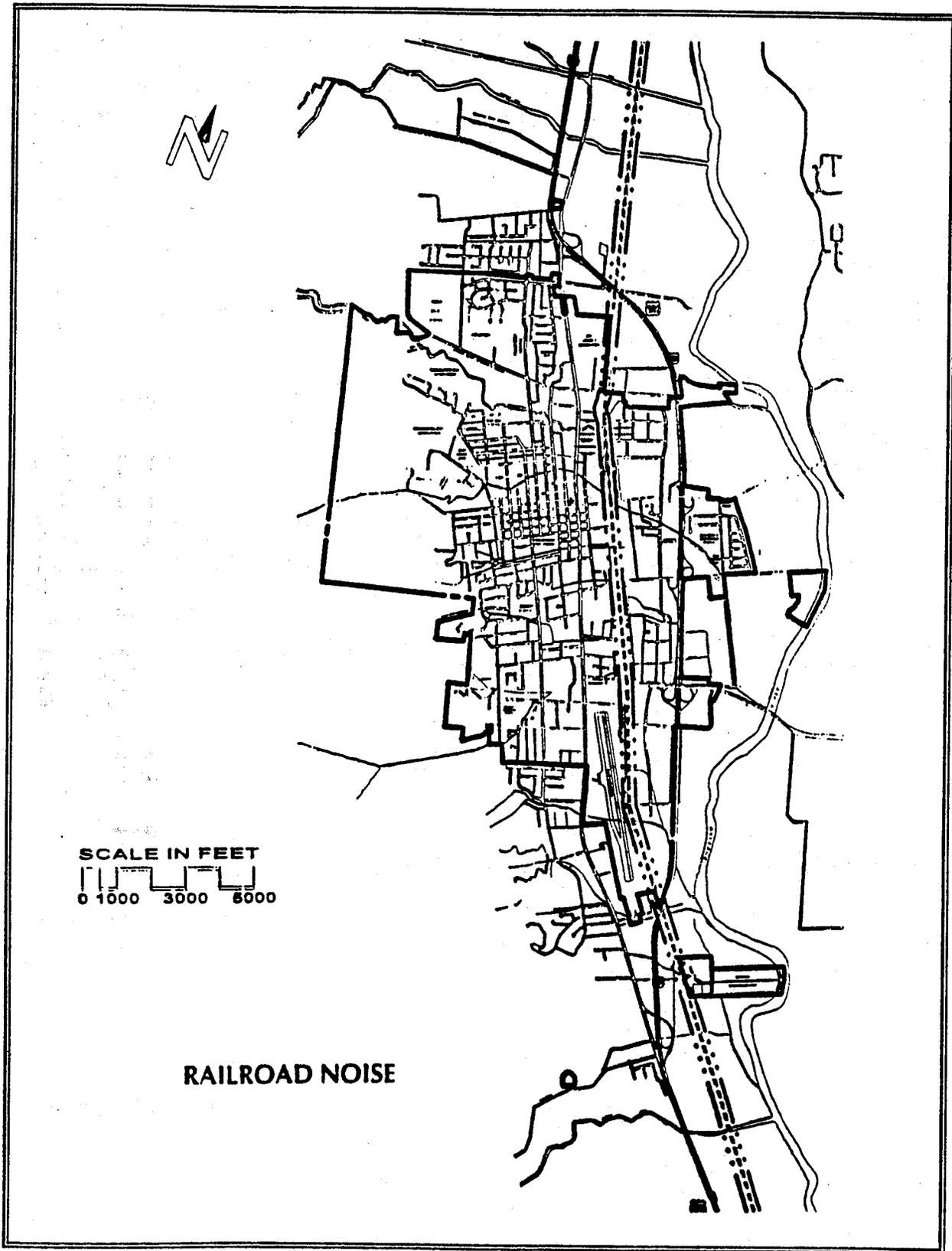


Figure IV.2-1: Existing railroad noise contours

Table IV.2-8: Maximum Allowable Noise Exposure Transportation Noise Sources

Land Use	Outdoor Activity Areas ¹ L _{dn} /CNEL, dB	Interior Spaces	
		L _{dn} /CNEL, dB	L _{eq} , dB ²
Residential	60 ³	45	—
Transient Lodging	60 ³	45	—
Hospitals, Nursing Homes	60 ³	45	—
Theaters, Auditoriums, Music Halls	—	—	35
Churches, Meeting Halls	60 ³	—	40
Office Buildings	—	—	45
Schools, Libraries	—	—	45
Playgrounds, Neighborhood Parks	70	—	—

¹Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving use.
²As determined for a typical worst-case hour during periods of use.
³Where it is not possible to reduce noise in outdoor activity areas to 60 dB L_{dn}/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB L_{dn}/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

Discussions with the Mendocino COG, North Coast Railroad Authority and Cal Rail indicate that predicting future use of the rail corridor for passenger trains is premature. A feasibility study for rail traffic along the rail corridor is in the process of being conducted, and estimates of future railroad activity should be based upon the projections which will be contained within that report.

