

APPENDIX 7.7 NOISE

FUNDAMENTALS OF COMMUNITY NOISE

HOW SOUND IS MEASURED

Noise is often described as unwanted sound, and thus is a subjective reaction to the physical phenomenon of sound. **Sound** is variations in air pressure that the ear can detect.

The ear responds to pressure changes over a range of 10^{14} to 1. This is roughly equivalent to the range of one second as compared to 3.2 million years, or one square yard compared to the entire surface area of the earth. To deal with the extreme range of pressures which the ear can detect, researchers express the amount of acoustical energy of a sound by comparing the measured sound pressure to a reference pressure, then taking the logarithm (base ten) of the square of that number. This original unit of sound measurement, named the **bel** after Alexander Graham Bell, corresponded well to human hearing characteristics if it was divided by a factor of ten. The resulting unit, one tenth of a bel, is called the **decibel**, and is abbreviated as **dB**.

The threshold of hearing is considered to be zero dB, and the range of sounds in normal human experience is zero to 140 dB.

Because sound pressure levels are defined as logarithmic numbers, the values cannot be directly added or subtracted. For example, two sound sources, each producing 50 dB, will produce 53 dB when combined, not 100 dB. This is because two sources have two times the energy of one source, and 10 times the logarithm of two equals three. Similarly, ten sources produce a 10 dB higher sound pressure level than one source, as ten times the logarithm of 10 equals 10.

The ear responds to pressure variations in the air from about 20 times per second to about 20,000 times per second. The frequency of the variations is described in terms of **hertz (Hz)**, formerly called cycles per second. The ear does not respond equally to all frequencies. For example, we do not hear very low frequency sounds as well as we hear higher frequency sounds, nor do we hear very high frequency sounds very well. This difference in perceived loudness varies with the sound pressure level of the sound. In general, the maximum sensitivity of the ear occurs at frequencies between about 500 and 8000 Hz.

To compensate for the fact that the ear is not as sensitive at some frequencies and sound pressure levels as at others, a number of frequency weighting scales have been developed. The "**A**" **weighting** scale is most commonly used for environmental noise assessment, as sound pressure levels measured using an A-weighting filter correlate well with community response to noise sources such as aircraft and traffic.

When an A-weighting filter is used to measure sound pressure levels, the results may be expressed as *sound levels*, in decibels (dB). It is sufficient to use the abbreviation "dB" if these terms are well defined, but many people prefer to use the expressions **dB(A)** or **dB(A)** for clarity. For convenience, many people

use the term "noise level" interchangeably with "sound level." Table A-1 shows typical sound levels and relative loudness for various types of noise environments.

The **ambient noise level** is defined as the noise from all sources near and far. A similar term is **background noise level**. This term usually refers the ambient noise level that is present before a noise source being studied is introduced. A synonymous term is **pre-project noise level**.

Noise exposure contours or **noise contours** are lines drawn about a noise source representing constant levels of noise exposure. CNEL or L_{dn} (DNL) contours are frequently utilized to graphically portray community noise exposure. The terms CNEL and L_{dn} (DNL) are defined in the following section.

ENVIRONMENTAL NOISE DESCRIPTORS

Most environmental noise sources produce varying amounts of noise over time, so the measured sound levels also vary. For example, noise produced during an aircraft overflight will vary from relatively quiet background levels before the overflight to a maximum value when the aircraft passes overhead, then returning down to background levels as the aircraft leaves the observer's vicinity. Similarly, noise from traffic varies with the number and types of vehicles, speed and proximity to the observer.

Variations in sound levels may be addressed by statistical methods. The simplest of these are the **maximum** (L_{max}) and **minimum** (L_{min}) noise levels, which are the highest and lowest levels observed. To describe less extreme variations in sound levels, other statistical descriptors may be used, such as the L_{10} and L_{50} and L_{90} . The L_{10} is the A-weighted sound level equaled or exceeded during ten percent of a time period. Similarly, the L_{50} and L_{90} are the sound levels equaled or exceeded during 50 and 90 percent of a time period. The most common time period used with these statistical descriptors is one hour, although any time period could be used so long as it is stated.

Because statistical descriptors such as L_{10} , L_{50} , etc. are cumbersome to use, the **equivalent sound level** (L_{eq}) or **energy average sound level** is often used to describe the "average" sound level during stated time period, usually one hour.

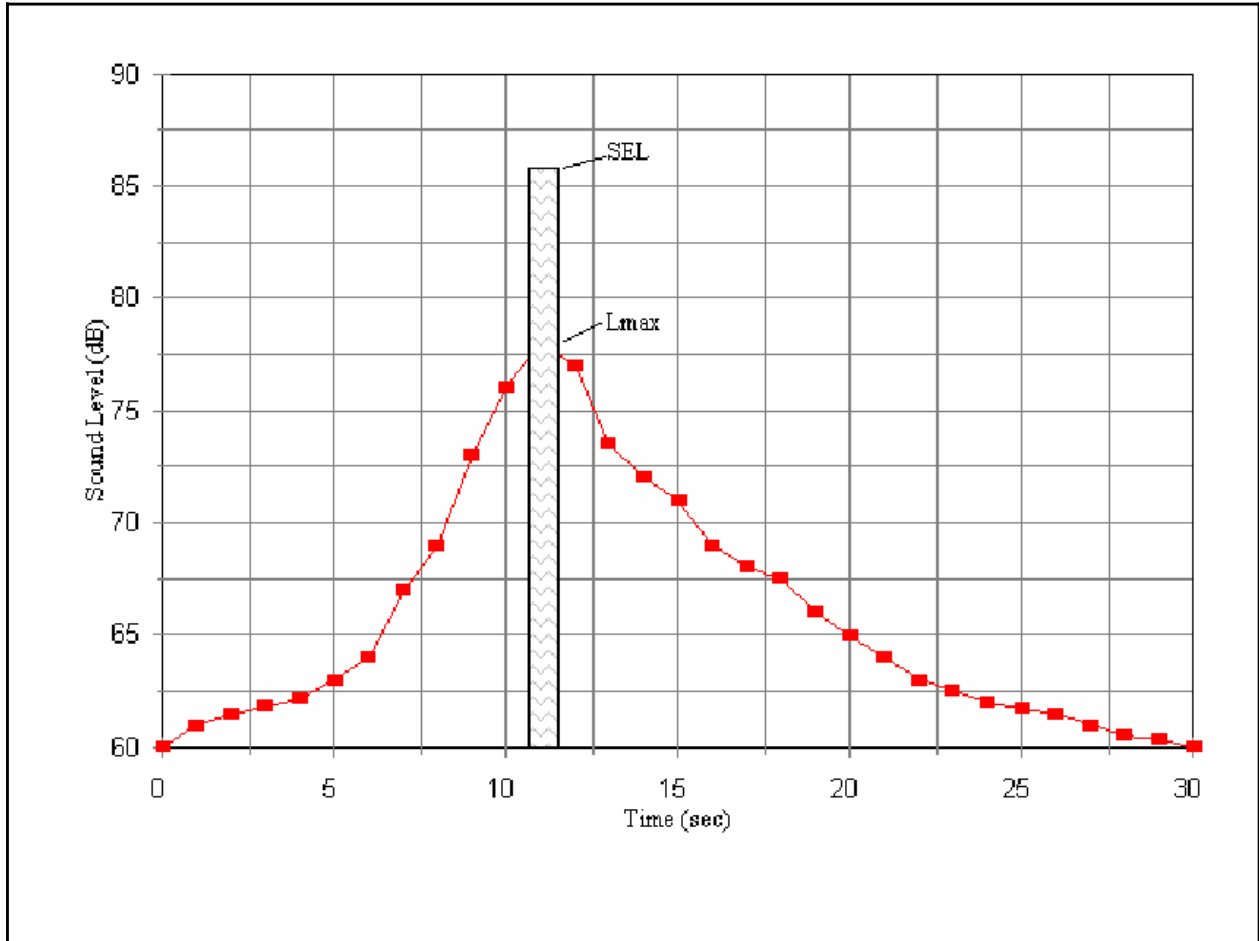
Exhibit 7.7-1
Examples of A-Weighted Sound Levels and Relative Loudness

Sound	Sound Level (dBA)	Relative Loudness (approximate)	Relative Sound Energy
Jet aircraft, 100 feet	130	128	10,000,000
Rock music with amplifier	120	64	1,000,000
Thunder, snowmobile (operator)	110	32	100,000
Boiler shop, power mower	100	16	10,000
Orchestral crescendo at 25 feet, noisy kitchen	90	8	1,000
Busy street	80	4	100
Interior of department store	70	2	10
Ordinary conversation, 3 feet away	60	1	1
Quiet automobile at low speed	50	½	.1
Average office	40	1/4	.01
City residence	30	1/8	.001
Quiet country residence	20	1/16	.0001
Rustle of leaves	10	1/32	.00001
Threshold of hearing	0	1/64	.000001

Source: U.S. Department of Housing and Urban Development, "Aircraft Noise Impact -- Planning Guidelines for Local Agencies," 1972.

