Appendix K

49ers STADIUM PROJECT
ENVIRONMENTAL NOISE ASSESSMENT
SANTA CLARA, CALIFORNIA

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INTRODUCTION

This report assesses potential noise impacts resulting from the construction and operation of the 49ers Stadium project proposed in Santa Clara, California. The project site is bounded on the north by Tasman Drive, on the east by the Santa Clara Youth Soccer Park and the existing Marie P. DeBartolo Sports Centre, on the south by Silicon Valley Power's Northern Receiving Station and the City of Santa Clara's North Side Water Storage Tanks, and on the west by San Tomas Aquino Creek. The project would construct a 68,500-seat stadium (expands up to 75,000 seats for special events), the relocation of an existing electrical substation, and the construction of new surface parking and a parking garage.

The Setting section of this report presents the fundamentals of environmental noise, provides a discussion of policies and standards applicable to the project, and presents the results of the ambient noise monitoring survey conducted in the vicinity of the project site as well as data collected before, during, and after a National Football League (NFL) game between the San Francisco 49ers and New York Jets at Candlestick Park. The Impacts and Mitigation Measures section of the report summarizes future noise levels resulting from the project and provides an evaluation of the potential significance of project-related noise impacts.

SETTING

Background Information on Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its loudness. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level or dBA*. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms

of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level, CNEL*, is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level, L_{dn}*, is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

The Occupational Safety and Health Administration (OSHA) has a noise exposure standard which is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over eight hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure

and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA L_{dn} with open windows and 65-70 dBA L_{dn} if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed, those facing major roadways and freeways typically need special glass windows.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 55 dBA L_{dn}. At an L_{dn} of about 60 dBA, approximately 2 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 12 percent of the population. There is, therefore, an increase of about 1 percent per dBA between an L_{dn} of 60-70 dBA. Between an L_{dn} of 70-80 dBA, each decibel increase increases by about 2 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the L_{dn} is 60 dBA, approximately 10 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 2 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 3 percent increase in the percentage of the population highly annoyed.

Table 1 Definitions of Acoustical Terms Used in this Report

Term	Definitions
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Table 2 Typical Noise Levels in the Environment

Common Outdoor Noise Source	Noise Level (dBA)	Common Indoor Noise Source
	120 dBA	
Jet fly-over at 300 meters		Rock concert
	110 dBA	
Pile driver at 20 meters	100 dBA	
		Night club with live music
	90 dBA	
Large truck pass by at 15 meters		
	80 dBA	Noisy restaurant
		Garbage disposal at 1 meter
Gas lawn mower at 30 meters	70 dBA	Vacuum cleaner at 3 meters
Commercial/Urban area daytime		Normal speech at 1 meter
Suburban expressway at 90 meters	60 dBA	
Suburban daytime		Active office environment
	50 dBA	
Urban area nighttime		Quiet office environment
	40 dBA	
Suburban nighttime		
Quiet rural areas	30 dBA	Library
		Quiet bedroom at night
Wilderness area	20 dBA	Quiet recording studio
Most quiet remote areas	10 dBA	
Threshold of human hearing	0 dBA	Threshold of human hearing

Regulatory Background

The State's CEQA guidelines are used to assess the potential significance of environmental noise impacts pursuant to local policies set forth in the Santa Clara General Plan and Municipal Code and the Santa Clara County Airport Commission Land Use Plan. A summary of the applicable guidelines is provided below.

State CEQA Guidelines. The California Environmental Quality Act (CEQA) contains guidelines to evaluate the significance of environmental noise impacts attributable to a proposed project. Applicable CEQA checklist questions ask whether the project would result in:

- Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies?
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?
- For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

CEQA does not define what noise level increase would be considered substantial. Typically, project-generated noise level increases of 3 dBA L_{dn} or greater would be considered significant where exterior noise levels would exceed the normally acceptable noise level standard (60 dBA L_{dn} for residential land uses). Where noise levels would remain at or below the normally acceptable noise level standard with the project, noise level increases of 5 dBA L_{dn} or greater would be considered significant.

Santa Clara County Airport Land Use Commission Land Use Plan. The Santa Clara County Airport Land Use Commission has adopted a Land Use Compatibility Chart (not shown) for projects within the vicinity of Mineta San José International Airport. The chart indicates that commercial/recreational uses are compatible in noise environments resulting from aircraft that are 65 dBA CNEL or less.

City of Santa Clara General Plan. The City of Santa Clara is currently updating the General Plan and anticipates adopting the new General plan in mid-2010. The Environmental Quality

Element of the City of Santa Clara's current General Plan establishes policies to control noise within the community. Applicable policies presented in the General Plan are as follows:

> 20. Protect to the extent possible existing developed areas of the City of Santa Clara from unacceptable noise levels.
>
> 21. Reduce transportation generated noise within the City of Santa Clara where feasible.
>
> 22. Comply with City, State and Federal guidelines for the compatibility of land uses with their noise environments, except where the City determines that there are prevailing circumstances of a unique or special nature.
>
> 24. Reduce noise from fixed sources, construction, and special events.

City of Santa Clara Municipal Code. The City's Municipal Code establishes noise level performance standards for fixed sources of noise. Noise levels generated by a fixed source of noise, defined as, "...a stationary device which creates sound or vibration while operating in a fixed or stationary position, including, but not limited to, residential, agricultural, industrial, and commercial machinery and equipment, pumps, fans, compressors, air conditioners, and refrigeration equipment..." would be limited to 55 dBA during daytime hours (7:00 a.m. to 10:00 p.m.) and to 50 dBA at night (10:00 p.m. to 7:00 a.m.) at nearby single-family or multiple-family residential land uses. These limits are reduced by 5 dBA if the alleged offensive sound or noise contains music or speech conveying informational content. The City's Municipal Code does not regulate mobile sources of noise. A mobile noise source is defined as, "...any noise, sound, or vibration source other than a fixed noise, sound, or vibration source, including but not limited to vehicles, hand-held power equipment, and portable music amplifiers..."

Construction activities occurring during daytime hours are specifically exempted from these limits. Section 9.10.230 limits construction within 300 feet of any residentially zoned properties between the hours of 7:00 A.M. to 6:00 P.M. on weekdays other than holidays, and within the hours of 9:00 A.M. to 6:00 P.M. on any Saturday which is not a holiday.

Existing Noise Environment in the Vicinity of the Proposed Stadium

A noise monitoring survey was completed to document existing noise conditions at locations representative of noise sensitive receivers in the site vicinity between Thursday, December 4, 2008 and Monday, December 8, 2008. The noise monitoring survey included four long-term noise measurements (approximately 96-hour durations) and five short-term noise measurements (10-minute durations) to quantify existing noise levels at sensitive residential land uses in the vicinity of the project site. Noise monitoring locations are shown on Figure 1. Data collected at each of the long-term noise monitoring sites are graphically summarized on Figures 2 through 21. Table 3 summarizes the results of the short-term noise measurements.

Long-term noise monitoring location LT-1 was located west of the stadium site near the intersection of Tasman Drive and Patrick Henry Drive. The noise measurements made at this site documented existing traffic noise levels generated by vehicles traveling along Tasman Drive

and light-rail train passages and established the daily trend in noise levels in the vicinity of the nearest residences west of the project site (about 4,500 feet away). The noise measurement was made approximately 140 feet south of the Tasman Drive/light-rail train centerline at an elevation of 12 feet above the ground. Day-night average noise levels at this site varied depending on whether the measurement occurred on a weekday (67 dBA L_{dn}) or on a weekend day (62 to 63 dBA L_{dn}). Typical daytime hourly average noise levels were approximately 57 to 62 dBA L_{eq} on weekend days. Daytime hourly average noise levels on weekdays were approximately 5 dBA L_{eq} higher because of the weekday traffic patterns associated with nearby commercial uses. Figures 2 through 6 summarize the noise data collected at Site LT-1.

A second long-term noise measurement site was selected approximately 2,000 feet southeast of the project site in Fuller Street Park. This noise measurement location represented the noise environment of single-family residential land uses located in neighborhoods south of the stadium site. Ambient noise levels measured at this location were primarily the result of aircraft departing Norman Y. Mineta San Jose International Airport (MSJIA). Aircraft departures generate fairly high maximum instantaneous noise levels (typically 75-85 dBA Lmax) every few minutes between the hours of 6:00 a.m. and 11:00 p.m. These maximum noise events yield daytime average noise levels ranging from about 60 to 65 dBA L_{eq}. An airport curfew is imposed between 11:00 p.m. and 6:00 a.m. thus resulting in much lower maximum and average noise levels at night. Day-night average noise levels at this site were 65 dBA L_{dn} on a typical weekday and 62 dBA L_{dn} on weekend days. Figures 7 through 11 summarize the noise data collected at Site LT-2.

Long-term noise measurement LT-3 was approximately 1,700 feet east of the stadium site in Lick Mill Park. The noise measurement location was approximately 180 feet east of the centerline of Lafayette Street and the noise environment at this location was primarily the result of vehicles along the roadway, aircraft departures from MSJIA, and intermittent railroad trains. Daytime hourly average noise levels were typically 60 to 66 dBA L_{eq} on weekdays and 55 to 63 dBA on weekend days. On weekday nights, hourly average noise levels typically ranged from 44 to 65 dBA L_{eq}. Hourly average noise levels on weekend nights ranged from 46 to 69 dBA L_{eq}. Day-night average noise levels at this site ranged from 65 to 67 dBA L_{dn}. The L_{dn} was slightly higher over the weekend because of high maximum instantaneous noise levels (92 dBA) measured during the 6:00 a.m. hour on each of those days. Figures 12 through 16 summarize the noise data collected at Site LT-3.

The final long-term noise measurement site was selected in Fairway Glen Park, approximately 2,100 feet east of the proposed stadium site. This site was selected to represent ambient noise levels in residential areas away from the major transportation routes in the site vicinity. Similar to the other long-term noise data gathered during the survey, ambient noise levels resulted primarily from aircraft overflights. Aircraft departures generated maximum instantaneous noise levels ranging from about 70-80 dBA L_{max}. Daytime hourly average noise levels varied from 57 to 67 dBA L_{eq} during weekdays and from 49 to 62 dBA L_{eq} during the weekend. Noise levels were similar on weekday and weekend nights with hourly average noise levels typically ranging from 46 to 63 dBA L_{eq}. Day-night average noise levels at this site were 63 dBA L_{dn} on a typical weekday and 60 to 61 dBA L_{dn} on weekend days. Figures 17 through 21 summarize the noise data collected at Site LT-4.

Short-term noise measurements were made at five additional locations representative of noise-sensitive land uses in the project vicinity to complete the noise monitoring survey. Data were collected on the afternoons of December 4, 2008 and December 8, 2008 to establish typical ambient daytime noise levels. Noise levels measured at these short-term measurement sites varied depending on the proximity of the noise measurement site to major noise sources (e.g., roadways) and the number, type, and relative location of aircraft passing overhead. Data collected at these sites are summarized in Table 3.

Table 3 Summary of Short-Term Noise Measurement Data in Santa Clara

Measurement ID	Location (Date/Time)	Average Noise Level (dBA, L_{eq})	Day-Night Average Noise Level (dBA, L_{dn})1
ST-1	Adobe Wells Mobile Home Park near Unit #67. (12/8/08 – 1450 to 1500)	52	Weekend - 50 to 51 Weekday - 55
ST-2	Gianera Street at Lakeshore Drive. (12/8/08 – 1420 to 1430)	56	Weekend - 62 Weekday - 65
ST-3	Lick Mill Park, 100 feet from the center of Lafayette Street. (12/4/08 – 1150 to 1200)	60	Weekend – 63 to 64 Weekday - 62
ST-4	Multi-family residences north of Calle de Escuela (12/8/08 – 1520 to 1530)	67	Weekend – 60 to 61 Weekday - 63
ST-5	Multi-family residences northwest of Tasman Drive at Renaissance Drive. (12/4/08 – 1200 to 1210)	57	Weekend - 53 to 54 Weekday - 58

Noise Data Collected during an NFL Game at Candlestick Park

Noise measurements were made at Candlestick Park in San Francisco, California, on Sunday, December 7, 2008 before, during, and after a regular season football game between the San Francisco 49ers and the New York Jets. The purpose of these noise measurements was to provide a credible estimate of noise levels that could be expected with the new stadium. Reference noise measurements were made at one location outside of the "crows nest" above the press box at the top of the stadium (LT-5) and at a second location approximately 1,350 feet southeast of the stadium edge (LT-6) and approximately 1,800 feet from the center of the playing field. Short-term noise measurements were also made at distances varying from about 1,350 to 1,800 feet from the stadium over periods of time ranging from 20 to 60 minutes. Noise measurement locations are shown on Figure 22.

Noise data were collected in one-minute and five-minute intervals at the crow's nest reference location and at the Candlestick Point Park reference location to identify maximum noise levels from specific events such as fireworks or touchdowns. The five-minute interval data are

1 L_{dn} estimated based on a comparison of data collected during corresponding time periods.

summarized on Figure 23. As indicated on this figure, average noise levels outside the crow's nest were about 65 dBA L_{eq} prior to the start of the game, with noise levels steadily increasing as spectators entered the stadium. Average noise levels throughout the game ranged from about 78 dBA L_{eq} to about 92 dBA L_{eq} at the crows nest reference position. Maximum instantaneous noise levels generated by the crowd were typically 95 to 97 dBA L_{max} when the 49ers gained enough yards for a 1st down or made a defensive stop. Touchdowns scored by the 49ers resulted in maximum instantaneous noise levels ranging from 99 to 103 dBA L_{max}. Figure 24 summarizes one-minute average and maximum time history data with annotations indicating the events that generated the highest noise levels during the game.

Average noise levels measured at the reference location at Candlestick Point Park (LT-6) typically ranged from 57 to 61 dBA L_{eq} prior to the start of the game. These average noise levels were primarily the result of tailgating activities occurring in the Candlestick Point Park parking lot as well as those tailgating activities occurring further from this site in the main stadium parking lots located west of Hunters Point Expressway. Tailgating noise sources included radios, televisions, portable power generators, conversations, laughter, and shouting. Tailgating noise levels began to decrease at about 1:00 p.m. just prior to kick-off. By the end of the first quarter, average noise levels fell to about 55 dBA L_{eq}. After halftime, average noise levels began to rise. Near the end of the game, average noise levels again reached pre-game conditions (about 60 dBA L_{eq}) then increased to about 63 dBA L_{eq} as spectators exited the stadium after the end of the game. Average noise levels were substantially increased between about 4:15 p.m. and 4:25 p.m. when several fireworks were launched by celebrating fans in the main parking lot. Maximum noise levels recorded at the reference location were primarily the result of local activities occurring in the parking lots. The sounds of the loudest events inside the stadium were typically 5 dBA or more below the maximum noise levels generated by tailgating activities. Figure 25 summarizes one-minute average and maximum time history data with annotations indicating the events that generated the highest noise levels during the game.

Short-term noise measurements were made at three additional sites to quantify noise levels generated by sources located within the stadium. Table 4 below shows typical maximum instantaneous noise levels measured at distances ranging from 1,350 feet to 1,800 feet from the edge of the stadium.

Table 4 Summary of Short-Term Noise Measurement Data at Candlestick Park

Site	Distance from Stadium Edge	Public Address System	National Anthem	Cheering	Pre-Game Fireworks
ST-6	1,350 feet	50-56	--	52-65	--
ST-7	1,450 feet	50-55	62	55	61
ST-8	1,800 feet	47	--	48-60	--

The final score of the football game was 24-14 in favor of the San Francisco 49ers. The announced attendance at the football game was 67,782. Noise data collected at this game were determined to credibly represent an exciting NFL football game at the proposed 68,500-seat stadium in Santa Clara.

NOISE IMPACT AND MITIGATION MEASURES

Significance Criteria

Appendix G of the CEQA Guidelines states that a project would normally result in significant noise impacts if noise levels generated by the project conflict with adopted environmental standards or plans or if ambient noise levels at sensitive receivers would be substantially increased over a permanent, temporary, or periodic basis. The following significance criteria were used to evaluate the significance of environmental noise resulting from the project:

- A significant noise impact would result if the project would expose sensitive residential receivers to noise levels that would exceed the City's Municipal Code standards (i.e., 55 dBA L_{eq} day / 50 dBA L_{eq} night for residential land uses). If the alleged offensive sound or noise contains music or speech conveying informational content, the limits shall be reduced by five dBA (e.g., 50 dBA L_{eq} day / 45 dBA L_{eq} night for residential land uses). Where ambient noise levels exceed the established standards, the standards are adjusted upwards to equal the ambient noise level.

- A substantial permanent noise increase would occur if the noise level increase resulting from the project is 3 dBA L_{dn} or greater, with a future noise level of 60 dBA L_{dn} or greater.

- A substantial temporary or periodic increase in noise would occur if noise levels generated by the project substantially exceed ambient noise conditions. A substantial exceedance is defined as 5 dBA above ambient conditions.

- Construction related noise would be considered significant when:

    - Noise from construction activities would exceed 60 dBA $L_{eq\text{-}hr}$ and the ambient noise environment by at least 5 dBA L_{eq} for a period of one year or more at exterior areas of uses sensitive to noise inside and outside (e.g., residences, residential care facilities, schools, libraries); or

    - Noise from construction activities would exceed 70 dBA L_{eq} and the ambient noise environment by at least 5 dBA $L_{eq\text{-}hr}$ for a period of one year or more at the exterior of offices or other commercial, retail, or institutional uses with interior spaces sensitive to noise.

Impact 1: **Noise and Land Use Compatibility.** The proposed stadium would be located in a compatible noise environment with respect to transportation noise sources affecting the site. **This is a less than significant impact.**

The predominant source of noise affecting the proposed stadium would be aircraft operations associated with Norman Y. Mineta San José International Airport. A review of the noise the CNEL noise contour established by the airport indicates that the site is exposed to a Community Noise Exposure Level of 65 dBA CNEL. Commercial and recreation land uses are considered

compatible with noise from aircraft in a noise environment of 65 CNEL or less. Noise from local traffic along Tasman Drive or VTA light-rail trains would not contribute to ambient noise levels at sensitive areas within the stadium.

