SANTANA WEST PROJECT
NOISE AND VIBRATION ASSESSMENT
SAN JOSÉ, CALIFORNIA

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INTRODUCTION

The Santana West project site is currently developed with three movie theaters (Century 21, 22, and 23), a restaurant, and a large surface parking lot. A public road, Olsen Drive, traverses the site, connecting Winchester Boulevard to a residential neighborhood west of the project site. The project site is adjacent to the historic Winchester Mystery House. The proposed project is a phased development that would include demolition of the two non-historic theater buildings on-site (Century 22 and 23) and construction of up to 970,000 square feet of office space and 29,000 square feet of retail space in six buildings, and retention of the Century 21 Theater building. Parking would be provided in above grade and below grade parking structures within the new buildings. The buildings would range in height from six to nine stories with the nine story buildings along Winchester Boulevard and in the center of the site. The six story buildings would be located near the western property line.

As proposed, the project would vacate the Olsen Drive right-of-way within the project boundary, converting it to a private street, and realign the road. Currently, the roadway is curved and would be realigned to make it straight. The road would then dead end at the Century 21 theater building. A new 180-space surface parking lot would be installed south of the roadway to support the Winchester Mystery House. New internal access roads would be constructed in a grid pattern between the proposed buildings, providing one main driveway from Winchester Boulevard and three driveways on Olin Avenue. Because Olsen Drive would no longer connect through the project site to the residential neighborhood to the west, a new roadway would be constructed along the western property line that would connect Olsen Drive (west of the project site) to Olin Avenue.

This report evaluates the project's potential to result in significant impacts with respect to applicable California Environmental Quality Act (CEQA) guidelines. The report is divided into three sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise, summarizes applicable regulatory criteria, and discusses the results of the ambient noise monitoring survey completed to document existing noise conditions; 2) the General Plan Consistency – Noise and Land use Compatibility Section discusses noise and land use compatibility utilizing policies in the City's General Plan; and 3) the Impacts and Mitigation Measures Section describes the significance criteria used to evaluate project impacts, provides a discussion of each project impact, and presents mitigation measures, where necessary, to provide a compatible project in relation to adjacent noise sources and land uses.

SETTING

Fundamentals of Environmental 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 (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* (*DNL* or 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

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 noises 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 DNL. Typically, the highest steady traffic noise level during the daytime is about equal to the DNL 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 DNL with open windows and 65-70 dBA DNL 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 DNL 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 50 dBA DNL. At a DNL of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the DNL increases to 70 dBA, the percentage of the population highly annoyed increases to about 25-30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between a DNL of 60-70 dBA. Between a DNL of 70-80 dBA, each decibel increase increases by about 3 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the DNL is 60 dBA, approximately 30-35 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 3 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 4 percent increase in the percentage of the population highly annoyed.

Fundamentals of Groundborne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction generated vibration for building damage and human complaints. Table 3 displays the reactions of people and the effects on buildings that continuous vibration levels produce.

The annoyance levels shown in Table 3 should be interpreted with care since vibration may be found to be annoying at much lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction related groundborne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess groundborne vibration and almost exclusively to assess the potential of vibration to induce structural damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life, are evaluated against different vibration limits. Studies have shown that the threshold of perception for average persons is in the range of 0.008 to 0.012 in/sec PPV. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as minor cracking of building elements, or may threaten the integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher and there is no general consensus as to what amount of vibration may pose a threat for structural damage to the building. Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
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 micro Pascals.
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.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, September 2013.

TABLE 3 Reaction of People and Damage to Buildings from Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Virtually no risk of damage to normal buildings
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential dwellings such as plastered walls or ceilings
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to newer residential structures

Source: Transportation and Construction Vibration Guidance Manual, California Department of Transportation, September 2013.

Regulatory Background – Noise

The State of California and the City of San José have established regulatory criteria that are applicable in this assessment. The State CEQA Guidelines, Appendix G, are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. A summary of the applicable regulatory criteria is provided below.

State CEQA Guidelines. The CEQA contains guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. Under CEQA, noise impacts would be considered significant if the project would result in:

(a) 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;

(b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;

(c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

(d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

(e) 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, if the project would expose people residing or working in the project area to excessive noise levels;

(f) For a project within the vicinity of a private airstrip, if the project would expose people residing or working in the project area to excessive noise levels.

Pursuant to recent court decisions, the impacts of site constraints such as exposure of the proposed project to excessive levels of noise and vibration identified in Checklist Questions (a), (b), (e), and (f) are not included in the Impacts and Mitigation Section of this report. These items are discussed in a separate section addressing Noise and Land Use Compatibility for consistency with the policies set forth in the City's General Plan.

CEQA does not define what noise level increase would be considered substantial. Typically, an increase in the DNL noise level resulting from the project at noise sensitive land uses of 3 dBA or greater would be considered a significant impact when projected noise levels would exceed those considered acceptable for the affected land use. An increase of 5 dBA DNL or greater would be considered a significant impact when projected noise levels would remain within those considered acceptable for the affected land use. Items (e) and (f) are not applicable to this project because the project is not located within an airport land use plan, is not within two miles of an airport, and is not in the vicinity of a private air strip.

2013 California Green Building Standards Code. The State of California established exterior sound transmission control standards for new non-residential buildings as set forth in the 2013 California Green Building Standards Code (Section 5.507.4.1 and 5.507.4.2). The sections that pertain to this project are as follows:

> **5.507.4.1 Exterior noise transmission, prescriptive method.** Wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 when the building falls within the 65 dBA CNEL noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway noise source, as determined by the local general plan noise element.
>
> **5.507.4.2 Performance method.** For buildings located, as defined by Section 5.507.4.1, wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level ($L_{eq\ (1\text{-}hr)}$) of 50 dBA in occupied areas during any hour of operation.

City of San José General Plan. The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies with the goal of minimizing the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies in the City of San José. The following policies are applicable to the proposed project:

EC-1.1 Locate new development in areas where noise levels are appropriate for the proposed uses. Consider federal, state, and City noise standards and guidelines as a part of new development review. Applicable standards and guidelines for land uses in San José include:

Interior Noise Levels

- The City's standard for interior noise levels in residences, hotels, motels, residential care facilities, and hospitals is 45 dBA DNL. Include appropriate site and building design, building construction and noise attenuation techniques in new development to meet this standard. For sites with exterior noise levels of 60 dBA DNL or more, an acoustical analysis following protocols in the City-adopted California Building Code is required to demonstrate that development projects can meet this standard. The acoustical analysis shall base required noise attenuation techniques on expected Envision General Plan traffic volumes to ensure land use compatibility and General Plan consistency over the life of this plan.

Exterior Noise Levels

- The City's acceptable exterior noise level objective is 60 dBA DNL or less for residential and most institutional land uses (Table EC-1). The acceptable exterior noise level objective is established for the City, except in the environs of the San José International Airport and the Downtown, as described below:

    - The City's acceptable exterior noise level objective for office buildings, business commercial uses, and professional offices is 70 dBA DNL (General Plan Table EC-1).

    - Green Building Code 5.507.4.2 Performance Method. The building envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level ($L_{eq\ (1\text{-}hr)}$) of 50 dBA in occupied areas during any hour of operation.

Table EC-1: Land Use Compatibility Guidelines for Community Noise in San José

LAND USE CATEGORY	EXTERIOR NOISE EXPOSURE (DNL IN DECIBELS (DBA)) 55	60	65	70	75	80
1. Residential, Hotels and Motels, Hospitals and Residential Care[1]						
2. Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds						
3. Schools, Libraries, Museums, Meeting Halls, Churches						
4. Office Buildings, Business Commercial, and Professional Offices						
5. Sports Arena, Outdoor Spectator Sports						
6. Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters						

[1]Noise mitigation to reduce interior noise levels pursuant to Policy EC-1.1 is required.

Normally Acceptable:

- Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable:

- Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

Unacceptable:

- New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

EC-1.2 Minimize the noise impacts of new development on land uses sensitive to increased noise levels (Categories 1, 2, 3 and 6) by limiting noise generation and by requiring use of noise attenuation measures such as acoustical enclosures and sound barriers, where feasible. The City considers significant noise impacts to occur if a project would:

- Cause the DNL at noise sensitive receptors to increase by five dBA DNL or more where the noise levels would remain "Normally Acceptable;" or
- Cause the DNL at noise sensitive receptors to increase by three dBA DNL or more where noise levels would equal or exceed the "Normally Acceptable" level.

EC-1.3 Mitigate noise generation of new nonresidential land uses to 55 dBA DNL at the property line when located adjacent to existing or planned noise-sensitive residential and public/quasi-public land uses.

EC-1.6 Regulate the effects of operational noise from existing and new industrial and commercial development on adjacent uses through noise standards in the City's Municipal Code.

EC-1.7 Require construction operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City's Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

- Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

For such large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

City of San José Municipal Code. The City's Municipal Code contains a Zoning Ordinance that limits noise levels at adjacent properties. Chapter 20.30.700 states that sound pressure levels generated by any use or combination of uses on a property shall not exceed 55 dBA at any property line shared with land zoned for residential use, except upon issuance and in compliance with a Conditional Use Permit. The code is not explicit in terms of the acoustical descriptor associated with the noise level limit. However, a reasonable interpretation of this standard, which is based on policy EC-1.3 of the City's General Plan, would identify the ambient base noise level criteria as a day-night average noise level (DNL).

Chapter 20.100.450 of the Municipal Code establishes allowable hours of construction within 500 feet of a residential unit between 7:00 am and 7:00 pm Monday through Friday unless permission is granted with a development permit or other planning approval. No construction activities are permitted on the weekends at sites within 500 feet of a residence.

Santa Clara County Airport Land Use Commission Comprehensive Land Use Plan. The Comprehensive Land Use Plan adopted by the Santa Clara County Airport land Use Commission contains standards for projects within the vicinity of San José International Airport which are relevant to this project;

4.3.2.1 Noise Compatibility Policies

Policy N-3 Noise impacts shall be evaluated according to the Aircraft Noise Contours presented on Figure 5 (2022 Aircraft Noise Contours).

Policy N-4 No residential or transient lodging construction shall be permitted within the 65 dB CNEL contour boundary unless it can be demonstrated that the resulting interior sound levels will be less than 45 dB CNEL and there are no outdoor patios or outdoor activity areas associated with the residential portion of a mixed use residential project or a multi-unit residential project. (Sound wall noise

mitigation measures are not effective in reducing noise generated by aircraft flying overhead.)

Regulatory Background – Vibration

City of San José General Plan. The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies to achieve the goal of minimizing vibration impacts on people, residences, and business operations in the City of San José. The following policies are applicable to the proposed project:

EC-2.3 Require new development to minimize vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, a vibration limit of 0.08 in/sec PPV (peak particle velocity) will be used to minimize the potential for cosmetic damage to a building. A vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction.

Existing Noise Environment

The proposed Santana West project is in close proximity to another project being considered, the 350 Winchester Boulevard project. Noise measurements were conducted for both projects at the same time, and because these neighboring projects are being evaluated concurrently, data from both surveys are used in this analysis.

The northern portion of the Santana West project is on the northwest corner of Winchester Boulevard and Olsen Drive, and the southern portion of the project is located to the west of the Winchester Mystery House on the other side of Olsen Drive. The project site is surrounded by residential land use to the north and west, residences and Interstate 280 (I-280) to the south, and commercial and residential land uses across Winchester Boulevard to the east.

A noise monitoring survey was performed in the vicinity of the project site beginning on Thursday, February 25, 2016 and concluding on Tuesday, March 1, 2016. The monitoring survey included four long-term (LT-1 through LT-4) noise measurements and three short-term (ST-1 through ST-3) noise measurements. One long-term measurement from the 350 Winchester Boulevard project was incorporated into this study as LT-5. All measurement locations are shown in Figure 1 and the daily trends in noise levels for the long-term measurements are shown in Appendix A. The noise environment at the site and at the nearby land uses results primarily from vehicular traffic along Winchester Boulevard and I-280.

Long-term noise measurement LT-1 was made in the rear of the Winchester Mystery House, 110 feet east of the southern theater. Hourly average noise levels at this location typically ranged from 52 to 66 dBA L_{eq} during the day, and from 44 to 64 dBA L_{eq} at night. The day-night average noise level from Thursday, February 25, 2016 through Tuesday, March 1, 2016 ranged from 61 to 64 dBA DNL. Local neighborhood noise was the likely cause of the noise level reaching 72 dBA L_{eq} from 8:00 am to 9:00 am on Monday, February 29, 2016.

LT-2 was measured on Olin Ave across from the Flames restaurant, 135 feet west of the Winchester Boulevard centerline. Hourly average noise levels at this location typically ranged from 60 to 73 dBA L_{eq} during the day, and from 52 to 69 dBA L_{eq} at night. The day-night average noise level from Thursday, February 25, 2016 through Tuesday, March 1, 2016 ranged from 66 to 70 dBA DNL.

LT-3 was measured along the west fence line of the project site, across from the Century 21 theater. Hourly average noise levels at this location typically ranged from 44 to 55 dBA L_{eq} during the day, and from 37 to 58 dBA L_{eq} at night. The higher nighttime L_{eq} actually occurred during the early morning, between 6:00 am and 7:00 am, and is likely due to the morning commute traffic from I-280 and Winchester Boulevard. The day-night average noise level from Thursday, February 25, 2016 through Tuesday, March 1, 2016 ranged from 53 to 57 dBA DNL.

LT-4 was located across from 3165 Olin Avenue, 160 feet east of Hanson Avenue and 430 feet west of Winchester Boulevard. Due to an equipment failure, noise measurements at this location were only taken for an approximate 27 hour period from Thursday, February 25, 2016 through Friday, February 26, 2016. Hourly average noise levels at this location typically ranged from 54 to 64 dBA L_{eq} during the day, and from 48 to 58 dBA L_{eq} at night. The day-night average noise level from Thursday, February 25, 2016 through Friday, February 26, 2016 was 61 dBA DNL.

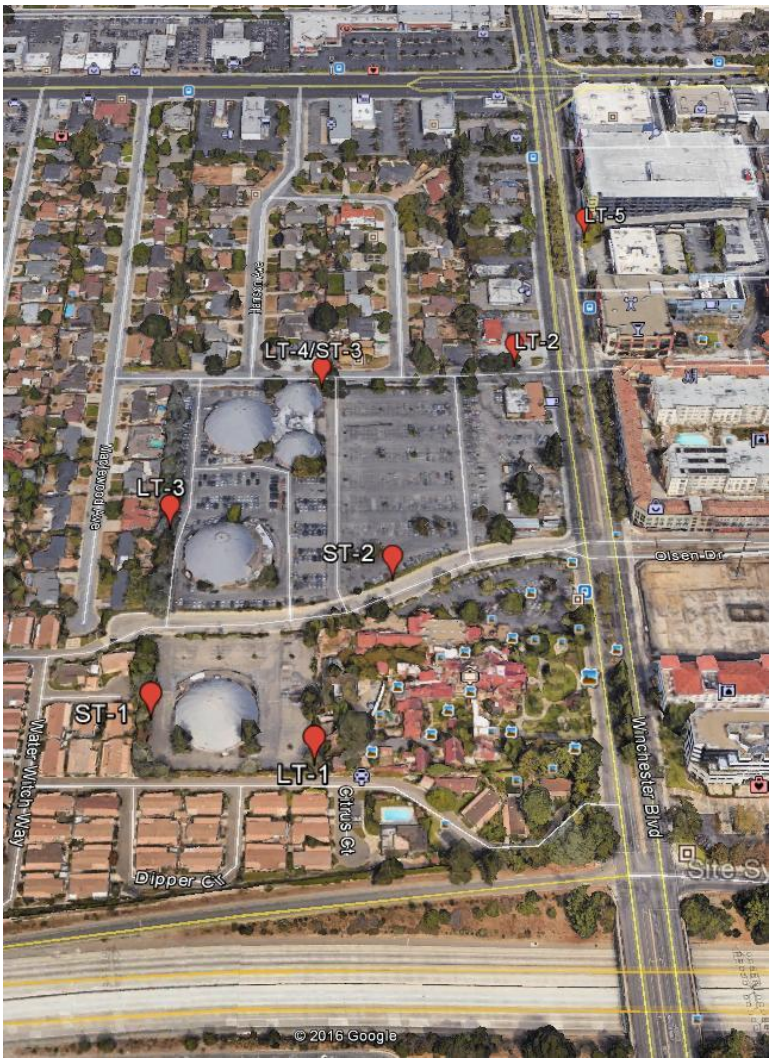
LT-5 (from the 350 Winchester Boulevard project) was made in front of 350 Winchester Boulevard, 66 feet from the Winchester Boulevard centerline. Hourly average noise levels at this location typically ranged from 62 to 73 dBA L_{eq} during the day, and from 55 to 67 dBA L_{eq} at night. The day-night average noise level from Thursday, February 25, 2016 through Tuesday, March 1, 2016 ranged from 69 to 71 dBA DNL.

Short-term noise measurement ST-1 was made on the southwest corner of the site along the fence line of the project and to the west of the southern theater (Century 23), 250 feet south of Olsen Drive. The 10-minute average noise level measured at this location between 12:10 pm and 12:20 pm on Tuesday, March 1, 2016 was 47 dBA L_{eq}. Short-term noise measurement ST-2 was made on Olsen Drive across form the Winchester Mystery House entrance, 310 feet west of Winchester Boulevard. During the survey there was considerable construction noise resulting from a project at Santana Row. The 10-minute average noise level measured at this location between 12:40 pm and 12:50 pm on Tuesday, March 1, 2016 was 59 dBA L_{eq}. Two consecutive short-term noise measurements were made at location ST-3 across from 3165 Olin Avenue, 160 feet east of Hanson Avenue and 430 feet west of Winchester Boulevard. The first measurement's 10-minute average noise level, between 11:50 am and 12:00 pm, on Thursday, March 3, 2016, was 55 dBA L_{eq}. The second measurement's 10-minute average noise level, between 12:00 pm and 12:10 pm, was 57 dBA L_{eq}. Table 4 summarizes the results of the short-term measurements.