For noise sources consisting of more or less discrete single noise events, such as aircraft overflights or train passbys, the exposure received during a noise event is expressed as the **Sound Exposure Level (SEL)**. The SEL represents the total amount of acoustical energy measured during a noise event as though it occurred in a one second period. The SEL incorporates the concept of "How loud was it?" with "How long was it loud?". **Exhibit 7.7-2** shows the relationship of SEL and L_{max} as applied to an aircraft noise event. The SEL is higher than the L_{max} occurring during the event because the SEL compresses the acoustical energy of the event into a reference period of one second, although the assumed duration of the event is 30 seconds in this example.

Exhibit 7.7-2
Typical Aircraft Noise Event



Finally, because people react not only to their perception of individual noise events but also to how many events there are and what time of day or night they occur, composite noise metrics have been developed to describe potential public reaction to long-term exposure to noise events. The two such common descriptors in the United States today are the **Day-Night Average Sound Level (L_{dn} or DNL)**, and the **Community Noise Equivalent Level (CNEL)**. The L_{dn} and CNEL include the concepts of “How loud was it?”, “How long was it loud?”, and “When was it loud?”.

One formula for calculating the L_{dn} is:

$$L_{dn} = 10 \text{ Log } 1/24 [15 \times 10^{(L_d/10)} + 9 \times 10^{(L_n+10)/10}]$$

where L_d is the average L_{eq} for the 15 daytime hours (i.e., 7 a.m.-10 p.m.), and L_n is the average L_{eq} for the nine nighttime hours (i.e., 10 p.m.-7 a.m.).

The CNEL may be calculated using the following formula:

$$\text{CNEL} = 10 \text{ Log } 1/24 [12 \times 10^{(L_d/10)} + 3 \times 10^{(L_e+4.77)/10} + 9 \times 10^{(L_n+10)/10}]$$

where L_e is the average L_{eq} for the three evening hours (i.e., 7 p.m.-10 p.m.). It is apparent that the L_{dn} and CNEL are very similar, differing only because the CNEL penalizes noise occurring in the evening hours by adding 4.77 dB to these values. As a practical matter, the L_{dn} and CNEL are almost equivalent, usually differing by less than one dB.

EFFECTS OF NOISE ON PEOPLE:

The most significant effects of noise on people are annoyance, sleep disturbance and long-term health impacts.

Annoyance

Public reaction to transportation noise was originally studied in 1978, and reexamined in 1992. The so-called Schultz curve was derived from those studies. The Schultz curve, as shown in **Exhibit 7.7-3**, expresses the percentage of the population which is “highly annoyed” by exposure to increasing L_{dn} or CNEL values. The number of persons “highly annoyed” represents 25-30 percent of all persons who are annoyed to some degree by noise.

Sleep Disturbance

Sleep disturbance is best correlated with single event noise descriptors such as the Sound Exposure Level (SEL). Cumulative descriptors of noise, such as the L_{dn} or CNEL, are useful for predicting annoyance in a community, but they do not adequately characterize the brief noise intrusions that usually disturb sleep. Finegold et al. in 1992 developed an interior dose-response to predict the percent of the exposed population expected to be awakened by single event noise exposure. The Finegold curve is shown in **Exhibit 7.7-4**.

Exhibit 7.7-3 Percentage of Population Highly Annoyed by Noise Exposure

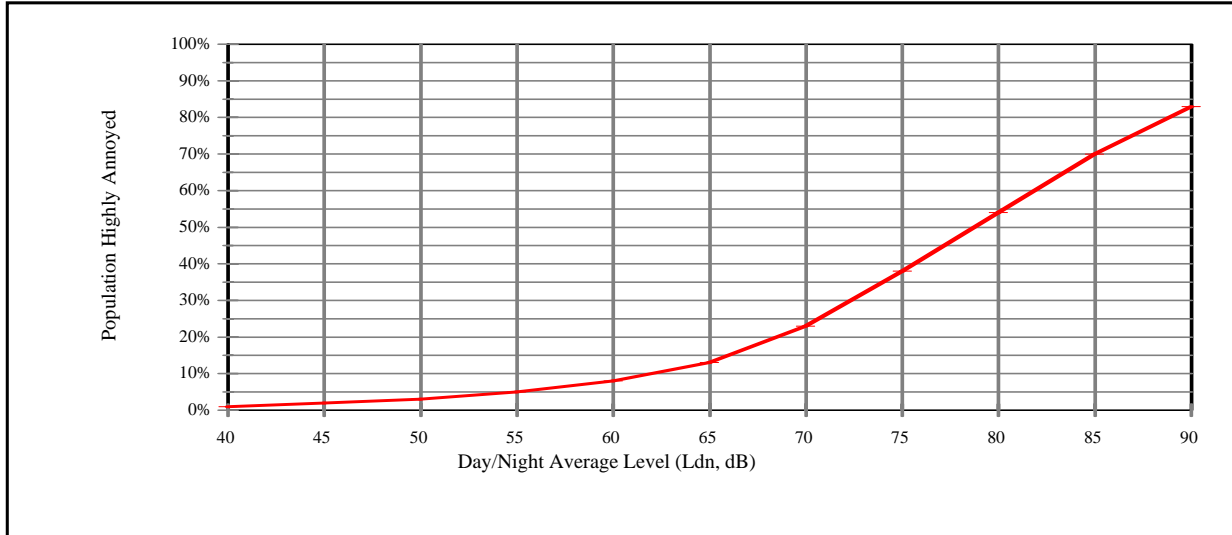
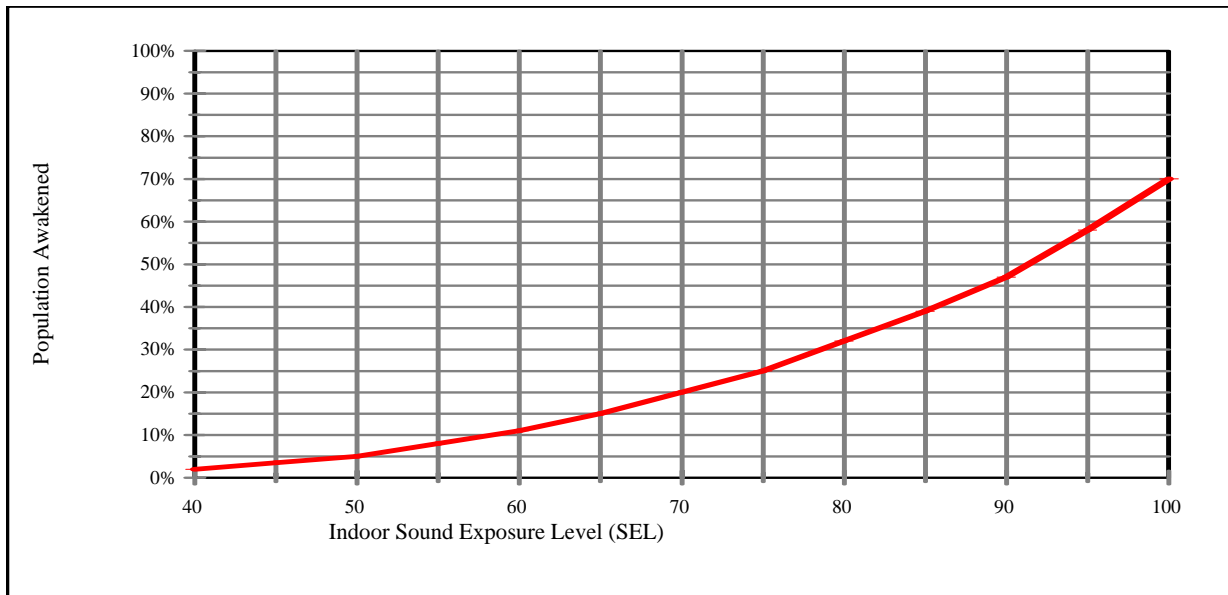


Exhibit 7.7-4 Population Awakened by Indoor Sound Exposure Levels



Long-Term Health Impacts

The National Research Council on Hearing, Bioacoustics and Biomechanics (CHABA) prepared occupational noise exposure guidelines in 1968. Those guidelines indicate that a long-term average noise exposure of less than 75 dB L_{dn} would be required to protect hearing. The Federal Occupational Safety and Health Administration (OSHA) enforces an occupational noise exposure standard of 90 dBA over an eight hour period, or an average of 85 dBA over a 24-hour period. The U.S. Environmental Protection Agency (EPA), to ensure that no measurable hearing loss would be expected over a 40-year working life, recommends an L_{dn} of 75 dB or less over a 24-hour period. The EPA's recommended level of 55 dB L_{dn} is also intended to protect against non-auditory health effects such as hypertension, cardiovascular disease and nervous disorders. It should be noted that the EPA does not consider this recommendation to be a standard since the recommended level does not take into account cost or technical feasibility, and it includes a five dB margin of safety.