Maximum noise levels generated by aircraft departing Mineta San José International Airport would typically range from about 75 to 87 dBA L_{max} within the stadium when aircraft pass over the stadium. Maximum instantaneous noise events associated with aircraft would not pose constraints on the functionality of the proposed stadium during large events such as NFL games or concerts given that maximum instantaneous noise levels from aircraft would generally be at or below average operational noise levels expected within the stadium occurring because of the crowd or amplified music. Smaller events occurring within the stadium or those that are more sensitive to environmental noise intrusion (e.g., weddings, graduation ceremonies, speeches, etc.) may not be compatible with the maximum instantaneous noise events associated with aircraft.

Mitigation Measures: **None required.**

Impact 2: **Operational Noise – Stadium Events.** The project would introduce new sources of noise into a noise environment that currently exceeds acceptable standards for adjacent residential properties. Ambient noise levels would be substantially increased over a temporary or periodic basis. **This is a significant impact.**

The proposed 68,500-seat stadium (expandable to 75,000 seats for special events) would be the home field of the San Francisco 49ers, a National Football League (NFL) franchise, for NFL pre-season, regular season, and post-season and other NFL related events. 10 to 14 NFL games would be played at the stadium per year between August and February. A summary of proposed NFL events is provided in Table 5.

Table 5 NFL Events

Type of Game	Number of Total Games Per Season	Time of Occurrence
Pre-Season	4 games per season (2 home games)	August – September (Weekdays or Weekends)
Regular Season	16 games per season (8 home games)	September – December (Weekdays or Weekends)
Post-Season (Playoffs)	3 games per season (home games vary)	January (Weekends Only)
Super Bowl	1 game per season (location varies by year)	Last Weekend of January or First Weekend of February

Approximately 20 large non-NFL events are planned per year (Table 6). Large non-NFL events include sporting events such as international soccer matches and college football games, X-Games and moto-cross events, concerts, auto shows, and festivals or antique shows. The project also contemplates up to 250 small events per year (e.g., corporate meetings, weddings, and other private functions), which are not anticipated to result in off-site noise impacts. Additional non-NFL events may be pursued by the Stadium Authority in any given year subject to the availability of parking during the proposed times of the events.

Noise data measured at Candlestick Park were used as a credible worst-case estimate of noise levels that could be expected with the operation of the proposed 68,500-seat stadium. Noise level calculations assumed a standard attenuation rate of 6 dB per doubling of distance between the noise source and receiver. Noise impacts were evaluated based on a comparison of project-related maximum noise levels with ambient maximum noise level conditions, as well as, a comparison of hourly average noise levels with ambient average and background noise levels.

Table 6 Possible Non-NFL Events

Event Type	Estimated Attendance	No. of Events per Year	Estimated Parking Demand
X-Games (4-day event)	50,000	1	4,500
Moto-Cross	42,500	1	13,005
International Soccer	40,000	2	12,240
Concerts	37,500	1	11,475
College Football	37,500	1	11,475
Festivals/Antiques Shows	25,000	8	9,000
College Bowl Game	25,000	1	7,650
Car Shows (parking lot event)	12,000	2	1,200
Small Events[2]	50 to 500+	250	varies

Tailgating

Prior to NFL games, tailgating activities would be allowed in open surface parking areas west of the proposed stadium. Tailgating activities begin when the parking lot gates open and steadily increase as attendees arrive at the stadium. Tailgating activities normally end just prior to the start of the game. Approximately 35% of attendees arrive more than two hours prior to the start of the game and approximately 5% of attendees arrive more than five hours prior to the start of the game.

Noise associated with tailgating activities would primarily result from the operation of radios/stereo systems, televisions, and portable power generators, as well as from conversations, laughter, and shouting. Measurements made at Candlestick Point Park were approximately 300 feet from the acoustic center of tailgating activities occurring in the Candlestick Point Park parking lot as well as those tailgating activities occurring further from this site in the main stadium parking lots located west of Hunters Point Expressway.

Maximum noise levels generated by tailgating and post-game activities typically ranged from 65 to 75 dBA L_{max}, and reached 85 to 89 dBA L_{max} when fans celebrating the 49er's victory launched fireworks in the parking lot. Hourly average noise levels resulting from tailgating activities typically ranged from 57 to 63 dBA L_{eq} at 300 feet from the acoustic center of the parking lots. Figure 26 displays the range of maximum and hourly average noise levels expected when tailgating occurs in the southeast portion of the Great America theme park parking lot adjacent to residential receivers south of the proposed stadium. The ranges of noise levels

2 Small events would be corporate meetings, weddings, and other private functions.

generated by tailgating activities are superimposed over ambient noise levels measured at Fuller Street Park (Site LT-2) on Sunday December 7, 2008. Ambient noise levels measured at this location represent ambient noise levels at the nearest receivers south of the stadium site. As demonstrated on this figure, maximum noise levels generated by tailgating activities would typically fall within the range of ambient maximum noise levels from aircraft. Similarly, hourly average noise levels would fall within the range of ambient hourly average noise levels that result from frequent aircraft overflights. However, the fairly-steady noise generated by tailgating and post-game activities would substantially exceed typical background noise levels (42 to 47 dBA $L_{(90)}$) by 15 to 21 dBA. The noise impact zone from tailgating activities is shown on Figure 27. Where residential receivers would have direct line of site to tailgating areas (i.e., perimeter units along San Tomas Aquino Creek and Villa Place), noise levels would substantially exceed typical background noise levels within about 1,900 feet of the southernmost parking areas. Receivers located within the subdivision would be partially shielded by existing structures and first row and second row residential units would provide 5 to 10 decibels of attenuation, respectively. The noise impact zone would extend into the neighborhood a distance ranging from 600 feet to 1,100 feet from the southernmost parking areas.

Stadium Activities

Figure 28 displays the range of maximum and hourly average noise levels expected as a result of game-related activities at the nearest residences south of the stadium. Maximum instantaneous noise levels generated by various sources associated with a NFL game (e.g., PA System, music, crowd cheering) would typically range from about 55 to 68 dBA at the nearest residential receivers approximately 700 feet south of the stadium. These noise levels would be well below ambient maximum noise levels resulting from aircraft overflights at receivers south of the site (typically 75 dBA L_{max}). Maximum instantaneous noise levels are calculated to be about 4 dBA lower at the nearest residential receivers to the east (51 to 64 dBA L_{max}) and would be below ambient maximum instantaneous noise levels generated by aircraft, railroad trains, and local traffic on Lafayette Street.

Hourly average noise levels generated during the game are calculated to range from 61 to 66 dBA L_{eq} at the nearest residential receivers to the south and from 57 to 62 dBA L_{eq} at receivers east of Lafayette Street. Game-related hourly-average noise levels would exceed typical Sunday afternoon average noise levels by about 4 dBA L_{eq} and would exceed typical median and background noise levels (represented by the $L_{(50)}$ and $L_{(90)}$) by 19 to 24 dBA. Hourly average noise levels during these hours would be noticeably higher than ambient average noise levels that result from aircraft operations, and would be substantially above median and background noise levels in the absence of aircraft. The noise impact zone from stadium activities is shown on Figure 28. Noise levels are calculated to substantially exceed typical background noise levels within about 2,000 feet of the stadium.

Non-NFL Events

Non-NFL sporting events, X-Games, and moto-cross events would be expected to generate noise levels similar to those resulting from the stadium during a NFL game. Maximum instantaneous noise levels would typically range from about 55 to 68 dBA at the nearest residential receivers

approximately 700 feet south of the stadium, and would be well below ambient maximum noise levels resulting from aircraft overflights at nearby receivers. Hourly average noise levels resulting from such events are estimated to range from 61 to 66 dBA L_{eq} at the nearest residential receivers, which would exceed ambient average noise levels by about 4 dBA L_{eq} and would exceed typical median and background noise levels (represented by the $L_{(50)}$ and $L_{(90)}$) by 19 to 24 dBA. Hourly average noise levels during these hours would be noticeably higher than ambient average noise levels that result from aircraft operations, and would be substantially above median and background noise levels in the absence of aircraft.

A concert occurring at the proposed stadium would also be expected to generate high noise levels at off-site receiver locations. Concert noise levels would vary depending on the musical act at the venue. A credible estimate of noise from concerts would assume an average noise level of 95 dBA L_{eq} at the sound mixing board, approximately 100 feet from the stage and speakers. Concert generated noise levels would be expected to be similar to or less than the sounds of cheering at a NFL football game. Concert-related noise levels would be expected to be 66 dBA L_{eq} or less at the nearest receivers assuming that stadium. Hourly average noise levels generated during concerts would exceed ambient hourly average noise levels by 4 dBA L_{eq}, and would exceed typical median and background noise levels by 19 to 24 dBA.

Noise levels generated by tailgating activities allowed during some of these events would be similar to those described previously for NFL events.

Mitigation Discussion:

Given the ambient day-night average noise levels resulting from aircraft and other transportation noise sources in the site vicinity, the operation of the project would not substantially increase day-night average noise levels at nearby receivers. However, the project would introduce new sources of noise that are more continuous in nature, which would substantially increase ambient noise levels when the sounds of aircraft, railroad trains, or vehicles are not present. The operation of the project would substantially increase noise levels on game days over a temporary or periodic basis (up to about 10 hours/day) resulting in a significant noise impact.

There are no feasible measures that would reduce noise levels generated by activities prior to, during, or after proposed events below median and background noise levels at nearby residential uses, and the impact would be unavoidable. The following list of noise control measures are provided to reduce noise levels where possible:

- Tailgating activities shall not occur prior to 9:00 a.m.

- Reserve surface parking within 750 feet of residences for vehicles only. Prohibit tailgating within these areas.

- Prohibit the use of large loudspeakers or stereo systems and fireworks within the surface parking lots. Patrol the parking lots to ensure that attendees are not generating excessive noise.

- Post-event clean up activities occurring in parking lots within 750 feet of residences shall be completed prior to 10:00 p.m. or on the following day no earlier than 9:00 a.m.

- Designate a "disturbance coordinator" to investigate and respond to noise complaints. Provide the name and contact information for the disturbance coordinator to residents within 750 feet of the stadium or surface parking lots.

Impact 3: **Operational Noise – Stadium Mechanical Equipment.** Noise generated by fixed noise sources within the stadium would not exceed Municipal Code noise standards or ambient noise levels, or result in a substantial permanent noise increase at residential receivers in the project vicinity. **This is a less than significant impact.**

The proposed stadium would include fixed noise sources such as heating, ventilation, and cooling equipment. The City of Santa Clara Municipal Code regulates noise generated by fixed sources. Noise levels generated by such equipment are required to be maintained at or below to 55 dBA during daytime hours (7:00 a.m. to 10:00 p.m.) and 50 dBA at night (10:00 p.m. to 7:00 a.m.).

Noise generated by mechanical equipment would vary depending on the selected equipment and design specification including equipment location, type, size, capacity, and enclosure design. These details are typically not available until later phases of the project design. Credible worst-case estimates of noise produced by such equipment indicate that noise levels generated by large pieces of heating, ventilation, and cooling equipment could reach 70 dBA at a distance 15 feet. The nearest residential receivers are located about 700 feet south of the stadium. At this distance, noise levels generated by mechanical equipment would be 37 dBA or less when not accounting for any additional attenuation provided by barriers or acoustical enclosures. Noise levels resulting from the operation of mechanical equipment associated with the operation of the stadium would not exceed the City's Municipal Code noise standards or ambient daytime or nighttime noise levels, and would not permanently increase noise levels at the nearest sensitive land uses.

Mitigation Measures: **None Required**

Impact 4: **Substation Relocation Component.** Electrical equipment located on the Tasman Substation Site may be relocated to the west end of the Silicon Valley Power Northern Receiving Station. Noise generated by equipment moved adjacent to residential land uses south of the stadium may exceed Municipal Code noise standards or ambient noise levels, and may result in a substantial permanent increase in background noise levels. **This is a significant impact.**

The existing electrical substation equipment located on the Tasman Substation site, west of San Tomas Aquino Creek, may be relocated to the west end of the Silicon Valley Power Northern Receiving Station. Electrical equipment would be placed west of the 60kv bus structure and just south of the Control House building. As stated previously, the City of Santa Clara Municipal Code limits noise from fixed sources to 55 dBA during daytime hours (7:00 a.m. to 10:00 p.m.)

and 50 dBA at night (10:00 p.m. to 7:00 a.m.). Given the proximity of adjacent residential receivers and potential noise levels that could result from the operation of the relocated equipment, Municipal Code noise standards or ambient noise levels may be exceeded.

Mitigation:

- Prior to the relocation of the electrical substation equipment, conduct an acoustical analysis to determine what, if any, additional noise control would be required to limit noise levels at nearby residential receivers to 50 dBA or less. Additional controls could include proper site planning to locate noisier equipment away from receivers or in shielded areas, noise barriers, the selection/replacement of equipment with quieter models, etc.

Impact 5: **Project-Generated Traffic Noise.** Project-generated traffic would not permanently increase ambient noise levels at sensitive receivers along roadways serving the site. **This is a less than significant impact.**

Traffic associated with the project would substantially increase traffic volumes on roadways serving the site (primarily Tasman Drive and Great America Parkway) prior to and after events held at the stadium. There would be brief periods of time prior to and after events where higher volumes of traffic would flow at the posted speed limit, thus increasing existing noise levels during these hours. Most of the time, however, the unusually large volume of traffic trying to access the site would result in congestion thereby decreasing travel speeds and traffic noise levels. The short periods when traffic noise would increase would not permanently increase ambient noise levels in the area and the impact is less than significant.

Mitigation Measures: **None Required**

Impact 6: **Construction Noise.** Noise generated by construction activities at the project site would substantially increase ambient noise levels at adjacent industrial, commercial, and residential land uses over a temporary basis. **This is a significant impact.**

The construction of the project would occur Monday through Saturday over a 28-month period. Major noise-generating construction phases would include the site preparation phase including activities such as excavation, access relocation to 4949 Centennial Boulevard, and the relocation of the electrical substation to the Silicon Valley Power Northern Receiving Station, the construction of the stadium foundation utilizing driven pre-cast concrete piles, structural frame construction (concrete and steel structures), and the construction of exterior walls. These phases utilize heavy equipment and impact tools that generate high noise levels. Interior improvements would follow the enclosure of the stadium and would include activities such as the installation of the seating, scoreboards, and playing field as well as the installation of mechanical, electrical, plumbing, and audio/visual equipment. Interior improvements would not be expected to generate significant noise levels at off-site receivers.

Construction activities generate considerable amounts of noise, especially when heavy equipment is used. Construction equipment would be typical of any large construction project including, but not limited to, earth-moving equipment and trucks, pile driving rigs, mobile cranes, compressors, pumps, generators, paving equipment, and pneumatic, hydraulic, and electric tools. Table 7 presents the typical range of hourly average noise levels generated by different phases of construction measured at a distance of 50 feet. Hourly average noise levels generated by demolition and construction are about 77 dBA to 89 dBA L_{eq} measured at a distance of 50 feet from the center of a busy construction site. During impact pile driving, which is anticipated to last 3 to 4 months in duration, hourly average noise levels could reach 94 dBA L_{eq} at 50 feet. Maximum noise levels generated during demolition or foundation construction would typically range from 85 to 105 dBA L_{max} assuming the operation of jackhammers, hoe rams, or impact pile drivers. Construction generated noise levels drop off at a rate of about 6 dBA per doubling of distance between the source and receptor. Shielding provided by barriers or structures can provide an additional 5 to 10 dBA noise reduction at distant receivers.

Table 7 Typical Ranges of Noise Levels at 50 Feet from Construction Sites (dBA L_{eq})

	Domestic Housing		**Office Building, Hotel, Hospital, School, Public Works**		**Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station**		**Public Works Roads & Highways, Sewers, and Trenches**	
	I	II	I	II	I	II	I	II
Ground Clearing	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundations	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84

I - All pertinent equipment present at site.
II - Minimum required equipment present at site.
Source: United States Environmental Protection Agency, 1973, Legal Compilation on Noise, Vol. 1, p. 2-104.

Noise impacts resulting from construction depend on the noise generated by various pieces of construction equipment, the timing and duration of noise-generating activities, and the distance between construction noise sources and noise sensitive receptors. Noise levels exceeding 60 dBA L_{eq} and the ambient noise environment by 5 dBA L_{eq} or more at nearby residential land uses for a period of more than one construction season would be considered significant. Where noise from construction activities exceeds 70 dBA L_{eq} and the ambient noise environment by 5 dBA L_{eq} or more at nearby industrial office and commercial land uses for a period of more than one construction season, the impact would also be considered significant.

The nearest industrial office buildings northwest of the site are located approximately 300 feet from the proposed parking garage (east) and proposed surface parking that will replace the existing electrical substation (south). These office buildings would be located about 600 feet northwest of the stadium. The Santa Clara Golf and Tennis Club is also located approximately

600 feet northwest of the stadium. Tennis courts would be within about 65 feet of the proposed parking garage. Noise sensitive residential land uses are located approximately 1,100 feet east of the stadium site along Lafayette Street, and about 700 feet south of the stadium site along Gianera Street. These residences would be located within about 85 feet of a private parking area located at southernmost portion of the stadium site. Sensitive areas within the Great America theme park (public pathways/waiting areas for rides, etc.) are located approximately 1,100 feet southwest of the stadium site where major construction activities would occur.

Table 8 shows the range in hourly average noise levels expected at nearby sensitive uses during construction of the proposed project. Noise from the loudest phases of construction would range from 50-87 dBA L_{eq} at adjacent land uses when construction activities occur at the site. Construction noise levels would exceed 70 dBA L_{eq} when exterior improvements to the site are made within about 450 feet of nearby industrial office, recreational, and commercial land uses. Hourly average noise levels would at times exceed 60 dBA L_{eq} at residential receivers within 1,400 feet of the site.

Pile driving noise levels would typically range from 67-92 dBA L_{eq} at sensitive uses when pile driving occurs near the periphery of the site nearest each use. Hourly average noise levels would exceed 70 dBA L_{eq} when pile-driving activities occur within about 800 feet of adjacent land uses and 60 dBA L_{eq} when pile-driving activities occur within about 2,200 feet. Construction noise levels would at times be intrusive inside offices facing the project site and in exterior use areas at adjacent residences, the golf and tennis club, and Great America theme park. Noise resulting from project construction activities substantially increase median and background noise levels over a period exceeding one construction season resulting in a significant temporary noise impact.