TABLE 4 Santana West Summary of Short-Term Noise Measurement Data

Noise Measurement Location	L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}
ST-1: Southwest corner of the site along the fence line, 250 feet south of Olsen Dr. (3/1/2016, 12:10 pm-12:20 pm)	57	51	48	47	46	47
ST-2: On Olsen Dr. across form Winchester Mystery House entrance, 310 feet west of Winchester Blvd. (3/1/2016, 12:40 pm-12:50 pm)	68	65	61	57	55	59
ST-3a: Across from 3165 Olin Ave., 160 feet east of Hanson Ave. and 430 feet west of Winchester Blvd. (3/3/2016, 11:50 am-12:00 pm)	72	66	58	48	46	55
ST-3b: Across from 3165 Olin Ave., 160 feet east of Hanson Ave. and 430 feet west of Winchester Blvd. (3/3/2016, 12:00 pm-12:10 pm)	78	70	55	48	45	57

FIGURE 1 Santana West Noise Measurement Locations



Source: Google Earth

GENERAL PLAN CONSISTENCY - NOISE AND LAND USE COMPATIBILITY

The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies with the goal of minimizing the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies in the City of San José. The project site is not located near a significant source of groundborne vibration such as a railroad train, and is more than two miles from an airport so policies related to these issues do not require evaluation. The General Plan policy EC-1.1 was presented in detail in the Regulatory Background section and is summarized below for the proposed project:

- EC-1.1 - Locate new development in areas where noise levels are appropriate for the proposed uses. Consider federal, state, and City noise standards and guidelines as a part of new development review.

    - The City's acceptable exterior noise level objective for office buildings, business commercial uses, and professional offices is 70 dBA DNL (General Plan Table EC-1).

    - Green Building Code 5.507.4.2 Performance Method. The building envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level ($L_{eq\ (1\text{-}hr)}$) of 50 dBA in occupied areas during any hour of operation.

The proposed project is a phased development that would include demolition of the two non-historic theater buildings on-site (Century 22 and 23) and construction of up to 970,000 square feet of office space and 29,000 square feet of retail space in six buildings, and retention of the Century 21 Theater building. Parking would be provided in above grade and below grade parking structures within the new buildings. The buildings would range in height from six to nine stories with the nine story buildings along Winchester Boulevard and in the center of the site. The six story buildings would be located near the western property line.

Buildings A and B of the project site would adjoin Winchester Boulevard and the future noise environment would continue to result primarily from traffic along the surrounding roadways and from local commercial activities. Existing noise sources generate noise levels of up to 70 to 71 dBA DNL at the ground level façades along Winchester Boulevard of the proposed Buildings A and B. The future noise level along Winchester Boulevard was calculated to increase by about 2 dBA DNL resulting in a level of 72 to 73 dBA DNL using cumulative future traffic volume data developed by *Hexagon Transportation Consultants*. Noise levels are anticipated to be 1 to 2 dBA higher at 3rd and 4th floor exposures, resulting in 74 to 75 dBA DNL outside the buildings' facades facing Winchester Boulevard. Above the 4th floor, noise levels drop off as the distance from the ground level noise source increases. The south façade of Building F would be approximately 375 feet from the centerline of I-280. The upper stories of the building would have an unobstructed view of I-280. Appendix 7 of the Envision San José 2040 General Plan includes Figure 10 which shows the noise exposure levels for this area. The 2035 traffic noise contours shows Building F would be exposed to noise levels approximately 75 dBA DNL. Future exterior noise levels at the project site would exceed the exterior noise thresholds (70 dBA DNL commercial) established in the Envision San José 2040 General Plan.

The California Green Building Code requires that commercial building shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level (L_{eq} (1-hr)) of 50 dBA in occupied areas during any hour of operation. A typical commercial building envelope provides at least a 30 dBA reduction in traffic noise. The noise exposure at the proposed building façades along Winchester Boulevard is calculated to be up to 75 dBA DNL. The ambient noise surveys indicate that the noisiest hours during the day would have a future exterior noise level of up to 76 to 77 dBA L_{eq}, resulting in interior noise levels of 46 to 47 dBA L_{eq}. Noise levels are then expected to comply with Green Building Code limits.

Appropriate acoustical design criteria have been established for different office uses. For example a conference room benefits from a quieter environment than an open plan office use. Given the future exterior noise environment the Project should consider traffic noise intrusion during the design phase, establish acoustical criteria for the spaces, and evaluate methods to reduce traffic noise, such as sound rated windows, to meet the design criteria.

NOISE IMPACTS AND MITIGATION MEASURES

Significance Criteria

Paraphrasing from the currently applicable CEQA checklist questions in Appendix G of the CEQA Guidelines, a project would normally result in significant noise impact if it would cause traffic or other on-going sources of operational noise to result in a substantial permanent noise increase, if it would cause ambient noise levels at sensitive receivers to increase substantially during construction, or if it would generate excessive groundborne vibration levels. The following criteria were used to evaluate the significance of environmental noise resulting from the project:

- A significant impact would be identified if project generated traffic or operational noise sources would substantially increase noise levels at sensitive receivers in the vicinity. A substantial increase would occur if: a) the noise level increase is 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or b) the noise level increase is 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater.

- A significant noise impact would be identified if construction-related noise would temporarily increase ambient noise levels at sensitive receptors. Hourly average noise levels exceeding 60 dBA L_{eq} at the property lines shared with residential land uses, and the ambient by at least 5 dBA L_{eq}, for a period of more than one year would constitute a significant temporary noise increase at adjacent residential land uses.

- A significant impact would be identified if the construction of the project would expose persons to excessive vibration levels. Groundborne vibration levels exceeding 0.2 in/sec PPV would have the potential to result in cosmetic damage to normal buildings.

Impact 1: **Project-Generated Traffic Noise.** The proposed project would result in a permanent noise level increase at existing noise sensitive land uses due to project-generated traffic. **This is a potentially significant impact.**

A significant impact would result if traffic generated by the project would substantially increase noise levels at sensitive receptors in the vicinity. A substantial increase would occur if: a) the noise level increase is 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or b) the noise level increase is 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater.

The project's traffic study[1] provided AM and PM project trip assignments for intersections surrounding the project site. Traffic volume information was reviewed to calculate the permanent noise increase attributable to project-generated traffic. Traffic volumes under the Existing Plus Project scenario were compared to the Existing scenario to calculate the relative increase in the hourly average traffic noise level (L_{eq}) attributable to the proposed project. The change in the DNL would be the same as the change in the peak hour L_{eq}. After analyzing all the traffic volumes along roadway segments relevant to the project site, noise levels would increase by up to 2 dBA DNL in all the segments except for Olin Avenue between Winchester Boulevard and Maplewood Avenue.

There are residences adjoining the north side of Olin Avenue between Hanson Avenue and Maplewood Avenue. A chiropractic office and business center adjoins Olin Avenue at Spar Avenue. Olin Avenue traffic would result in a noise level of 60 dBA DNL at adjoining land uses. Noise levels at these land uses would increase from about 3 dBA between Spar Avenue and Hanson Avenue where the existing noise level is 61 dBA DNL, and up to about 5 dBA DNL near Maplewood Avenue where existing level is 56 dBA DNL. This would be a substantial increase in noise above existing conditions and a potentially significant impact.

The site plan for the project shows an entrance driveway on Olin Avenue adjoining the rear property line of the residences on Maplewood Avenue. The proposed bypass road would replace the Olsen Drive entrance and exit for the residents of the Winchester Ranch Mobile Home Community. The other entrance from Winchester Boulevard on Charles Cali Drive would remain. Traffic on the proposed bypass road would be within 12 feet of the property line and 25 feet of the houses on Maplewood Avenue. Traffic in this close proximity to the backs of the homes would cause a noticeable change in the noise environment.

The Winchester Mystery House adjoins the current location of Olsen Drive. Olsen Drive would be reconfigured into a straight east-west entryway into the project site that would be located about 150 feet north of the Winchester Mystery House. The existing parking area for the Winchester Mystery House would remain and a new parking area would be located between the Winchester Mystery House and the new Olsen Drive. Considering the increase in traffic, reconfiguration of Olsen Drive, and based on the site plans of the project, the noise levels at the Winchester Mystery House would increase by up to 2 dBA DNL. This would not be a substantial increase in noise above existing conditions.

[1] Santana Row West Project, San Jose, CA, Hexagon Transportation Consultants, Inc., March 4, 2015.

Mitigation Measure 1: Noise barriers are typically used along roadways to mitigate traffic noise. Noise barriers along Olin Avenue were evaluated and were determined not to be feasible because of requirements for driveways, pedestrian access, and the short distances between intersections.

An alternative to noise barriers would be to revise the site's vehicular traffic access and circulation plan. By eliminating the entrances on Olin Avenue to the Bypass Road and Private Road West, project generated traffic would be limited to Olin Avenue between Winchester Boulevard and Private Road East where there are no sensitive residential uses adjoining Olin Avenue. Access to the mobile home community would be accomplished by putting a connecting roadway from Private Road West to the mobile home community entrance between the existing Century 21 Theater and Building F. This mitigation measure would reduce the impact to a less-than-significant level.

Impact 2: **Operational Noise.** Mechanical equipment associated with the project and on site vehicle deliveries could generate noise in excess of the City's noise policy goal of 55 dBA DNL at residential receivers. **This is a potentially significant impact.**

Multi-use structures typically include various mechanical equipment, such as air conditioners, exhaust fans, and air handling equipment for the buildings and the underground parking levels. Due to the number of variables inherent in the mechanical equipment needs of the project (number and types of units, locations, size, housing, specs, etc.), the impacts of mechanical equipment noise on nearby noise-sensitive uses should be assessed during the final project design stage. The most substantial noise-generating equipment would likely be large exhaust fans and building cooling and air conditioning units. Design planning should take into account the noise criteria associated with such equipment and utilize site planning to locate equipment in less noise-sensitive areas. Other controls could include, but shall not be limited to, fan silencers, enclosures, and screen walls.

Under the City's Noise Element, noise levels from building equipment would be limited to a noise level of 55 dBA DNL at receiving noise-sensitive land uses. Given the close proximity of residences to the north, west, and south, and the low existing noise level, mechanical equipment noise could exceed 55 dBA DNL at these nearby residences. The final site plan and project design should be reviewed by a qualified acoustical consultant to address any potential conflicts.

Truck deliveries for the ground-level commercial and retail uses on the project site would also have the potential to generate noise. The potential locations of loading docks have not been determined. Typical noise levels generated by loading and unloading of truck deliveries would be similar to noise levels generated by truck movements on local roadways and by similar activities at surrounding uses.

Mitigation Measure 2:

The following mitigation measures shall be included in the project to reduce the impact to a less-than-significant level:

- A detailed acoustical study shall be prepared during building design to evaluate the potential noise generated by building mechanical equipment and to identify the necessary noise controls that are included in the design to meet the City's 55 dBA DNL noise limit at the shared property line with residential uses. The study shall evaluate the noise from the equipment and predict noise levels at noise-sensitive locations. Noise control features, such as sound attenuators, baffles, and barriers, shall be identified and evaluated to demonstrate that mechanical equipment noise would not exceed 55 dBA DNL at noise-sensitive locations, such as residences. The study shall be submitted to the City of San José for review and approval prior to issuance of any building permits.

- Ensure that noise-generating activities, such as maintenance activities and loading/unloading activities, are limited to the hours between 7:00 am and 9:00 pm.

Impact 3: **Construction Noise.** Existing noise-sensitive land uses would be exposed to construction noise levels in excess of the significance thresholds for a period of more than one year. **This is a potentially significant impact**.

Noise impacts resulting from construction depend upon 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 areas. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (e.g., early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise-sensitive land uses, or when construction lasts over extended periods of time.

Where noise from construction activities exceeds 60 dBA L_{eq} and exceeds the ambient noise environment by at least 5 dBA L_{eq} at noise-sensitive residential uses in the project vicinity for a period exceeding one year, the impact would be considered significant. For commercial uses, a significant impact would be identified if construction noise were to exceed 70 dBA L_{eq} and exceeds the ambient noise environment by at least 5 dBA L_{eq} for a period exceeding one year. Additionally, the City considers significant construction noise impacts to have occurred if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would involve substantial noise-generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months, according to Policy EC-1.7 of the General Plan.

The project will be divided into three major phases. Phase one would be the construction of Block I (Buildings A and B) located adjacent to Winchester Boulevard between Olin Avenue and Olsen Drive. Phase two would be the construction of Block II (Buildings C and D) located between the Olin Avenue and Spar Avenue intersection and Olsen Drive. Phase three would be the construction of Block III (Buildings E) located adjacent to the Olin Avenue and Hanson Avenue intersection and behind the residents on Maplewood Avenue between Olin Avenue and Olsen Drive and Block III (Buildings F) located on the south side of Olsen Drive adjacent to the Winchester Mystery House and the residents of the Winchester Ranch Mobile Home Community. At this time, the start date is assumed to be April 2017 and each Block would take approximately two years to complete, resulting in an estimated total construction time of six years.

The land uses potentially most affected by the construction of Block I include the Santana Row Apartments located across Winchester Boulevard, the Winchester Mystery House, and the residential and commercial uses on Olin Avenue between Winchester Boulevard and Hanson Avenue. The residential uses on Maplewood Avenue between Olin Avenue and Olsen Drive would also be potentially affected. The land uses potentially most affected by the construction of Block II include the residential and commercial uses on Olin Avenue between Winchester Boulevard and Maplewood Avenue and the Winchester Mystery House. The residential uses on Maplewood Avenue between Olin Avenue and Olsen Drive would also be potentially affected. The land uses potentially most affected by the construction of Block III include the residential and commercial uses on Olin Avenue between Winchester Boulevard and Maplewood Avenue, the residential uses on Maplewood Avenue between Olin Avenue and Olsen Drive, the residential uses in the Winchester Ranch Mobile Home Community, and the Winchester Mystery House.

Construction activities for individual projects are typically carried out in phases. During each phase of construction, there would be a different mix of equipment operating, and noise levels would vary by phase and vary within phases, based on the amount of equipment in operation and the location at which the equipment is operating. Typical construction noise levels at a distance of 50 feet are shown in Tables 5. Table 5 shows the maximum noise level ranges for different construction equipment. Most demolition and construction noise falls with the range of 80 to 90 dBA at a distance of 50 feet from the source.

Construction activities generate considerable amounts of noise, especially during earth-moving activities when heavy equipment is used. The construction of the proposed project would involve demolition of existing structures and pavement, substantial grading and excavating to create the below-grade parking garage and to lay foundations, trenching, building erection, and paving. The hauling of excavated materials and construction materials would generate truck trips on local roadways, as well. Table 6 shows the calculated construction noise levels for each phase of construction per Block, based on the equipment specified for the project, at a distance of 100 feet from the center of the construction activity.

TABLE 5 Construction Equipment 50-foot Noise Emission Limits

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/Continuous
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor[3]	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	105	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines larger than 5 HP	85	Continuous

Notes:

[1] Measured at 50 feet from the construction equipment, with a "slow" (1 sec.) time constant.

[2] Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.

[3] Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.

Source: Mitigation of Nighttime Construction Noise, Vibrations and Other Nuisances, National Cooperative Highway Research Program, 1999.

TABLE 6 Calculated Construction Noise Levels for Each Phase of Construction[1]

Construction Phase	At Distance of 100 ft.	
	L_{eq}, dBA	L_{max}, dBA
Demolition, 25 days	81	81
Site Preparation, 10 days	78	78
Grading/Excavation/Foundation, 80 days	82	82
Trenching, 40 days	75	75
Building-Exterior, xx days[2]	76	76
Building-Interior, xx days[2]	Minimal Off-Site	Minimal Off-Site
Paving, 20 days	76	76

[1] Calculated using a standard drop off rate for point sources of 6 dB per doubling of distance.
[2] Information not yet available.

The highest noise levels would be generated during demolition and grading/excavation/ foundation construction. The trenching and construction of the building exterior would also cause considerable noise for fairly long durations. At 100 feet from the noise source, maximum noise levels generated by project construction equipment would typically range from 75 to 82 dBA L_{eq}. Pile driving was not included in the list of construction equipment for the project and is therefore not evaluated at this time.

The range of noise levels at surrounding land uses resulting from construction at Block I, II, and III are described below and summarized in Table 7.

Block I

The Santana Row Apartments are located 140 feet east from the edge of the construction site across Winchester Boulevard. When construction is occurring along the Winchester Boulevard edge of the construction site where it is closest to the nearest residences, the range of construction noise would be 72 to 79 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 68 to 75 dBA L_{eq}. The nearest residences along Spar Avenue are located 140 feet north from the edge of the construction site across Olin Avenue. When construction is occurring along the Olin Avenue edge of the construction site where it is closest to the nearest residences, the range of construction noise would be 72 to 79 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 65 to 72 dBA L_{eq}. The residences along Olin Avenue between Hanson Avenue and Maplewood Avenue and the residences along Maplewood Avenue and the western boundary of the project site would be exposed to construction noise ranging from 58 to 66 dBA L_{eq}. The Winchester Mystery House is located 240 feet south from the edge of the construction site across Olsen Drive. When construction is occurring along the Olsen Drive edge of the construction site where it is closest to the Winchester Mystery House, the range of construction noise would be 67 to 74 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 62 to 69 dBA L_{eq}.

The nearest commercial/office land uses are located 75 feet north from the edge of the construction site across Olin Avenue. When construction is occurring along the Olin Avenue edge of the construction site where it is closest to the nearest commercial/office uses, the range of construction noise would be 77 to 84 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 68 to 75 dBA L_{eq}. Retail uses across Winchester Boulevard and commercial/office uses further along Olin Avenue would have the same range of construction noise levels as their corresponding residential uses discussed above.