Exhibit 7.7-5
Distances To Existing Ldn Traffic Noise Contours, Sonoma State Highways

Roadway Name	Segment Description	Distance to 60 dB L_{dn}, feet	Distance to 65 dB L_{dn}, feet
SR 1	Sonoma County Petaluma Valley Ford Road	54	25
SR 1	Valley Ford/Freestone Roads	52	24
SR 1	Bodega Highway	52	24
SR 1	Eastshore Road	65	30
SR 1	Jct. Rte. 116 East	39	18
SR 1	Jenner	23	11
SR 1	Fort Ross, Fort Ross Road	22	10
SR 1	Stewarts Point/Skaggs Springs Road	25	12
SR 12	Sebastopol, Jct. Rte. 116, Main Street	189	88
SR 12	Sebastopol East City Limits	273	127
SR 12	Santa Rosa, Wright/Fulton Roads	400	186
SR 12	Santa Rosa, Stony Point Road	581	270
SR 12	Santa Rosa, Dutton Avenue	642	298
SR 12	Santa Rosa, Jct. Rte. 101	662	307
SR 12	Santa Rosa, Bennett Valley Road	488	226
SR 12	Santa Rosa, Brookwood/ Maple Avenues	560	260
SR 12	Santa Rosa, Farmers Lane, West Junction	441	205
SR 12	Santa Rosa, Brush Creek Road	429	199
SR 12	Santa Rosa, Farmers Lane, East Junction	461	214
SR 12	Santa Rosa, Middle Rincon Road	445	207
SR 12	Santa Rosa, Calistoga Road	362	168
SR 12	Santa Rosa, Los Alamos Road	324	150
SR 12	Adobe Canyon Road	281	131
SR 12	Kenwood, Warm Springs Road	266	123
SR 12	Trinity Road	270	125
SR 12	Arnold Drive	252	117
SR 12	Madrone Road	207	96
SR 12	Cavedale Road	151	70
SR 12	Agua Caliente Road	131	61
SR 12	Boyes Boulevard	113	52
SR 12	Verano Avenue	119	55
SR 12	Sonoma, Petaluma Avenue	122	57
SR 12	Sonoma, Fifth Street West	102	47
SR 12	Sonoma, First Street West	96	44
SR 12	Sonoma, Patten Street	81	37
SR 12	Sonoma, Mac Arthur Street	129	60
SR 12	Napa/Leveroni Roads	107	50
SR 12	Watmaugh Road	149	69

Roadway Name	Segment Description	Distance to 60 dB L_{dn}, feet	Distance to 65 dB L_{dn}, feet
SR 37	Sonoma County Lakeville Road	860	399
SR 37	Jct. Rte. 121 North	686	318
SR 101	Sonoma County Kastania Road	1627	755
SR 101	South Petaluma Boulevard	1566	727
SR 101	Petaluma, South Jct. Rte. 116 East	1686	783
SR 101	Petaluma, East Washington Street	1674	777
SR 101	Petaluma, Old Redwood Highway North	1780	826
SR 101	Pepper Road	1745	810
SR 101	Railroad Avenue	1609	747
SR 101	Cotati, Sierra Avenue	1555	722
SR 101	Cotati, North Jct. Rte. 116	1609	747
SR 101	Rohnert Park, Rohnert Park Expressway	1663	772
SR 101	Rohnert Park, Wilfred Avenue	1860	863
SR 101	Santa Rosa Avenue	1468	682
SR 101	Todd Road	1468	682
SR 101	Santa Rosa, Hearn Avenue	1526	708
SR 101	Santa Rosa, Baker Avenue	1620	752
SR 101	Santa Rosa, Jct. Rte. 12, Third Street	1488	691
SR 101	Santa Rosa, Fourth Street	1620	752
SR 101	Santa Rosa, College Avenue	1564	726
SR 101	Santa Rosa, Steele Lane	1478	686
SR 101	Santa Rosa, Bicentennial Way	1278	593
SR 101	Santa Rosa, Mendocino Avenue	1299	603
SR 101	Santa Rosa, Hopper Avenue	1370	636
SR 101	East Fulton/River Roads	1529	710
SR 101	Fulton Road	1582	735
SR 101	Airport Boulevard	1516	704
SR 101	Shiloh Road	1321	613
SR 101	Windsor River Road	1078	501
SR 101	Grant Avenue	918	426
SR 101	South Healdsburg	752	349
SR 101	Healdsburg, Westside Road	825	383
SR 101	Healdsburg, Dry Creek Road	701	325
SR 101	Lytton Springs Road	683	317
SR 101	Independence Lane	674	313
SR 101	South Geyserville	608	282
SR 101	Jct. Rte. 128 East, Canyon Road	606	281
SR 101	Asti	604	280
SR 101	Dutcher Creek Road	604	280
SR 101	South Cloverdale	560	260
SR 101	Central Cloverdale/Citrus Fair Drive	487	226
SR 101	Jct. Rte. 128 West	481	223

Roadway Name	Segment Description	Distance to 60 dB L_{dn}, feet	Distance to 65 dB L_{dn}, feet
SR 116	Jct. Rte. 1; Jenner, South	69	32
SR 116	Austin Creek	117	54
SR 116	Monte Rio Road (Town Center)	139	65
SR 116	Guerneville Park, Hulbert Creek Bridge	197	91
SR 116	Guerneville, Armstrong Woods Road	140	65
SR 116	Santa Nella Winery Road	66	31
SR 116	Forestville, Mirabel Road	181	84
SR 116	Guerneville Road	176	81
SR 116	Graton/Frei Roads	224	104
SR 116	Occidental/Molino Roads	225	105
SR 116	Sebastopol, Covert Lane	272	126
SR 116	Sebastopol, on Main Street	251	117
SR 116	Sebastopol, on Petaluma Avenue	179	83
SR 116	Sebastopol, Jct. Rte. 12 East	213	99
SR 116	Sebastopol, Jct. Rte. 12 East	218	101
SR 116	Sebastopol, Petaluma Avenue	323	150
SR 116	Bloomfield Road	244	113
SR 116	Mt. Vernon/lone Pine Roads	246	114
SR 116	Stony Point Road (East)	235	109
SR 116	Petaluma, South Jct. Rte. 101	568	263
SR 116	Frates Road/Cader Lane	476	221
SR 116	Lakeville Road	106	49
SR 116	Adobe Road	391	181
SR 116	Watmaugh Road (To Sonoma)	347	161
SR 116	Arnold Drive	380	176
SR 121	Jct. Rte. 37	369	171
SR 121	Jct. Rte. 116 West, Arnold Drive	435	202
SR 121	Jct. Rte. 12 North; Schellville, West	401	186
SR 121	Schellville, Eighth Street	407	189
SR 121	Ramal Road	373	173
SR 121	Napa Road	558	259
SR 121	Mendocino Sonoma County Line	95	44
SR 121	South Jct. Rte. 101, Canyon Road	98	46
SR 121	Canyon Road/Old Redwood Highway	100	46
SR 121	River Road	73	34
SR 121	Geyersville, Old Redwood Highway	115	53
SR 121	Geysers Road	88	41
SR 121	Alexander Valley Road	152	71
SR 121	Pine Flat Road	138	64
SR 121	Chalk Hill Road	104	48
SR 121	Kellogg, Franz Valley Road	81	38
SR 121	Sonoma County Napa County	107	49

Exhibit 7.7-6
Distances to Existing Ldn Traffic Noise Contours, Sonoma County Roads

Roadway Name	Segment Description	Distance to 60 dB Ldn, feet	Distance to 65 dB Ldn, feet
Adobe Rd	E/Old Redwood Hwy N	76	35
Adobe Rd	W/Petaluma Hill Rd	84	39
Adobe Rd	W/Woodward Ave	171	79
Adobe Rd	E/Woodward Ave	171	79
Adobe Rd	W/ Corona Rd	189	88
Adobe Rd	W/ East Washington Rd	181	84
Adobe Rd	E/ East Washington Rd	190	88
Adobe Rd	E/ Frates Rd	208	96
Agua Caliente Rd	E/Arnold Dr	37	17
Airport Blvd	W/Ordinance Rd	52	24
Airport Blvd	W/Laughlin Rd	60	28
Airport Blvd	E/ Skylane	134	62
Airport Blvd	E/ Brickway	173	80
Airport Blvd	W/ Regional Parkway	145	67
Airport Blvd	E/ Concourse Blvd	143	67
Airport Blvd	E/ RR Tracks	179	83
Airport Blvd	E/ Regional Pkwy	203	94
Airport Blvd	E/ Aviation Blvd	258	120
Airport Blvd	W/ Fulton Rd	140	65
Airport Blvd	E/ Fulton Rd	151	70
Airport Blvd	W/ Faught Rd	87	40
Alexander Valley Rd	W/ Lytton Station Rd	82	38
Armstrong Woods Rd	N/ Hwy 116	40	18
Armstrong Woods Rd	N/ Watson	18	8
Arnold Dr	S/ Watmaugh Rd	201	93
Arnold Dr	N/ Watmaugh Rd	237	110
Arnold Dr	N/ Almeria	254	118
Arnold Dr	N/ Leveroni Rd	219	102
Arnold Dr	S/ Petaluma Ave	195	91
Arnold Dr	N/ Solano Ave	221	103
Arnold Dr	N/ Verano Ave	224	104
Arnold Dr	S/ Agua Caliente Rd	206	96
Arnold Dr	N/ Agua Caliente Rd	178	83
Arnold Dr	N/ Chauvet Rd	87	40
Arnold Dr	S/ London Ranch Rd	89	41
Arnold Dr	S/ Dunbar Rd	64	30
Arnold Dr	S/ Hwy 12	65	30
Aviation Blvd	W/ Airport Ave	76	35