Table 8 Range of Construction Noise Levels at Nearby Land Uses (dBA L_{eq})

Direction of Nearest Receivers	Distance from Major Areas Proposed for Construction	Land Use Type	Typical Construction Noise Level Range	Pile Driving Construction Noise Levels
Northwest	300	Indust. Office	61-73	78
Northwest	600	Indust. Office	55-67	72
North	65	Recreation Golf/Tennis	75-87	92
North	600	Recreation Golf/Tennis	55-67	72
East	1,100	Residential	50-62	67
South	100	Residential	71-83	88
South	700	Residential	54-66	71
Southwest	1,100	Theme Park	50-62	67

Mitigation Measures:

- Develop a construction mitigation plan in close coordination with adjacent land uses so that construction activities can be scheduled to minimize noise disturbance. The

construction mitigation plan shall consider the following available controls to reduce construction noise levels as low as practical.

- Prohibit pile driving on weekends and holidays to minimize disturbances at the theme park, golf and tennis club, and residences. Construction shall be limited within 300 feet of any residentially zoned properties between the hours of 7:00 A.M. to 6:00 P.M. on weekdays other than holidays, and within the hours of 9:00 A.M. to 6:00 P.M. on any Saturday which is not a holiday.

- Utilize 'quiet' models of air compressors and other stationary noise sources where technology exists;

- Equip all internal combustion engine-driven equipment with mufflers, which are in good condition and appropriate for the equipment;

- Locate all stationary noise-generating equipment, such as air compressors and portable power generators, as far away as possible from adjacent land uses;

- Locate staging areas and construction material areas as far away as possible from adjacent land uses;

- Prohibit all unnecessary idling of internal combustion engines;

- Notify all adjacent land uses of the construction schedule in writing;

- Designate a "disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and will require that reasonable measures warranted to correct the problem be implemented. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

Significance After Mitigation:

Although the above measures would reduce construction noise levels and the potential for offending noise sources at the project site, adjacent industrial, commercial, and residential land uses would continue to be subject to construction noise levels that substantially exceed ambient median and background noise levels for over two years. The impact would remain significant and unavoidable.

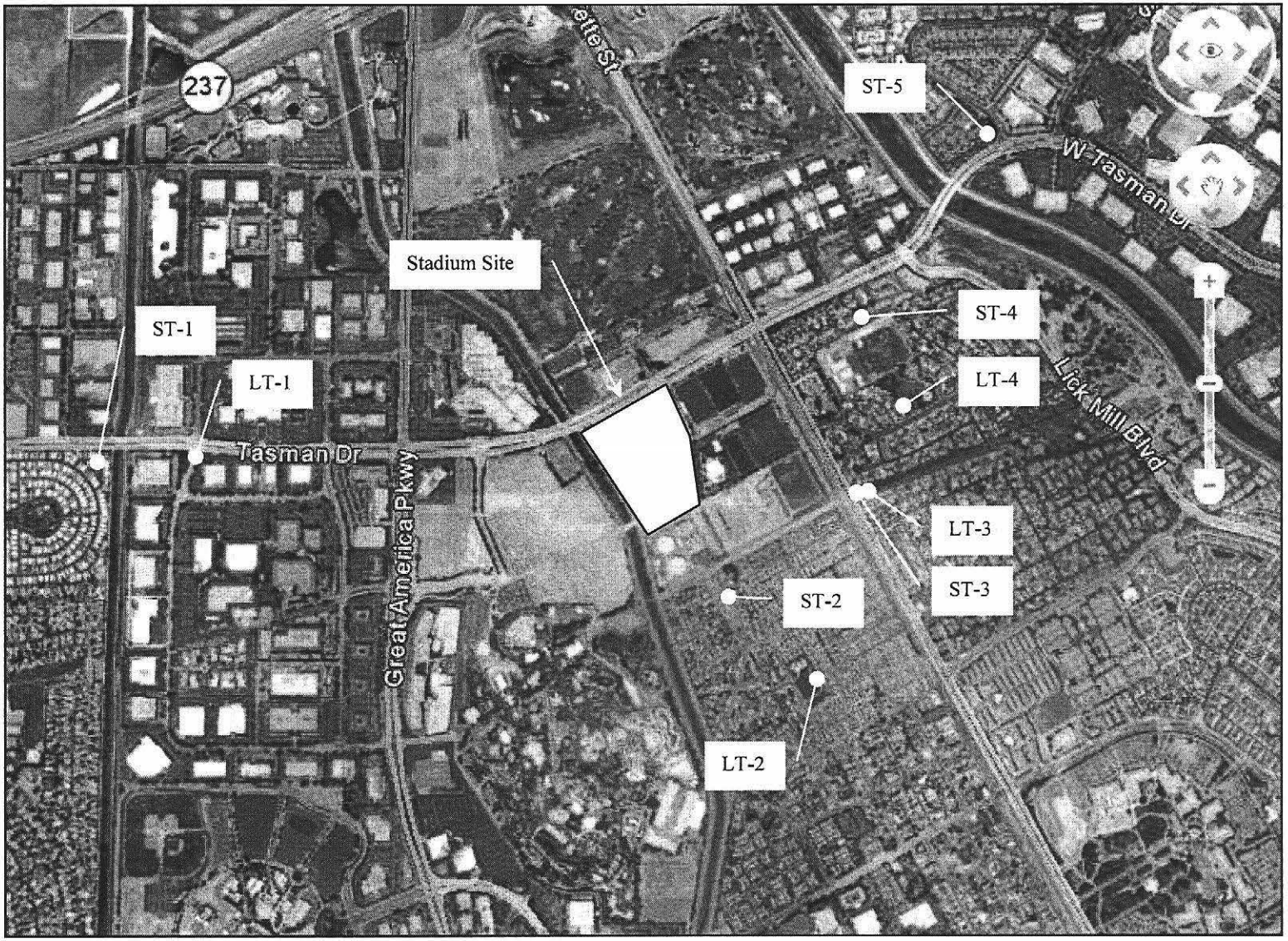
Impact 7: **Construction Vibration.** Vibration levels generated during demolition and construction activities would not be perceptible at neighboring land uses, and would not be considered excessive or be expected to cause cosmetic or structural damage to buildings. **This is a less than significant impact.**

Demolition and construction activities proposed as part of the project would generate perceptible vibration levels when heavy equipment or impact tools (e.g. jackhammers, pile drivers, hoe rams) are used in the immediate vicinity of nearby land uses. Distinctly perceptible groundborne vibration levels could be generated by heavy tracked vehicles (e.g., bulldozers or excavators) when these equipment operate within approximately 25 feet of sensitive land uses. Impact pile drivers can generate distinctly perceptible groundborne vibration levels at distances up to about 100 feet.

Residential receivers are located over 700 feet from areas on the stadium site that where major construction activities (e.g., pile driving) with the potential to generate perceptible vibration are planned to occur. These residences are located approximately 100 feet from the southernmost surface parking area where heavy tracked vehicles would likely be used during construction. Groundborne vibration levels generated by the construction of the project would not be perceptible at nearby residential land uses, and would not be expected to result in cosmetic or structural damage to adjacent buildings. Therefore, groundborne vibration resulting from the project would result in a less than significant impact.

Mitigation Measures: **None Required**

Figure 1 **Aerial Photo Showing Proposed Stadium Site and Noise Monitoring Locations**



Noise Levels at LT-1
~140 feet from the Centerline of Tasman Drive
Thursday, December 4, 2008

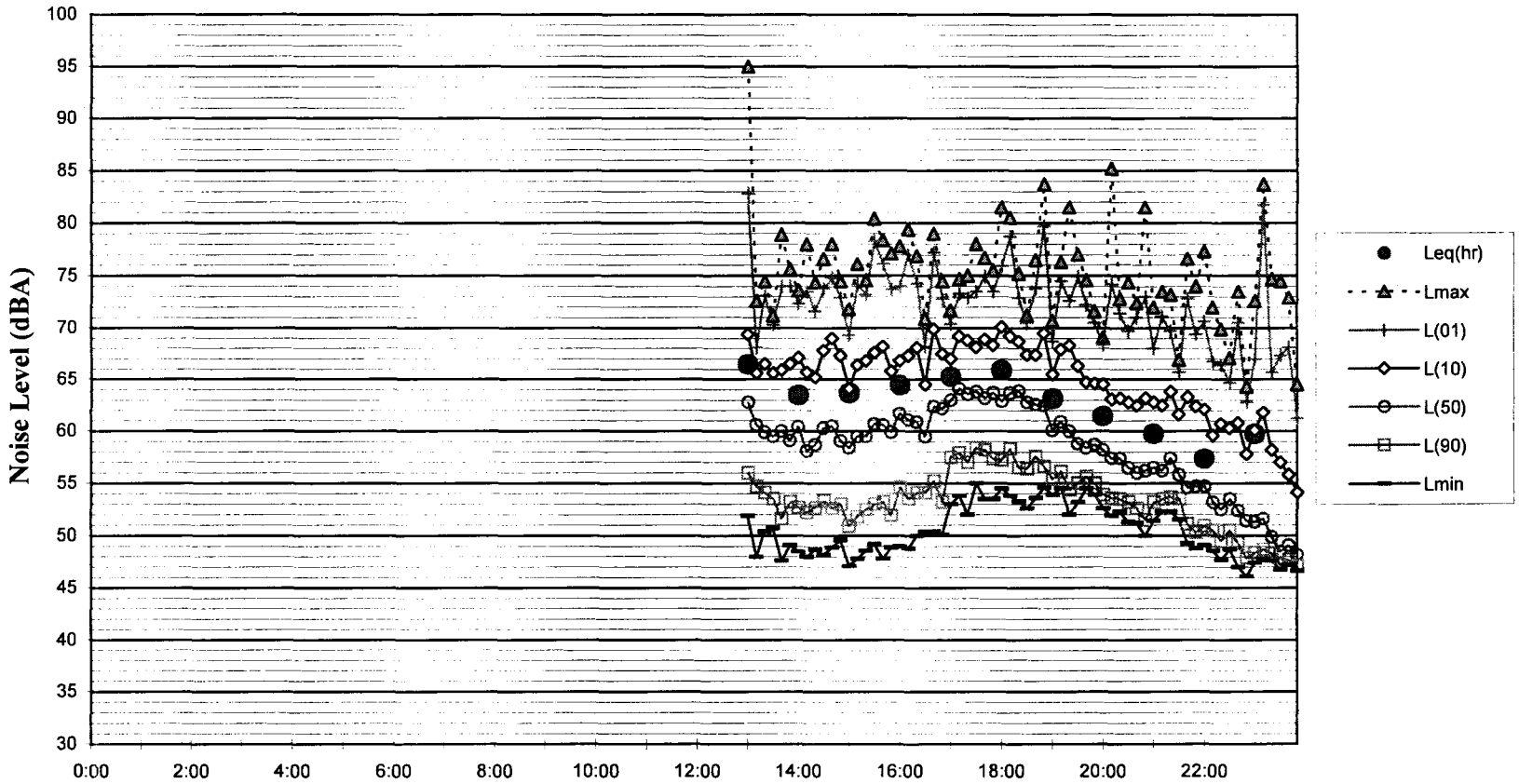


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Figure 2

Noise Levels at LT-1
~140 feet from the Centerline of Tasman Drive
Friday, December 5, 2008

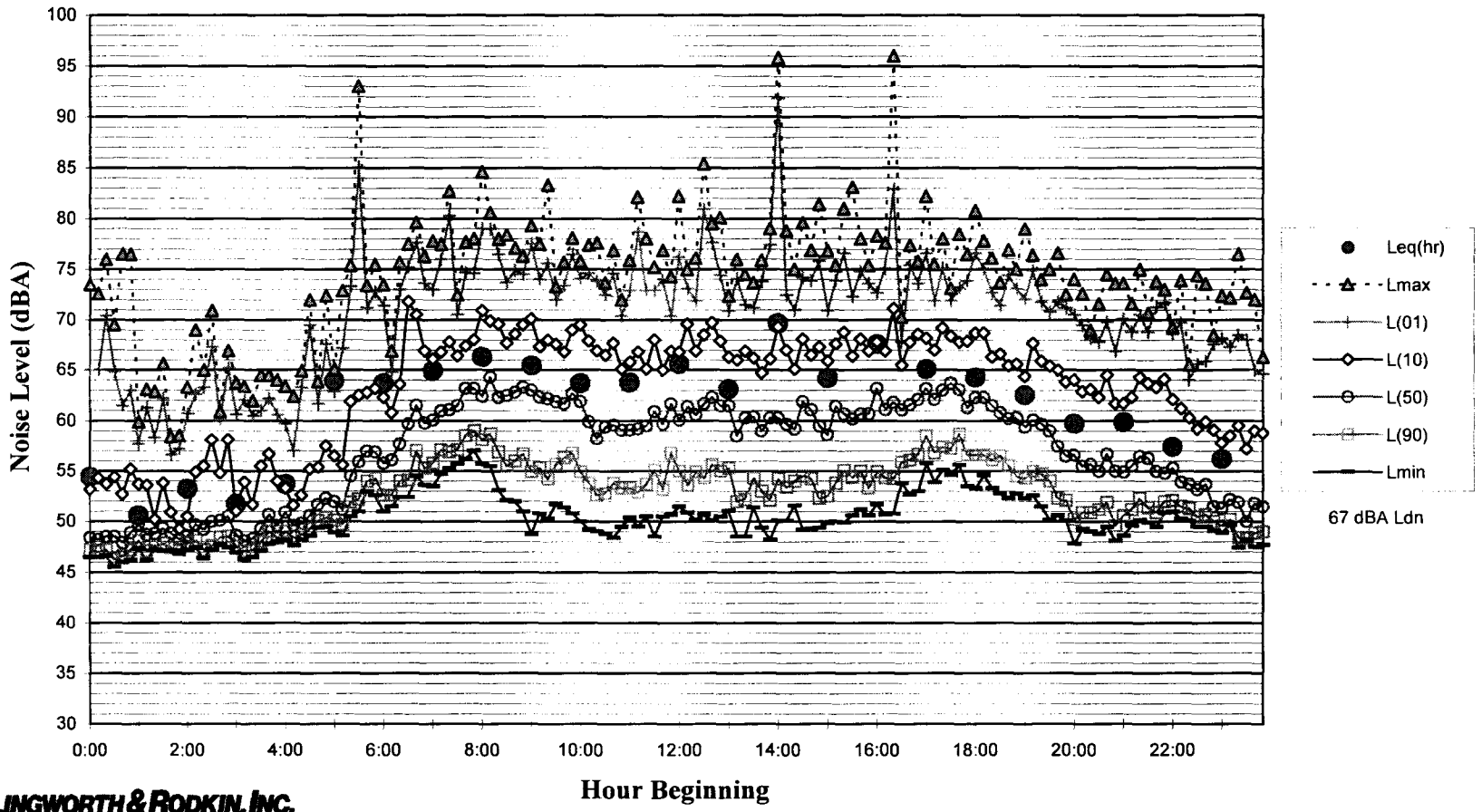

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Figure 3

Noise Levels at LT-1
~140 feet from the Centerline of Tasman Drive
Saturday, December 6, 2008

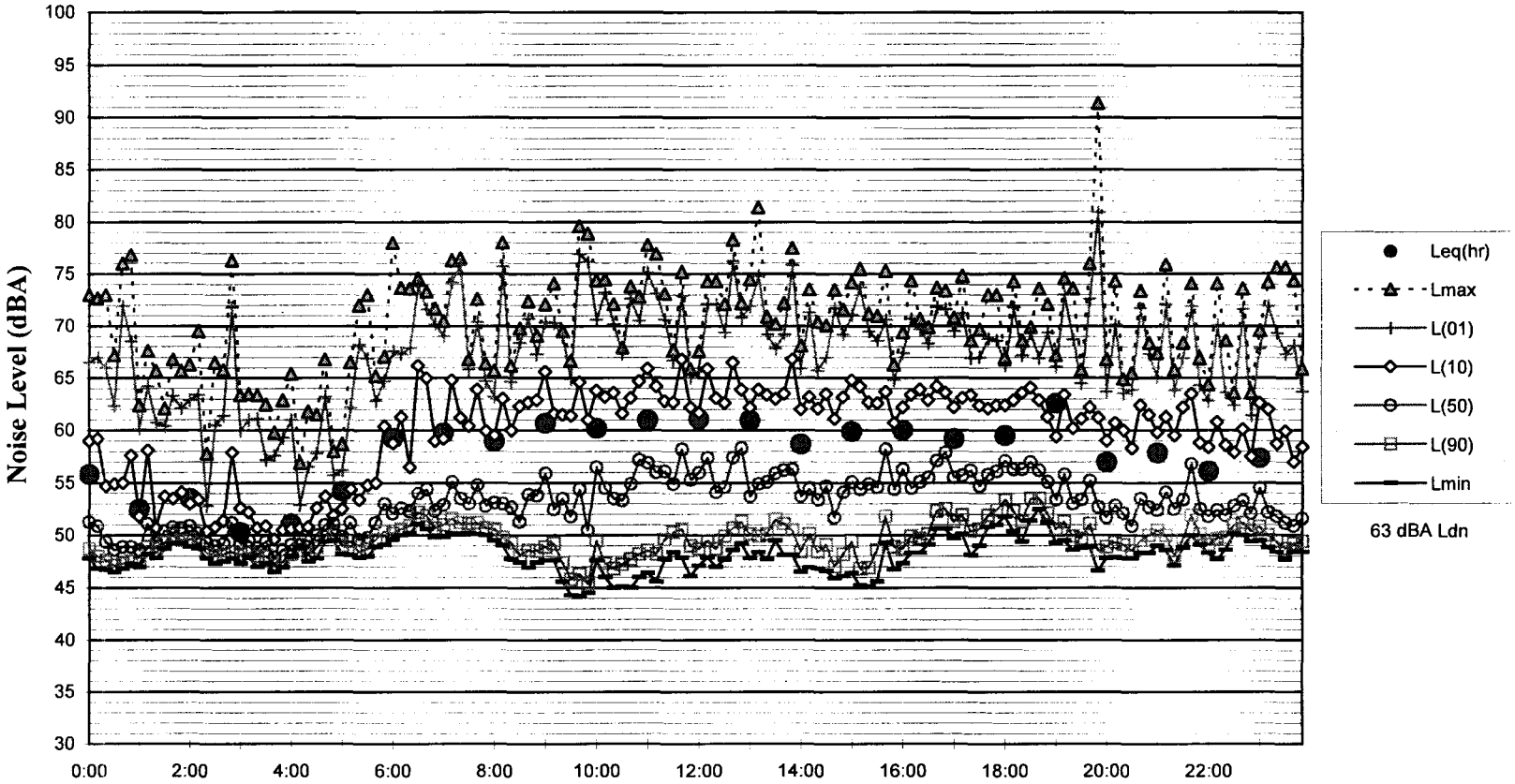

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Figure 4

Noise Levels at LT-1
~140 feet from the Centerline of Tasman Drive
Sunday, December 7, 2008