2.02.02 General Plan goals, policies, and implementing programs

Goal NZ-1: Stabilize or reduce transportation noise impacts on adjacent residential.

Policy NZ-1.1: Inventory noise contours for major traffic corridors, the railroad, and the airport.

Implementation Measure NZ-1.1(a): The City shall schedule an update to the mobile noise source analysis when the Element is updated. [Timeframe for completion: Intermediate-term planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Planning Department]

Policy NZ-1.2: Residential zoned land shall be located as much as possible outside of the Discomfort Threshold Corridor (DTC) of existing transportation corridors.

Implementation Measure NZ-1.2(a): When reviewing proposals for new residential or recreational development, ensure that design measures are incorporated to separate the new uses from the existing or projected DTC. [Timeframe for completion: Intermediate-term planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Planning Department]

Implementation Measure NZ-1.2(b): New development of noise-sensitive uses shall not be permitted in areas exposed to existing or projected noise which exceed the levels specified in Table IV.2-4 unless the project design includes effective mitigation measures to reduce noise in outdoor activity areas and interior spaces to the level specific in Table IV.2-4. [Timeframe for completion: Intermediate-term planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Planning Department]

Implementation Measure NZ-1.2(c): Expansion of existing roads must be designed using accepted acoustical engineering features — examples include low landscaped berms, landscaping, below-grade construction, and speed control — to minimize expansion of the existing DTC. [Timeframe for completion: Ongoing planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Public Works Department]

Policy NZ-1.3: Use appropriate construction techniques to reduce interior noise exposure for residences built within a DTC.

Implementation Measure NZ-1.3(a): In the revised Land Development Code reference the standards of the Uniform Building Code to require construction methods to reduce indoor noise levels to acceptable Building Code standards. [Timeframe for completion: Intermediate-term planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Planning Department]

Table IV.2-9: Noise Level Performance Standards for projects affected by or including non-transportation sources

Noise Level Descriptor	Daytime (7 am to 10 pm)	Nighttime (10 pm to 7 am)
Hourly L_{eq} , dB	50	45
Maximum Level, dB	70	65

Each of the noise levels specified above shall be lowered by 5 dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.

Policy NZ-1.4: Encourage programs to reduce impacts from aircraft.

Implementation Measure NZ-1.4(a): During the short term planning period, the City airport shall initiate a notification program to notify pilots of the one thousand (1,000) foot ceiling for fixed-wing aircraft over congested areas. [Timeframe for completion: Ongoing planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Department of Aviation]

Implementation Measure NZ-1.4(b): During the short-term planning period, the airport shall initiate a public education program designed to reach appropriate pilots to request that recreational overflights — such as ultralight craft and balloon — avoid hovering, circling, or making repeated passes over the same geographic area as a means of reducing noise nuisance to those on the ground. [Timeframe for completion: Short-term planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Department of Aviation]

Implementation Measure NZ-1.4(c): At such time that scheduled passenger aircraft begin to use the airport, require that commercial passenger service aircraft comply with the best available noise equipment standards to reduce noise impacts on the ground. [Timeframe for completion: Short-term planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Department of Aviation]

Policy NZ-1.5: Disclose potential airport noise impacts on property transactions in the airport area.

Implementation Measure NZ-1.5(a): During the short-term planning period, the City shall enact an ordinance requiring that the following statement be included in all property transactions or as a part of the issuance of use permits for property or projects within the airports's area of influence, both core and peripheral.

"This project/residence is in close proximity to the Ukiah Municipal Airport which is a major noise generating source. Development in this area will be subject to overflights of aircraft taking off from and landing at the airport. These aircraft include privately owned corporate jets and fire fighting air tankers from the California Department of Forestry. It is anticipated that the volume of traffic and resulting noise may increase in future years." [Timeframe for completion: Short-term planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Department of Aviation]

Policy NZ-1.6: Incorporate sound reducing measures in new construction around the airport.

Implementation Measure NZ-1.6(a): The City shall enact appropriate code changes to require that interior noise levels conform to requirements of the Uniform Building Code. [Timeframe for completion: Short-term planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Planning Department]

2.03 Stationary source noise

2.03.01 Summary of major findings

Industrial noise can adversely impact other land uses. Existing residences within the noise contours identified in Table IV.2-3 (also known as the *Discomfort Threshold Contour* or *DTC*) generated as a result of industry-related noise, may result in becoming the source of complaints about excessive noise if the property changes hands without the new owners understanding that their new residence may be subjected to high noise levels.

Many industrial processes result in noise even when the best available noise control technology is applied. Noise exposures within industrial facilities are controlled by Federal and State employee health and safety regulations (Federal Occupational Safety and Health Administration [OSHA] and Cal-OSHA). Exterior noise levels are controlled by local standards. Commercial, recreational and public service facility activities can also produce noise which affects adjacent sensitive land uses.