Roadway Name	Segment Description	Distance to 60 dB Ldn, feet	Distance to 65 dB Ldn, feet
Barham Ave	E/ Dutton Ave	49	23
Barham Ave	W/ Olive St	21	10
Barham Ave	E/ Olive St	12	5
Barnes Rd	S/ River Rd	62	29
Bonnet Valley Rd	W/ Grange Rd	113	53
Bennett Valley Rd	E/ Sonoma Mountain Rd	68	32
Bennett Valley Rd	W/ Warm Springs Rd	54	25
Bloomfield Rd	N/ Valley Ford Rd	32	15
Bloomfield Rd	S/ Kennedy Rd	62	29
Bloomfield Rd	S/ Pleasant Hill Rd	55	25
Bloomfield Rd	S/ Hwy 116	111	52
Bodega Ave	W/ King Rd	93	43
Bodega Ave	W/ Thompson Ln	129	60
Bodega Ave	E/ Lohrman Ln	161	75
Bodega Ave	W/ Paula	164	76
Bodega Ave	E/ Paula	158	73
Bodega Hwy	E/ Valley Ford / Freestone Rd	161	75
Bodega Hwy	W/ Bohemian Hwy	152	70
Bodega Hwy	W/ Jonive	107	50
Bodega Hwy	E/ Wagon Rd	117	54
Bodega Hwy	E/ Grandview Rd	143	66
Bodega Hwy	W/ Watertrough Rd	157	73
Bodega Hwy	E/ Watertrough Rd	177	82
Bohemian Hwy	S/ Hwy 116	86	40
Bohemian Hwy	N/ Freestone Flat Rd	52	24
Bohemian Hwy	S/ Bittner Rd	58	27
Bohemian Hwy	S/ Main St	58	27
Bohemian Hwy	N/ Graton Rd	73	34
Boyes Blvd	W/ Railroad Ave	45	21
Boyes Blvd	E/ Railroad Ave	71	33
Boyes Blvd	E/ Riverside Rd	61	28
Brush Creek Rd	N/ Montecito Ave	88	41
Calistoga Rd	S/ Rincon Ave	75	35
Calistoga Rd	S/ Porter Creek Rd	68	32
Corby Ave	S/ Smokewood Drive	71	33
Corby Ave	S/ Peach St	58	27
Corby Ave	N/ Peach St	53	24
Corona Rd	S/ Adobe Rd	86	40
Crane Canyon Rd	E/ Petaluma Hill Rd	67	31
Crane Canyon Rd	E/ Inverness Ave	46	21
D St	S/ San Antonio Rd	63	29
Dry Creek Rd	N/ Lytton Springs Rd	108	50

Roadway Name	Segment Description	Distance to 60 dB Ldn, feet	Distance to 65 dB Ldn, feet
Dry Creek Rd	N/ Lambert Bridge Rd	78	36
Dutton Ave	N/ Hearn Ave	62	29
Dutton Ave	S/ Barham Ave	77	36
East Cotati Ave	W/ Petaluma Hill Rd	98	45
East Napa St	W/ Seventh St. East	71	33
East Washington St	S/ Adobe Rd	84	39
Eighth St East	N/ Hwy 12 / 121	39	18
Eighth St East	S/ Napa Rd	68	31
Eighth St East	N/ Napa Rd	79	37
Eighth St East	S/ East Napa St	65	30
Ely Rd	E/ Old Redwood Hwy N	56	26
Fifth St West	N/ Leveroni Rd	132	61
Frates Rd	S/ Adobe Rd	100	46
Fulton Rd	S/ River Rd	191	89
Fulton Rd	N/ River Rd	206	96
Grange Rd	S/ Bennett Valley Rd	86	40
Graton Rd	W/ Green Hill Rd	37	17
Graton Rd	W/ Ross Rd	37	17
Graton Rd	W/ Hwy 116	35	16
Green Valley Rd	E/ Hwy 116	6	3
Green Valley Rd	E/ Harrison Grade Rd	11	5
Green Valley Rd	W/ Hwy 116	38	18
Guerneville Rd	E/ Vine Hill Rd	104	48
Guerneville Rd	E/ Frei Rd	123	57
Guerneville Rd	W/ Willowside Rd	211	98
Guerneville Rd	E/ Willowside Rd	259	120
Guerneville Rd	W/ Lance Ave	178	82
Hearn Ave	W/ Dutton Ave	72	34
Hearn Ave	E/ Dutton Ave	138	64
High School Rd	N/ East Hurlbut Ave	69	32
High School Rd	S/ Occidental Rd	71	33
Lakeville Rd	N/ Hwy 37	287	133
Lakeville Rd	N/ Cannon Ln	279	130
Leveroni Rd	E/ Arnold Dr	190	88
Leveroni Rd	E/ Harrington	159	74
Llano Rd	N/ Hwy 116	72	34
Llano Rd	N/ Ludwig Ave	120	56
Lone Pine Rd	W/ Hwy 116	55	25
Ludwig Ave	W/ Stony Pt. Rd	84	39
Madrone Rd	W/ Hwy 12	46	21
Main St	S/ Hwy 12	37	17
Main St	S/ Adobe Rd	77	36

Roadway Name	Segment Description	Distance to 60 dB Ldn, feet	Distance to 65 dB Ldn, feet
Main St	N/ Tyrone Rd	22	10
Mark West Springs Rd	E/ Hwy 101	236	110
Mark West Springs Rd	E/ Ursuline Rd	189	88
Mark West Springs Rd	W/ Mark West Springs Lodge	122	57
Mark West Springs Rd	E/ Michele Way	125	58
Mark West Springs Rd	W/ Porter Creek Rd	134	62
Mark West Springs Rd	E/ Trenton Healdsburg Rd	22	10
Mecham Rd	S/ Dump	50	23
Mecham Rd	N/ Pepper Rd	49	23
Mecham Rd	N/ Refuse Rd	79	36
Mecham Rd	S/ Stony Pt. Rd	74	34
Mill Station Rd	W/ Occidental Rd	33	15
Millbrae Ave	W/ Stony Pt. Rd	35	16
Millbrae Ave	E/ Stony Pt. Rd	101	47
Mirabel Rd	S/ Trenton Rd	128	59
Moorland Ave	N/ Todd Rd	49	23
Mountain View Ave	E/ Santa Rosa Ave	60	28
Mountain View Ave	W/ Hunter Ln	49	23
Mountain View Ave	E/ Hunter Ln	43	20
Napa Rd	W/ Fifth St East	120	56
Napa Rd	E/ Pueblo Ave	125	58
Napa Rd	W/ Eighth St East	125	58
Napa Rd	W/ Hyde Rd	131	61
Napa Rd	E/ Burndale Rd	125	58
Occidental Rd	E/ Mill St	108	50
Occidental Rd	E/ Hwy 116	147	68
Occidental Rd	W/ Sanford Rd	169	78
Occidental Rd	E/ High School Rd	133	62
Occidental Rd	E/ Irwin Ln	139	65
Occidental Rd	E/ Merced	138	64
Old Redwood Hwy	N/ Mendocino	175	81
Old Redwood Hwy	S/ Ursuline	179	83
Old Redwood Hwy	N/ Mark West Springs Rd	218	101
Old Redwood Hwy	S/ Wikiup Dr	191	88
Old Redwood Hwy	N/ Mark West Circle Bridge	196	91
Old Redwood Hwy	N/ Wikiup Dr	175	81
Old Redwood Hwy	N/ Faught Rd	171	79
Old Redwood Hwy	N/ Fulton Rd	165	76
Old Redwood Hwy	N/ Eastside Rd	117	54
Old Redwood Hwy	N/ Ely Rd	239	111
Old Redwood Hwy	N/ Adobe Rd	157	73
Old Redwood Hwy	S/ West Railroad Ave	171	79

Roadway Name	Segment Description	Distance to 60 dB Ldn, feet	Distance to 65 dB Ldn, feet
Old Redwood Hwy	N/ West Railroad Ave	177	82
Old Redwood Hwy	N/ East Railroad Ave	169	78
Olivet Rd	N/ Guerneville Rd	78	36
Olivet Rd	S/ River Rd	71	33
Pepper Rd	E/ Walker Rd	104	49
Pepper Rd	E/ Mecham Rd	74	34
Pepper Rd	W/ Stony Pt. Rd	92	43
Petaluma Ave	E/ Arnold Dr	92	43
Petaluma Blvd N	N/ Skillman Ln	257	119
Petaluma Blvd S	N/ Hwy 101 S/B Off Ramp	221	102
Petaluma Hill Rd	N/ Adobe Rd	280	130
Petaluma Hill Rd	S/ East Railroad Ave	282	131
Petaluma Hill Rd	N/ East Railroad Ave	291	135
Petaluma Hill Rd	N/ Roberts Rd	246	114
Petaluma Hill Rd	N/ East Cotati Ave	268	124
Petaluma Hill Rd	S/ Crane Canyon Rd	265	123
Petaluma Hill Rd	N/ Crane Canyon Rd	190	88
Petaluma Hill Rd	N/ Snyder Ln	306	142
Petrified Forest Rd	W/ Sharp Rd	164	76
Porter Creek Rd	E/ Franz Valley Rd	77	36
Railroad ave	S/ Verano Ave	21	10
Railroad Ave	N/ Verano Ave	76	35
Railroad Ave	S/ Boyes Blvd	48	22
Railroad Ave	N/ Boyes Blvd	28	13
Riel Rd	W/ Wilshire Dr	67	31
River Rd	W/ Orchard Rd	126	59
River Rd	E/ Canyon Two Rd	120	56
River Rd	W/ Mirabel Rd	130	60
River Rd	W/ Trenton_Healdsburg Rd	116	54
River Rd	W/ Fulton Rd	137	64
River Rd	E/ Fulton Rd	133	62
Riverside Dr	N/ Hwy 12	101	47
Riverside Dr	N/ Petaluma Ave	63	29
Riverside Dr	S/ Grove St	47	22
Riverside Dr	N/ Grove St	26	12
Riverside Dr	N/ Verano Ave	36	17
Roblar Rd	W/ Canfield Rd	38	18
Roblar Rd	E/ Canfield Rd	52	24
Roblar Rd	W/ Stony Pt. Rd	82	38
Rohnert Park Exp	E/ Stony Pt. Rd	209	97
Rohnert Park Exp	W/ Petaluma Hill Rd	158	73
Santa Rosa Ave	S/ Horn Ave	147	68