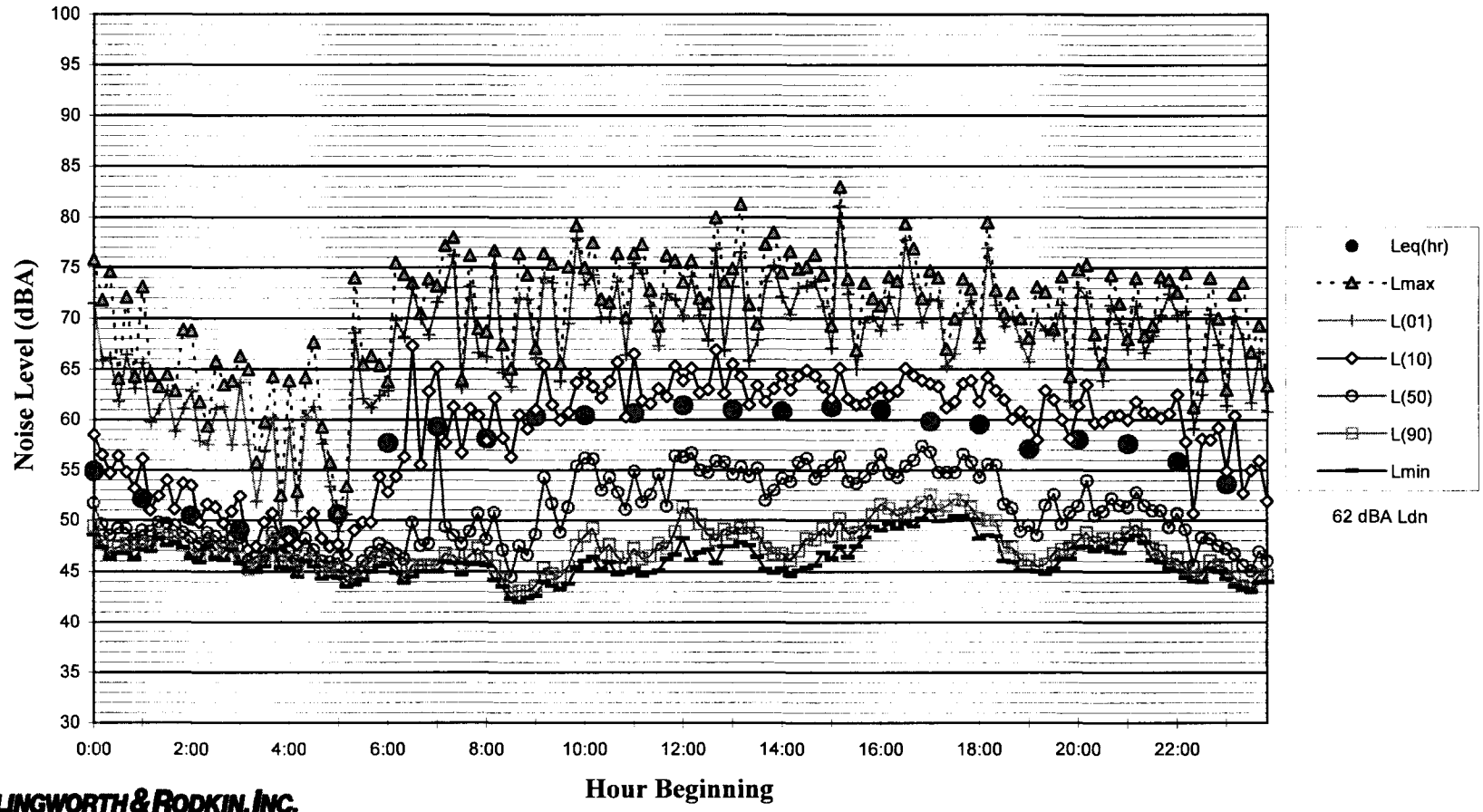

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Figure 5

Noise Levels at LT-1
~140 feet from the Centerline of Tasman Drive
Monday, December 8, 2008