Block II

The residences along Maplewood Avenue are located 310 feet west from the edge of the construction site. When construction is occurring along the western edge of the construction site where it is closest to the nearest residences, the range of construction noise would be 65 to 72 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 62 to 69 dBA L_{eq}. The nearest residences along Hanson Avenue are located 225 feet northwest from the edge of the construction site. When construction is occurring along the Olin Avenue edge of the construction site where it is closest to the nearest residences, the range of construction noise would be 68 to 75 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 63 to 70 dBA L_{eq}. The nearest residences along Spar Avenue are located 150 feet north from the edge of the construction site. When construction is occurring along the Olin Avenue edge of the construction site where it is closest to the nearest residences, the range of construction noise would be 71 to 78 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 64 to 71 dBA L_{eq}. The Santana Row Apartments are located 470 feet east from the edge of the construction site across Winchester Boulevard. When construction is occurring along the Winchester Boulevard edge of the construction site where it is closest to the nearest residences, the range of construction noise would be 65 to 72 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 62 to 69 dBA L_{eq}. The Winchester Mystery House is located 180 feet south from the edge of the construction site across Olsen Drive. When construction is occurring along the Olsen Drive edge of the construction site where it is closest to the Winchester Mystery House, the range of construction noise would be 70 to 77 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 63 to 70 dBA L_{eq}.

The nearest commercial/office land uses are located 75 feet north from the edge of the construction site across Olin Avenue. When construction is occurring along the Olin Avenue edge of the construction site where it is closest to the nearest commercial/office uses, the range of construction noise would be 77 to 84 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 68 to 75 dBA L_{eq}. Retail uses across Winchester Boulevard have the same range of construction noise levels as their corresponding residential uses discussed above.

Block III

Block III has a northern (Building E) and southern (Building F) portion of the site, which are assumed to be built at the same time according to the construction information received. The land uses potentially affected by construction noise are assumed to be from the construction of the closest portion of this Block.

The residences along Maplewood Avenue are located 75 feet west from the edge of the northern portion of the construction site. When construction is occurring along the western edge of the northern portion of the construction site where it is closest to the nearest residences, the range of construction noise would be 77 to 84 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 71 to 78 dBA L_{eq}. The nearest residences along Hanson Avenue are located 75 feet north from the edge of the northern portion of the construction site. When construction is occurring along the Olin Avenue edge of the northern portion of the construction site where it is closest to the nearest residences, the range of construction noise would be 77 to 84 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 66 to 73 dBA L_{eq}. The nearest residences along Spar Avenue are located 330 feet northeast from the edge of the northern portion of the construction site. When construction is occurring along the Olin Avenue edge of the northern portion of the construction site where it is closest to the nearest residences, the range of construction noise would be 65 to 72 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 61 to 68 dBA L_{eq}. The nearest commercial/office land uses are located 110 feet northeast from the edge of the northern portion of the construction site across Olin Avenue. When construction is occurring along the Olin Avenue edge of the northern portion of the construction site where it is closest to the nearest commercial/office uses, the range of construction noise would be 74 to 81 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 65 to 72 dBA L_{eq}.

The nearest residences along Maplewood Avenue are located 75 feet west from the edge of the southern portion of the construction site. When construction is occurring along the western edge of the southern portion of the construction site where it is closest to the nearest residences, the range of construction noise would be 77 to 84 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 69 to 76 dBA L_{eq}. The nearest residences in the Winchester Ranch Mobile Home Community are located 75 feet west and south from the edge of the southern portion of the construction site. When construction is occurring along the western and southern edges of the southern portion of the construction site where it is closest to the nearest residences, the range of construction noise would be 77 to 84 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 71 to 78 dBA L_{eq}. The Winchester Mystery House is located 100 feet east from the edge of the southern portion of the construction site. When construction is occurring along the eastern edge of the southern portion of the construction site where it is closest to the Winchester Mystery House, the range of construction noise would be 75 to 82 dBA L_{eq}. The typical construction noise, represented by construction occurring in the central area of the project site, would range from 67 to 74 dBA L_{eq}.

TABLE 7 Range of Construction Noise Levels (dBA L_{eq})

Receiver	Block I (2017-2019)		Block II (2019-2021)		Block I (2021-2023)	
	Worst Case	Typical	Worst Case	Typical	Worst Case	Typical
Santana Row Apartments	72 - 79	68 - 75	65 - 72	62 - 69	--[1]	--
Winchester Boulevard Retail	72 - 79	68 - 75	65 - 72	62 - 69	--	--
Winchester Mystery House	67 - 74	62 - 69	70 - 77	63 - 70	75 - 82	67 - 74
Spar Avenue Residences	72 - 79	65 - 72	71 - 78	64 - 71	65 - 72	61 - 68
Olin Avenue/Hanson Avenue Residences	59 - 67	58 - 66	68 - 75	63 - 70	77 - 84	66 - 73
Maplewood Avenue Residences	58 - 66	57 - 65	65 - 72	62 - 69	77 - 84	71 - 78
Olin Avenue Commercial/Office	77 - 84	68 - 75	77 - 84	68 - 75	74 - 81	65 - 72
Winchester Ranch Mobile Home Community	--	--	--	--	77 - 84	71 - 78

[1] Distance and/or structures would buffer construction noise.

The Santana Row Apartments and the Winchester Boulevard Retail have an ambient noise level of 67 to 70 dBA L_{eq} during the daytime hours when construction would occur. During construction of Block I, construction noise would exceed the ambient noise level by 5 dBA L_{eq} or more for longer than a year. Construction noise of Blocks II and III would not substantially exceed the ambient noise level. This would be considered a significant impact.

The existing ambient noise levels at the other sensitive receptors listed in Table 7 range from 48 to 60 dBA L_{eq} during the daytime hours when construction would occur. For the entire duration of the whole six-year project, all receptors will exceed the ambient noise level by 5 dBA L_{eq} or more for longer than a year and exceed the 60 dBA L_{eq} for residential receptors and the 70 dBA L_{eq} for commercial receptors. Residential receptors are located within 500 feet of the project site and commercial receptors are located within 200 feet of the project site, where construction involving substantial noise-generating activities will last more than 12 months. Construction activities would cause a potentially significant impact.

Mitigation Measure 3:

Policy EC-1.7 of the City's General Plan states that for large or complex projects within 500 feet of residential land uses or within 200 feet of commercial land uses or offices involving substantial noise-generating activities lasting more than 12 months, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

Modification, placement, and operation of construction equipment are possible means for minimizing the impact on the existing sensitive receptors. Construction equipment should be

well-maintained and used judiciously to be as quiet as possible. Additionally, construction activities for the proposed project should include the following best management practices to reduce noise from construction activities near sensitive land uses:

- Construction activities shall be limited to the hours between 7:00 am and 7:00 pm, Monday through Friday, unless permission is granted with a development permit or other planning approval. No construction activities are permitted on the weekends at sites within 500 feet of a residence.

- To the extent possible, utilize the Olsen Drive project entrance from Winchester Boulevard for construction truck traffic. If construction truck traffic must utilize Olin Avenue, prohibit construction truck traffic on Olin Avenue west of the proposed project entrance closest to Winchester Boulevard.

- Construct solid plywood fences around construction sites adjacent to operational businesses, residences, or other noise-sensitive land uses.

- Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

- Unnecessary idling of internal combustion engines should be strictly prohibited.

- Locate stationary noise-generating equipment such as air compressors or portable power generators as far as possible from sensitive receptors. Construct temporary noise barriers to screen stationary noise-generating equipment when located near adjoining sensitive land uses. Temporary noise barriers could reduce construction noise levels by 5 dBA.

- Utilize "quiet" air compressors and other stationary noise sources where technology exists.

- Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project site.

- Notify all adjacent business, residences, and other noise-sensitive land uses of the construction schedule, in writing, and provide a written schedule of "noisy" construction activities to the adjacent land uses and nearby residences.

- A temporary noise control blanket barrier could be erected, if necessary, along building facades facing construction sites. This mitigation would only be necessary if conflicts occurred which were irresolvable by proper scheduling. Noise control blanket barriers can be rented and quickly erected.

- Designate a "disturbance coordinator" who would be responsible for responding to any complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., bad muffler, etc.) and will require that reasonable measures be implemented to correct the problem. Conspicuously post a telephone number

for the disturbance coordinator at the construction site and include in it the notice sent to neighbors regarding the construction schedule.

Implementation of the above measures would reduce construction noise levels emanating from the site, limit construction hours, and minimize disruption and annoyance. Even with the implementation of these measures, the project would substantially increase noise levels intermittently at sensitive receptors over a period of six years. **The impact would be significant and unavoidable.**

Impact 4: **Groundborne Vibration During Construction.** Residences and local businesses in the vicinity of the project site would not be exposed to excessive construction-related vibration levels. **This is a potentially significant impact.**

The construction of the project may generate perceptible vibration when heavy equipment or impact tools (e.g. jackhammers, hoe rams) are used. Construction activities would include site demolition work, preparation work, excavation of below-grade levels, foundation work, and new building framing and finishing. Table 8 presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet.

TABLE 8 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)	Approximate L_v at 25 ft. (VdB)
Pile Driver (Impact)	upper range	1.158	112
	typical	0.644	104
Pile Driver (Sonic)	upper range	0.734	105
	typical	0.170	93
Clam shovel drop		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, May 2006.

According to Policy EC-2.3 of the City of San José General Plan, a vibration limit of 0.08 in/sec PPV shall be used to minimize the potential for cosmetic damage to sensitive historical structures, and a vibration limit of 0.20 in/sec PPV shall be used to minimize damage at buildings of normal conventional construction. The Winchester Mystery House is a designated Historic Structure and may qualify as a vibration sensitive historic structure, so the stringent 0.08

criterion is applied to this structure.[2] A significant impact would occur if any other nearby buildings were exposed to vibration levels in excess of 0.20 in/sec PPV.

Impact pile driving has the potential to generate the highest ground vibration levels and would be the primary concern to structural damage, particularly when it occurs within 100 to 200 feet of structures. Impact pile driving, which produces substantial vibrations, is not anticipated as a method of construction at this time. Other project construction activities, such as drilling, the use of jackhammers, rock drills and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.) may also generate substantial vibration in the immediate vicinity. A vibratory roller and clam shell (or dozer bucket) drop typically generates a level of up to 0.21 in/sec PPV at a distance of 25 feet. Jackhammers typically generate vibration levels of 0.035 in/sec PPV, and drilling typically generates vibration levels of 0.09 in/sec PPV at a distance of 25 feet. Vibration levels would vary depending on soil conditions, construction methods, and equipment used.

The Winchester Mystery House structure is located about 50 feet from the portion of Olsen Drive that will be demolished, and where a parking lot will be constructed. The use of a heavy vibratory roller or the dropping of a heavy loader bucket within about 60 feet of the structure could result in a vibration level equal to or above the 0.08 in/sec PPV threshold. All other structures would be located at sufficient distance from construction activities so that vibration levels would be below the 0.20 in/sec PPV threshold. This is a potentially significant impact.

Vibration levels may still be perceptible. However, as with any type of construction, this would be anticipated and would not be considered significant, given the intermittent and short duration of the phases that have the highest potential of producing vibration (pile driving and use of jackhammers and other high power tools). By use of administrative controls, such as notifying neighbors of scheduled construction activities and scheduling construction activities with the highest potential to produce perceptible vibration during hours with the least potential to affect nearby businesses, perceptible vibration can be kept to a minimum.

Mitigation Measure 4:

The following measures, in addition to the best construction practices specified in Mitigation Measure 3, are recommended to reduce vibration impacts from construction activities to a less-than-significant impact:

- Use of heavy vibration-generating construction such as impact compactors and large dozers shall be prohibited within 60 feet of the Winchester Mystery House structure.

- Designate a person responsible for registering and investigating claims of excessive vibration. The contact information of such person shall be clearly posted on the construction site.

[2] "City of San José Historic Resources Inventory". City of San José. 2/8/2016. https://www.sanjoseca.gov/DocumentCenter/View/35475

Impact 5: **Cumulative Traffic Noise.** The project would result in a substantial increase in noise levels above existing noise levels along area roadways. The project would make a "cumulatively considerable" contribution to noise levels that would be substantially increased as a result of cumulative growth in the area. **This is a significant impact.**

A substantial permanent cumulative noise increase would occur if the project contributed a minimum noise increase of 1 dBA DNL where the noise level increase is 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or the noise level increase is 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater.

The project traffic study provided AM and PM project trip assignments for intersections surrounding the project site. Traffic volume information was reviewed to calculate the permanent noise increase attributable to project-generated traffic. Traffic volumes under the Cumulative Plus Project scenario were compared to the Existing scenario to calculate the relative increase in the hourly average traffic noise level (L_{eq}) attributable to the proposed project. The change in the DNL would be the same as the change in the peak hour L_{eq}. After analyzing all the traffic volumes along roadway segments relevant to the project site, the only segment where a significant cumulative noise impact would occur is on Olin Avenue between Winchester Boulevard and Maplewood Avenue.

Mitigation Measure 5:

The cumulative traffic noise impact is the same as the project traffic noise impact. The mitigation measures recommended for the Cumulative Plus Project scenario would be the same as those for the Existing Plus Project scenario (Mitigation Measure 1). This mitigation measure would reduce the impact to a less-than-significant level.

Impact 6: **Cumulative Construction Noise.** Existing noise-sensitive land uses would be exposed to cumulative construction noise levels in excess of the significance thresholds for a period of more than one year. **This is a significant impact.**

The construction of the Santana Row West project's Block 1 will be occurring at the same time as the construction of the 350 Winchester Boulevard project.[3] The construction for both projects will begin in early 2017 and last for approximately two years. The Santana Row Apartments along Winchester Boulevard and the residences along Olin Avenue, Spar Avenue, Hanson Avenue, and Maplewood Avenue are land uses that would be affected by the construction noise of both projects. The cumulative noise exposure, both the noise level and the noise exposure time, would be increased because of the two projects happening simultaneously. Each project individually would result in significant construction noise impact at these land uses, and the two together would result in a significant cumulative construction noise impact.

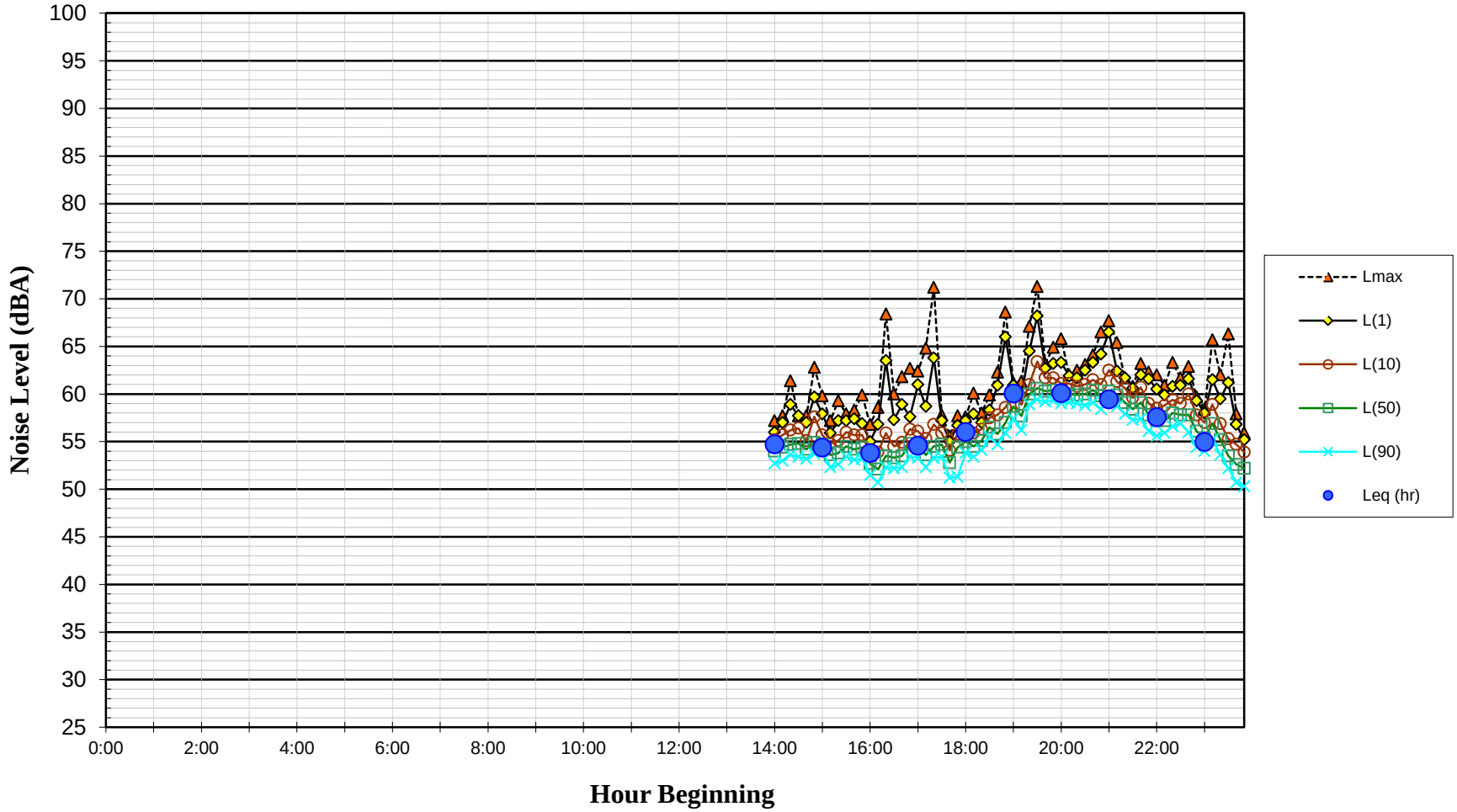
[3] "350 Winchester Boulevard Mixed-Use at Santana Row Project Noise and Vibration Assessment". Illingworth & Rodkin, Inc. April 2016.