Roadway Name	Segment Description	Distance to 60 dB Ldn, feet	Distance to 65 dB Ldn, feet
Santa Rosa Ave	S/ Mountain View Ave	175	81
Santa Rosa Ave	N/ Mountain View Ave	195	91
Santa Rosa Ave	S/ East Robles Ave	181	84
Santa Rosa Ave	N/ East Robles Ave	160	74
Sebastopol Rd	E/ Stony Pt. Rd	196	91
Sebastopol Rd	E/ West Ave	230	107
Skillman Ln	E/ Bodega Ave	50	23
Skillman Ln	E/ Thompson Ln	77	36
Skillman Ln	W/ Petaluma Blvd	106	49
Skylane Blvd	N/ Airport Blvd	68	31
Snyder Ln	S/ Petaluma Hill Rd	127	59
Standish Ave	N/ Todd Rd	69	32
Stony Point Rd	S/ Pepper Rd	127	59
Stony Point Rd	N/ Pepper Rd	114	53
Stony Point Rd	S/ Mecham Rd	165	76
Stony Point Rd	N/ Mecham Rd	132	61
Stony Point Rd	N/ Roblar Rd	201	93
Stony Point Rd	S/ Madrone	166	77
Stony Point Rd	N/ Hwy 116	144	67
Stony Point Rd	N/ Rohnert Park Exp	127	59
Stony Point Rd	S/ Millbrae Ave	152	71
Stony Point Rd	N/ Millbrae Ave	160	74
Stony Point Rd	N/ Scenic Ave	186	86
Stony Point Rd	S/ Todd Rd	145	67
Stony Point Rd	N/ Todd Rd	172	80
Todd Rd	W/ Llano Rd	59	28
Todd Rd	W/ Stony Pt. Rd	79	37
Todd Rd	E/ Stony Pt. Rd	101	47
Todd Rd	W/ Standish Ave	88	41
Todd Rd	E/ Standish Ave	140	65
Valley Ford Rd	E/ Gericke Rd	85	39
Valley Ford Rd	W/ Tomales Rd	88	41
Verano Ave	E/ Hickory St	51	23
Verano Ave	E/ Linden Ave	62	29
Verano Ave	W/ Railroad Ave	64	30
Verano Ave	W/ Riverside Dr	67	31
Verano Ave	E/ Riverside Dr	75	35
Verano Ave	W/ Hwy 12	77	36
Verano Ave	E/ Lomita Ave	62	29
Vine Hill Rd	S/ Guerneville	92	43
Warm Springs Rd	N/ Henno Rd	51	24
Warm Springs Rd	N/ Sonoma Mt Rd	45	21

Roadway Name	Segment Description	Distance to 60 dB Ldn, feet	Distance to 65 dB Ldn, feet
Warm Springs Rd	S/ Lawndale	19	9
Warm Springs Rd	N/ Bennett Valley Rd	21	10
Warm Springs Rd	N/ Lawndale	27	12
Warm Springs Rd	S/ Hwy 12	28	13
Watertrough Rd	S/ Burnside Rd	66	31
Watertrough Rd	S/ Bodega Hwy	91	42
Watmaugh Rd	W/ Arnold Dr	95	44
Watmaugh Rd	E/ Arnold Dr	71	33
Watmaugh Rd	W/ Hwy 12	66	31
West Ave	N/ Gloria Dr	32	15
West Ave	S/ South Ave	40	18
West Ave	N/ South Ave	44	20
West Ave	S/ Sunset Ave	45	21
West Third St	W/ Dutton Ave	116	54
Westside Rd	N/ Felta Rd	65	30
Westside Rd	S/ Kinley Dr	93	43
Wikiup Dr	E/ Old Redwood Hwy N	46	21

**Exhibit 7.7-7
Comparison of Existing and Future Traffic Noise Levels – State Highways and Roadways**

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
SR 1	Sonoma County Petaluma-Valley Ford Road	60.5	62.6	2.1	74
SR 1	Valley Ford / Freestone Roads	60.3	62.4	2.1	72
SR 1	Bodega Highway	60.2	62.3	2.1	71
SR 1	Eastshore Road	61.7	63.8	2.1	89
SR 1	Jct. Rte. 116 East	58.4	60.5	2.1	54
SR 1	Jenner	55.0	57.0	2.1	32
SR 1	Fort Ross, Fort Ross Road	54.8	56.9	2.1	31
SR 1	Stewarts Point/Skaggs Springs Road	55.6	57.7	2.1	35
SR 12	Sebastopol, Jct. Rte. 116, Main Street	68.7	70.1	1.5	237
SR 12	Sebastopol East City Limits	71.1	72.5	1.5	341
SR 12	Santa Rosa, Wright/Fulton Roads	73.6	75.0	1.5	501
SR 12	Santa Rosa, Stony Point Road	76.0	77.4	1.5	728
SR 12	Santa Rosa, Dutton Avenue	76.6	78.1	1.5	804
SR 12	Santa Rosa, Jct. Rte. 101	76.8	78.3	1.5	828
SR 12	Santa Rosa, Bennett Valley Road	74.8	76.3	1.5	610
SR 12	Santa Rosa, Brookwood/ Maple Avenues	75.7	77.2	1.5	701
SR 12	Santa Rosa, Farmers Lane, West Junction	74.2	75.6	1.5	552

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
SR 12	Santa Rosa, Brush Creek Road	74.0	75.5	1.5	537
SR 12	Santa Rosa, Farmers Lane, East Junction	74.5	75.9	1.5	577
SR 12	Santa Rosa, Middle Rincon Road	74.2	75.7	1.5	557
SR 12	Santa Rosa, Calistoga Road	72.9	74.4	1.5	453
SR 12	Santa Rosa, Los Alamos Road	72.2	73.6	1.5	406
SR 12	Adobe Canyon Road	71.3	72.7	1.5	352
SR 12	Kenwood, Warm Springs Road	70.9	72.3	1.5	332
SR 12	Trinity Road	71.0	72.5	1.5	338
SR 12	Arnold Drive	70.5	72.0	1.5	316
SR 12	Madrone Road	69.2	70.1	0.8	235
SR 12	Cavedale Road	67.2	68.0	0.8	172
SR 12	Agua Caliente Road	66.3	67.1	0.8	148
SR 12	Boyes Boulevard	65.3	65.9	0.6	124
SR 12	Verano Avenue	65.7	66.5	0.8	135
SR 12	Sonoma, Petaluma Avenue	65.8	66.6	0.8	138
SR 12	Sonoma, Fifth Street West	64.7	65.4	0.8	115
SR 12	Sonoma, First Street West	64.2	65.0	0.8	108
SR 12	Sonoma, Patten Street	63.1	63.9	0.8	91
SR 12	Sonoma, Mac Arthur Street	66.2	67.0	0.8	146
SR 12	Napa/Leveroni Roads	65.0	65.8	0.8	121
SR 12	Watmaugh Road	67.1	67.9	0.8	169

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
SR 37	Sonoma County Lakeville Road	78.5	80.3	1.8	1127
SR 37	Jct. Rte. 121 North	77.1	80.0	2.9	1077
SR 101	Sonoma County Kastania Road	82.7	82.4	-0.3	1553
SR 101	South Petaluma Boulevard	82.4	83.0	0.5	1699
SR 101	Petaluma, South Jct. Rte. 116 East	82.9	83.4	0.5	1829
SR 101	Petaluma, East Washington Street	82.9	83.4	0.5	1817
SR 101	Petaluma, Old Redwood Highway North	83.3	83.8	0.5	1931
SR 101	Pepper Road	83.1	83.7	0.5	1893
SR 101	Railroad Avenue	82.6	83.1	0.5	1746
SR 101	Cotati, Sierra Avenue	82.4	82.9	0.5	1687
SR 101	Cotati, North Jct. Rte. 116	82.6	83.1	0.5	1746
SR 101	Rohnert Park, Rohnert Park Expressway	82.8	83.4	0.5	1804
SR 101	Rohnert Park, Wilfred Avenue	83.6	83.9	0.4	1972
SR 101	Santa Rosa Avenue	82.0	82.4	0.4	1555
SR 101	Todd Road	82.0	82.4	0.4	1555
SR 101	Santa Rosa, Hearn Avenue	82.3	82.6	0.4	1616
SR 101	Santa Rosa, Baker Avenue	82.7	83.0	0.4	1715
SR 101	Santa Rosa, Jct. Rte. 12, Third Street	82.1	83.6	1.5	1877
SR 101	Santa Rosa, Fourth Street	82.7	84.2	1.5	2046