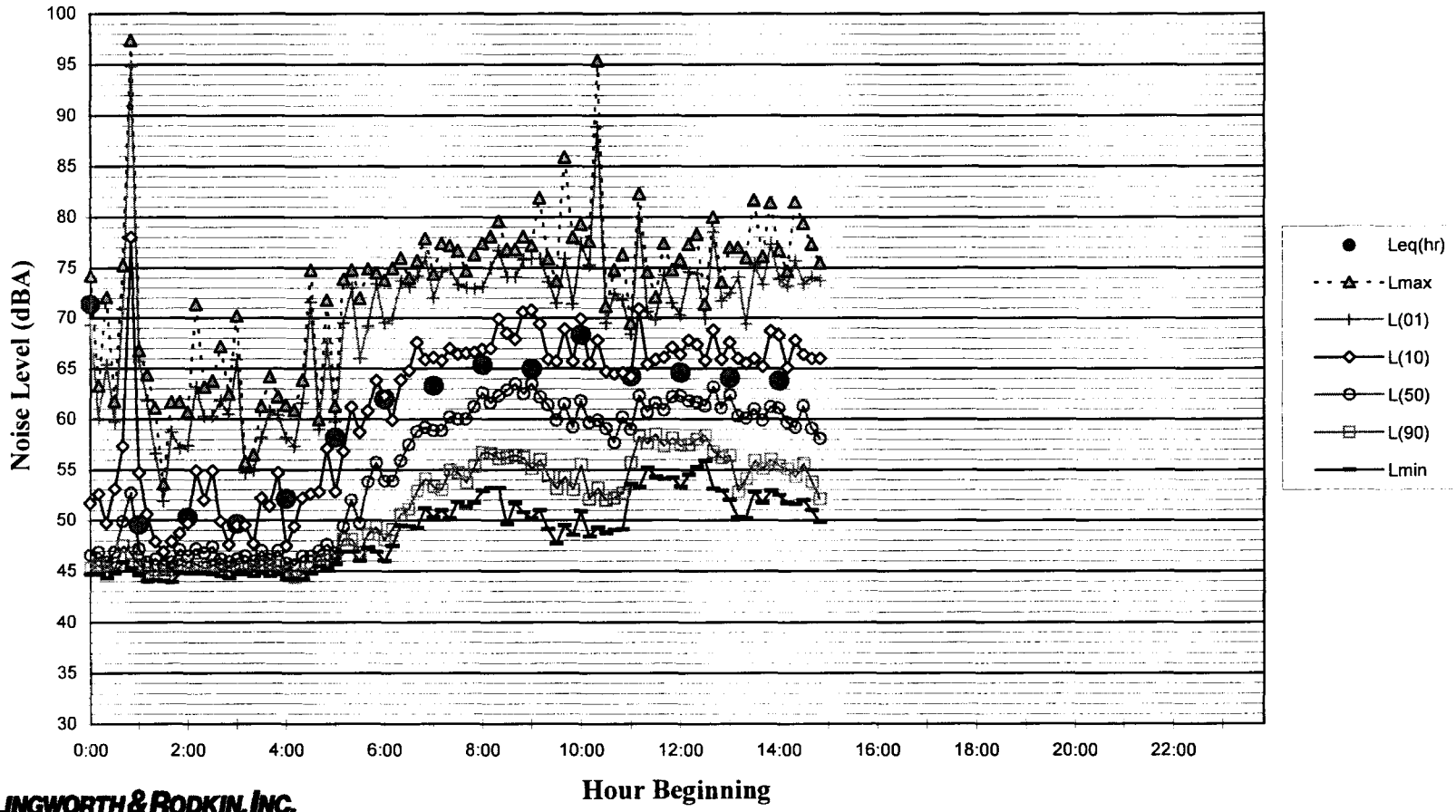

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Figure 6

Noise Levels at LT-2
Fuller Street Park
Thursday, December 4, 2008

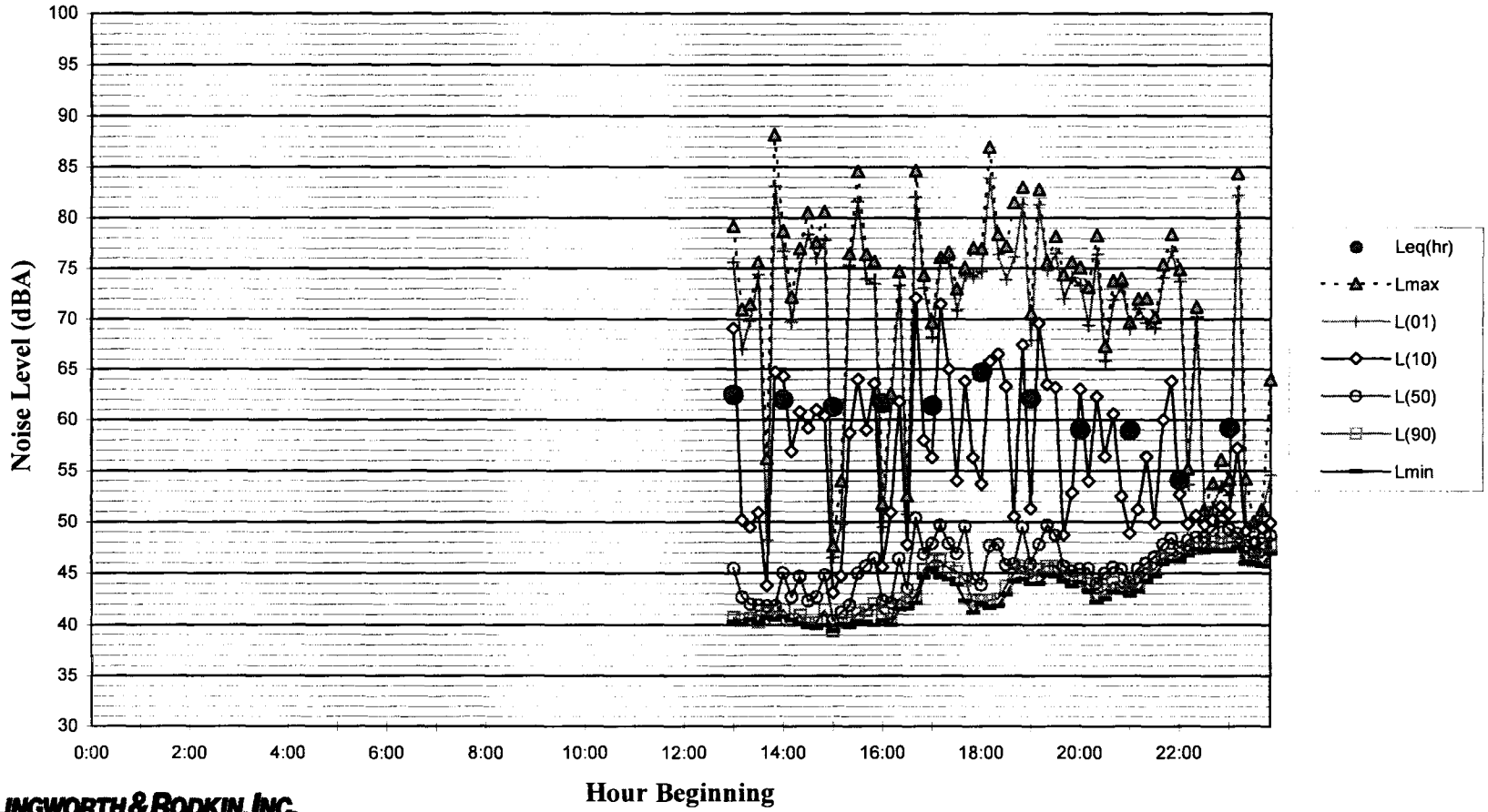

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Figure 7

Noise Levels at LT-2
Fuller Street Park
Friday, December 5, 2008

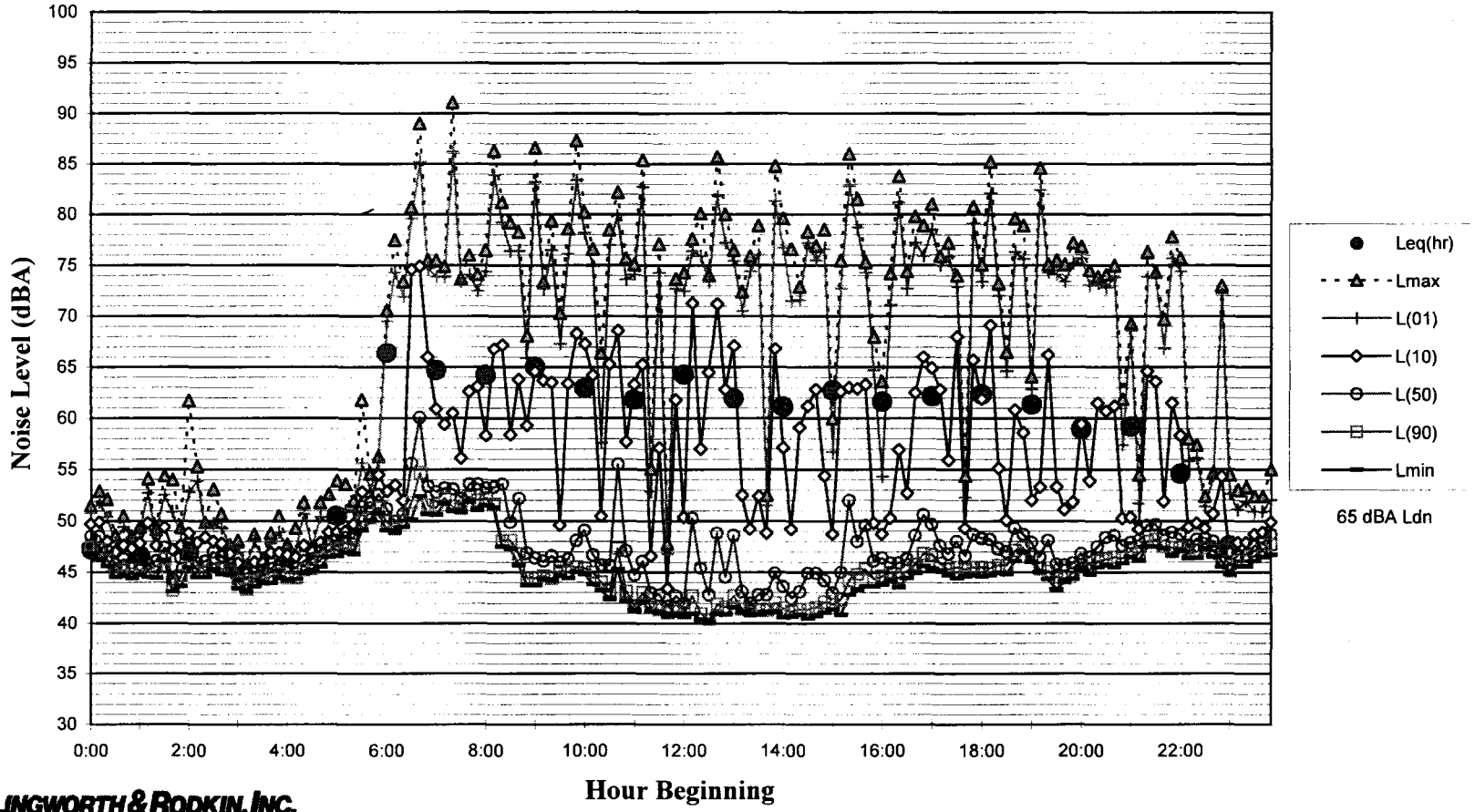

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Figure 8

Noise Levels at LT-2
Fuller Street Park
Saturday, December 6, 2008

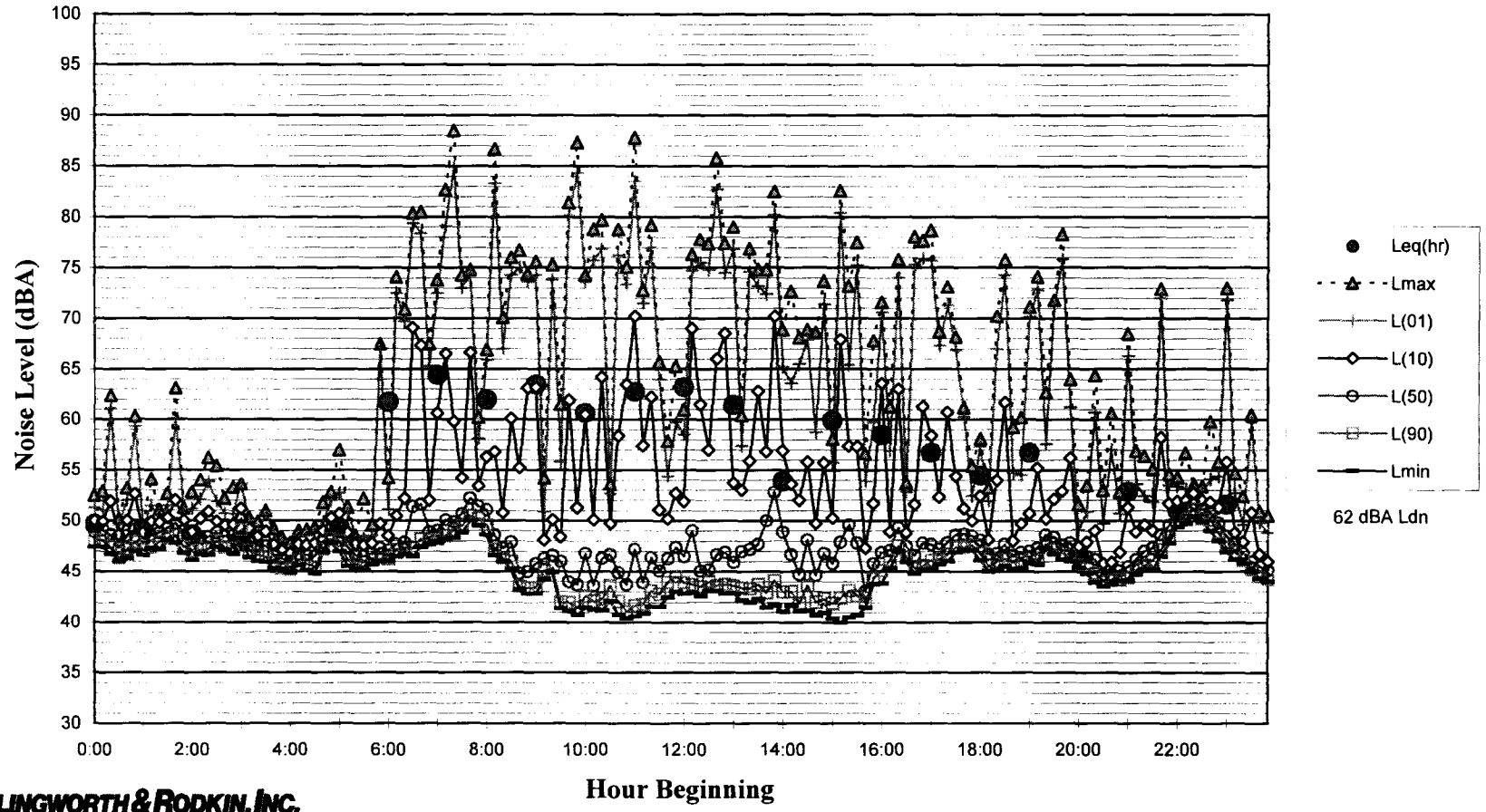

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Figure 9

Noise Levels at LT-2
Fuller Street Park
Sunday, December 7, 2008

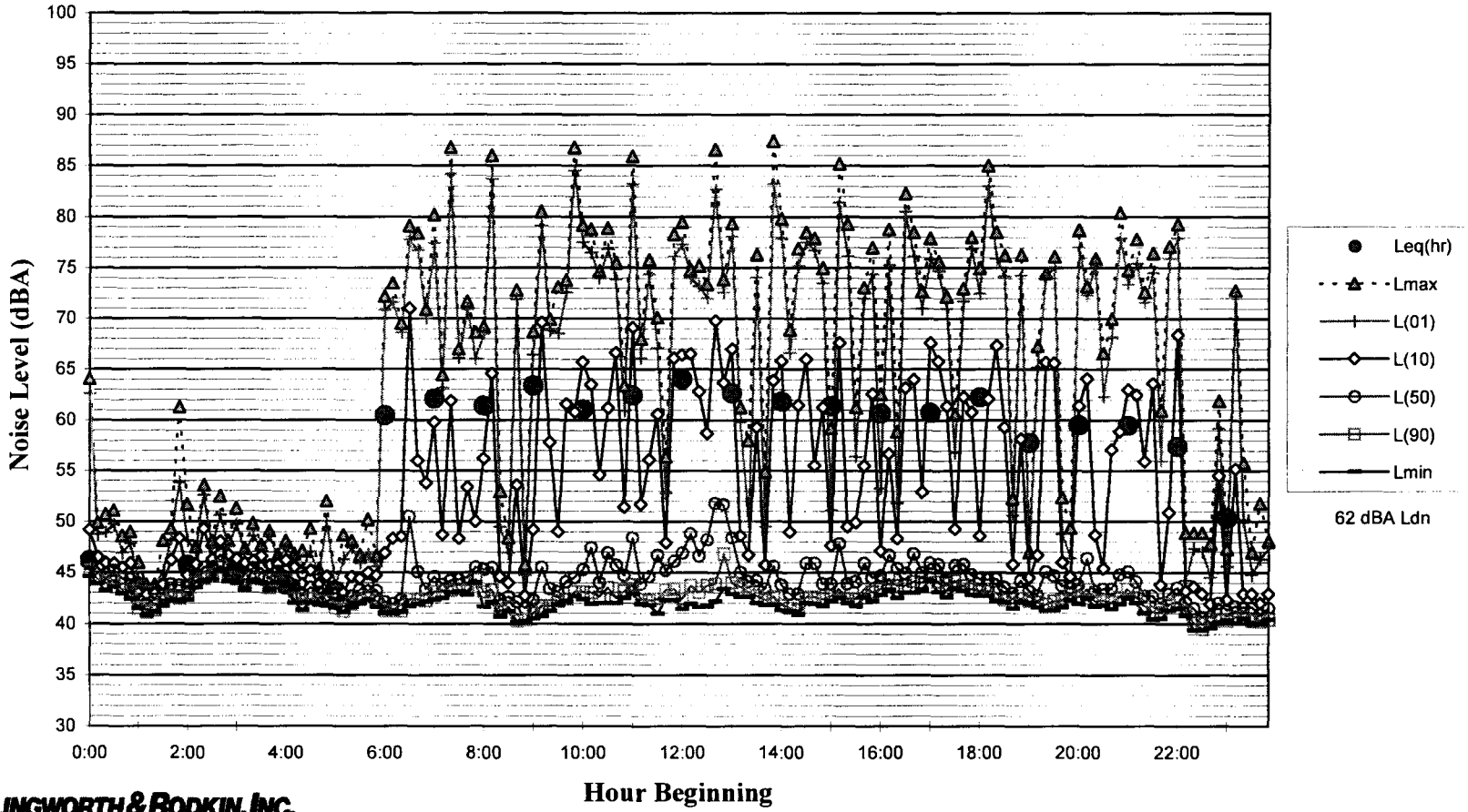

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Figure 10

Noise Levels at LT-2
Fuller Street Park
Monday, December 8, 2008

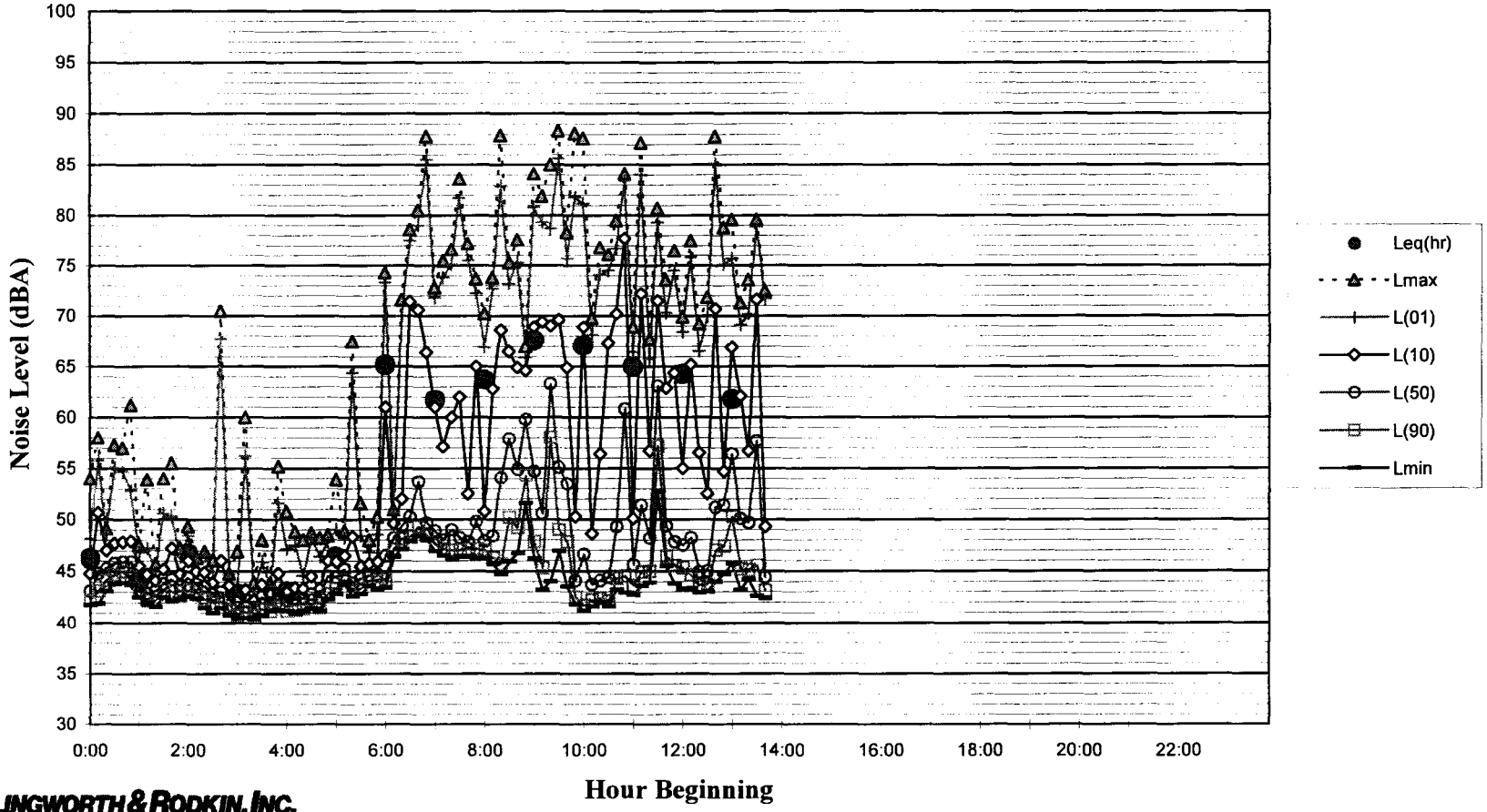

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Figure 11

Noise Levels at LT-3
~180 feet from the Centerline of Lafayette Street at Fairway Glen Street
Thursday, December 4, 2008

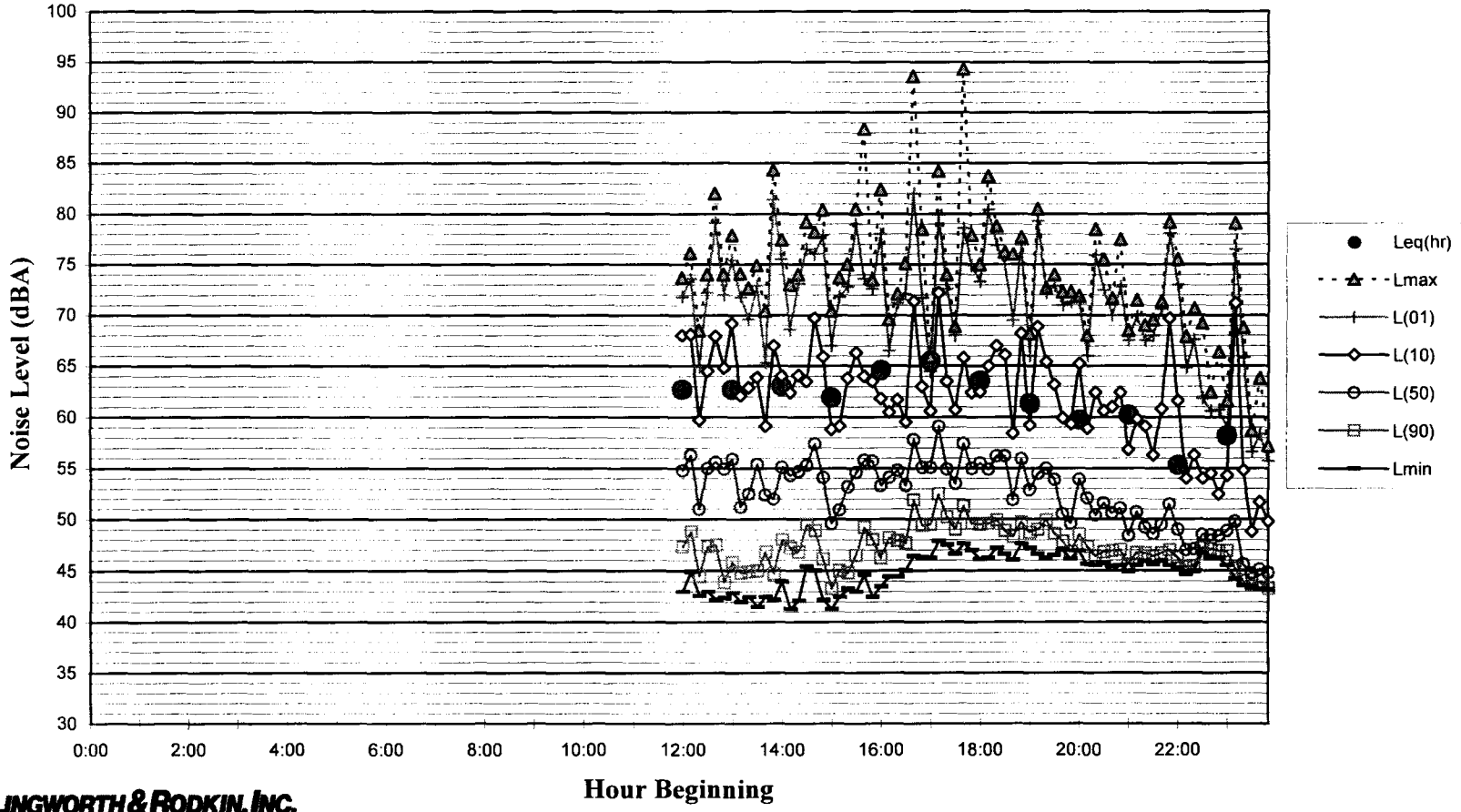

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Figure 12

Noise Levels at LT-3
~180 feet from the Centerline of Lafayette Street at Fairway Glen Street
Friday, December 5, 2008

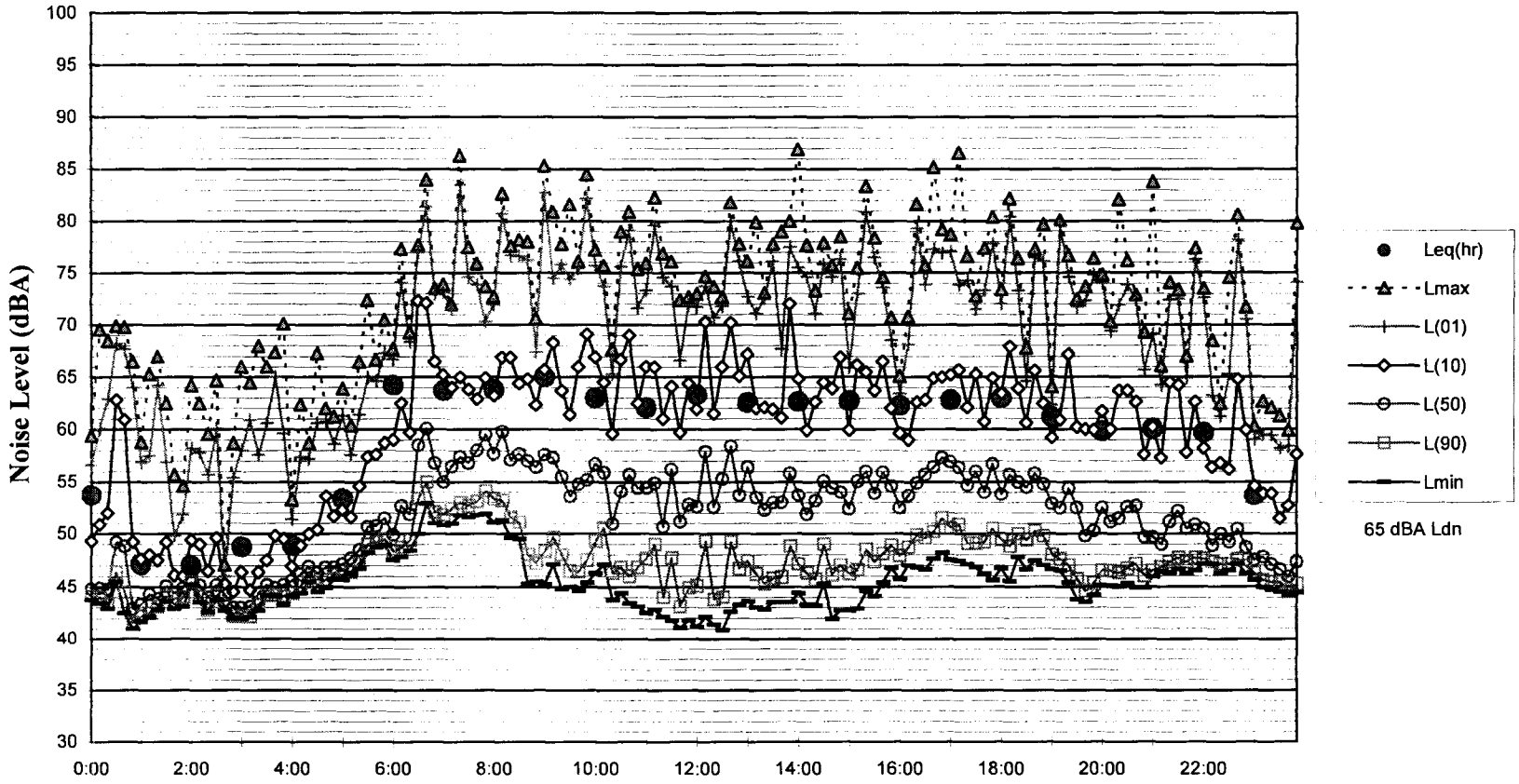

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Figure 13

Noise Levels at LT-3
~180 feet from the Centerline of Lafayette Street at Fairway Glen Street
Saturday, December 6, 2008