Mitigation Measure 6:

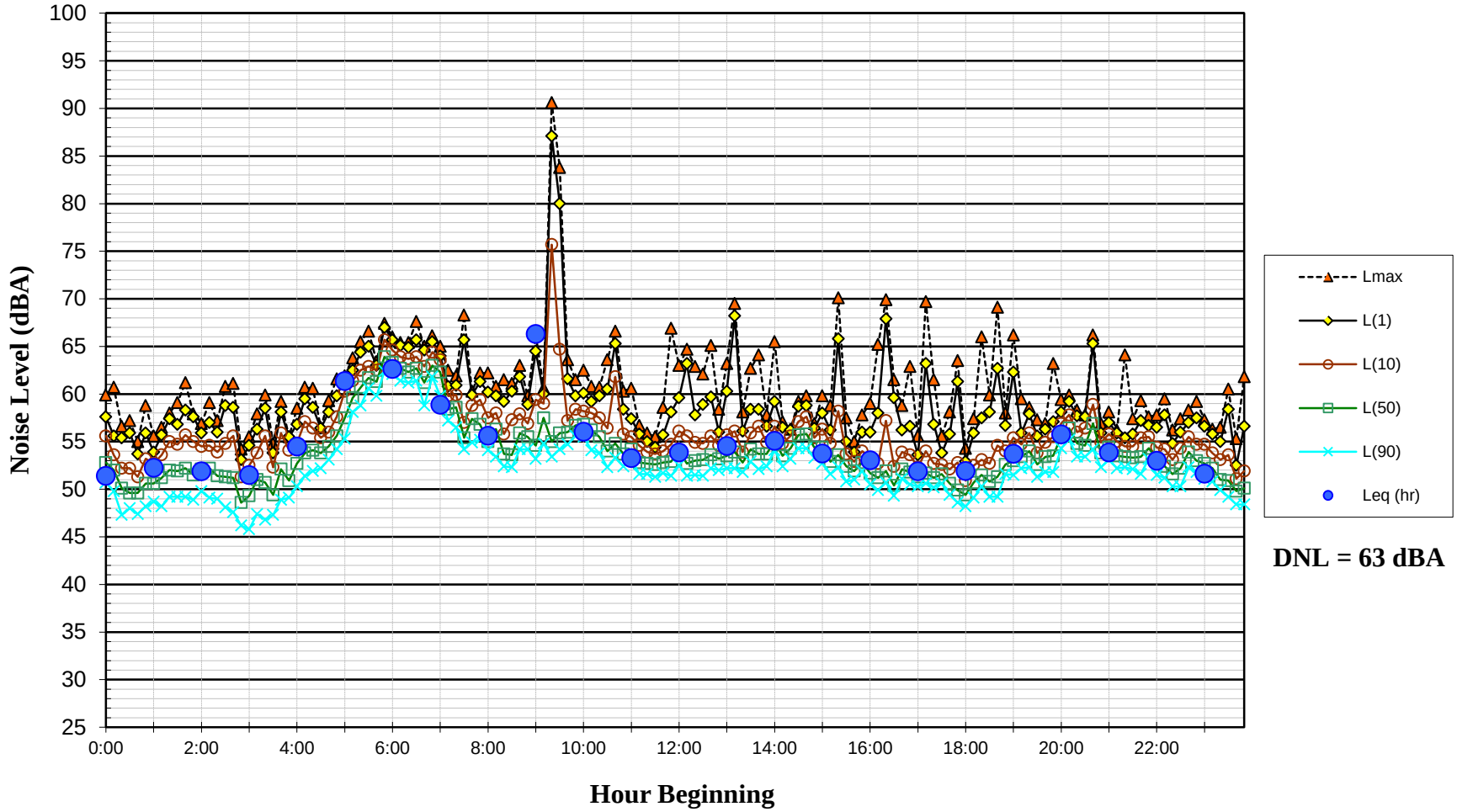
The mitigation measures recommended for the cumulative project construction would be the same as those for the projects (Mitigation Measure 3). Implementation of the mitigation measures would reduce construction noise levels emanating from the site, limit construction hours, and minimize disruption and annoyance. Even with the implementation of these measures, the cumulative construction noise impact would substantially increase noise levels intermittently at sensitive receptors over a period of two years. **The impact would be significant and unavoidable.**

APPENDIX A: Long Term Noise Level Daily Trends

Noise Levels at Noise Measurement Site LT-1
Rear of Winchester Mystery House, 110 Feet East of Southern Theater
Thursday, February 25, 2016

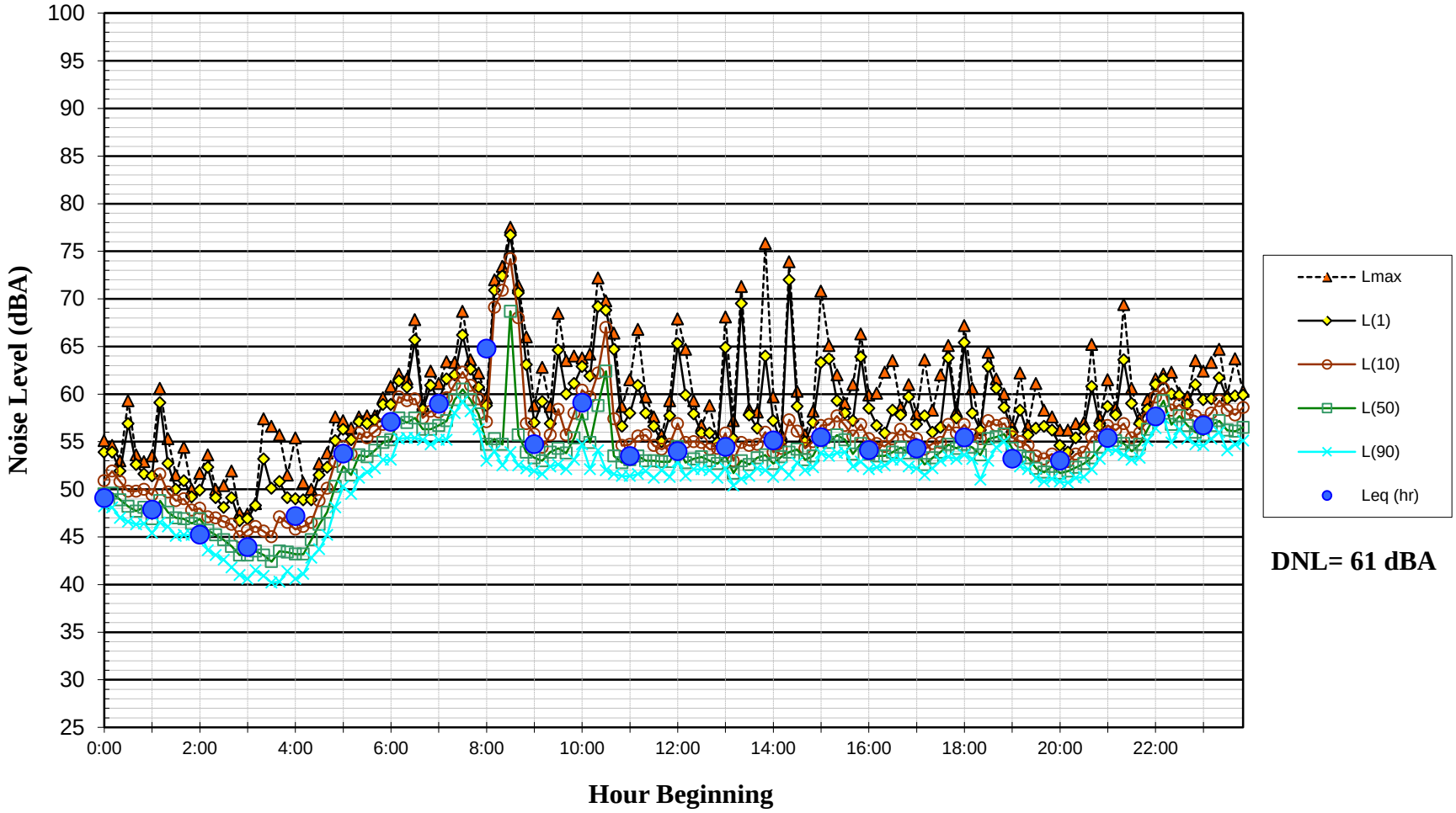


Noise Levels at Noise Measurement Site LT-1
Rear of Winchester Mystery House, 110 Feet East of Southern Theater
Friday, February 26, 2016



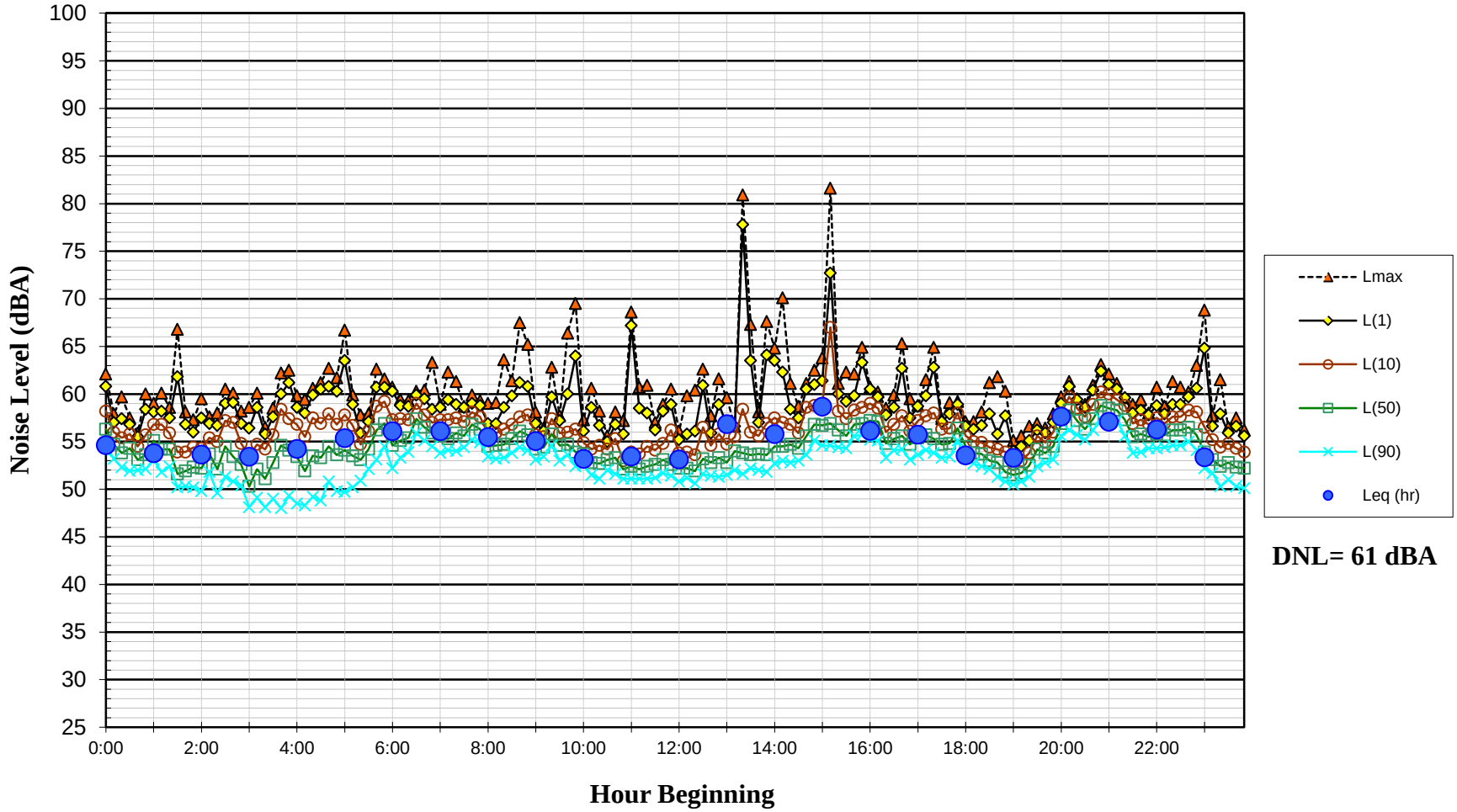
DNL = 63 dBA

Noise Levels at Noise Measurement Site LT-1
Rear of Winchester Mystery House, 110 Feet East of Southern Theater
Saturday, February 27, 2016



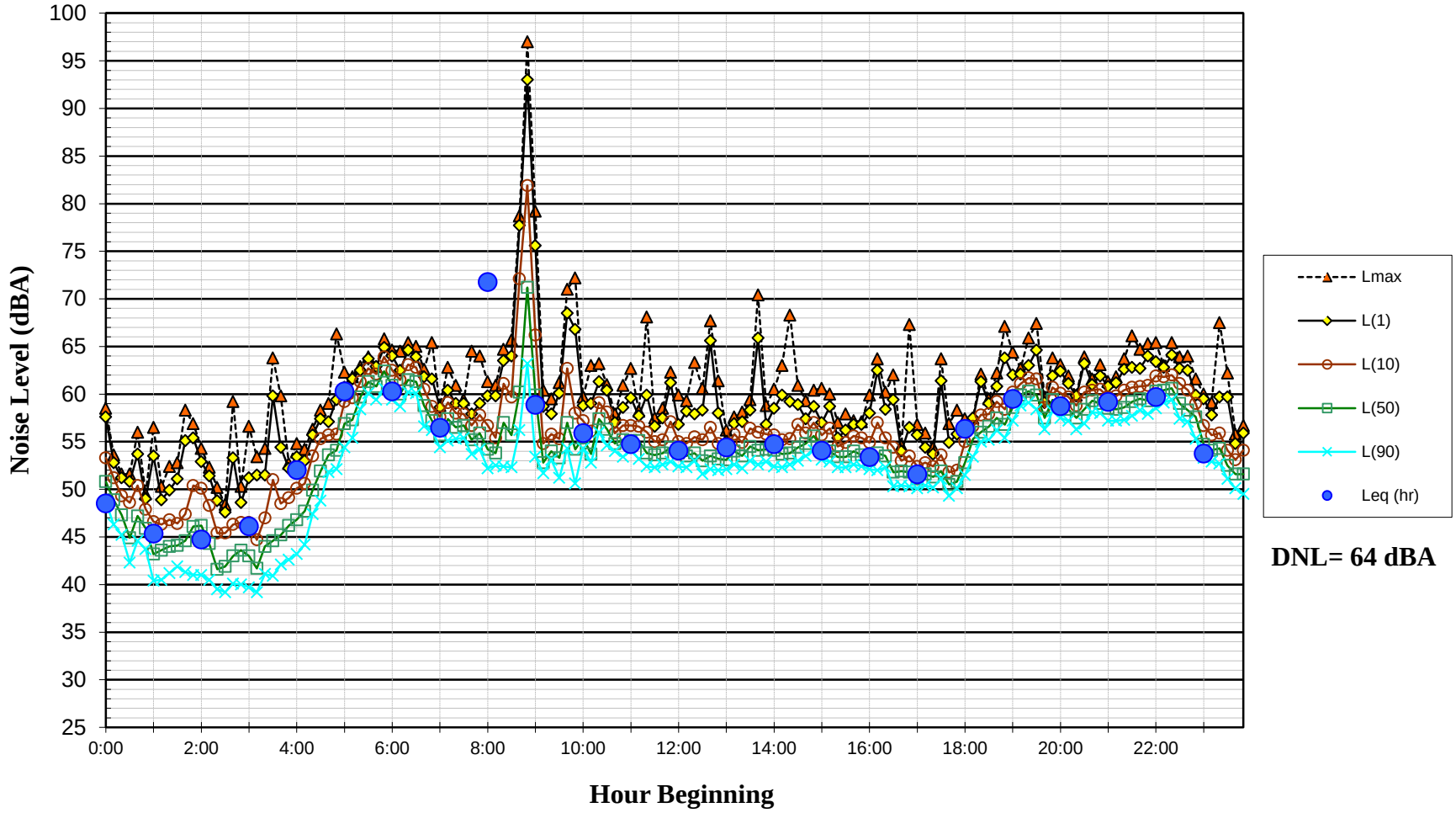
DNL= 61 dBA

Noise Levels at Noise Measurement Site LT-1
Rear of Winchester Mystery House, 110 Feet East of Southern Theater
Sunday, February 28, 2016



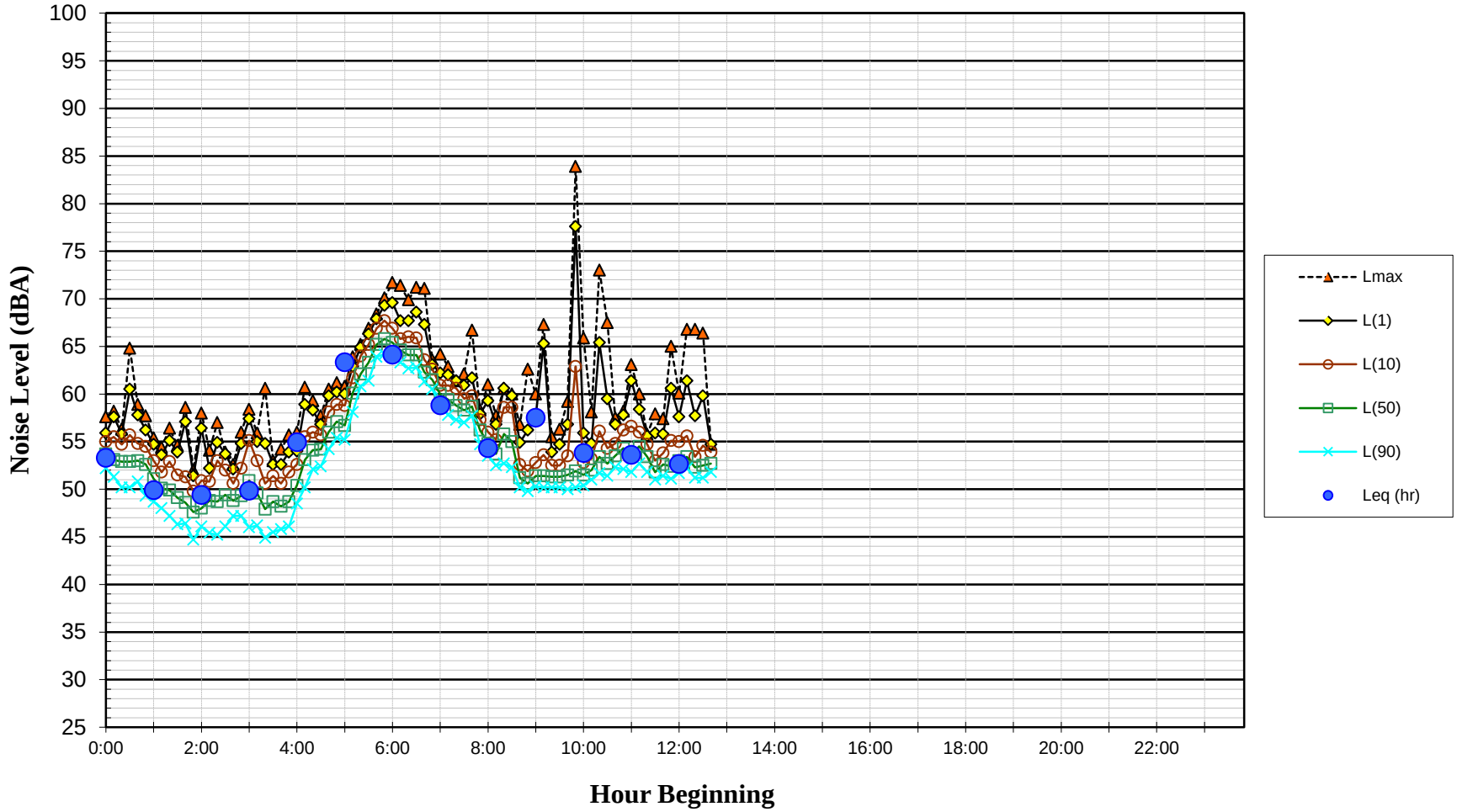
DNL= 61 dBA

Noise Levels at Noise Measurement Site LT-1
Rear of Winchester Mystery House, 110 Feet East of Southern Theater
Monday, February 29, 2016