From a land use planning perspective, *fixed-source*¹ noise control issues focus upon two goals: to prevent the introduction of new noise-producing uses in noise sensitive areas, and to prevent encroachment of noise sensitive uses upon existing or potential noise-producing facilities. The first goal can be achieved by applying noise performance standards to proposed new noise-producing uses. The second goal can be met by requiring that new noise-sensitive uses in proximity to noise producing facilities include mitigation measures to ensure compliance with noise performance standards.

¹"Fixed-source" noise generator is the term assigned to a specific land use that generates noise from a specific location, such as an industrial facility.

2.03.01(A) Major fixed noise sources

The following descriptions of existing fixed noise sources in the General Plan study area are intended to be representative of the relative noise impacts of such uses, and to identify specific noise sources which should be considered in the review of development proposals. All of these fixed noise sources are outside of the City.

- ♦ *The Masonite Plant* operates 24 hours per day, 7 days per week. Major noise sources associated with the hardboard plant include industrial processing, stack scrubbers, blowers, conveyor systems, heavy trucks to and from the site, and front end loaders operating on the site. Operational noise level data was collected for the Masonite Plant on October 3, 1991.

An average noise level of 63 dB and a maximum noise level of 68 dB were measured at a distance of 600 feet from the main plant, and approximately 100 feet from the property boundary. The estimated location of the 50 dB L_{eq} noise contour is shown on Figure IV.2-J.

- ♦ *The Louisiana Pacific Sawmill and Planing Plant* operates 24 hours per day, 7 days per week. Major noise sources associated with the plant include truck traffic to and from the site, blowers, large saws and wood planers. Noise level data collected near the plant site indicated an average noise level of 60 dB at a distance of 300 feet from the center of the lumber yard, and 50 feet from the entrance to the plant. The estimated location of the 50 dB L_{eq} noise contour is shown on Figure IV.2-J.

- ♦ *The Parnum Paving Company* is located along North State Street, north of Pomo Lane. The Parnum Paving Company is an asphalt batch plant which operates during the daytime hours. Major noise sources associated with the Parnum Paving Company include heavy trucks to and from the site, front end loaders which move material on the site, and the operation of the batch plant. Noise level data collected at the plant indicated an average noise level of 54 dB at a distance of 250 feet from the asphalt plant. The estimated location of the 50 dB L_{eq} contour is approximately 400 feet from the batch plant, and is located outside of the Plan Area map boundary.