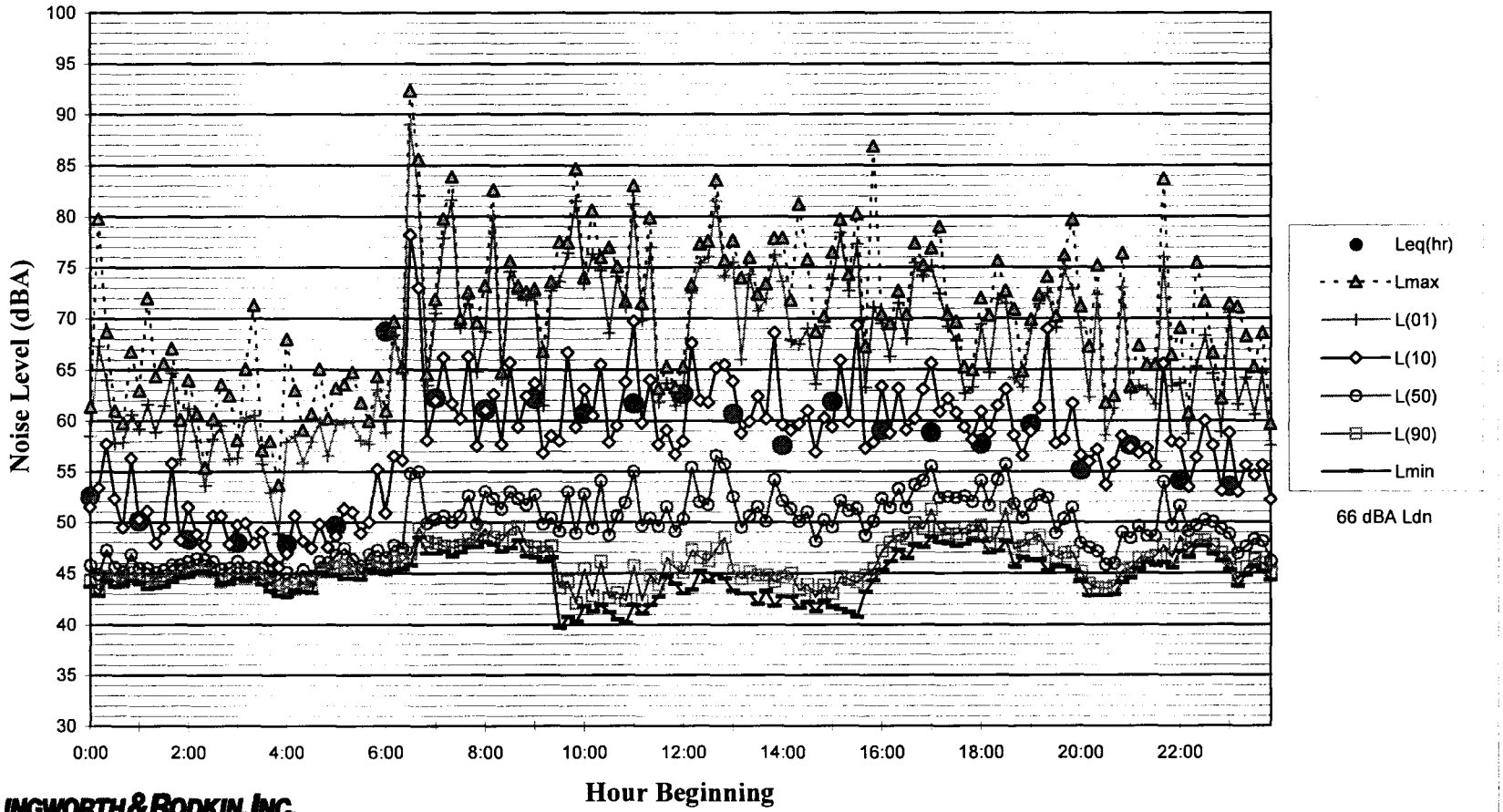

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Figure 14

Noise Levels at LT-3
~180 feet from the Centerline of Lafayette Street at Fairway Glen Street
Sunday, December 7, 2008

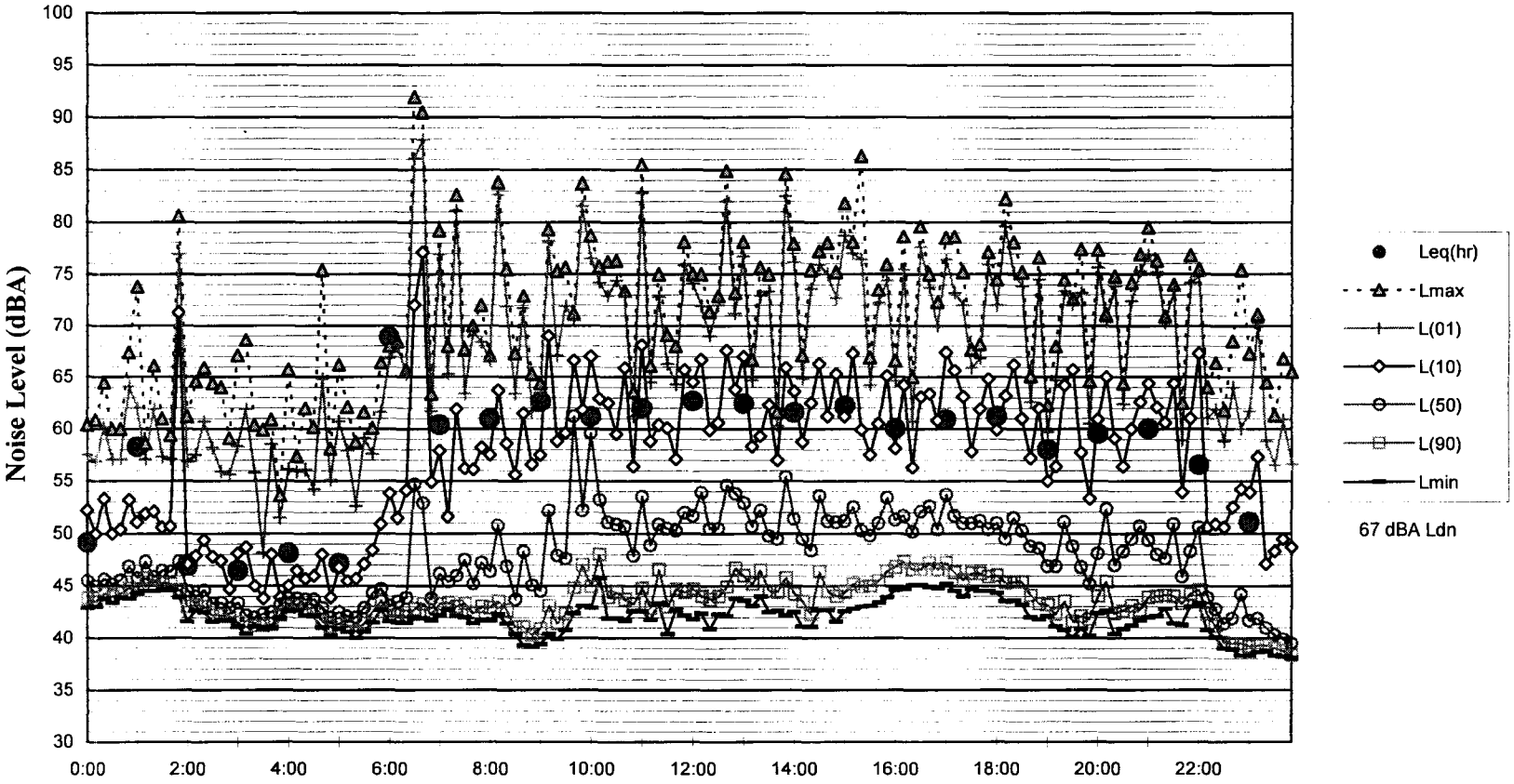

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Figure 15

Noise Levels at LT-3
~180 feet from the Centerline of Lafayette Street at Fairway Glen Street
Monday, December 8, 2008