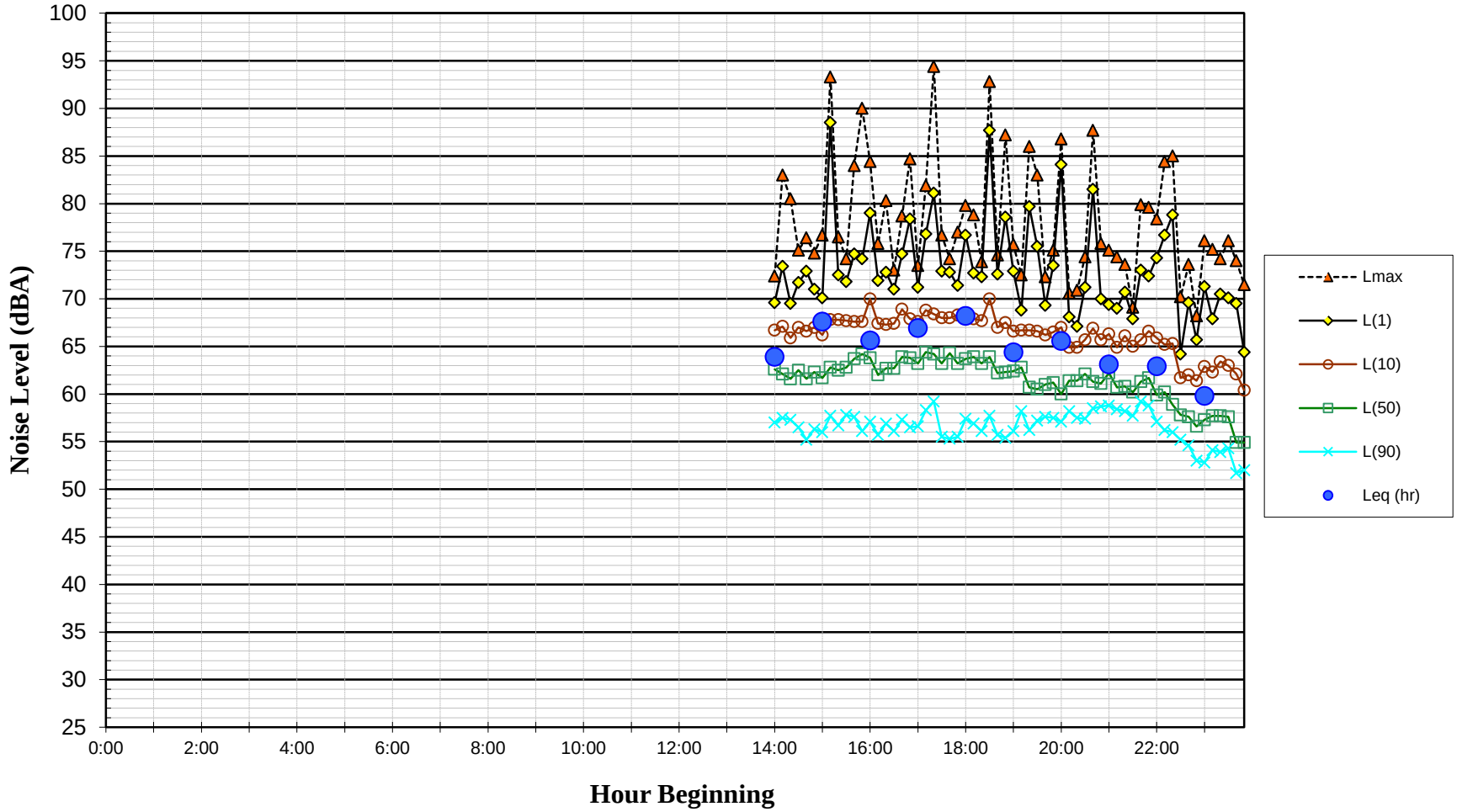


DNL= 64 dBA

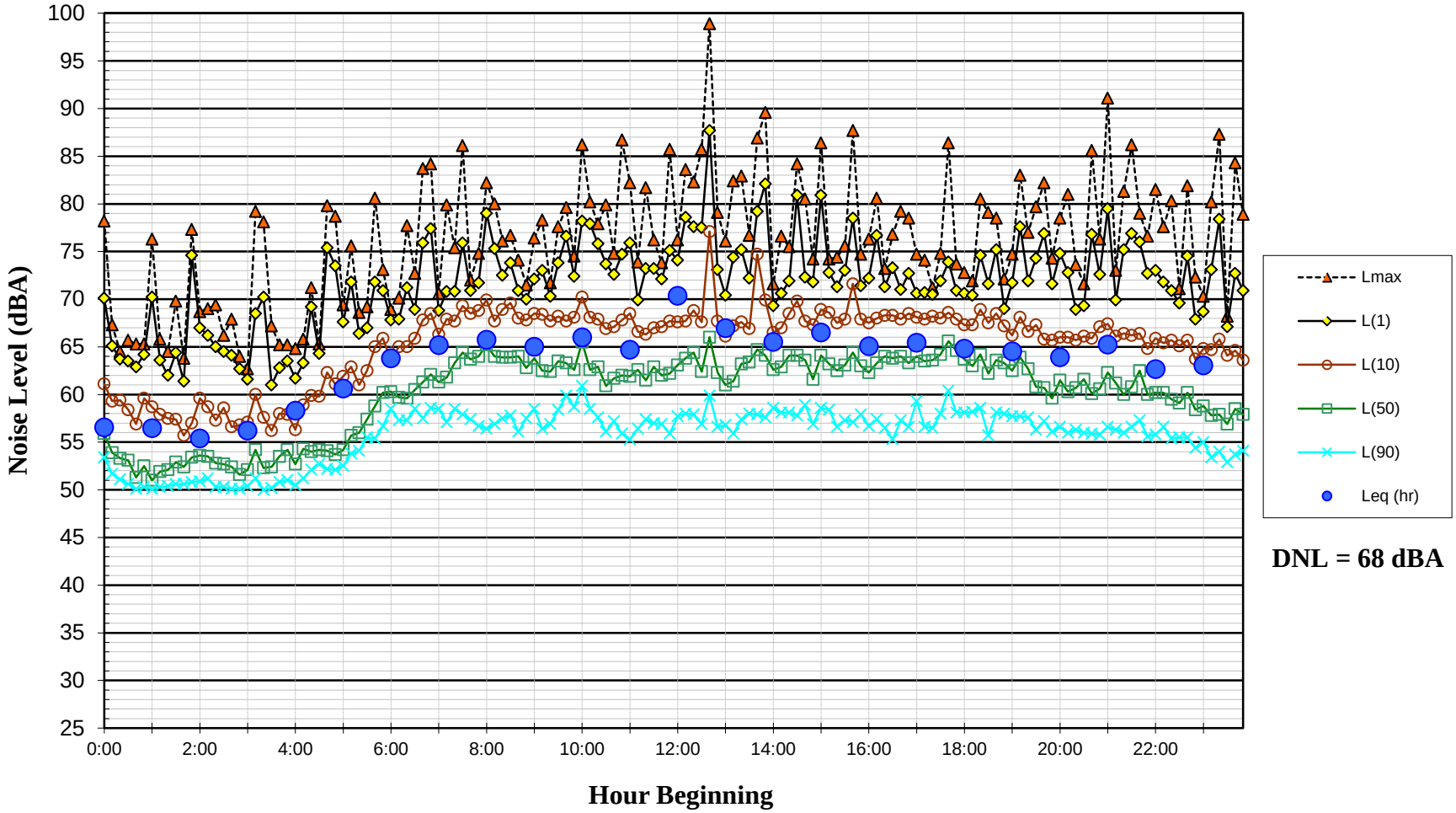
Noise Levels at Noise Measurement Site LT-1
Rear of Winchester Mystery House, 110 Feet East of Southern Theater
Tuesday, March 1, 2016



Noise Levels at Noise Measurement Site LT-2
Olin Ave Across from Flames. 135 Feet West of Winchester Blvd Centerline
Thursday, February 25, 2016

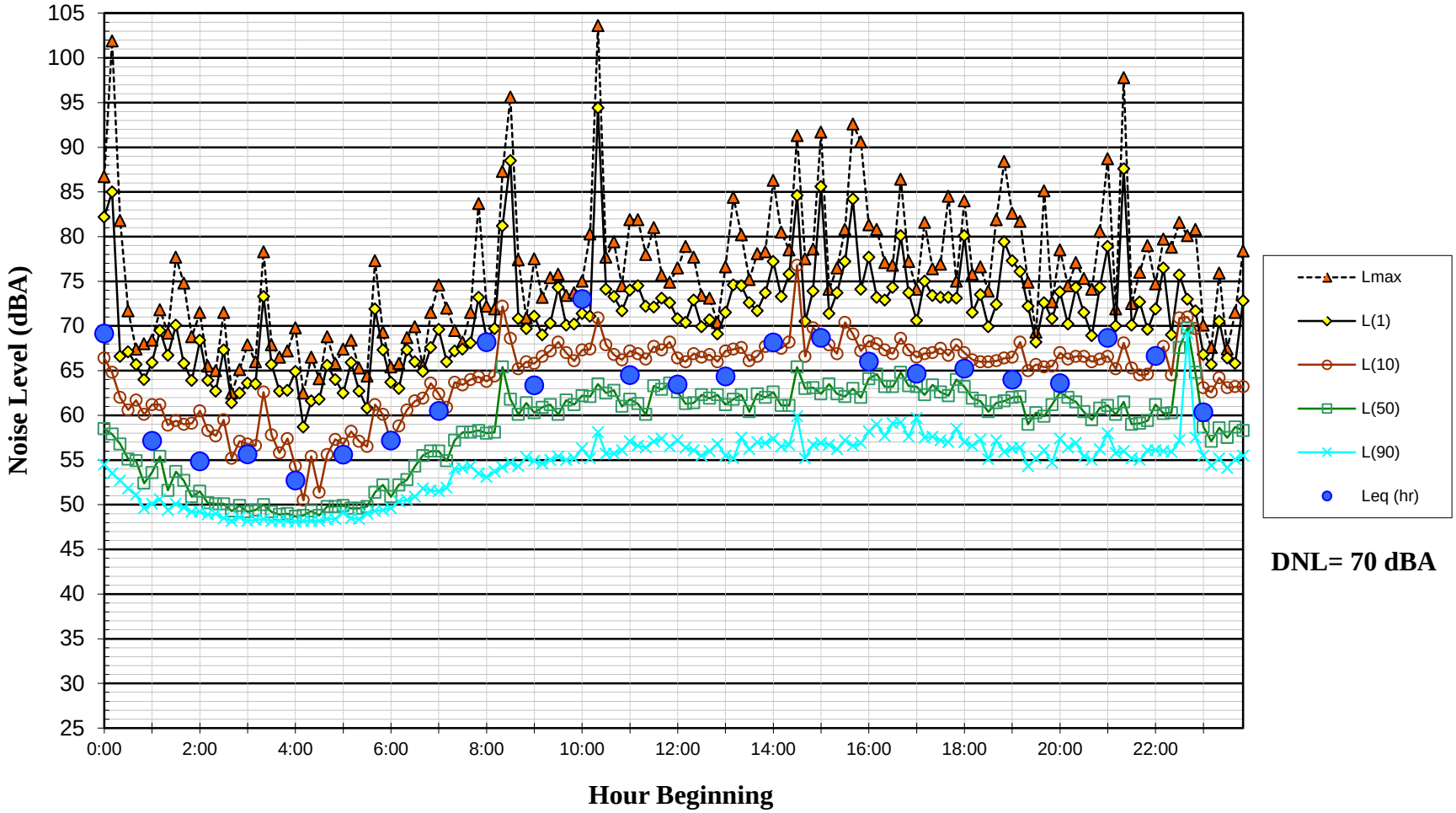


Noise Levels at Noise Measurement Site LT-2
Olin Ave Across from Flames. 135 Feet West of Winchester Blvd Centerline
Friday, February 26, 2016



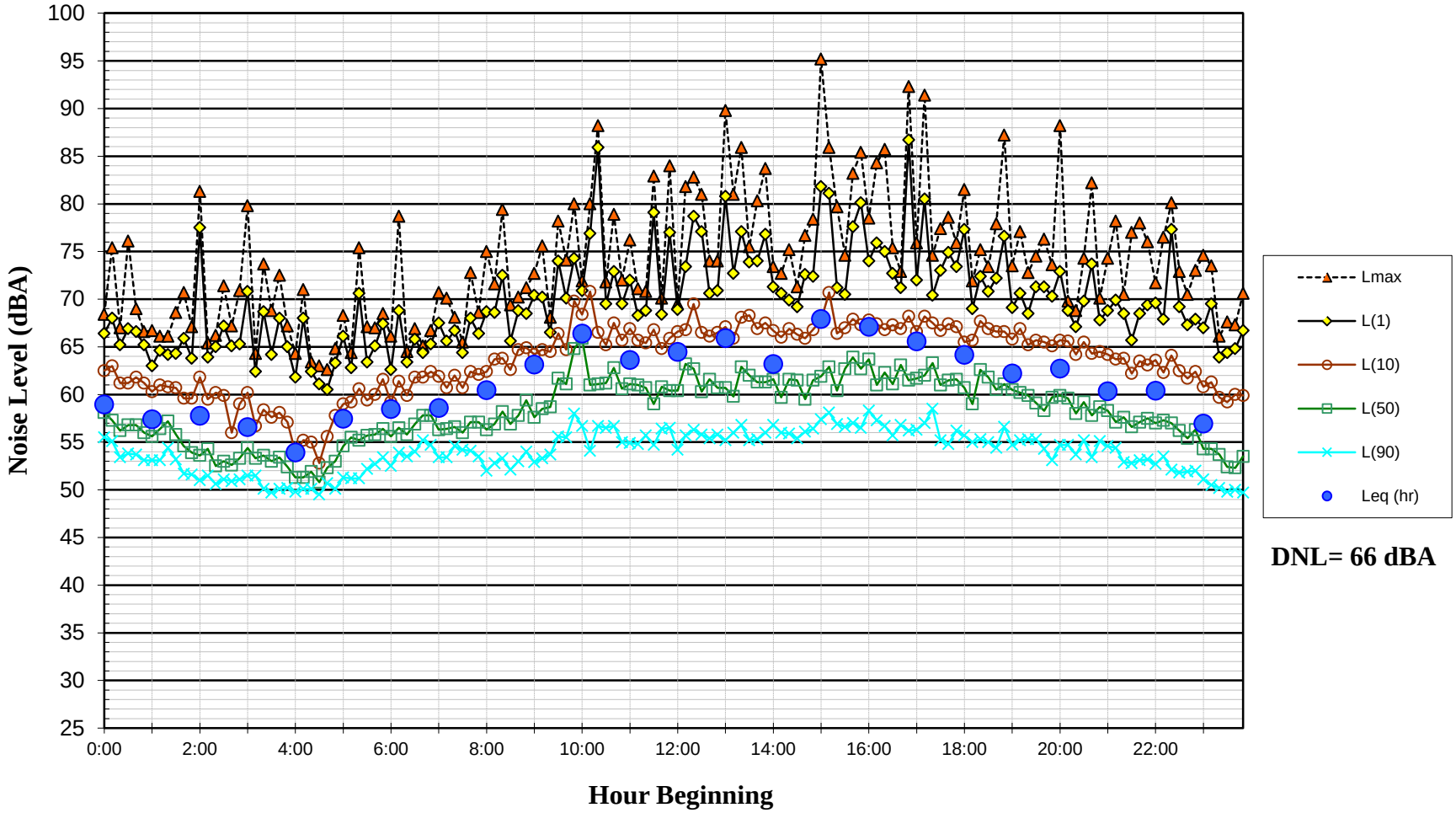
DNL = 68 dBA

Noise Levels at Noise Measurement Site LT-2
Olin Ave Across from Flames. 135 Feet West of Winchester Blvd Centerline
Saturday, February 27, 2016