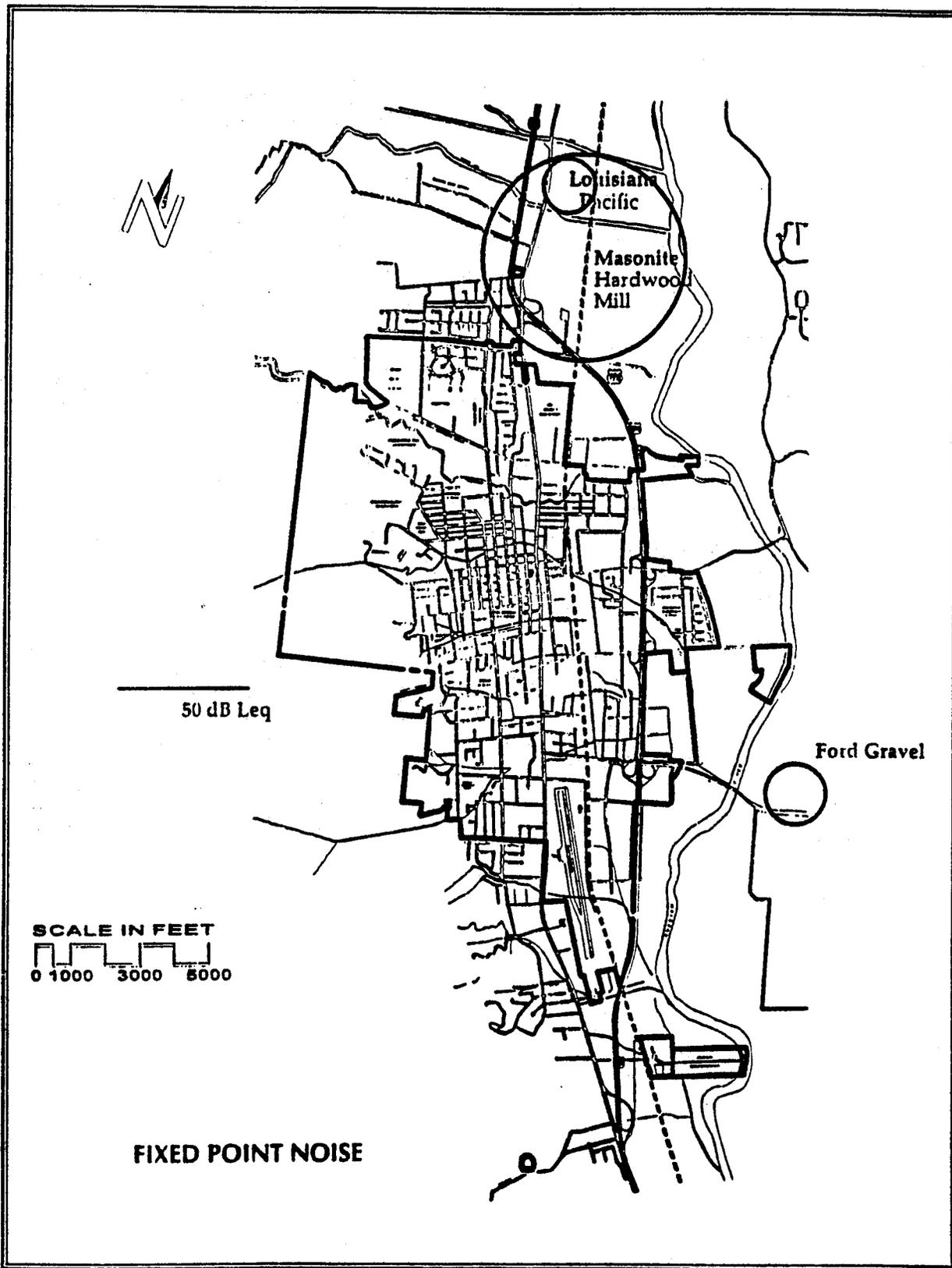


Figure IV.2-J: Fixed noise source contours

- ♦ *The Ford Gravel Company* is a concrete batch plant which operates during the daytime hours. Typical noise producing operations associated with the Ford Gravel Company include the arrival and departure of heavy trucks, onsite front end loaders which move batch plant materials, loading of concrete trucks with ready-mix at the batch plant, and vibrating shakers on the batch plant. Noise level data collected at the plant indicated an average noise level of 62.5 dB at a distance of 100 feet from the property line. The estimated location of the 50 dB L_{eq} contour is shown on Figure IV.2-J.
- ♦ *Mendocino County Fairgrounds*. The Fairgrounds were not being used during the preparation of the Noise Element. The facilities allow a variety of activities that may generate noise. These range from outdoor concerts to vehicle races at the track, as well as anything drawing a large crowd.

2.03.01(B) City of Ukiah Municipal Airport

The City of Ukiah Municipal Airport is located at the south end of the City of Ukiah, and is bordered by South State Street to the west, U.S. 101 to the east and Hastings Avenue to the north. The City of Ukiah Municipal Airport is a public use airport which is operated by the City of Ukiah. According to the 1990 California Aviation System Plan (CASP), the airport has one runway with a heading of 15/33, and a runway length of 4,415 feet. The CASP reports that the airport has 103 based aircraft with a total of 50,000 annual operations. According to the CASP, the existing based aircraft include 92 single engine piston, 9 multi-engine piston and 2 rotorcraft. Discussions with the airport manager on October 2, 1991 indicate that the number of based aircraft reported in the CASP is consistent with 1991 estimates.

Approximately 65% of the aircraft depart on runway 15 to the south. However, depending on wind direction, this percent may change on any given day. The majority of residences in the City of Ukiah are located to the north and west of the airport. Approximately 90% of the aircraft which depart to the north on runway 33 make a 15 degree right turn beginning at approximately Gobbi Street, and then proceed south. This procedure avoids flying over the majority of the residential developments. Some aircraft which depart on runway 33 will continue a straight-out departure, and will fly directly over residential developments.

The most recent airport master plan was adopted on March 17, 1971, and the last airport layout plan was adopted in December 1974. The City updated its Airport Master Plan in 1995, and it is scheduled to be adopted by the City Council and the Mendocino County Airport Land Use Commission before the end of 1995. There are no Community Noise Equivalent Level (CNEL)² contours which have been developed for the City of Ukiah Municipal Airport. Based upon discussions with the airport manager regarding flight tracks, aircraft operational procedures and runway usage, CNEL contours were developed for the Ukiah Airport for a peak day, which includes CDF firefighting tankers, and for an annual average day. See Figures IV.2-K and IV.2-L for predicted locations of the City of Ukiah Airport CNEL contours.

♦ *Crop dusting aircraft*

City of Ukiah staff have expressed concern about the noise associated with crop dusting activities. Aerial application aircraft are frequently used to spray crops or to spread seed or fertilizers. There are many types of fixed or rotary wing aircraft used for aerial application, including aircraft with radial and

²CNEL: Community Noise Equivalent Level means the average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.

turbine engines, and 2- or 3-blade propellers. Most of the noise impacts generated by aerial application aircraft occur as the result of propeller noise and the low altitude at which the aircraft are typically flown. One of the most widely used aerial application aircraft in the Ukiah area is the Cessna Ag Wagon.