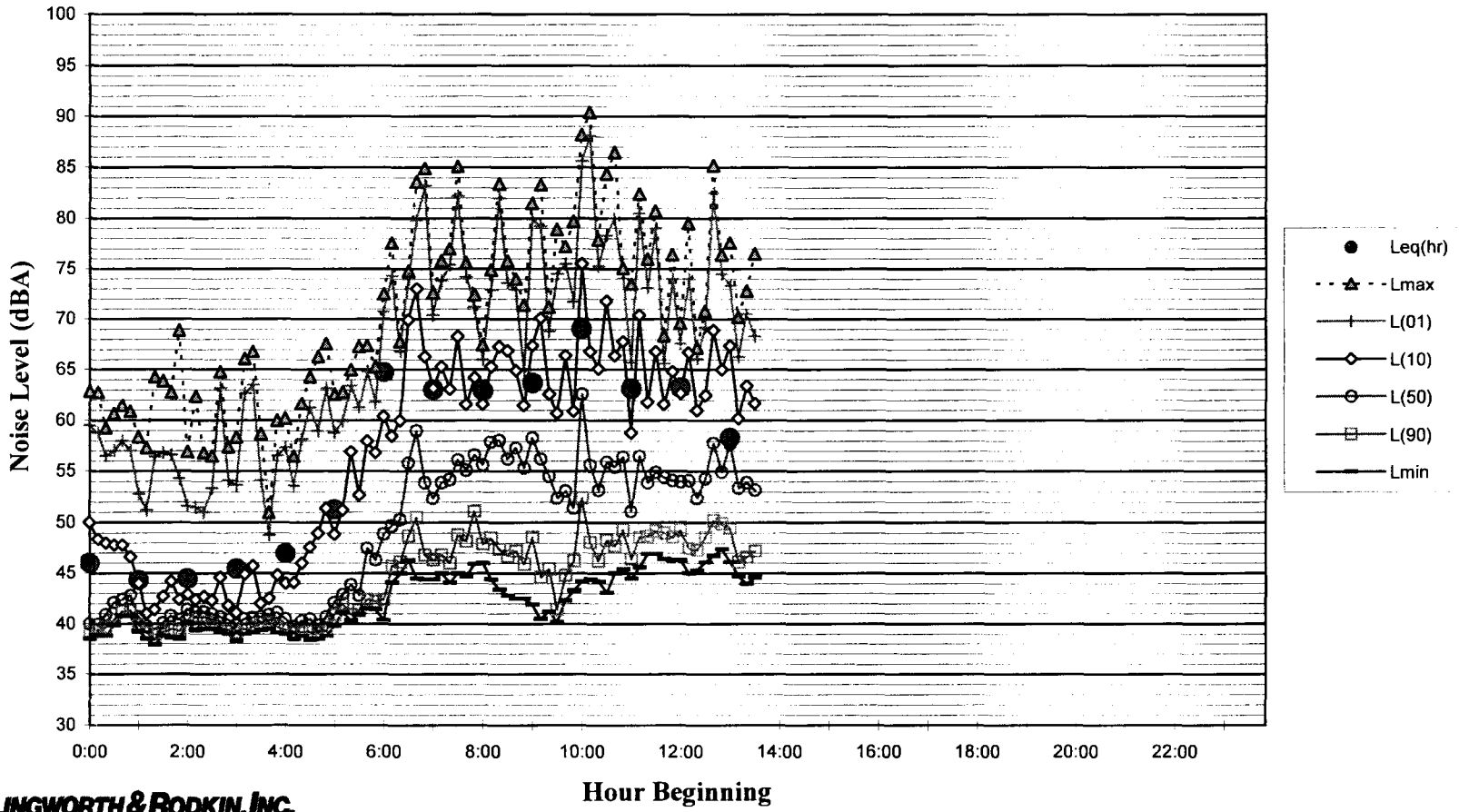

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Figure 16

Noise Levels at LT-4
Fairway Glen Park
Thursday, December 4, 2008

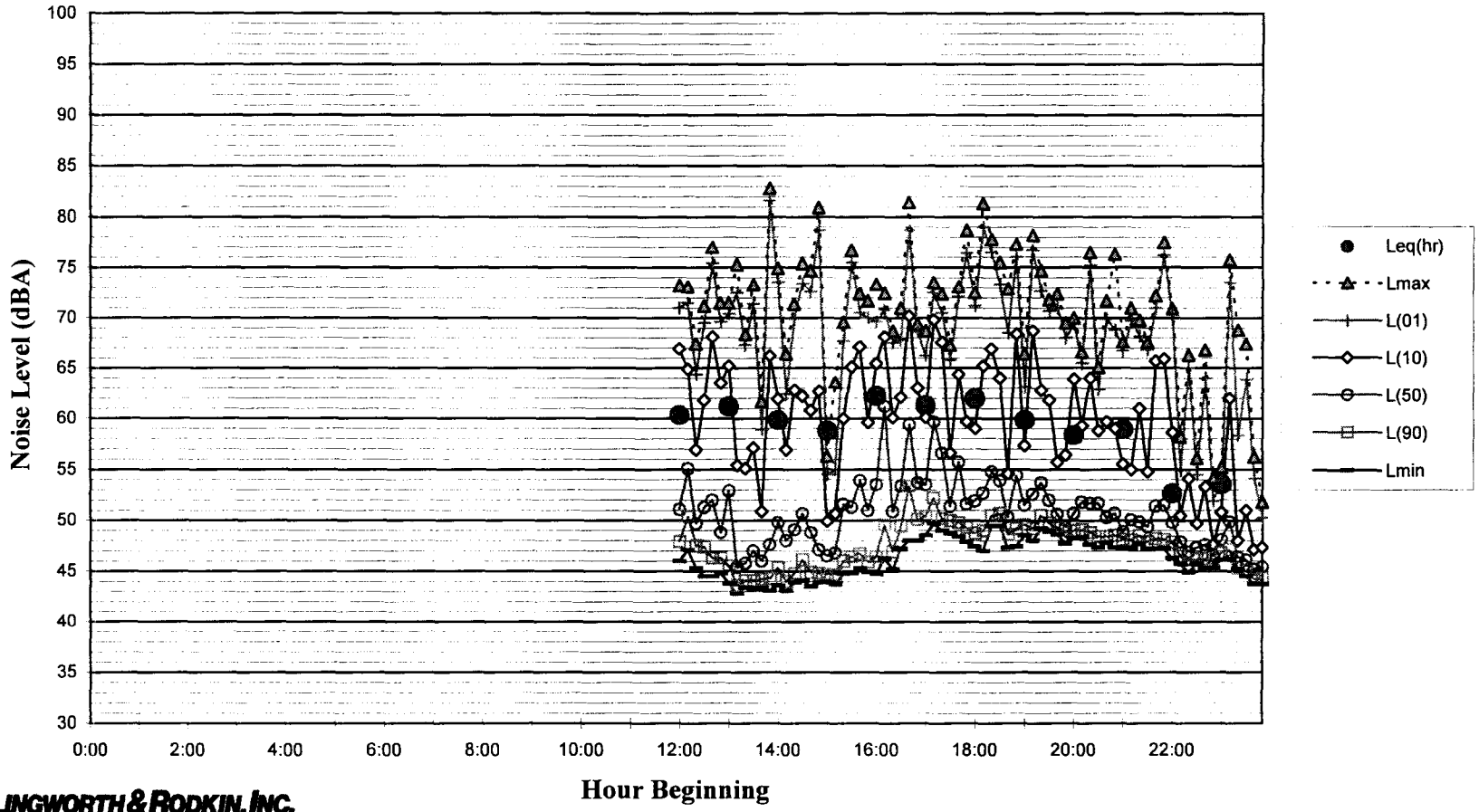

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Figure 17

Noise Levels at LT-4
Fairway Glen Park
Friday, December 5, 2008

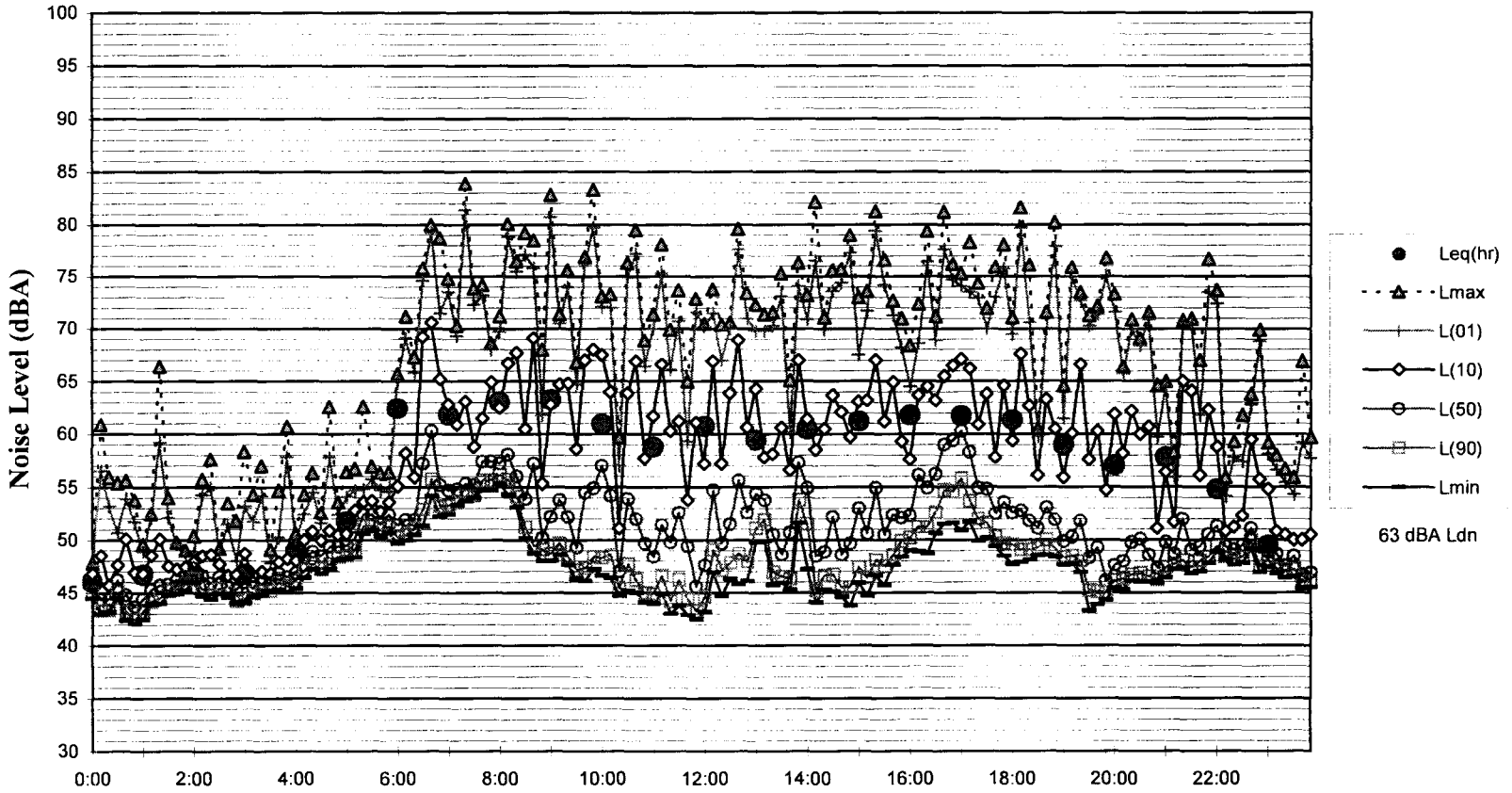

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Figure 18

Noise Levels at LT-4
Fairway Glen Park
Saturday, December 6, 2008

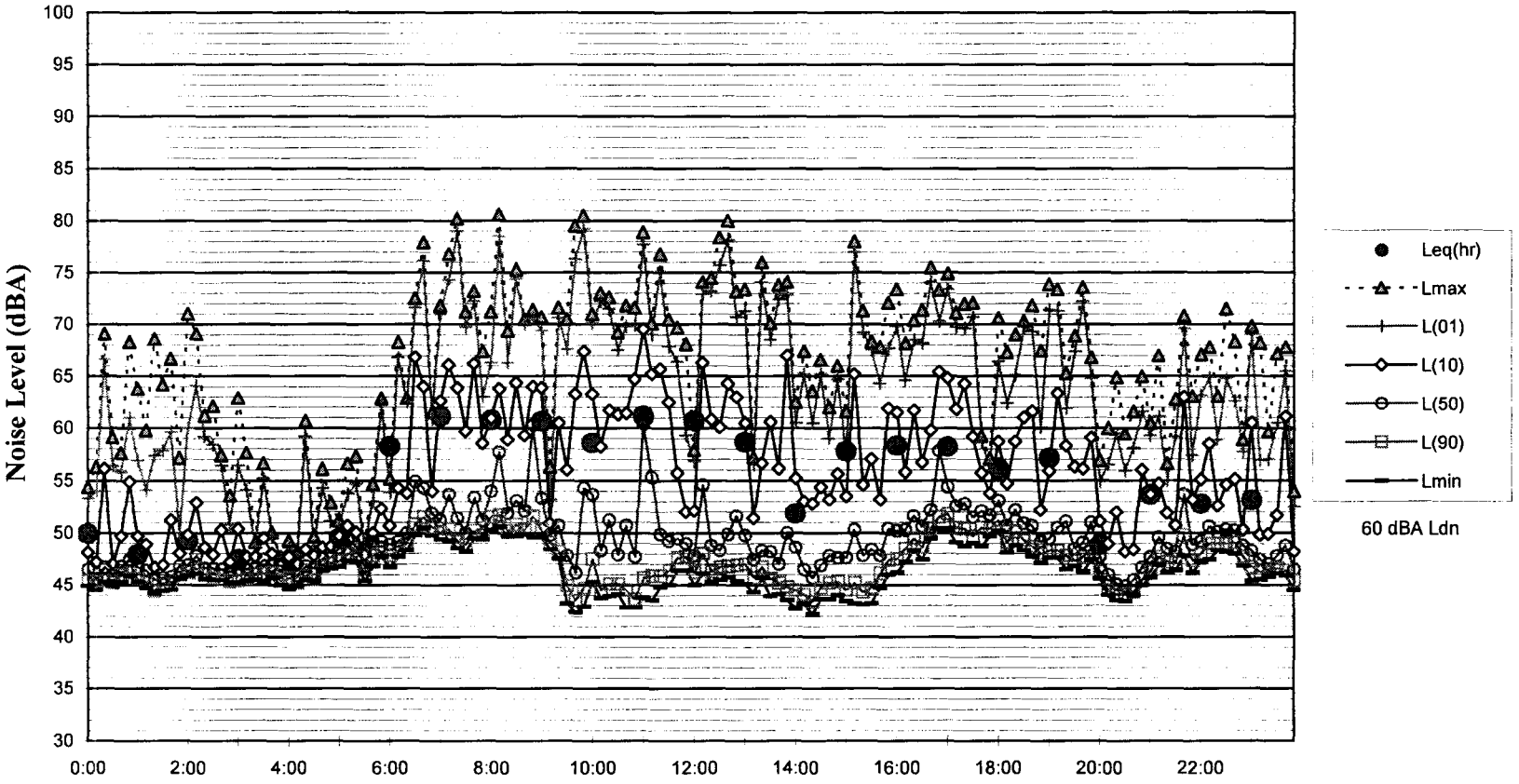

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Figure 19

Noise Levels at LT-4
Fairway Glen Park
Sunday, December 7, 2008

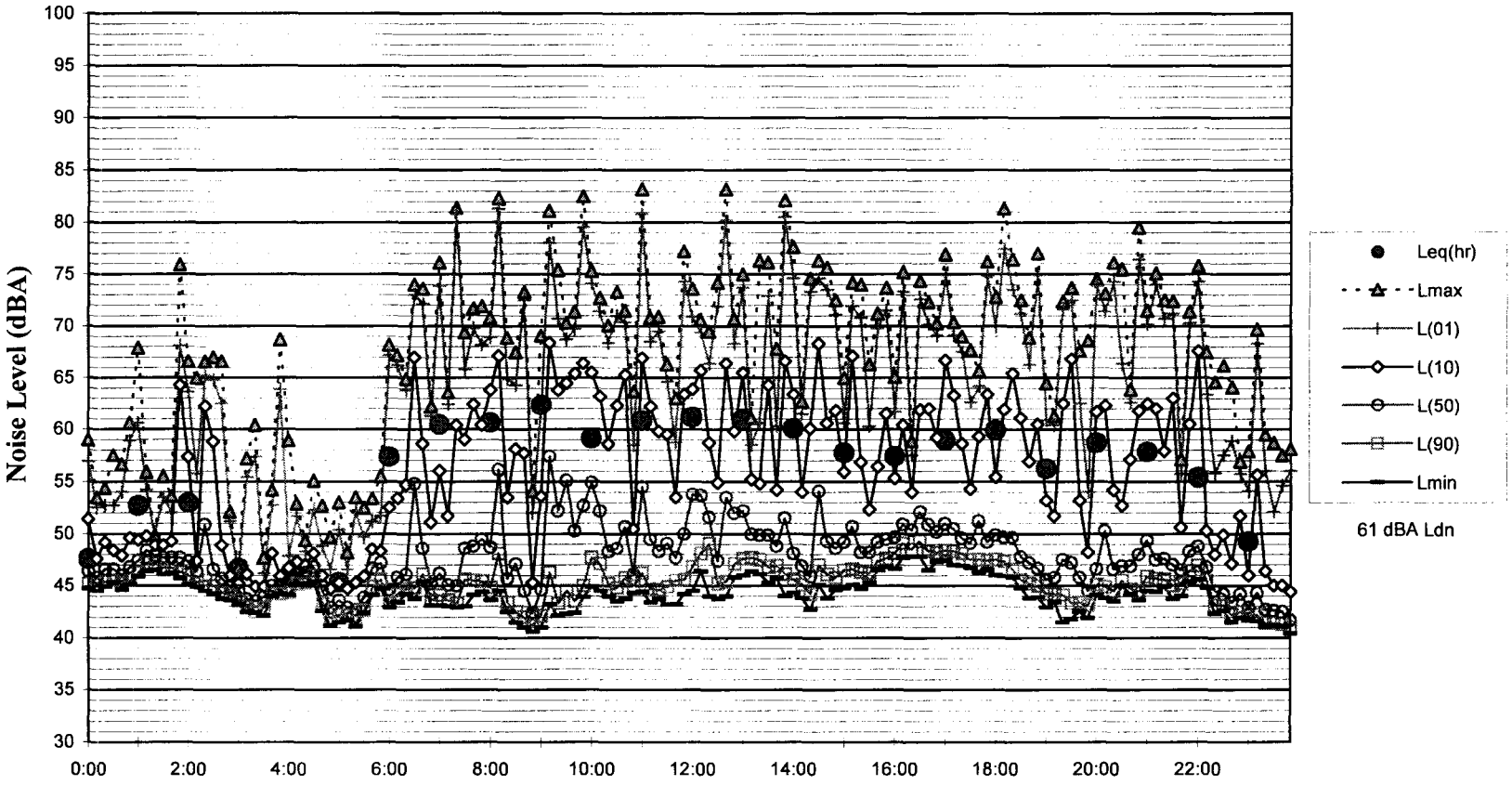

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Figure 20

Noise Levels at LT-4
Fairway Glen Park
Monday, December 8, 2008

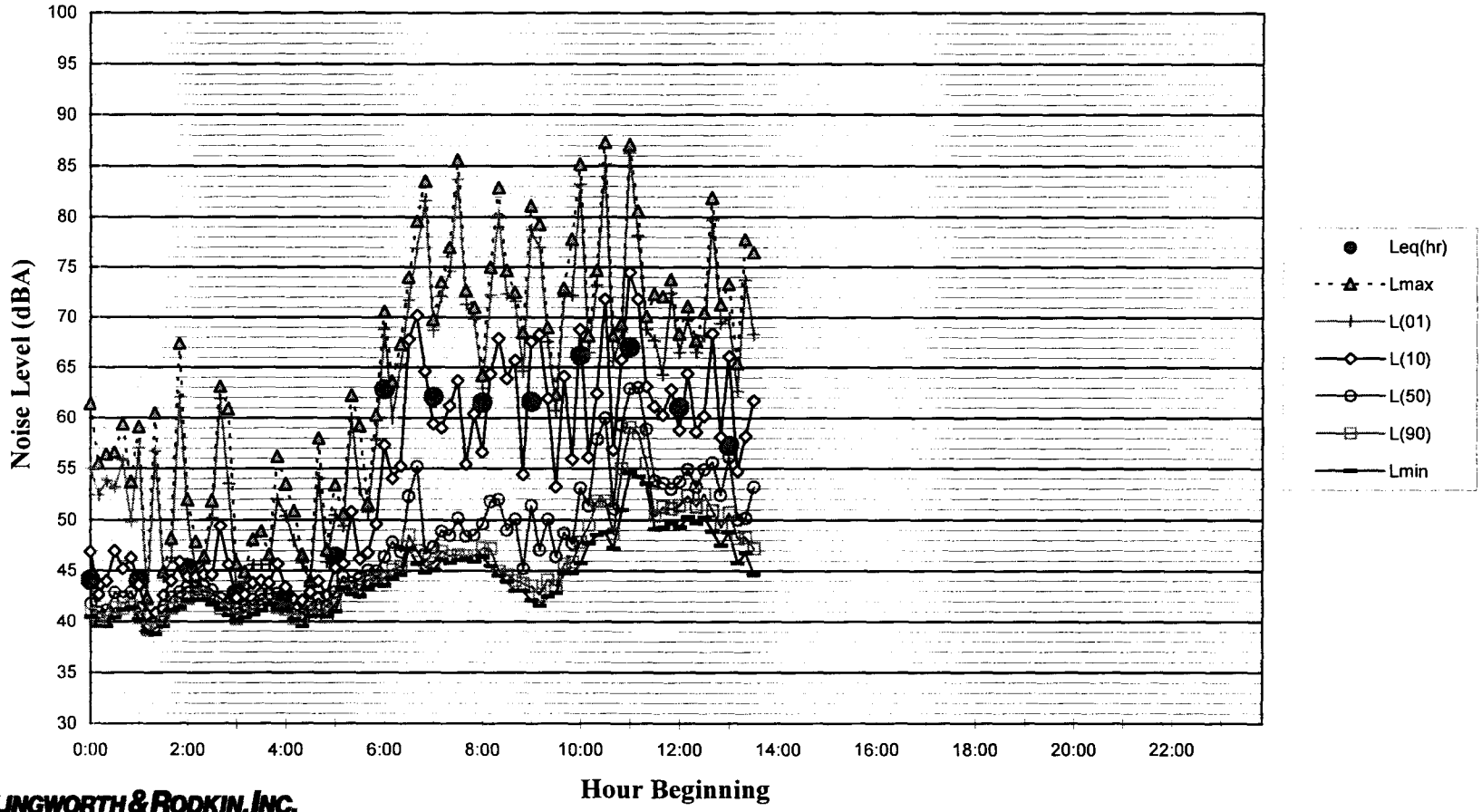

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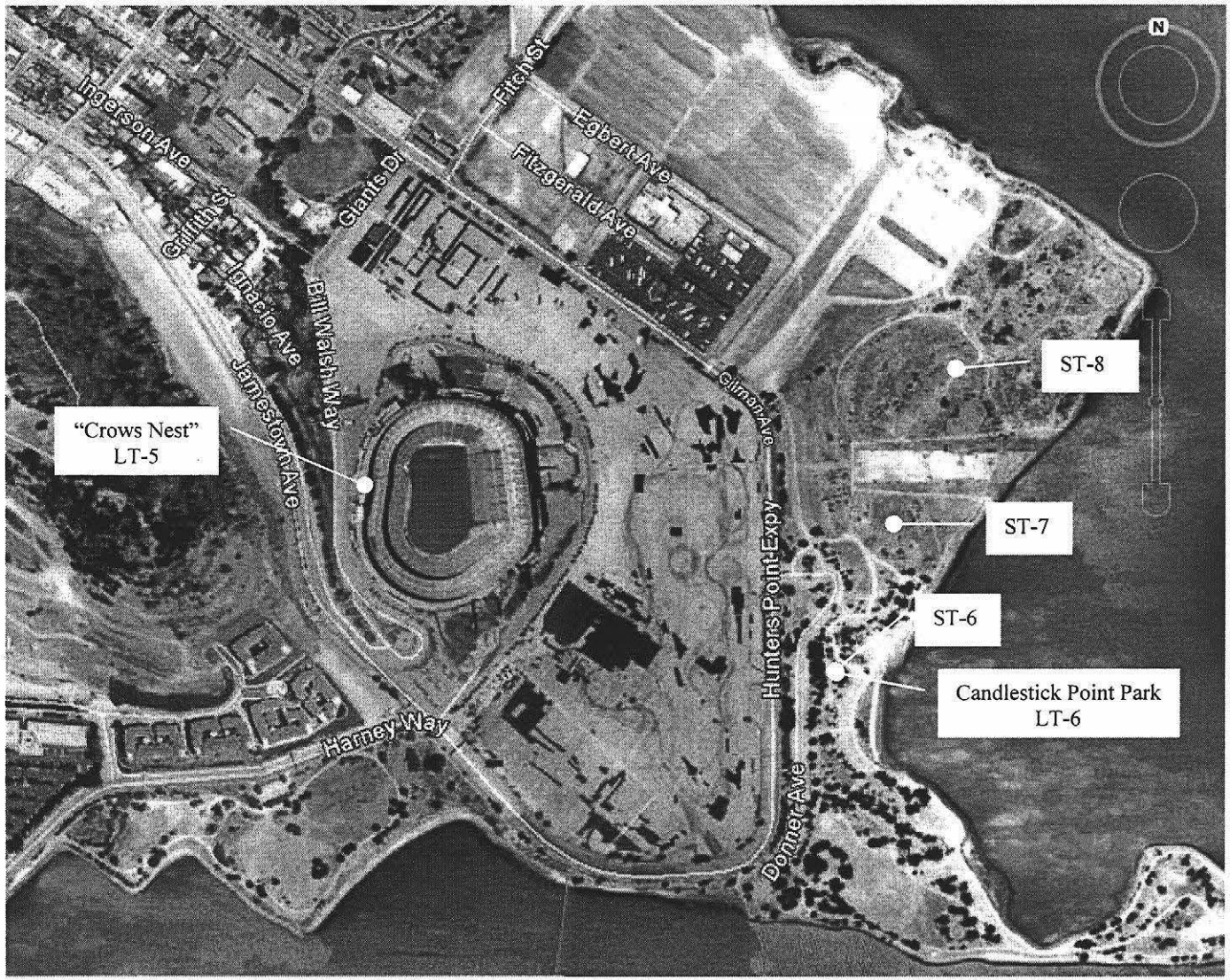
Figure 21

Figure 22 Aerial Photo Showing Candlestick Park and Noise Monitoring Locations



5-min Average Noise Levels (Leq)
San Francisco 49ers vs. New York Jets
Sunday, December 7, 2008