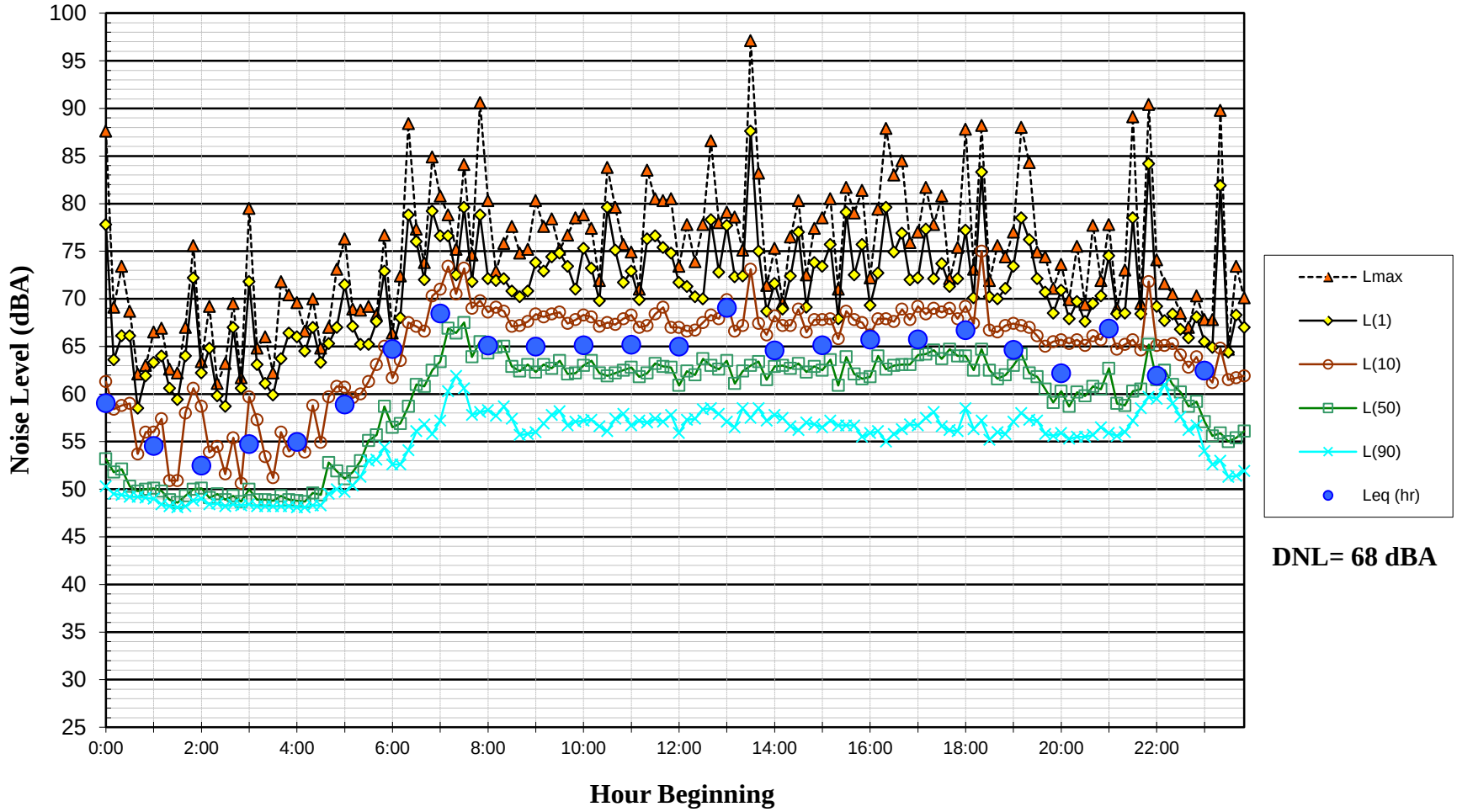
DNL= 70 dBA

Noise Levels at Noise Measurement Site LT-2
Olin Ave Across from Flames. 135 Feet West of Winchester Blvd Centerline
Sunday, February 28, 2016



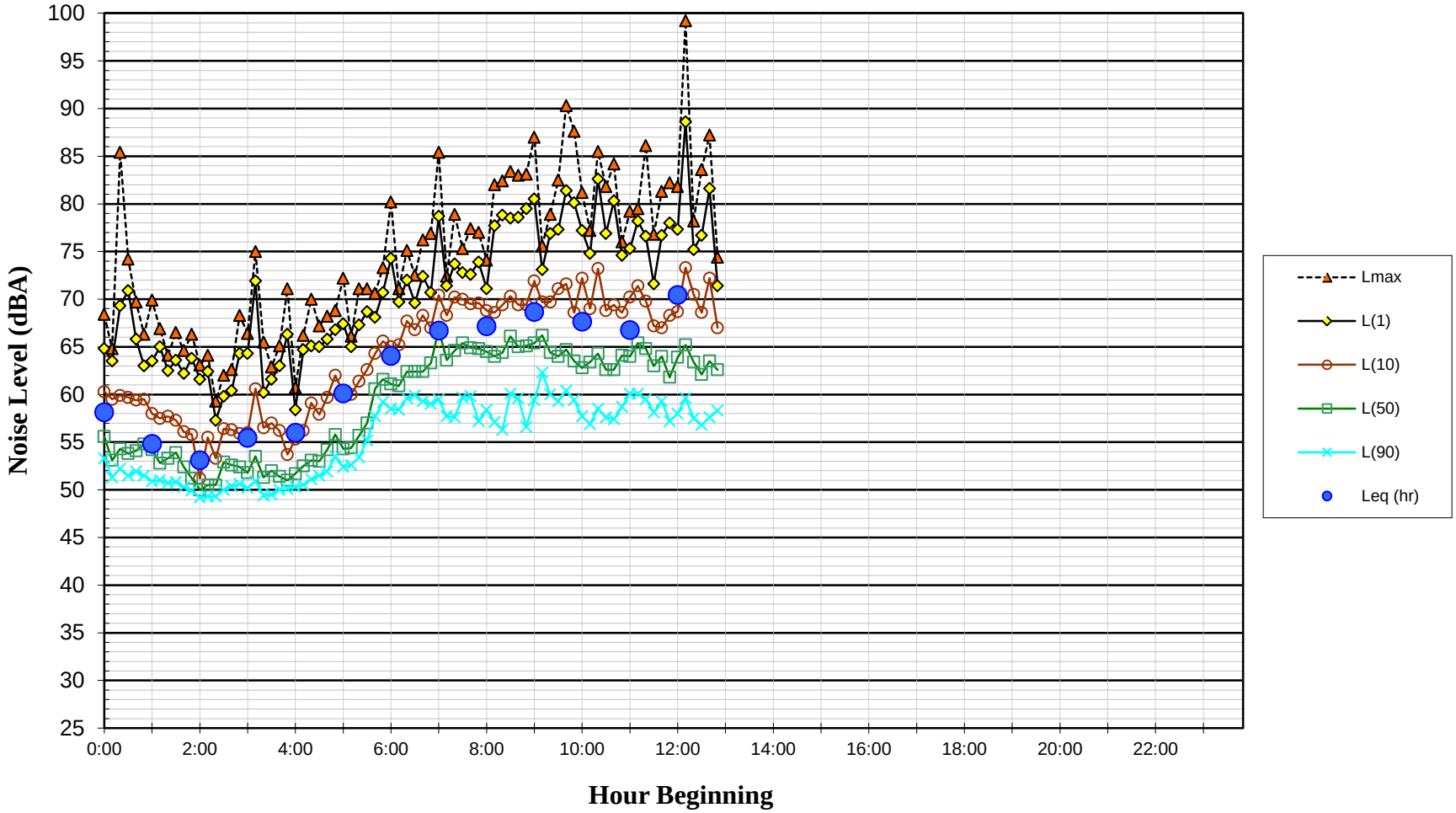
DNL= 66 dBA

Noise Levels at Noise Measurement Site LT-2
Olin Ave Across from Flames. 135 Feet West of Winchester Blvd Centerline
Monday, February 29, 2016

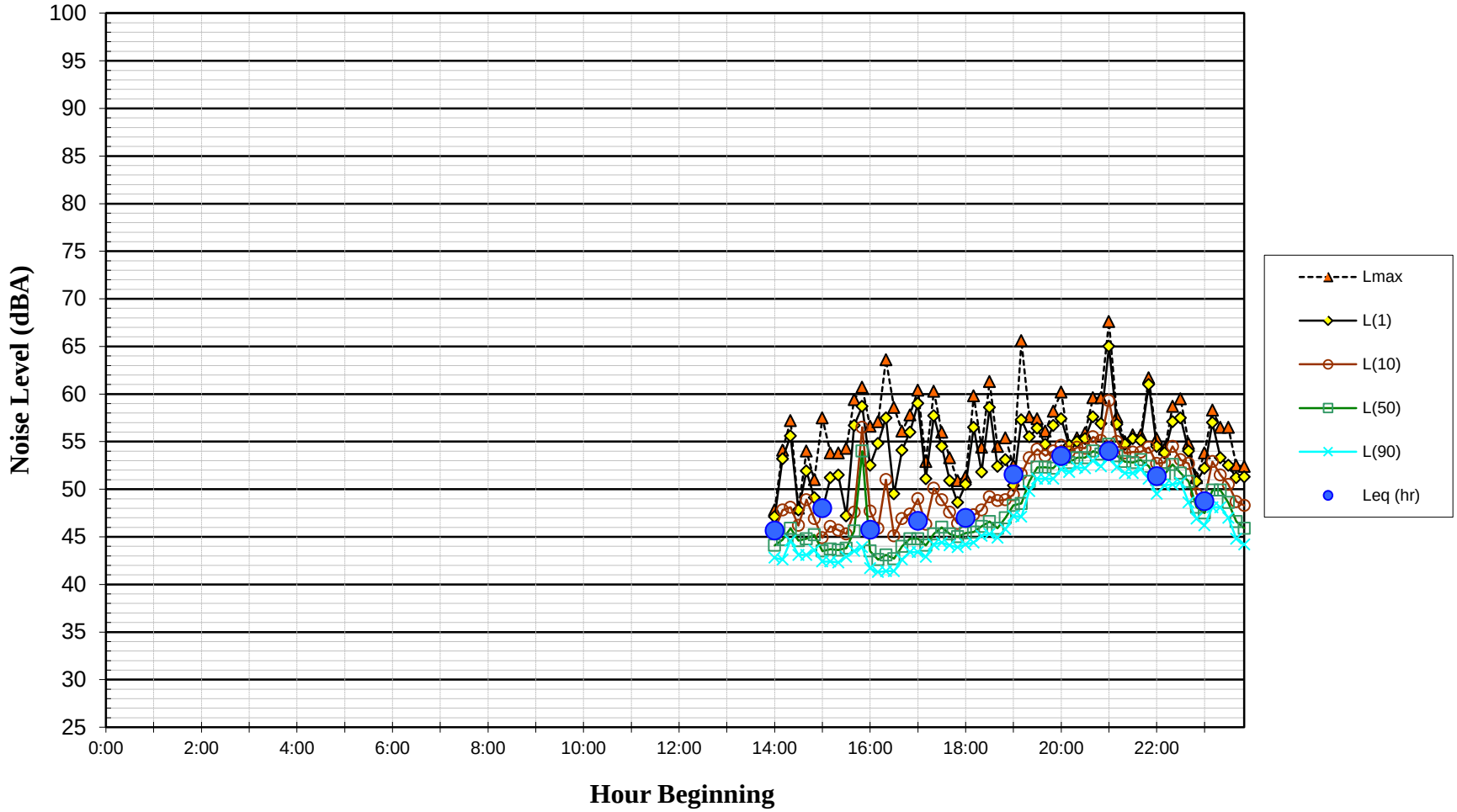


DNL= 68 dBA

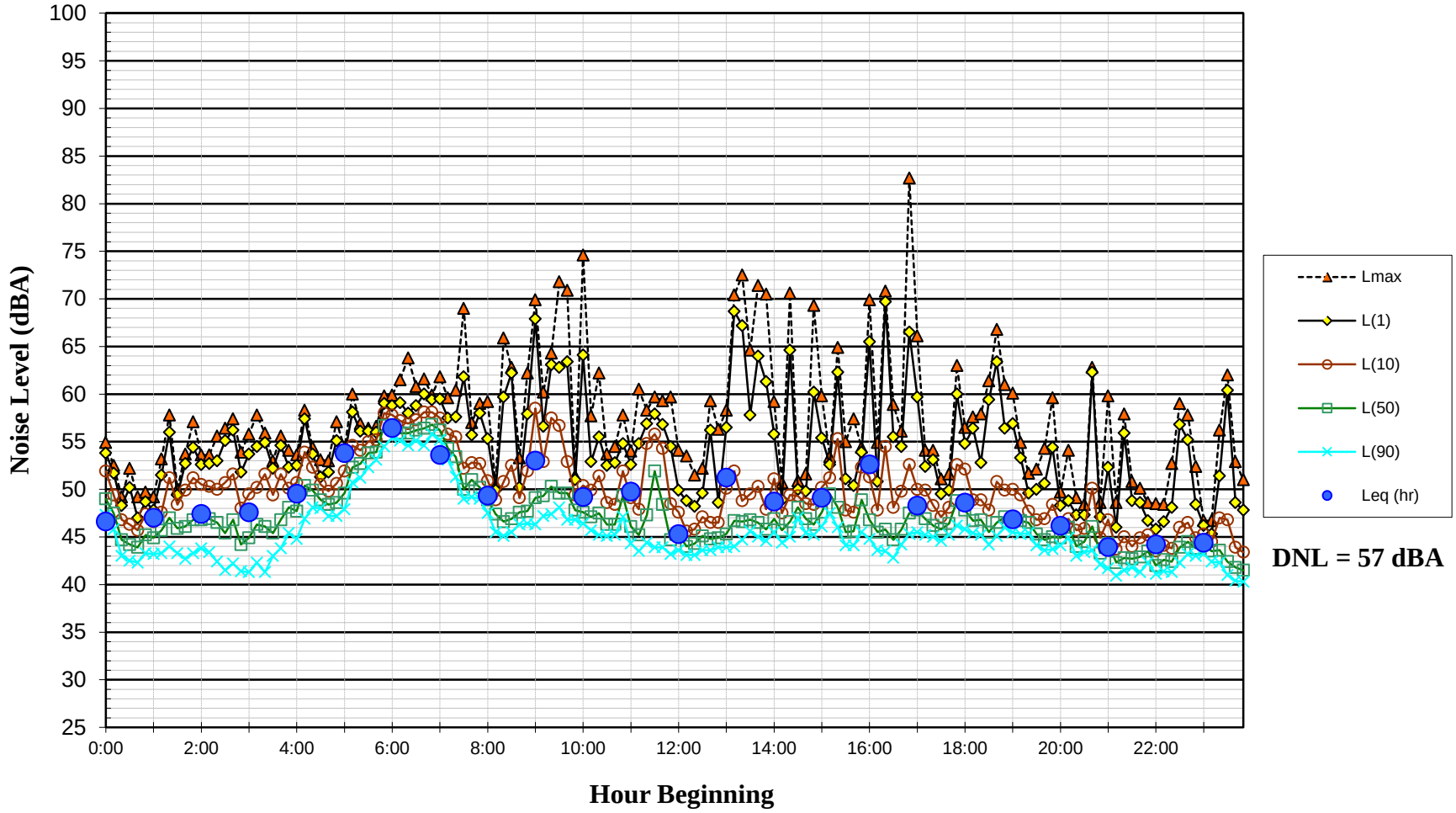
Noise Levels at Noise Measurement Site LT-2
Olin Ave Across from Flames. 135 Feet West of Winchester Blvd Centerline
Tuesday, March 1, 2016



Noise Levels at Noise Measurement Site LT-3
Along West Fence Line, Across from Middle Theater
Thursday, February 25, 2016

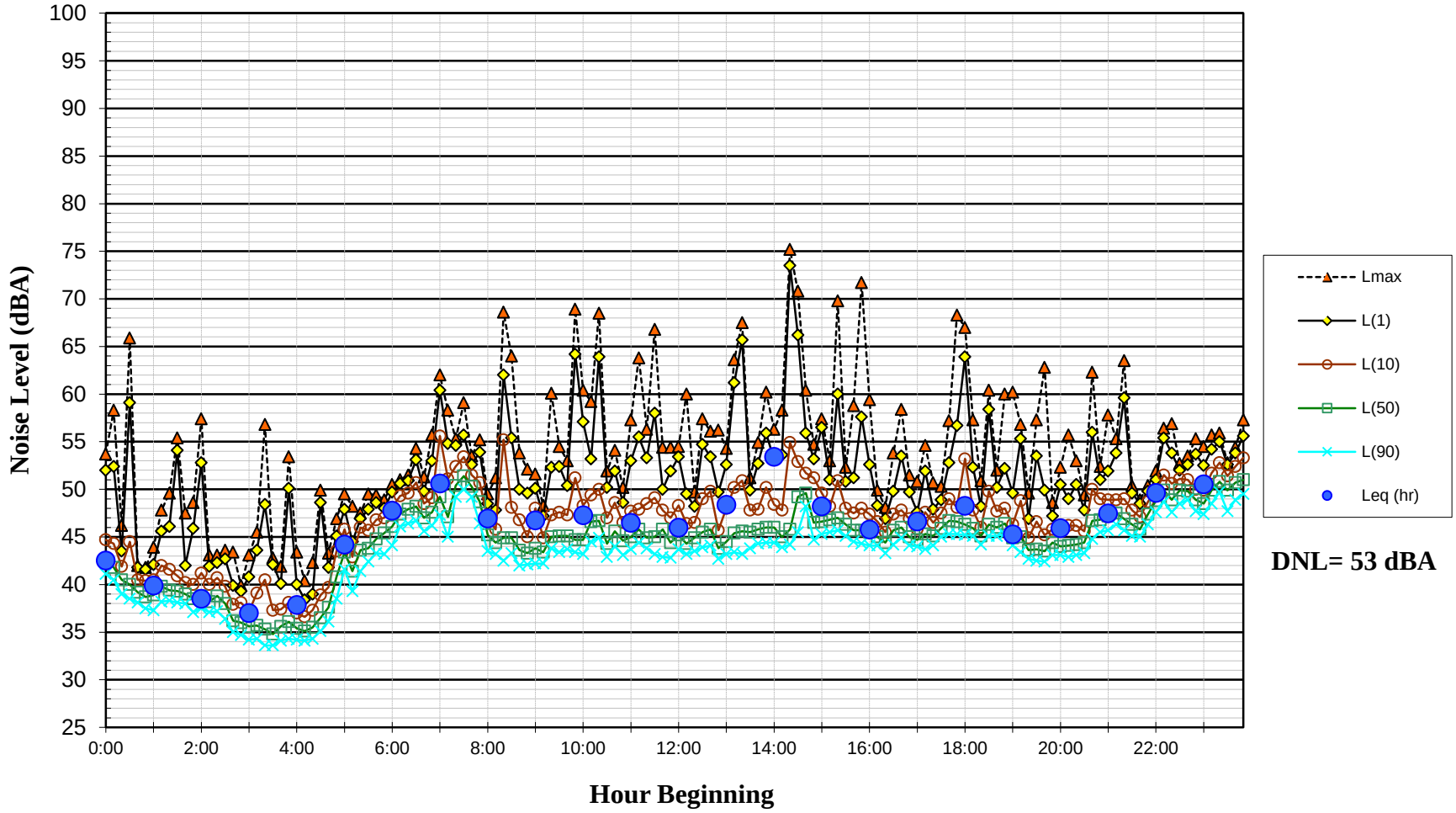


Noise Levels at Noise Measurement Site LT-3
Along West Fence Line, Across from Middle Theater
Friday, February 26, 2016