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
SR 101	Santa Rosa, College Avenue	82.4	84.0	1.5	1976
SR 101	Santa Rosa, Steele Lane	82.1	83.6	1.5	1867
SR 101	Santa Rosa, Bicentennial Way	81.1	82.6	1.5	1615
SR 101	Santa Rosa, Mendocino Avenue	81.2	82.7	1.5	1641
SR 101	Santa Rosa, Hopper Avenue	81.6	83.1	1.5	1731
SR 101	East Fulton/River Roads	82.3	84.0	1.7	1990
SR 101	Fulton Road	82.5	84.2	1.7	2055
SR 101	Airport Boulevard	82.2	83.4	1.2	1811
SR 101	Shiloh Road	81.3	82.5	1.2	1581
SR 101	Windsor River Road	80.0	82.1	2.1	1482
SR 101	Grant Avenue	79.0	81.0	2.1	1261
SR 101	South Healdsburg	77.7	79.7	2.1	1032
SR 101	Healdsburg, Westside Road	78.3	80.3	2.1	1133
SR 101	Healdsburg, Dry Creek Road	77.2	79.3	2.1	962
SR 101	Lytton Springs Road	77.0	79.1	2.1	939
SR 101	Independence Lane	76.9	79.0	2.1	926
SR 101	South Geyserville	76.3	78.3	2.1	835
SR 101	Jct. Rte. 128 East, Canyon Road	76.2	78.3	2.1	832
SR 101	Asti	76.2	78.3	2.1	829
SR 101	Dutcher Creek Road	76.2	78.3	2.1	829
SR 101	South Cloverdale	75.7	79.7	4.0	1030
SR 101	Central Cloverdale/Citrus	74.8	78.8	4.0	895

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
	Fair Drive				
SR 101	Jct. Rte. 128 West	74.7	75.7	1.0	556
SR 116	Jct. Rte. 1; Jenner, South	62.1	63.0	0.9	79
SR 116	Austin Creek	65.5	66.5	0.9	135
SR 116	Monte Rio Road (Town Center)	66.7	67.6	0.9	161
SR 116	Guerneville Park, Hulbert Creek Bridge	68.9	69.9	0.9	227
SR 116	Guerneville, Armstrong Woods Road	66.7	67.7	0.9	162
SR 116	Santa Nella Winery Road	61.8	62.8	0.9	77
SR 116	Forestville, Mirabel Road	68.4	69.3	0.9	209
SR 116	Guerneville Road	68.2	65.1	-3.1	110
SR 116	Graton/Frei Roads	69.8	69.4	-0.4	211
SR 116	Occidental/Molino Roads	69.8	69.4	-0.4	213
SR 116	Sebastopol, Covert Lane	71.0	70.7	-0.4	257
SR 116	Sebastopol, On Main Street	70.5	70.2	-0.4	238
SR 116	Sebastopol, On Petaluma Avenue	68.3	67.9	-0.4	169
SR 116	Sebastopol, Jct. Rte. 12 East	69.4	71.3	1.8	282
SR 116	Sebastopol, Jct. Rte. 12 East	69.6	71.4	1.8	288
SR 116	Sebastopol, Petaluma Avenue	72.2	74.0	1.8	427
SR 116	Bloomfield Road	70.3	72.2	1.8	323
SR 116	Mt. Vernon/Lone Pine Roads	70.4	72.2	1.8	325

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
SR 116	Stony Point Road (East)	70.1	71.9	1.8	310
SR 116	Petaluma, South Jct. Rte. 101	75.8	77.6	1.8	750
SR 116	Frates Road/Cader Lane	74.7	76.5	1.8	630
SR 116	Lakeville Road	64.9	66.7	1.8	140
SR 116	Adobe Road	73.4	76.9	3.5	664
SR 116	Watmaugh Road (To Sonoma)	72.6	76.1	3.5	590
SR 116	Arnold Drive	73.2	76.7	3.5	647
SR 121	Jct. Rte. 37	73.0	73.7	0.6	407
SR 121	Jct. Rte. 116 West, Arnold Drive	74.1	74.4	0.3	456
SR 121	Jct. Rte. 12 North; Schellville, West	73.6	73.9	0.3	419
SR 121	Schellville, Eighth Street	73.7	73.9	0.3	425
SR 121	Ramal Road	73.1	73.4	0.3	390
SR 121	Napa Road	75.7	75.7	0.0	560
SR 121	Mendocino-Sonoma County Line	64.2	64.2	0.0	96
SR 121	South Jct. Rte. 101, Canyon Road	64.4	64.4	0.0	99
SR 121	Canyon Road/Old Redwood Highway	64.5	64.5	0.0	100
SR 121	River Road	62.5	62.5	0.0	74
SR 121	Geysersville, Old Redwood Highway	65.4	65.5	0.0	116
SR 121	Geysers Road	63.7	63.7	0.0	88
SR 121	Alexander Valley Road	67.3	67.3	0.0	153
SR 121	Pine Flat Road	66.6	66.6	0.0	139

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
SR 128	Chalk Hill Road	64.8	66.9	2.2	145
SR 128	Kellogg, Franz Valley Road	63.2	64.1	1.0	94
SR 128	Sonoma County-Napa County	64.9	63.7	-1.2	88
Adobe Rd	E/Old Redwood Hwy N	62.7	64.5	1.8	99
Adobe Rd	W/Petaluma Hill Rd	63.4	65.1	1.8	110
Adobe Rd	W/Woodward Ave	68.0	69.8	1.8	225
Adobe Rd	E/Woodward Ave	68.0	69.8	1.8	225
Adobe Rd	W/ Corona Rd	68.7	70.5	1.8	249
Adobe Rd	W/ East Washington Rd	68.4	70.9	2.5	265
Adobe Rd	E/ East Washington Rd	68.7	70.9	2.2	265
Adobe Rd	E/ Frates Rd	69.3	71.5	2.3	294
Agua Caliente Rd	E/Arnold Dr	58.0	59.9	1.9	49
Airport Blvd	W/Ordinance Rd	60.2	62.8	2.6	77
Airport Blvd	W/Laughlin Rd	61.2	63.8	2.6	89
Airport Blvd	E/ Skylane	66.4	69.0	2.6	200
Airport Blvd	E/ Brickway	68.1	70.7	2.6	257
Airport Blvd	W/ Regional Parkway	66.9	69.5	2.6	215
Airport Blvd	E/ Concourse Blvd	66.9	69.4	2.6	213
Airport Blvd	E/ RR Tracks	68.3	70.9	2.6	266
Airport Blvd	E/ Regional Pkwy	69.1	71.7	2.6	301
Airport Blvd	E/ Aviation Blvd	70.7	73.3	2.6	383
Airport Blvd	W/ Fulton Rd	66.7	69.3	2.6	208
Airport Blvd	E/ Fulton Rd	67.2	69.8	2.6	225
Airport Blvd	W/ Faight Rd	63.6	66.2	2.6	130
Alexander Valley Rd	W/ Lytton Station Rd	63.3	64.4	1.1	98

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
Armstrong Woods Rd	N/ Hwy 116	58.5	59.6	1.1	47
Armstrong Woods Rd	N/ Watson	53.3	54.5	1.1	21
Arnold Dr	S/ Watmaugh Rd	69.0	70.9	1.9	268
Arnold Dr	N/ Watmaugh Rd	70.2	70.9	0.8	268
Arnold Dr	N/ Almeria	70.6	72.3	1.7	328
Arnold Dr	N/ Leveroni Rd	69.6	71.3	1.7	284
Arnold Dr	S/ Petaluma Ave	68.9	70.6	1.7	253
Arnold Dr	N/ Solano Ave	69.7	71.4	1.7	286
Arnold Dr	N/ Verano Ave	69.8	71.4	1.7	289
Arnold Dr	S/ Agua Caliente Rd	69.2	70.9	1.7	267
Arnold Dr	N/ Agua Caliente Rd	68.3	69.7	1.4	221
Arnold Dr	N/ Chauvet Rd	63.6	65.0	1.4	108
Arnold Dr	S/ London Ranch Rd	63.7	65.1	1.4	110
Arnold Dr	S/ Dunbar Rd	61.6	63.0	1.4	79
Arnold Dr	S/ Hwy 12	61.8	62.9	1.1	78
Aviation Blvd	W/ Airport Ave	62.7	63.9	1.1	91
Barham Ave	E/ Dutton Ave	59.9	61.0	1.1	58
Barham Ave	W/ Olive St	54.4	55.5	1.1	25
Barham Ave	E/ Olive St	50.5	51.6	1.1	14
Barnes Rd	S/ River Rd	61.4	62.6	1.1	74
Bennet Valley Rd	W/ Grange Rd	65.3	69.2	3.9	205
Bennet Valley Rd	E/ Sonoma Mountain Rd	62.0	65.9	3.9	123
Bennet Valley Rd	W/ Warm Springs Rd	60.5	64.4	3.9	98
Bloomfield Rd	N/ Valley Ford Rd	57.1	58.2	1.1	38
Bloomfield Rd	S/ Kennedy Rd	61.4	62.5	1.1	74
Bloomfield Rd	S/ Pleasant Hill Rd	60.6	61.7	1.1	65
Bloomfield Rd	S/ Hwy 116	65.2	66.3	1.1	132