To characterize noise impacts associated with aerial application aircraft, BBA utilized file data collected for the Cessna Ag Wagon aircraft at the Bettencourt Flying Service air strip near the Town of Delhi, in Merced County, California. Consultation with aerial application aircraft operators, field observations, and noise measurements indicated that it was not practical, nor representative of perceived noise impacts, to prepare CNEL contours for frequent operations by aerial application aircraft. This is because aerial application operations generally follow the shortest possible route to the application site at a minimal altitude, meaning that there are no typical flight tracks. Typical "ferry" altitudes range from 50 to 150 feet based upon information previously collected from crop dusting companies.

Noise level data collected at the Bettencourt Flying Service air strip in Merced County for Ag Wagon operations indicate that noise levels produced by aircraft flying directly overhead with an estimated altitude of 150 feet were about 105 dB L_{max} and 106 dB SEL.

Crop dusting activities generally occur during the early morning hours, when people may be sleeping. Single event noise levels from aircraft arrivals, departures and overflights may cause sleep disturbance at nearby residences. The noise level at which a sleep stage change or interruption occurs is highly individualized. A persons' level of sleep is dependent on many factors including fatigue, exhaustion, stress, room temperature, bed comfort and noise level in the room. For these reasons, a single number criterion for the evaluation of sleep interference has not been established.

According to the Noise Effects Handbook published by the National Association of Noise Control Officials, behavioral awakening will most likely occur with noise levels of 70 dB or above. However, duration of the noise exposure, background noise levels and type of sound generated by the source are all important factors.

♦ *California Department of Forestry (CDF) Air Tanker Operations*

The City of Ukiah staff indicated that the majority of noise complaints associated with airport operations are related to the CDF air tanker operations. The airport staff estimated that on a peak day up to 45 air tanker operations may occur. The majority of the CDF air tanker fleet is comprised of Grumman S-2 aircraft. The CDF also uses Cessna 337/0-2 aircraft for reconnaissance and patrol. The CDF aircraft typically depart from the airport and make a 15 degree turn to the east, and try to avoid flying over residential areas. These aircraft are typically at a low altitude during takeoff because they are fully loaded, and therefore may be considered noisy. The existing Grumman S-2 aircraft which are used by CDF have a reciprocating propeller engine. However, the CDF is currently retrofitting the S-2 aircraft with a turboprop engine which is expected to be considerably quieter. The Peak Day CNEL contours for the Ukiah Municipal Airport (Figure IV.2-L) are dominated by S-2 flights.

By a wide margin, the noisiest airplanes which routinely use this airport are the Department of Forestry air tankers. We may draw an analogy to ambulances or fire trucks which also generate noise, but which citizens willingly tolerate because of the benefit received. Noise levels for the Grumman S-2 air tankers have not been measured. Suffice it to say, being radial piston engines of Korean War vintage, they roar with all the authority of their two 1525 horse power engines. They are loud and can easily disrupt

³ L_{max} : Maximum loudness means the maximum sound level recorded during a noise event.

ordinary conversation at over a mile. Fortunately, their flights are generally restricted to daylight hours from late June until mid October and then usually only when a fire is being fought.

♦ *Corporate aircraft*

Corporate jets are also noisy and use the airport throughout the year. It should be noted that newer planes, especially jets, are both more efficient and less noisy than older models, with reductions in noise levels of about 15-20 decibels, a significant decrease (FAA, 1990). As CDF replaces its fire fighting aircraft, citizens can expect the newer equipment to be quieter. The same holds true for the corporate jets. On balance, the annoyance for noise is outweighed by the usefulness of the aircraft involved and their importance to the community.

♦ *General aviation noise levels*

General aviation aircraft ordinarily do not pose a noise problem outside the perimeter of the airport boundary. Their noise levels are comparable to large trucks, and are less noisy than some leaf blowers. Noise levels typically are 90-100 decibels or below at 100 feet from the plane. However, a low overflight or a missed approach may result in episodic higher noise levels to those directly below the aircraft.

2.03.01(C) Methods of mitigation

California standards have been developed for maximum aircraft noise levels. The California Administrative Code Title 21 states, "The standard for the acceptable level of aircraft noise for persons living in the vicinity of airports is hereby established to be a community noise equivalent level of 65 decibels" (Hodges and Schutt, 1991, Page 5-4). Moreover, the regulations stipulate that certain kinds of land uses are incompatible near airports. These include residences of all types, public and private schools, hospitals and convalescent homes, and places of public worship. These standards are identical to the ones set forth by the FAA. Hodges and Schutt (1991) state,

"An important policy implication of overflight annoyance is that of disclosure to owners and prospective buyers of property near an airport of the nature and extent of the airport's activities and the plans for its future. Policies requiring some form of buyer notification for residential uses in an airport's vicinity are recommended. The intent of a buyer awareness or disclosure policy is to enable those who are particularly sensitive to overflights to avoid moving into the affected areas" (Page 5-7).