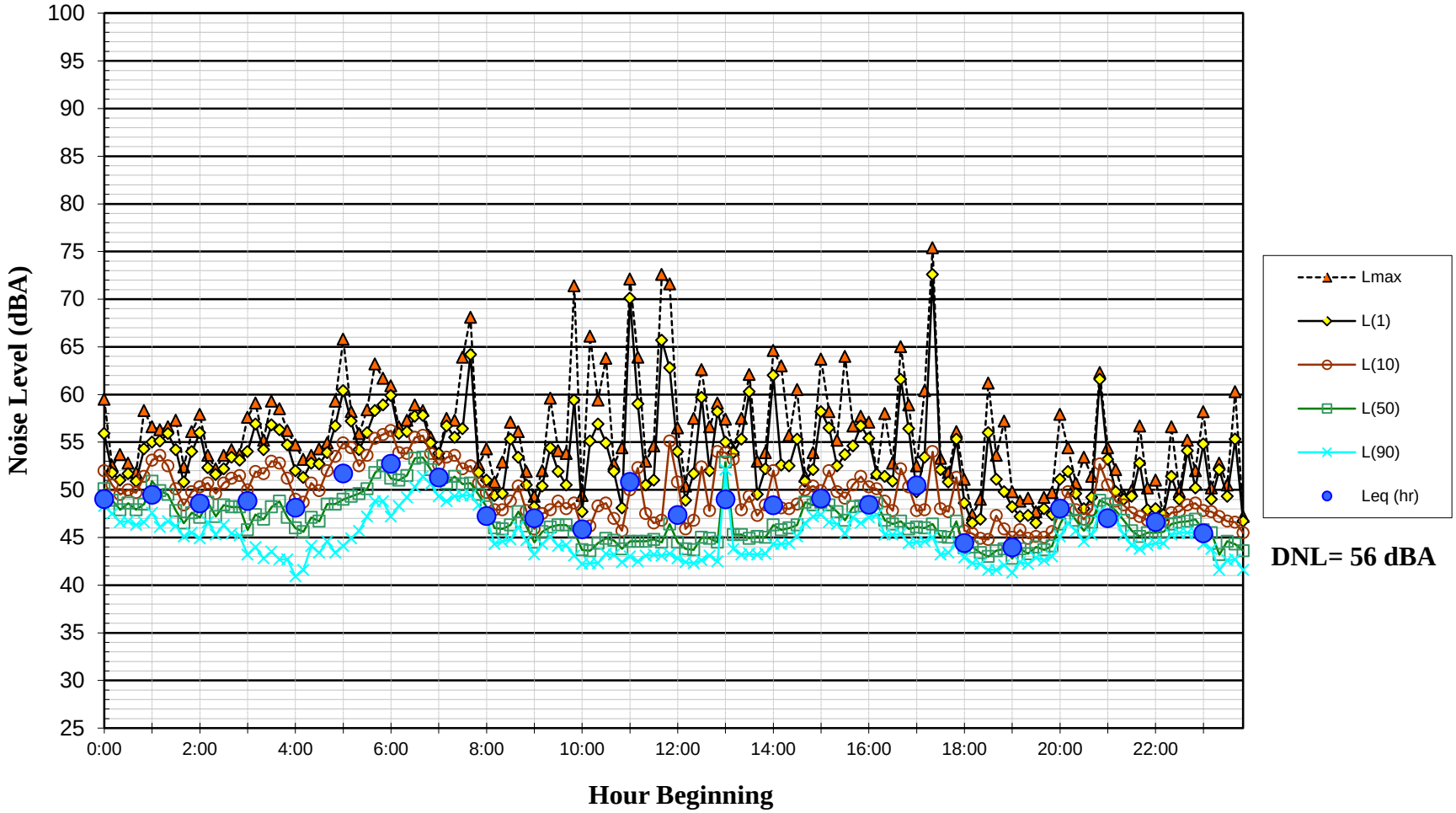
DNL = 57 dBA

Noise Levels at Noise Measurement Site LT-3
Along West Fence Line, Across from Middle Theater
Saturday, February 27, 2016



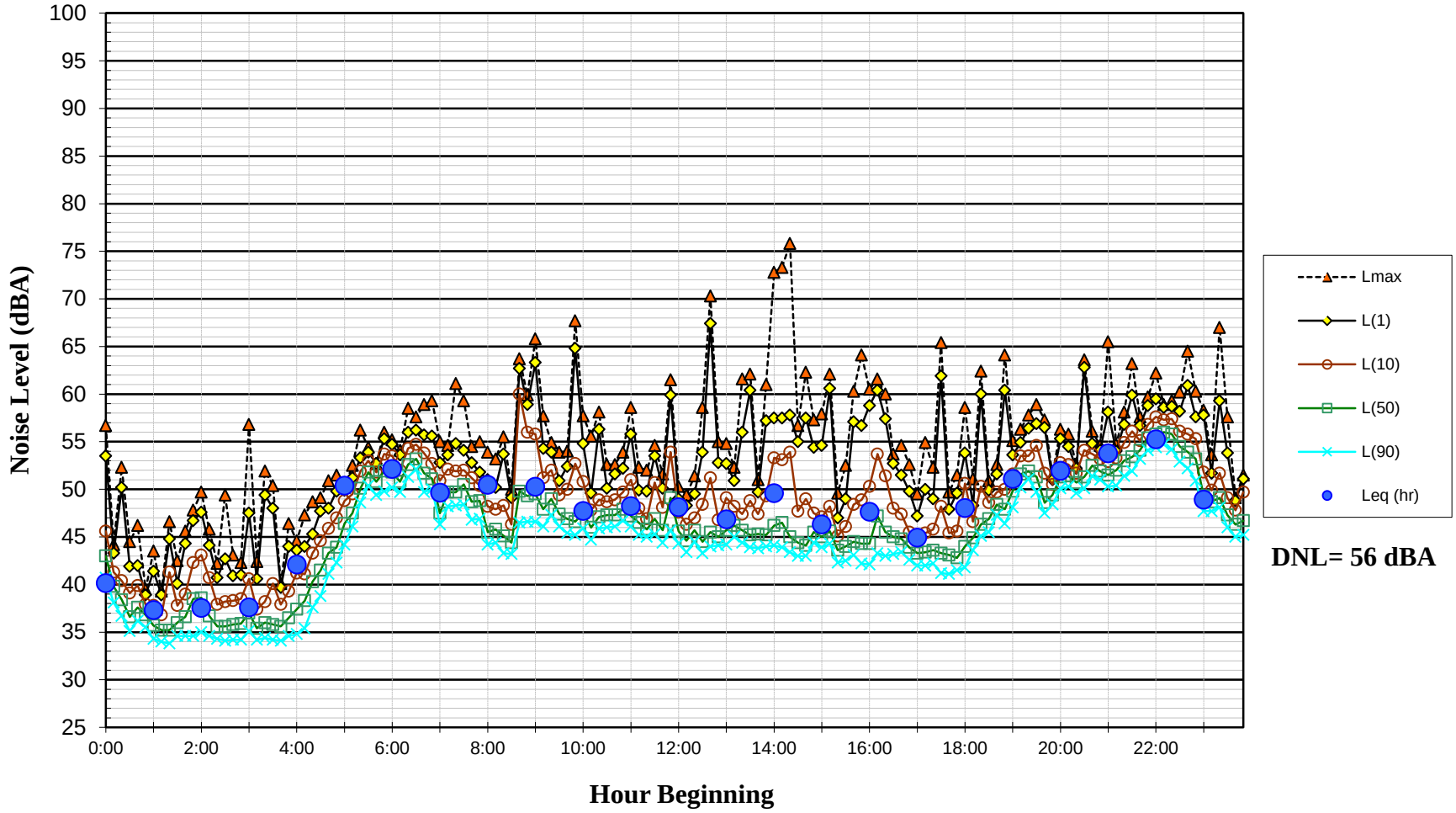
DNL= 53 dBA

Noise Levels at Noise Measurement Site LT-3
Along West Fence Line, Across from Middle Theater
Sunday, February 28, 2016



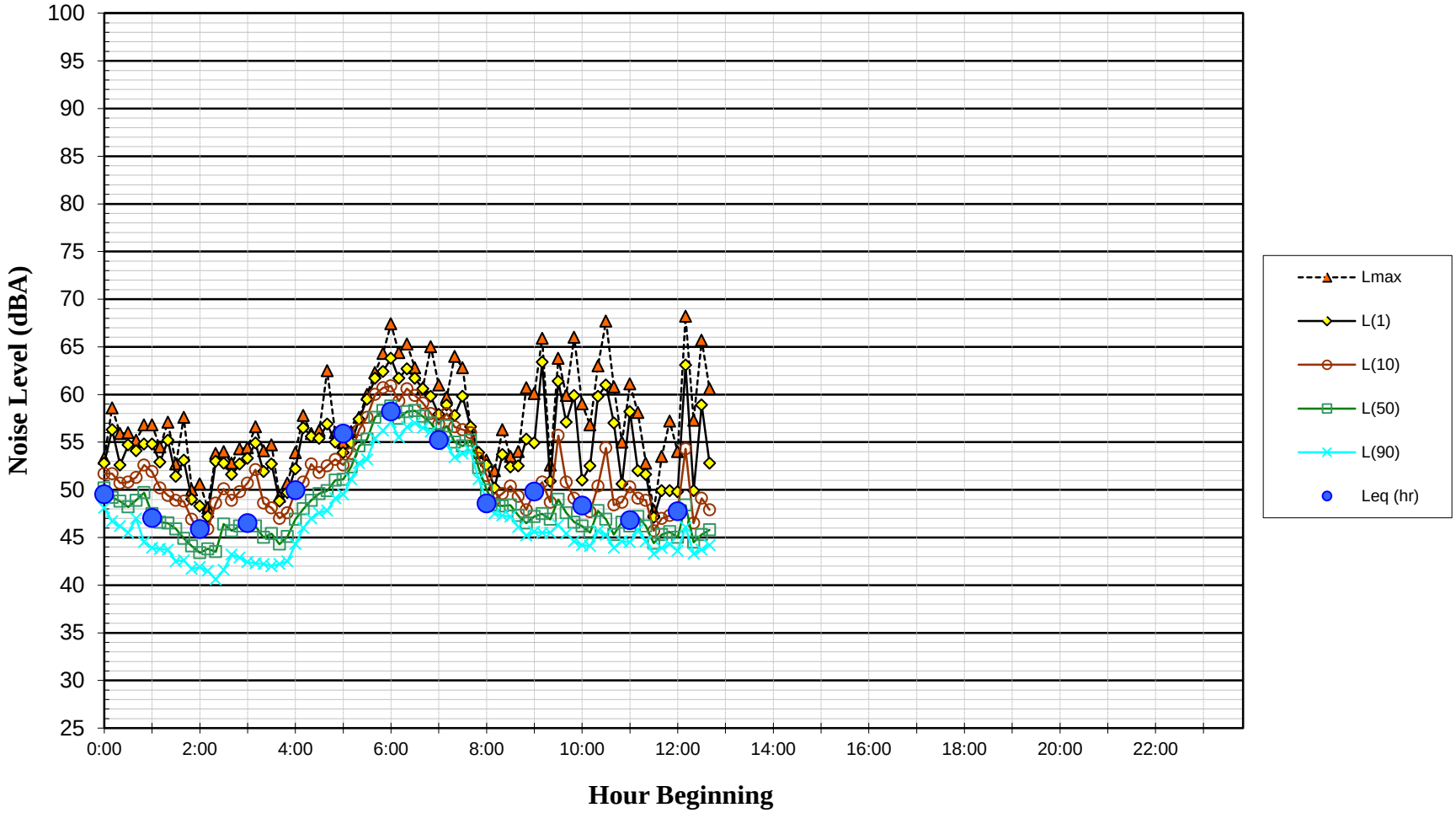
DNL= 56 dBA

Noise Levels at Noise Measurement Site LT-3
Along West Fence Line, Across from Middle Theater
Monday, February 29, 2016

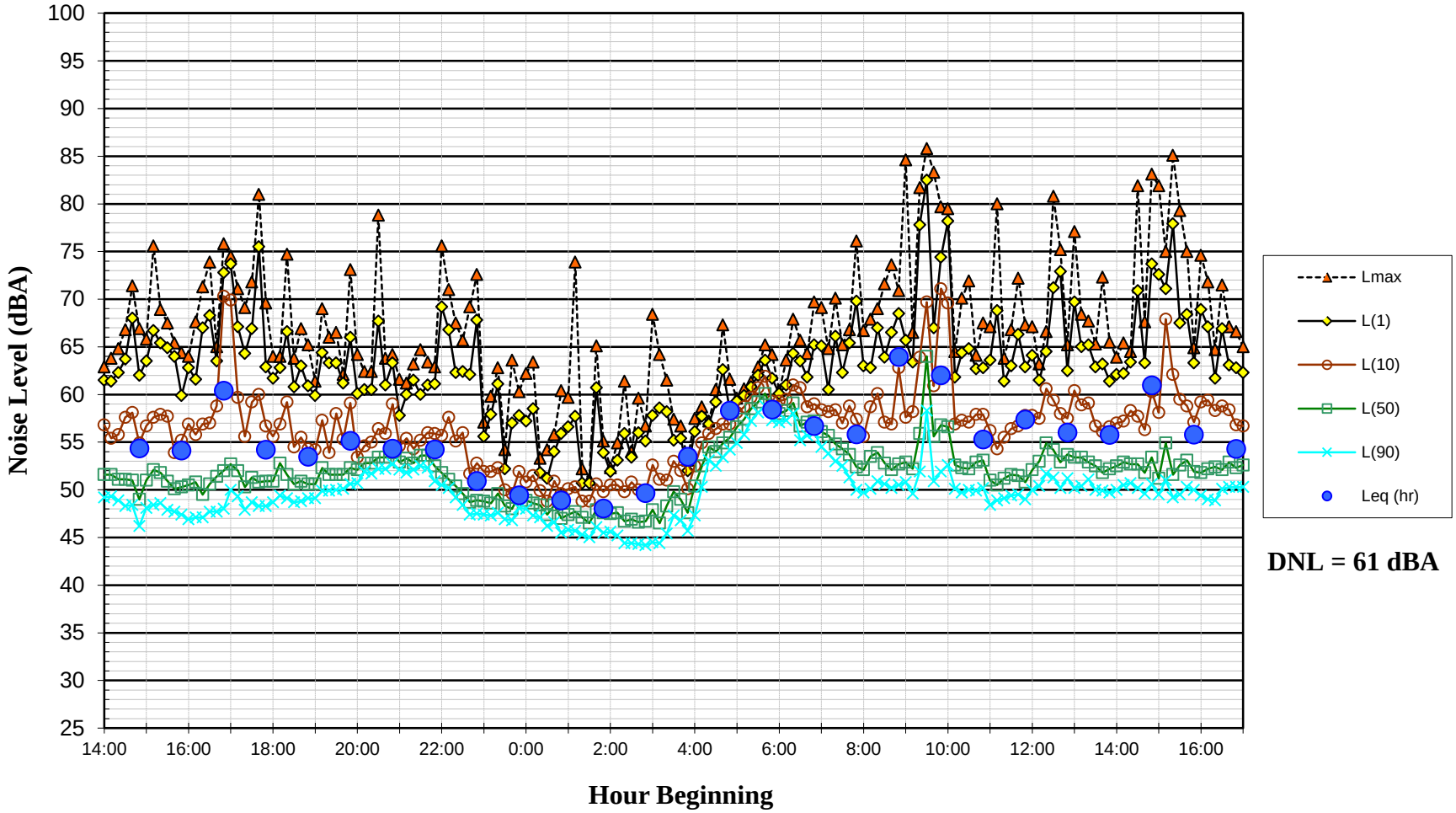


DNL= 56 dBA

Noise Levels at Noise Measurement Site LT-3
Along West Fence Line, Across from Middle Theater
Tuesday, March 1, 2016