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
Bodega Ave	W/ King Rd	64.1	65.2	1.1	111
Bodega Ave	W/ Thompson Ln	66.2	67.0	0.8	146
Bodega Ave	E/ Lohrman Ln	67.6	68.4	0.8	182
Bodega Ave	W/ Paula	67.7	68.5	0.8	186
Bodega Ave	E/ Paula	67.5	68.3	0.8	179
Bodega Hwy	E/ Valley Ford / Freestone Rd	67.6	68.5	0.8	183
Bodega Hwy	W/ Bohemian Hwy	67.2	68.1	0.8	172
Bodega Hwy	W/ Jonive	65.0	65.8	0.8	122
Bodega Hwy	E/ Wagnon Rd	65.5	66.4	0.8	133
Bodega Hwy	E/ Grandview Rd	66.8	67.7	0.8	162
Bodega Hwy	W/ Watertrough Rd	67.5	68.3	0.8	179
Bodega Hwy	E/ Watertrough Rd	68.2	69.1	0.8	201
Bohemian Hwy	S/ Hwy 116	63.5	65.6	2.0	117
Bohemian Hwy	N/ Freestone Flat Rd	60.3	62.3	2.0	71
Bohemian Hwy	S/ Bittner Rd	60.9	62.1	1.1	69
Bohemian Hwy	S/ Main St	60.9	62.1	1.1	69
Bohemian Hwy	N/ Graton Rd	62.4	63.6	1.1	86
Boyes Blvd	W/ Railroad Ave	59.4	60.5	1.1	54
Boyes Blvd	E/ Railroad Ave	62.3	63.5	1.1	85
Boyes Blvd	E/ Riverside Rd	61.3	62.4	1.1	72
Brush Creek Rd	N/ Montecito Ave	63.7	64.8	1.1	105
Calistoga Rd	S/ Rincon Ave	62.6	63.1	0.5	80
Calistoga Rd	S/ Porter Creek Rd	62.0	62.5	0.4	73
Corby Ave	S/ Smokewood Drive	62.3	63.5	1.1	85
Corby Ave	S/ Peach St	61.0	62.1	1.1	69
Corby Ave	N/ Peach St	60.3	61.5	1.1	63
Corona Rd	S/ Adobe Rd	63.5	65.9	2.4	123
Crane Canyon Rd	E/ Petaluma Hill Rd	61.9	67.6	5.7	161
Crane Canyon Rd	E/ Inverness Ave	59.5	65.2	5.7	111

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
D St	S/ San Antonio Rd	61.5	62.7	1.2	76
Dry Creek Rd	N/ Lytton Springs Rd	65.0	67.8	2.8	167
Dry Creek Rd	N/ Lambert Bridge Rd	62.9	65.7	2.8	120
Dutton Ave	N/ Hearn Ave	61.4	62.6	1.1	74
Dutton Ave	S/ Barham Ave	62.8	64.0	1.1	92
East Cotati Ave	W/ Petaluma Hill Rd	64.4	65.0	0.7	108
East Napa St	W/ Seventh St. East	62.3	63.4	1.1	85
East Washington St	S/ Adobe Rd	63.4	65.0	1.7	108
Eighth St East	N/ Hwy 12 / 121	58.4	59.8	1.4	48
Eighth St East	S/ Napa Rd	62.0	62.3	0.3	71
Eighth St East	N/ Napa Rd	63.0	63.3	0.3	83
Eighth St East	S/ East Napa St	61.7	62.0	0.3	68
Ely Rd	E/ Old Redwood Hwy N	60.8	61.9	1.1	67
Fifth St West	N/ Leveroni Rd	66.3	67.5	1.1	158
Frates Rd	S/ Adobe Rd	64.5	65.0	0.5	108
Fulton Rd	S/ River Rd	68.7	71.9	3.2	311
Fulton Rd	N/ River Rd	69.2	72.4	3.1	333
Grange Rd	S/ Bennet Valley Rd	63.5	66.7	3.1	139
Graton Rd	W/ Green Hill Rd	58.0	58.4	0.4	39
Graton Rd	W/ Ross Rd	58.1	58.5	0.4	40
Graton Rd	W/ Hwy 116	57.6	58.0	0.4	37
Green Valley Rd	E/ Hwy 116	46.6	47.7	1.1	8
Green Valley Rd	E/ Harrison Grade Rd	50.1	51.3	1.1	13
Green Valley Rd	W/ Hwy 116	58.3	59.4	1.1	46
Guerneville Rd	E/ Vine Hill Rd	64.8	66.5	1.7	137
Guerneville Rd	E/ Frei Rd	65.9	67.2	1.3	150
Guerneville Rd	W/ Willowside Rd	69.4	70.7	1.3	256

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
Guerneville Rd	E/ Willowside Rd	70.7	72.0	1.3	315
Guerneville Rd	W/ Lance Ave	68.3	69.5	1.3	216
Hearn Ave	W/ Dutton Ave	62.4	63.5	1.1	86
Hearn Ave	E/ Dutton Ave	66.6	67.8	1.1	165
High School Rd	N/ East Hurlbut Ave	62.1	63.2	1.1	82
High School Rd	S/ Occidental Rd	62.3	63.5	1.1	85
Lakeville Rd	N/ Hwy 37	71.4	72.7	1.3	352
Lakeville Rd	N/ Cannon Ln	71.2	72.5	1.3	343
Leveroni Rd	E/ Arnold Dr	68.7	71.0	2.3	270
Leveroni Rd	E/ Harrington	67.5	69.8	2.3	226
Llano Rd	N/ Hwy 116	62.4	63.5	1.1	85
Llano Rd	N/ Ludwig Ave	65.7	66.8	1.1	141
Lone Pine Rd	W/ Hwy 116	60.6	61.7	1.1	65
Ludwig Ave	W/ Stony Pt. Rd	63.4	64.6	1.1	101
Madrone Rd	W/ Hwy 12	59.4	60.6	1.1	55
Main St	S/ Hwy 12	58.0	58.8	0.8	42
Main St	S/ Adobe Rd	62.8	63.7	0.8	88
Main St	N/ Tyrone Rd	54.7	55.5	0.8	25
Mark West Springs Rd	E/ Hwy 101	70.1	73.0	2.9	367
Mark West Springs Rd	E/ Ursuline Rd	68.7	71.5	2.9	294
Mark West Springs Rd	W/ Mark West Springs Lodge	65.8	68.7	2.9	189
Mark West Springs Rd	E/ Michele Way	66.0	68.8	2.9	194
Mark West Springs Rd	W/ Porter Creek Rd	66.4	67.2	0.8	152
Mark West Springs Rd	E/ Trenton Healdsburg Rd	54.8	55.6	0.8	25
Mecham Rd	S/ Dump	60.0	61.3	1.2	61

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
Mecham Rd	N/ Pepper Rd	59.9	61.1	1.2	59
Mecham Rd	N/ Refuse Rd	62.9	64.2	1.2	95
Mecham Rd	S/ Stony Pt. Rd	62.6	63.8	1.2	89
Mill Station Rd	W/ Occidental Rd	57.3	58.5	1.1	40
Millbrae Ave	W/ Stony Pt. Rd	57.6	59.0	1.4	43
Millbrae Ave	E/ Stony Pt. Rd	64.6	66.0	1.4	125
Mirabel Rd	S/ Trenton Rd	66.1	66.6	0.5	139
Moorland Ave	N/ Todd Rd	59.9	61.1	1.1	59
Mountain View Ave	E/ Santa Rosa Ave	61.1	65.6	4.5	118
Mountain View Ave	W/ Hunter Ln	59.8	64.3	4.5	97
Mountain View Ave	E/ Hunter Ln	59.0	63.5	4.5	85
Napa Rd	W/ Fifth St East	65.7	66.9	1.1	143
Napa Rd	E/ Pueblo Ave	66.0	67.1	1.1	149
Napa Rd	W/ Eighth St East	66.0	67.1	1.1	149
Napa Rd	W/ Hyde Rd	66.3	67.4	1.1	156
Napa Rd	E/ Burndale Rd	66.0	66.7	0.7	140
Occidental Rd	E/ Mill St	65.0	65.8	0.8	122
Occidental Rd	E/ Hwy 116	67.0	67.8	0.8	166
Occidental Rd	W/ Sanford Rd	67.9	69.0	1.1	200
Occidental Rd	E/ High School Rd	66.4	67.5	1.1	158
Occidental Rd	E/ Irwin Ln	66.7	67.8	1.1	165
Occidental Rd	E/ Merced	66.6	67.7	1.1	164
Old Redwood Hwy	N/ Mendocino	68.2	72.6	4.4	346
Old Redwood Hwy	S/ Ursuline	68.3	72.8	4.4	354
Old Redwood Hwy	N/ Mark West Springs Rd	69.6	74.0	4.4	431