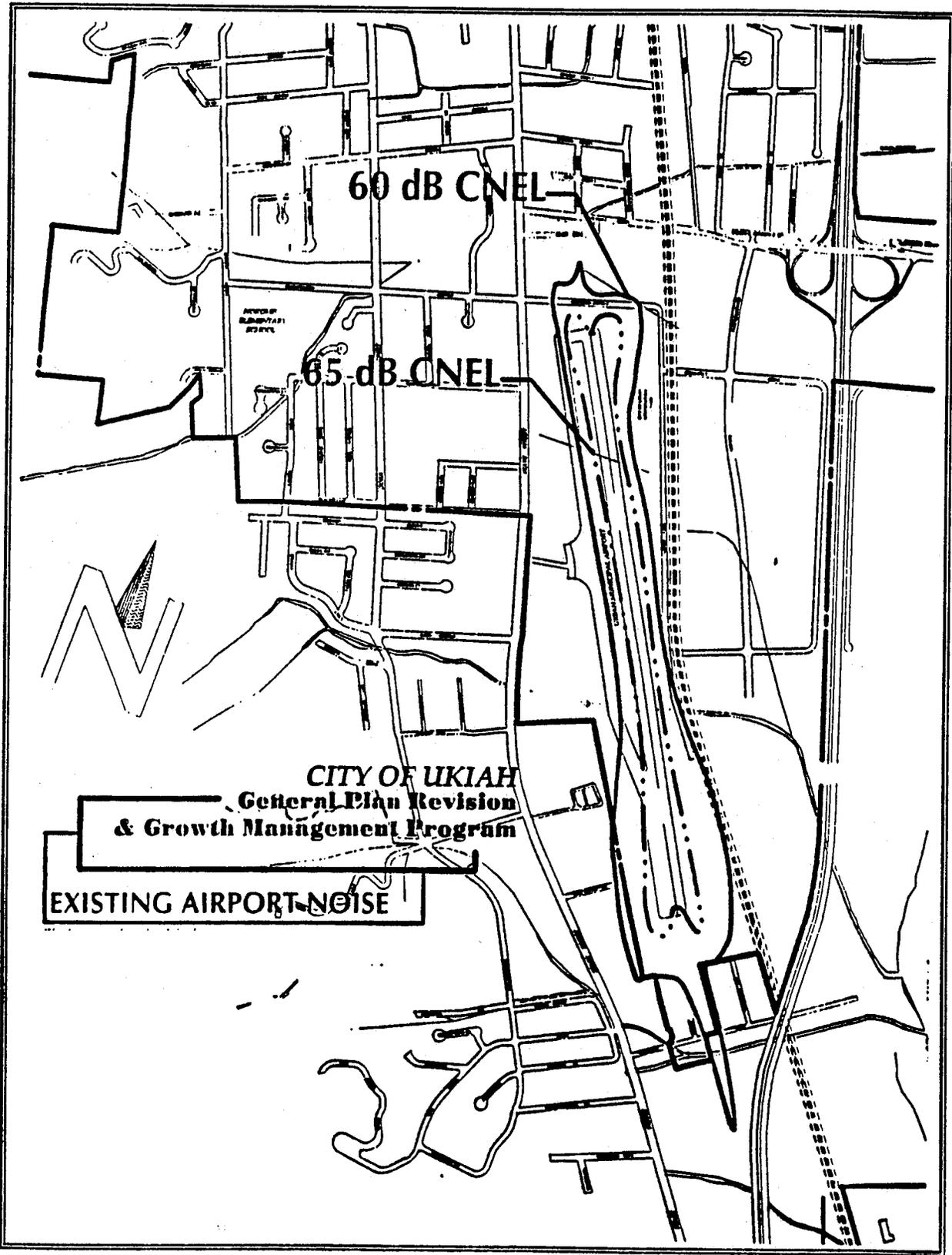


Figure IV.2-K: Existing average annual day CNEL airport noise contours

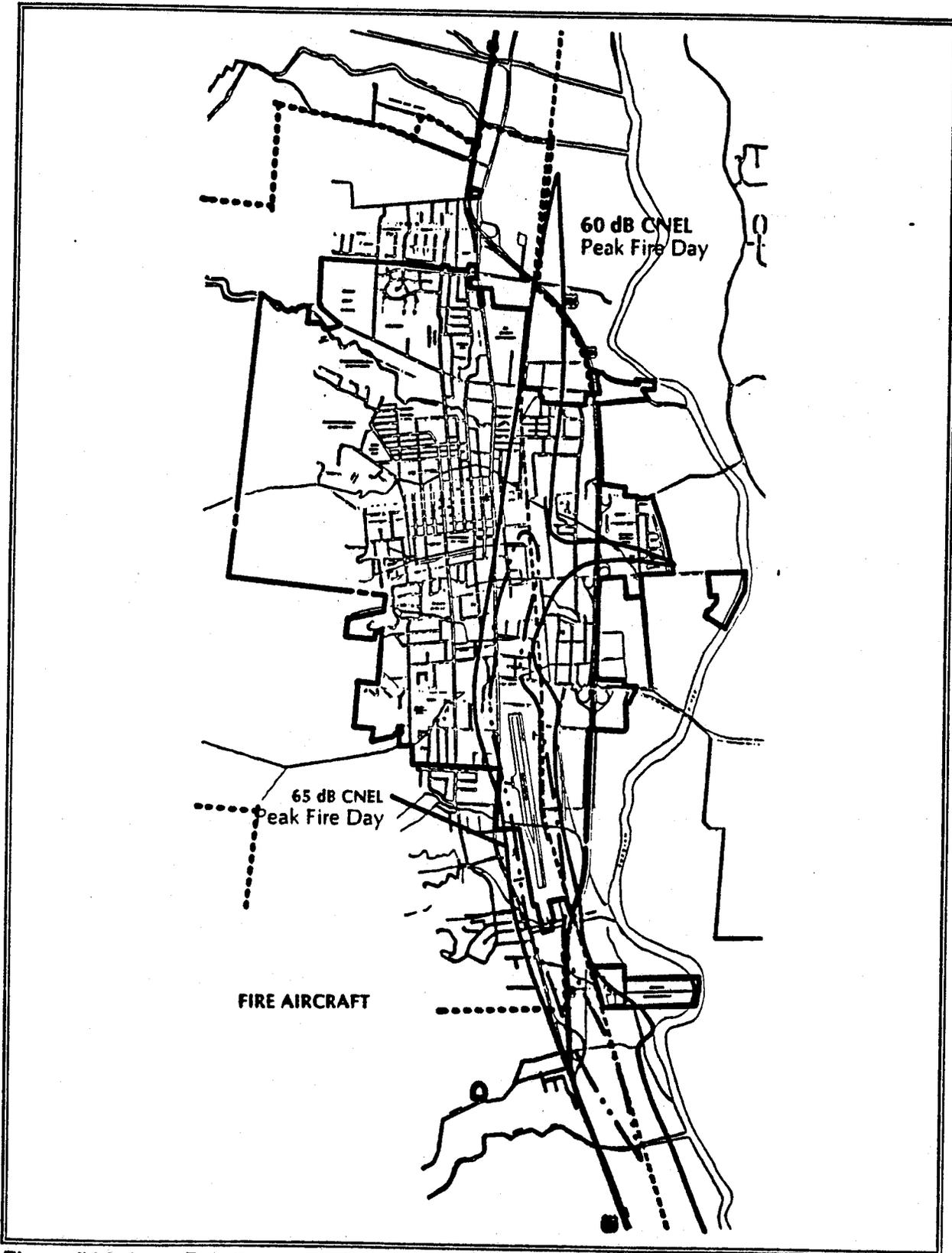


Figure IV.2-L: Existing peak day (fire fighting activities) CNEL airport contours

Compatibility for these uses near an airport can be achieved if the structure can be insulated such that indoor sound levels are no more than 45 decibels. This of course must be specially designed into any project with the help of architects, civil engineers and subsequently overseen by the authorities.

The State also has standards for noise mitigation through sound insulation. For residences other than single family detached houses, the interior noise level must not exceed 45 decibels. Any residential structure within a noise level contour of 60 decibels is required to possess additional sound insulation in order to meet the noise standards.

Mitigating for noise impact at this airport is difficult given the sporadic flight schedule of the air tankers. When the air tankers are active, the single noise events are widespread and very loud. When the tankers do not fly, only those areas directly under the takeoff paths are likely to exceed noise standards, and then only when jets and certain twin engine planes are within ½ mile of the airport.

Land use compatibility ordinances can be adopted on the basis of single noise events (Hodges and Schutt, 1991) but at the same time some compromise is reasonable in order to balance the noise of the air tankers against the public good achieved, and to take into account ordinary economic growth and development. This issue is a difficult one to resolve, but notification can ease this potential conflict.

Thus, as well as noise measurement and mitigation, there is a clear need for notification and disclosure to buyers of property anywhere near the airport. Such a disclosure should notify potential buyers of the airport's activity, its major noise generating sources, and indicate some idea of future noise. This notification will go a long way in avoiding later conflicts. This area must include both the prescribed region where aircraft activity is common, but also those areas below and around which corporate jets and air tankers operate.

2.03.02 General Plan goals, policies, and implementing programs

Goal NZ-2: Reduce industrial noise impact through the enforcement of appropriate building and land use codes.