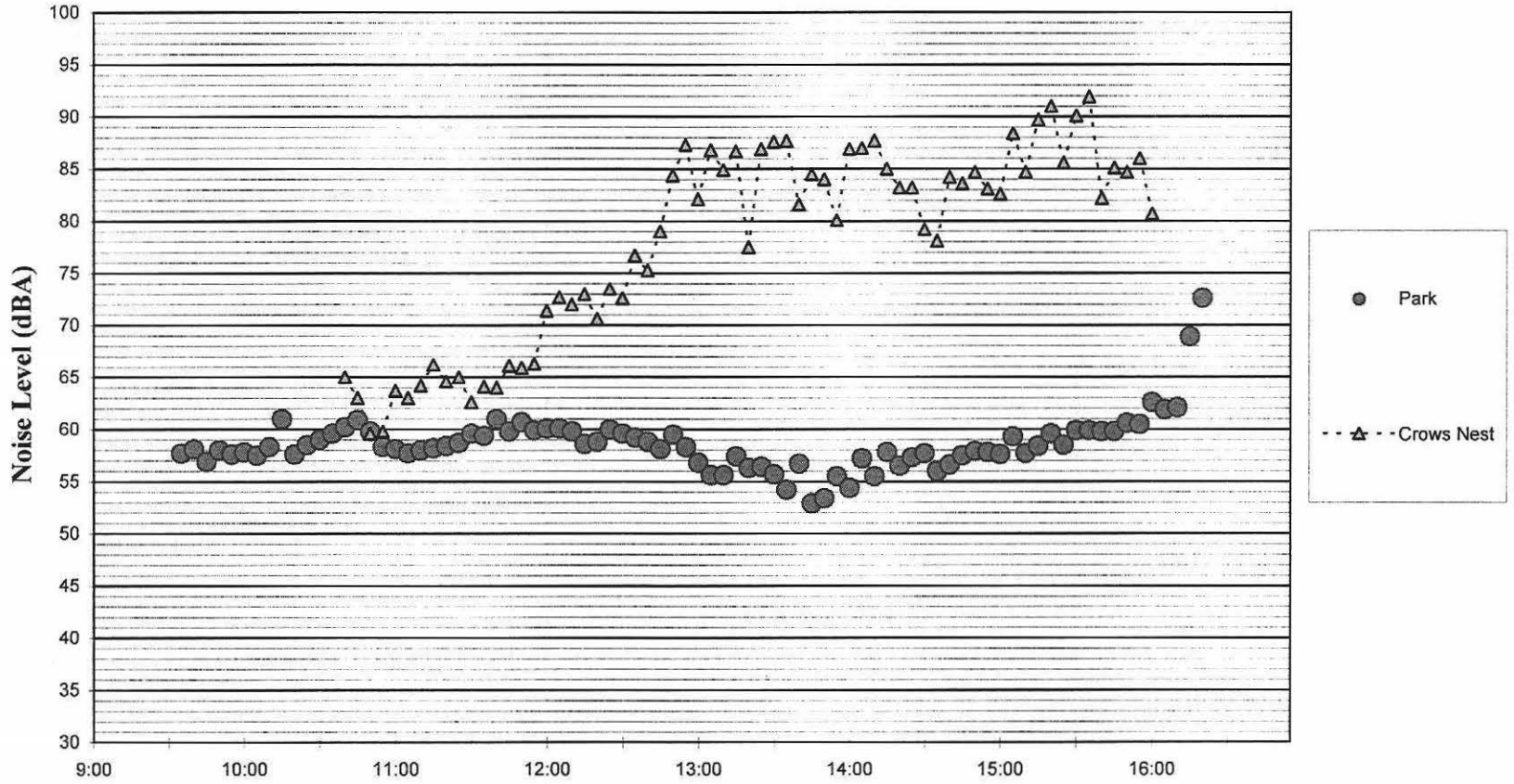


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Figure 23

1-min Maximum and Average Noise Levels Above the Press Box
San Francisco 49ers vs. New York Jets
Sunday, December 7, 2008

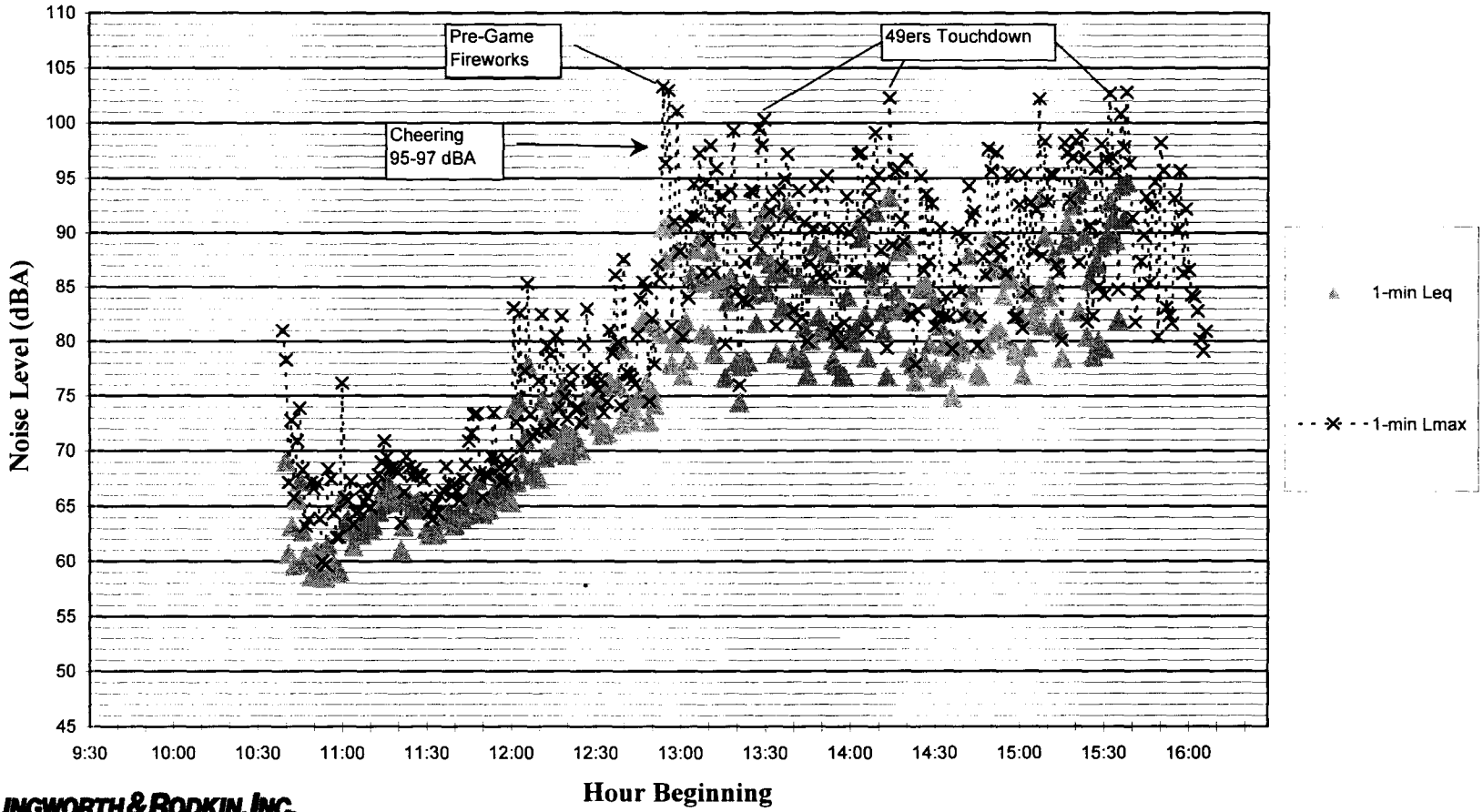

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Figure 24

1-min Maximum and Average Noise Levels at Candlestick Point Park
San Francisco 49ers vs. New York Jets
Sunday, December 7, 2008

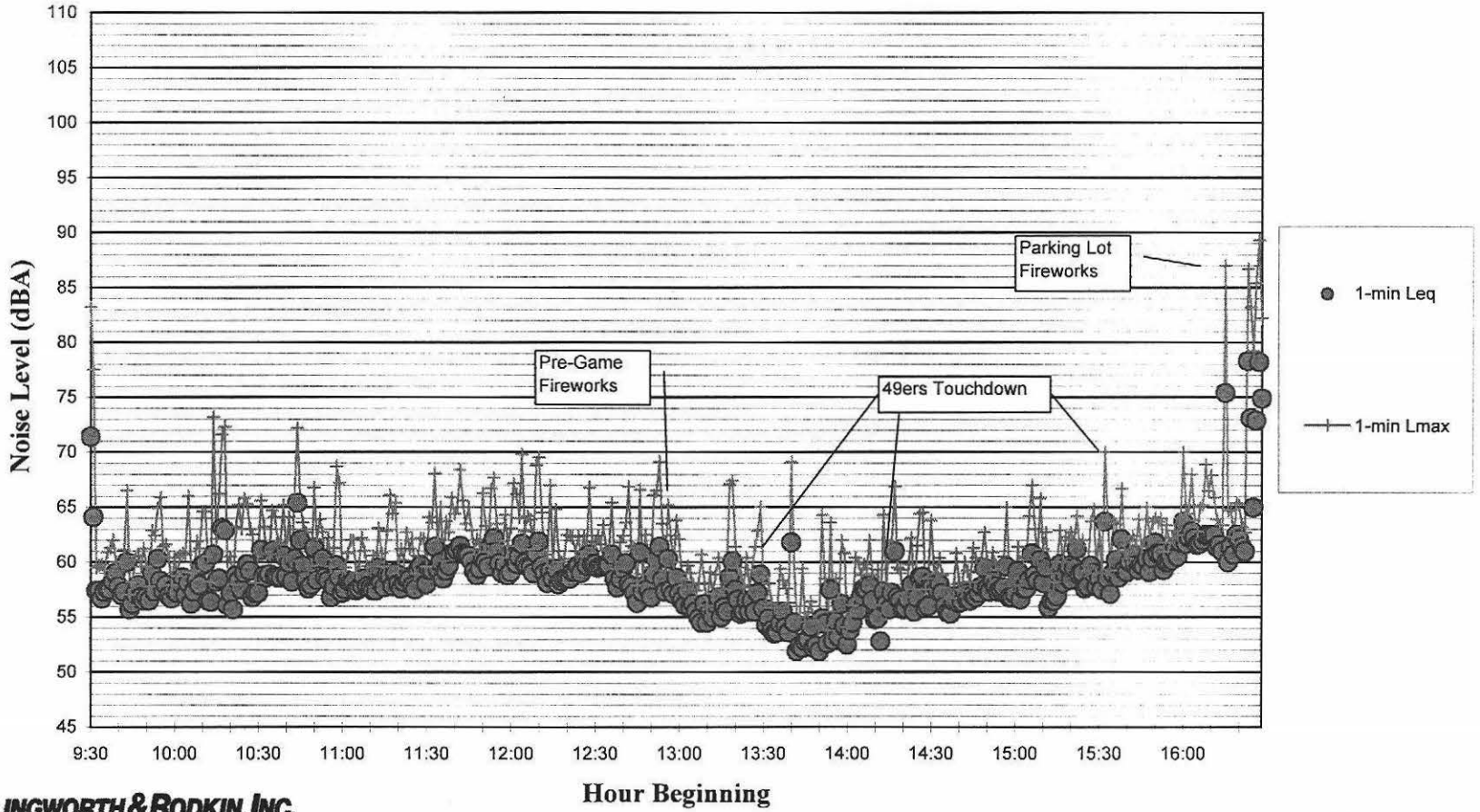

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Figure 25

Comparison of Maximum and Hourly Average Noise Levels (Tailgating Activities) with Ambient Noise Levels at Receivers Nearest the Main Stadium Parking Lot

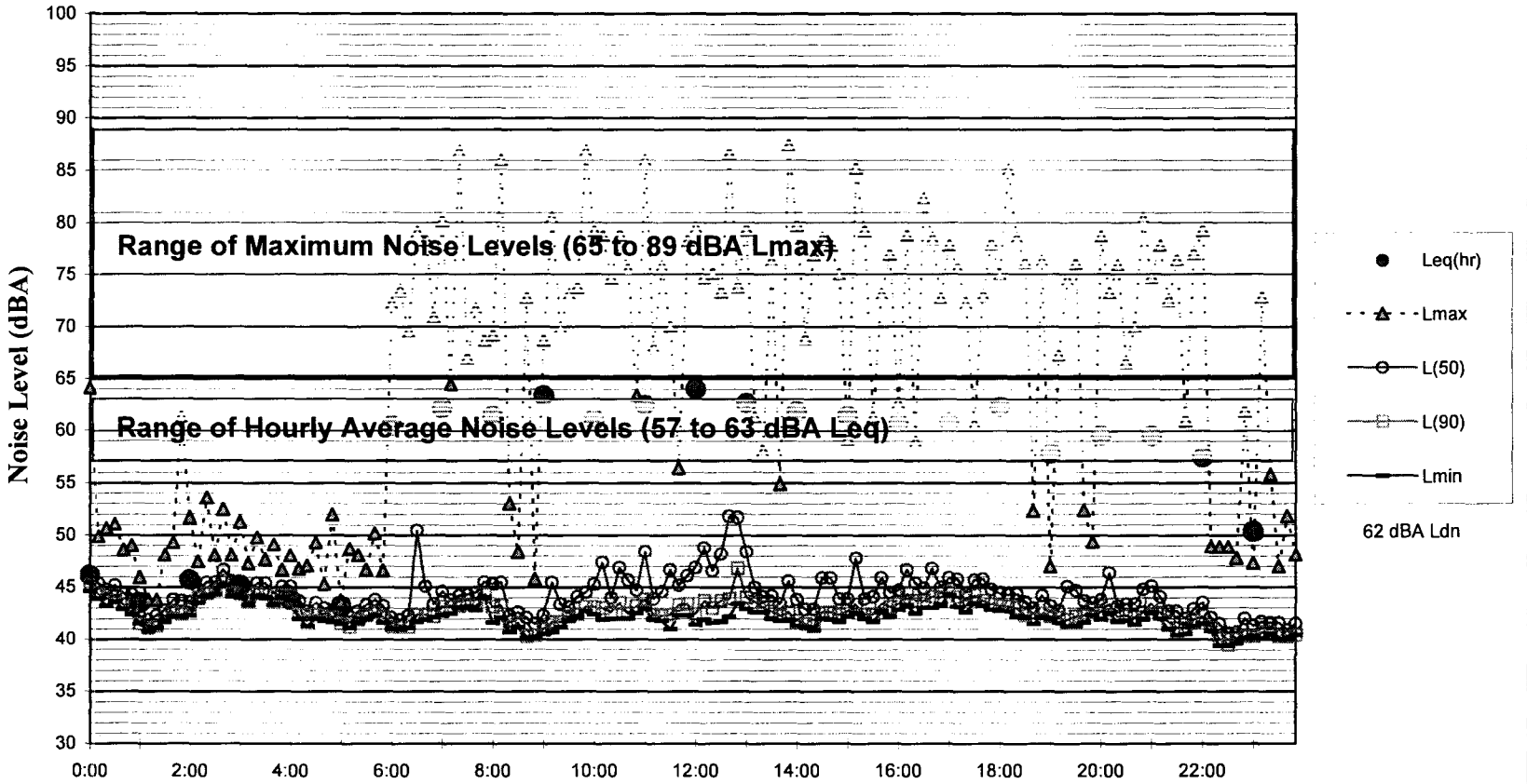

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Figure 26

Figure 27 Aerial Photo Showing Tailgating Noise Impact Zone

Comparison of Maximum and Hourly Average Noise Levels (Stadium Activities) with Ambient Noise Levels at the Nearest Receivers to the South

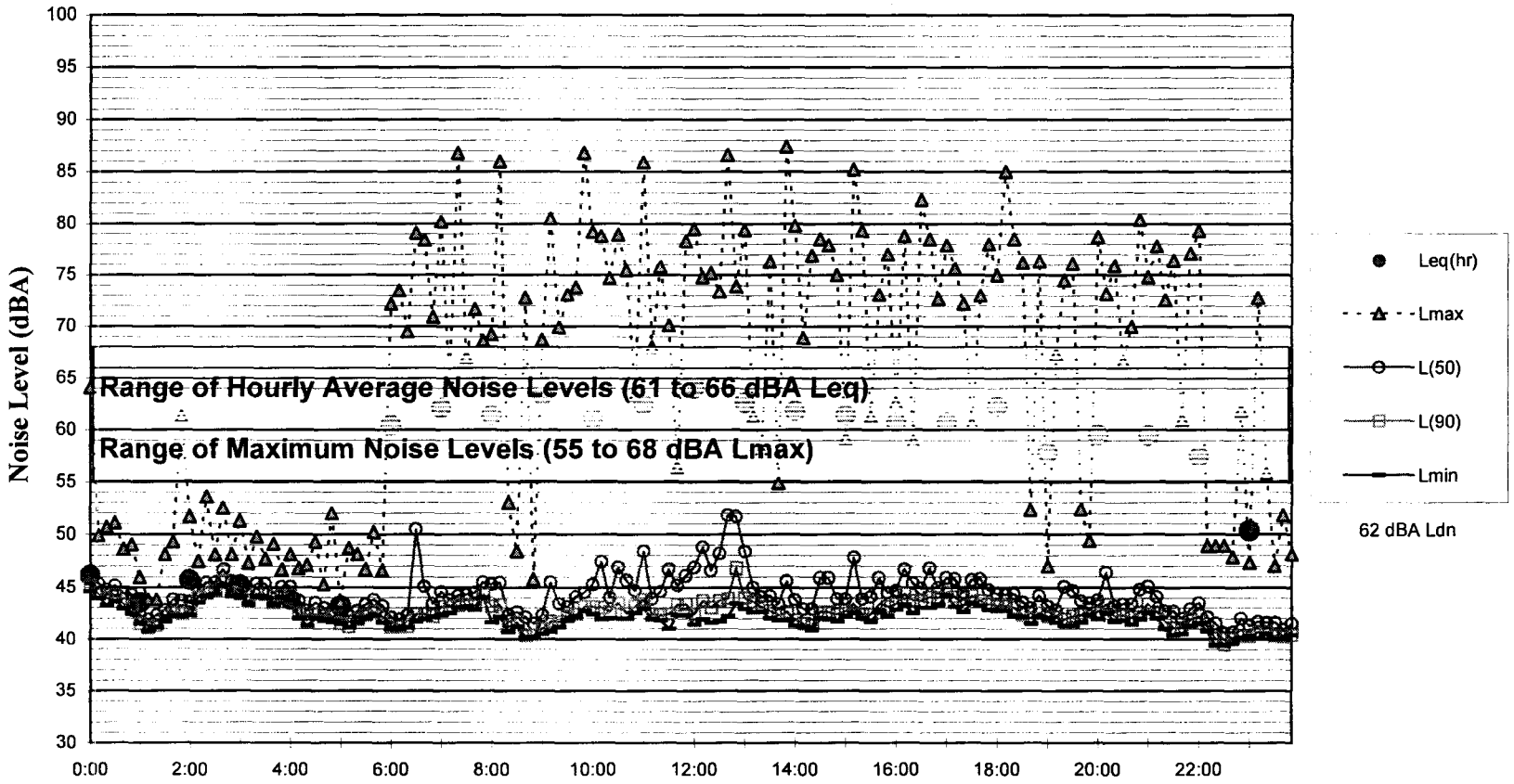

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Figure 28

Figure 29 Aerial Photo Showing Stadium Noise Impact Zone