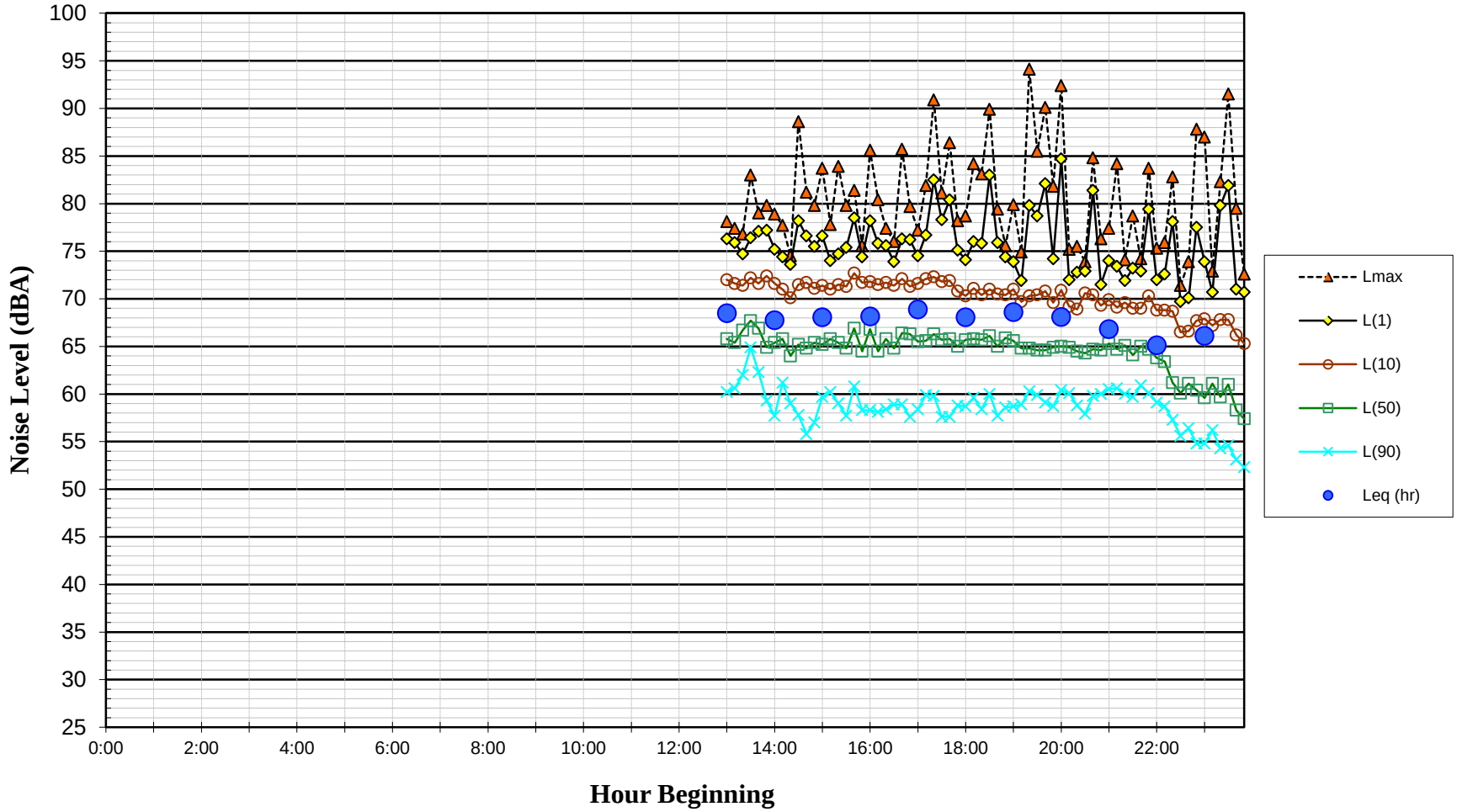


Noise Levels at Noise Measurement Site LT-4
Across from 3165 Olin Ave, 160 ft east of Hanson Ave and 430 ft west of Winchester Blvd
Thursday, February 25, 2016 - Friday, February 26, 2016

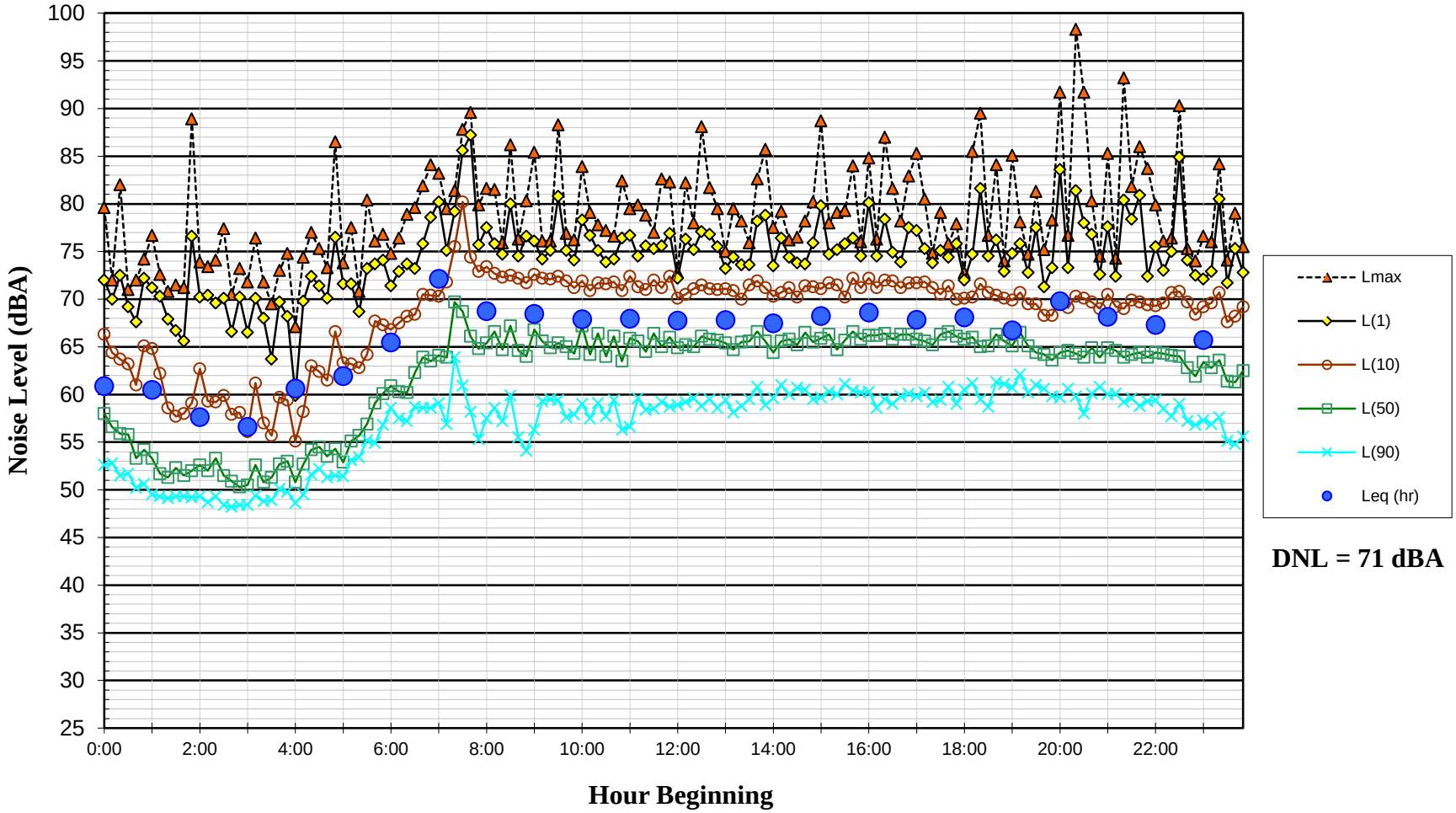


DNL = 61 dBA

Noise Levels at Noise Measurement Site LT-5
In Front of 350 Winchester Boulevard
Thursday, February 25, 2016

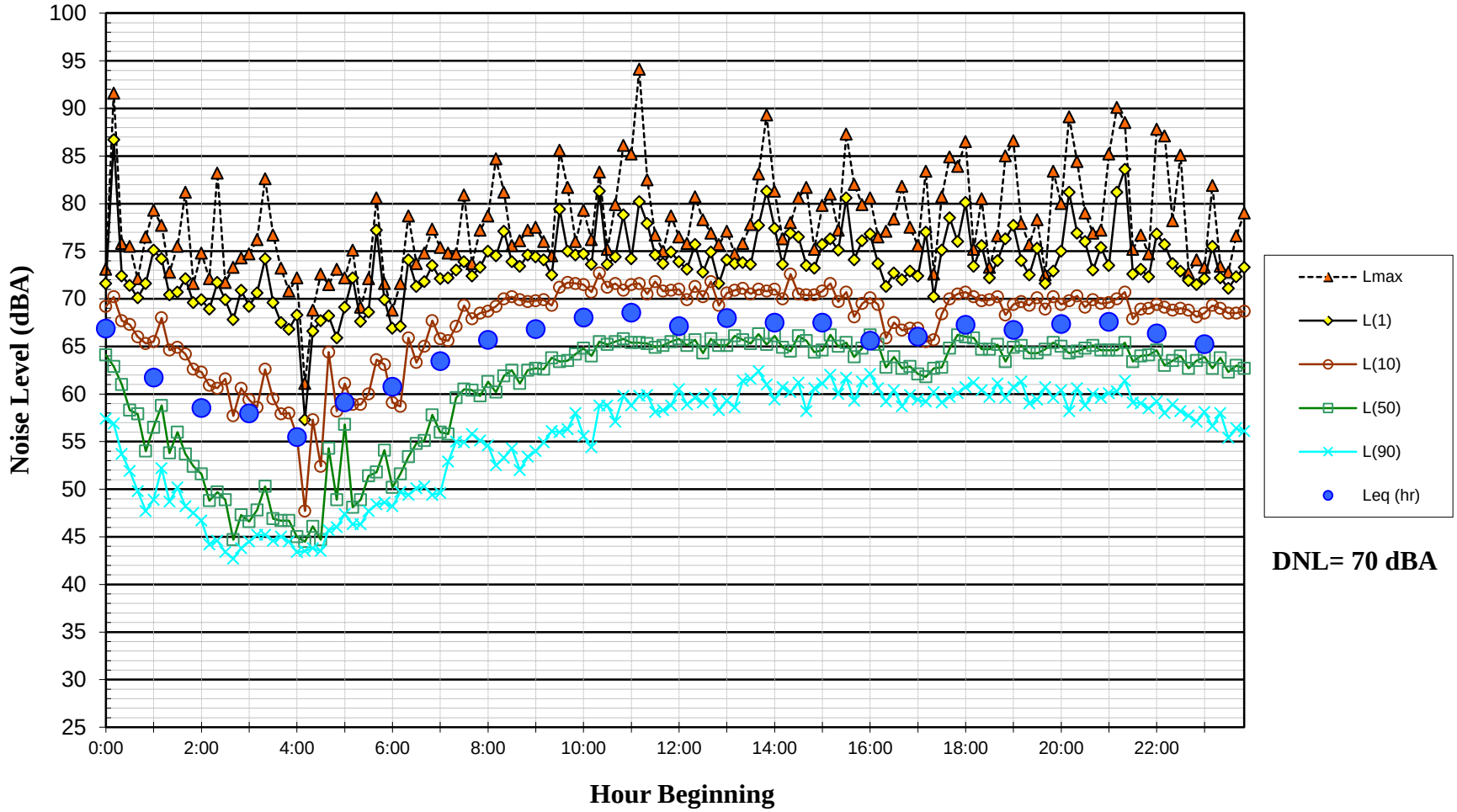


Noise Levels at Noise Measurement Site LT-5
In Front of 350 Winchester Boulevard
Friday, February 26, 2016



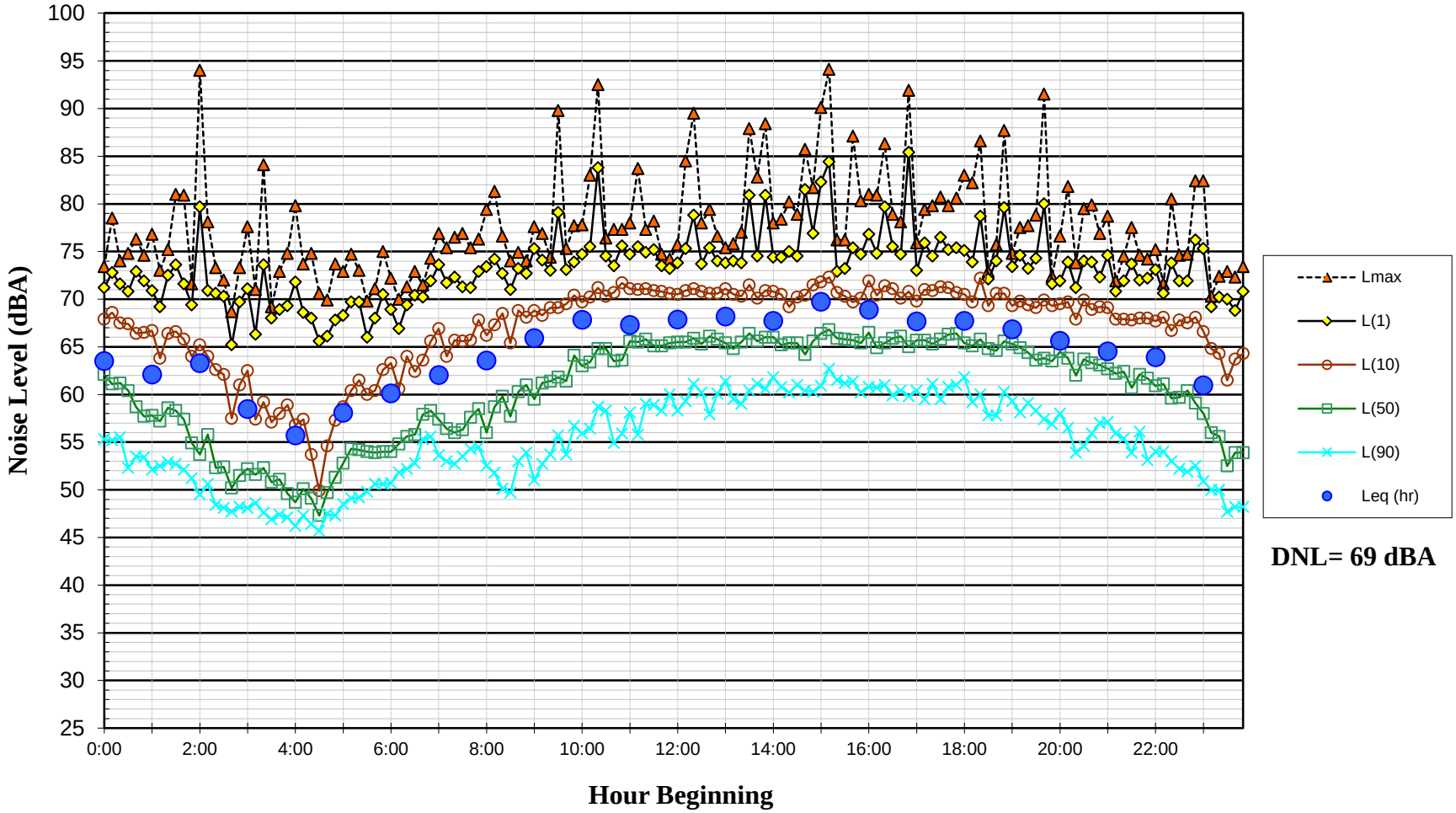
DNL = 71 dBA

Noise Levels at Noise Measurement Site LT-5
In Front of 350 Winchester Boulevard
Saturday, February 27, 2016



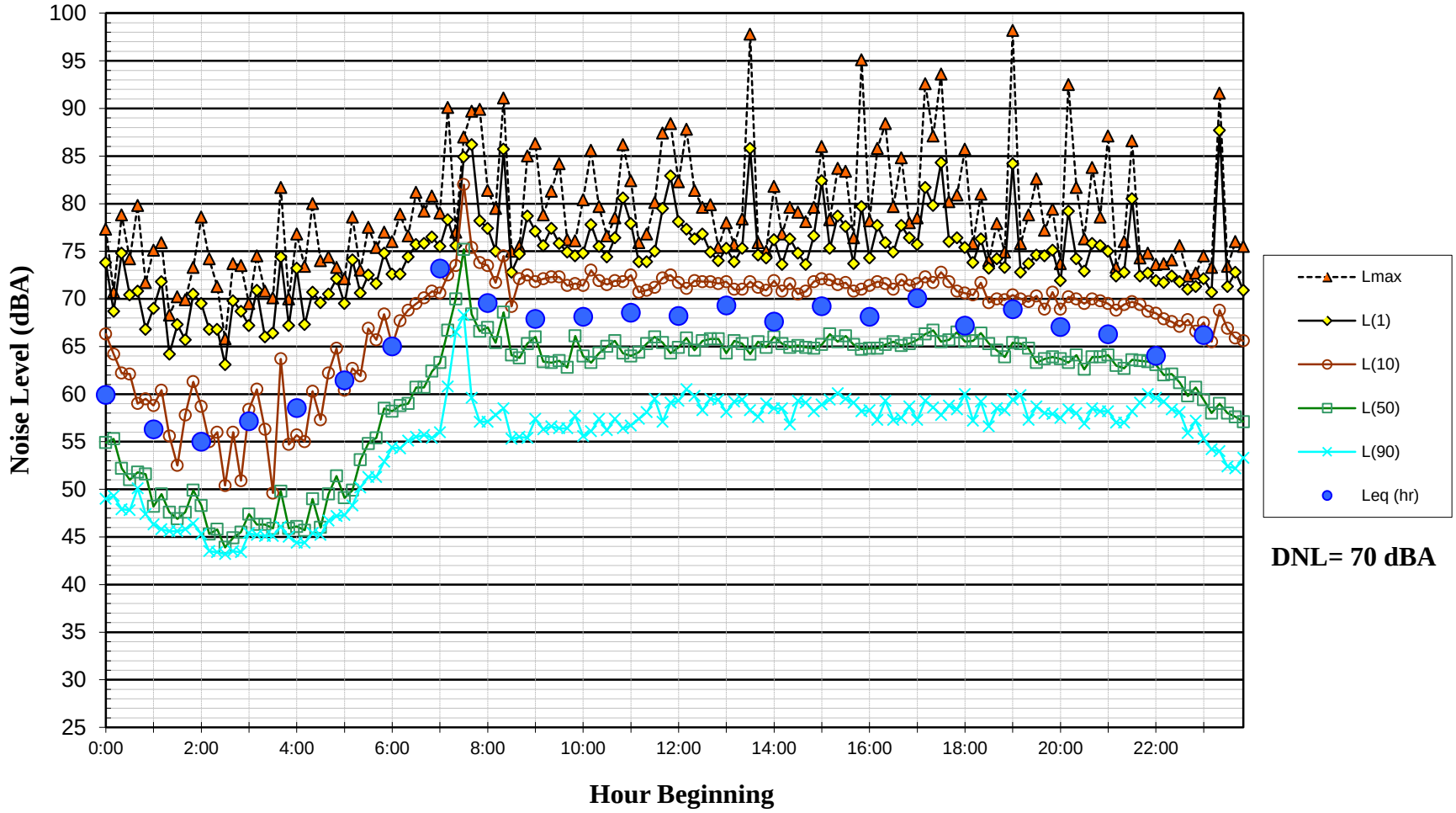
DNL= 70 dBA

Noise Levels at Noise Measurement Site LT-5
In Front of 350 Winchester Boulevard
Sunday, February 28, 2016



DNL= 69 dBA

Noise Levels at Noise Measurement Site LT-5
In Front of 350 Winchester Boulevard
Monday, February 29, 2016



DNL= 70 dBA

Noise Levels at Noise Measurement Site LT-5
In Front of 350 Winchester Boulevard
Tuesday, March 1, 2016