Policy NZ-2.1: Maintain an inventory of noise contours for existing and future stationary sources.

Implementation Measure NZ-2.1(a): When the City schedules a General Plan update, include the Noise Element in the program. [Timeframe for completion: Intermediate-term planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Planning Department]

Policy NZ-2.2: Ensure adequate analysis of noise impacts when reviewing project permits.

Implementation Measure NZ-2.2(a): As a part of an application for any new construction for industrial facilities, the City shall require an estimate of noise levels from stationary sources as measured at the property line. [Timeframe for completion: Ongoing planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Planning Department]

Policy NZ-2.3: Land use designations shall follow State of California noise and land use compatibility guidelines.

Implementation Measure NZ-2.3(a): New development of noise-sensitive uses shall not be allowed where the noise level from non-transportation noise sources exceeds the

noise level standards of Table IV.2-3 as measured immediately within the property line of the new development, unless effective noise mitigation measures have been incorporated into the development design to achieve the standards specified in the table. [Timeframe for completion: Ongoing planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Planning Department]

Implementation Measure NZ-2.3(b): Noise created by new proposed non-transportation noise sources shall be mitigated to a level at or below the standards of Table IV.2-3, as measured immediately within the property line. This measure does not apply to noise sources associated with agricultural operations on lands zoned for agricultural use. [Timeframe for completion: Ongoing planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Planning Department]

Policy NZ-2.4: Protect existing residential areas from future noise impacts.

Implementation Measure NZ-2.4(a): When a new industry or an expansion of an existing industry will enlarge the DTC and impact adjacent or nearby non-industrial areas, noise-abating construction techniques or methods, such as berms, below-grade location, sound walls, dense vegetation screens, or similar technically acceptable methods shall be utilized to reduce the noise to levels within the existing DTC. [Timeframe for completion: Ongoing planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Planning Department]

2.04 Community noise levels

2.04.01 Summary of major findings

Excessive amplified sound for personal entertainment or self-expression can adversely impact another citizen's desire for peace and quiet.

Short-term noise monitoring was conducted for the preparation of the Noise Element. Each site was monitored three different times during the day and night so that valid estimates of L_{dn} could be prepared. Two long-term noise monitoring sites were established within the City of Ukiah to record day-night statistical trends. The data collected included the L_{eq} and other statistical descriptors. Measured noise levels and estimated L_{dn} values for each site are summarized in Table IV.2-5. Monitoring sites are shown in Figure IV.2-G.

Community noise monitoring systems were calibrated with acoustical calibrators in the field prior to use. The systems comply with all pertinent requirements of the American National Standards Institute (ANSI) for Type I sound level meters.

The community noise survey results indicate that typical noise levels in noise sensitive areas (such as residential neighborhoods) of the City of Ukiah General Plan study area are in the range of 48 dB to 53 dB L_{dn} . Noise from traffic on local roadways, distant industrial activities, Ukiah Municipal Airport operations and neighborhood activities are the controlling factor for background noise levels in the majority of the study area. In general, the areas of the City of Ukiah General Plan study area which contain noise sensitive uses are relatively quiet.

The L_{90} values shown in Table IV.2-5 represent background noise levels, where there are typically no identifiable local noise sources. The L_{50} values represent median noise levels. The L_{eq} values in Table IV.2-5 represent the average noise energy during the sample periods, and show the effects of brief noisy

periods. The L_{eq} values were the basis of the estimated L_{dn} values. L_{max} values show the maximum noise levels observed during the samples, and were typically due to passing cars, aircraft overflights, or children playing.

The 24-hour noise monitoring data in Figure IV.2-G show that ambient noise levels reach a minimum during the hours of 1-5 a.m., increasing during the daytime hours as a function of increased traffic and other human activities.

Noise enforcement may be put into place through several different methods. First, enforcement usually rests with the Health Department. Although the Police Department may enforce "noisy vehicles" and "loud activities," the Health Department usually enforces ongoing or peak noises from business and industry. The City, which does not have a health department, could assign noise enforcement to a code enforcement officer. With proper training and equipment, the officer would respond to calls about ongoing noisy situations, make appropriate measurements and use the normal code enforcement process to abate the noise.

2.04.02 General Plan goals, policies, and implementing programs

Goal NZ-3: Respect individuals' rights to avoid exposure to excessive or unwanted noise.

Policy NZ-3.1: Enforce existing noise regulations.

Implementation Measure NZ-3.1(a): Provide for effective enforcement of a Noise ordinance.
[Timeframe for completion: Ongoing planning period ♦ Measure applies to: City ♦ Agency/Department responsible: Planning Department and Police Department]

Implementation Measure NZ-3.1(b): Enforcement shall be supported through appropriate training and budget allowance. [Timeframe for completion: Ongoing planning period ♦ Measure applies to: City ♦ Agency/Department responsible: City Council]