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
Old Redwood Hwy	S/ Wikiup Dr	68.7	73.2	4.4	377
Old Redwood Hwy	N/ Mark West Circle Bridge	68.9	73.3	4.4	388
Old Redwood Hwy	N/ Wikiup Dr	68.1	72.6	4.4	345
Old Redwood Hwy	N/ Faught Rd	68.0	72.4	4.4	337
Old Redwood Hwy	N/ Fulton Rd	67.8	71.5	3.7	292
Old Redwood Hwy	N/ Eastside Rd	65.5	68.4	2.9	182
Old Redwood Hwy	N/ Ely Rd	70.2	72.5	2.3	340
Old Redwood Hwy	N/ Adobe Rd	67.5	69.7	2.3	223
Old Redwood Hwy	S/ West Railroad Ave	68.0	70.3	2.3	243
Old Redwood Hwy	N/ West Railroad Ave	68.2	70.5	2.3	251
Old Redwood Hwy	N/ East Railroad Ave	67.9	70.2	2.3	240
Olivet Rd	N/ Guerneville Rd	62.9	64.0	1.1	92
Olivet Rd	S/ River Rd	62.3	63.4	1.1	84
Pepper Rd	E/ Walker Rd	64.8	65.4	0.6	114
Pepper Rd	E/ Mecham Rd	62.6	63.2	0.6	81
Pepper Rd	W/ Stony Pt. Rd	64.0	64.6	0.6	101
Petaluma Ave	E/ Arnold Dr	64.0	65.4	1.4	114
Petaluma Blvd N	N/ Skillman Ln	70.7	70.6	-0.1	253
Petaluma Blvd S	N/ Hwy 101 S/B Off Ramp	69.7	71.9	2.2	308
Petaluma Hill Rd	N/ Adobe Rd	71.2	73.4	2.2	390
Petaluma Hill Rd	S/ East Railroad Ave	71.3	73.5	2.2	394

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
Petaluma Hill Rd	N/ East Railroad Ave	71.5	73.6	2.2	406
Petaluma Hill Rd	N/ Roberts Rd	70.4	72.6	2.2	344
Petaluma Hill Rd	N/ East Cotati Ave	70.9	73.1	2.2	374
Petaluma Hill Rd	S/ Crane Canyon Rd	70.9	73.0	2.2	369
Petaluma Hill Rd	N/ Crane Canyon Rd	68.7	70.9	2.2	265
Petaluma Hill Rd	N/ Snyder Ln	71.8	75.4	3.6	532
Petrified Forest Rd	W/ Sharp Rd	67.7	68.9	1.1	195
Porter Creek Rd	E/ Franz Valley Rd	62.8	63.9	1.1	91
Railroad Ave	S/ Verano Ave	54.3	55.5	1.1	25
Railroad Ave	N/ Verano Ave	62.7	63.9	1.1	90
Railroad Ave	S/ Boyes Blvd	59.8	60.9	1.1	58
Railroad Ave	N/ Boyes Blvd	56.2	57.4	1.1	33
Riebli Rd	W/ Wilshire Dr	61.9	63.1	1.1	80
River Rd	W/ Orchard Rd	66.0	67.2	1.1	150
River Rd	E/ Canyon Two Rd	65.7	66.8	1.1	142
River Rd	W/ Mirabel Rd	66.2	67.4	1.2	155
River Rd	W/ Trenton-Healdsburg Rd	65.5	66.6	1.1	138
River Rd	W/ Fulton Rd	66.6	67.9	1.3	168
River Rd	E/ Fulton Rd	66.4	67.7	1.3	162
Riverside Dr	N/ Hwy 12	64.6	65.4	0.8	115
Riverside Dr	N/ Petaluma Ave	61.5	62.3	0.8	72
Riverside Dr	S/ Grove St	59.6	60.4	0.8	53
Riverside Dr	N/ Grove St	55.8	56.6	0.8	30
Riverside Dr	N/ Verano Ave	57.8	58.7	0.8	41
Roblar Rd	W/ Canfield Rd	58.3	59.6	1.3	47
Roblar Rd	E/ Canfield Rd	60.3	61.6	1.3	64
Roblar Rd	W/ Stony Pt. Rd	63.2	64.5	1.3	100
Rohnert Park Exp	E/ Stony Pt. Rd	69.3	72.6	3.3	345
Rohnert Park Exp	W/ Petaluma Hill Rd	67.5	69.8	2.3	224

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
Santa Rosa Ave	S/ Horn Ave	67.0	69.4	2.3	210
Santa Rosa Ave	S/ Mountain View Ave	68.2	70.5	2.3	251
Santa Rosa Ave	N/ Mountain View Ave	68.9	71.2	2.3	279
Santa Rosa Ave	S/ East Robles Ave	68.4	70.7	2.3	259
Santa Rosa Ave	N/ East Robles Ave	67.6	69.9	2.3	229
Sebastopol Rd	E/ Stony Pt. Rd	68.9	70.0	1.1	233
Sebastopol Rd	E/ West Ave	70.0	71.1	1.1	275
Skillman Ln	E/ Bodega Ave	60.0	60.7	0.7	55
Skillman Ln	E/ Thompson Ln	62.8	63.6	0.7	86
Skillman Ln	W/ Petaluma Blvd	64.9	65.6	0.7	118
Skylane Blvd	N/ Airport Blvd	62.0	65.2	3.2	111
Snyder Ln	S/ Petaluma Hill Rd	66.1	68.0	2.0	171
Standish Ave	N/ Todd Rd	62.1	63.2	1.1	82
Stony Point Rd	S/ Pepper Rd	66.1	67.1	1.0	148
Stony Point Rd	N/ Pepper Rd	65.3	66.3	1.0	132
Stony Point Rd	S/ Mecham Rd	67.8	68.7	1.0	191
Stony Point Rd	N/ Mecham Rd	66.3	67.3	1.0	153
Stony Point Rd	N/ Roblar Rd	69.1	69.7	0.6	220
Stony Point Rd	S/ Madrone	67.8	68.4	0.6	182
Stony Point Rd	N/ Hwy 116	66.9	69.3	2.4	208
Stony Point Rd	N/ Rohnert Park Exp	66.1	68.5	2.4	183
Stony Point Rd	S/ Millbrae Ave	67.2	69.6	2.4	219
Stony Point Rd	N/ Millbrae Ave	67.6	69.9	2.4	230
Stony Point Rd	N/ Scenic Ave	68.6	70.3	1.7	242
Stony Point Rd	S/ Todd Rd	66.9	68.7	1.7	189
Stony Point Rd	N/ Todd Rd	68.0	69.8	1.7	224
Todd Rd	W/ Llano Rd	61.1	63.3	2.2	83
Todd Rd	W/ Stony Pt. Rd	63.0	65.2	2.2	111

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
Todd Rd	E/ Stony Pt. Rd	64.6	66.8	2.2	142
Todd Rd	W/ Standish Ave	63.7	65.9	2.2	123
Todd Rd	E/ Standish Ave	66.7	68.9	2.2	197
Valley Ford Rd	E/ Gericke Rd	63.5	65.2	1.7	110
Valley Ford Rd	W/ Tomales Rd	63.7	65.4	1.7	114
Verano Ave	E/ Hickory St	60.1	61.2	1.1	60
Verano Ave	E/ Linden Ave	61.4	62.5	1.1	74
Verano Ave	W/ Railroad Ave	61.6	62.8	1.1	77
Verano Ave	W/ Riverside Dr	61.9	63.1	1.1	80
Verano Ave	E/ Riverside Dr	62.6	63.8	1.1	89
Verano Ave	W/ Hwy 12	62.8	64.0	1.1	92
Verano Ave	E/ Lomita Ave	61.4	62.5	1.1	74
Vine Hill Rd	S/ Guerneville	64.0	65.1	1.1	110
Warm Springs Rd	N/ Henno Rd	60.1	64.8	4.7	104
Warm Springs Rd	N/ Sonoma Mt Rd	59.3	64.0	4.7	93
Warm Springs Rd	S/ Lawndale	53.7	58.4	4.7	39
Warm Springs Rd	N/ Bennet Valley Rd	54.4	59.1	4.7	43
Warm Springs Rd	N/ Lawndale	55.9	60.6	4.7	55
Warm Springs Rd	S/ Hwy 12	56.2	60.9	4.7	57
Watertrough Rd	S/ Burnside Rd	61.8	62.9	1.1	78
Watertrough Rd	S/ Bodega Hwy	63.9	65.0	1.1	108
Watmaugh Rd	W/ Arnold Dr	64.2	64.3	0.1	97
Watmaugh Rd	E/ Arnold Dr	62.3	62.4	0.1	72
Watmaugh Rd	W/ Hwy 12	61.9	62.0	0.1	68
West Ave	N/ Gloria Dr	57.2	58.3	1.1	39
West Ave	S/ South Ave	58.5	59.7	1.1	47
West Ave	N/ South Ave	59.2	60.3	1.1	53
West Ave	S/ Sunset Ave	59.4	60.5	1.1	54
West Third St	W/ Dutton Ave	65.5	66.6	1.1	138

Roadway	Segment	Predicted L_{dn} at 50 Feet from Roadway Centerline			Distance to L_{dn} 60 dB Contour, Feet
		Existing	Future	Future minus Existing	
Westside Rd	N/ Felta Rd	61.7	62.9	1.2	78
Westside Rd	S/ Kinley Dr	64.0	65.2	1.2	112
Wikiup Dr	E/ Old Redwood Hwy N	59.4	60.6	1.1	55

Note: Shaded cells indicate a substantial change in ambient noise levels.