UPC WIND MANAGEMENT, LLC
EVERGREEN WIND POWER, LLC
MARS HILL WIND FARM
MARS HILL, MAINE

SOUND LEVEL STUDY

AMBIENT & OPERATIONS SOUND LEVEL MONITORING

3RD QUARTERLY REPORT

Maine Department of Environmental Protection Order No. L-21635-26-A-N

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Resource
Systems
Engineering

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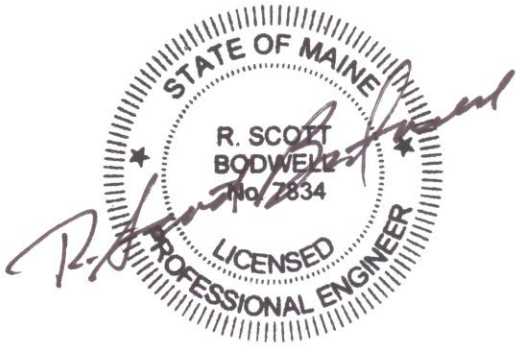

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LIST OF ACRONYMS

ANSI	American National Standards Institute
dB	Decibel (Unit of Sound Pressure Level)
dBA	Decibel A-weighted
Hz	Hertz (cycles per second)
ISO	International Organization for Standardization
kW	Kilowatt
L_{A1}	Sound Level Exceeded 1% of a Measurement Period (dBA)
L_{A10}	Sound Level Exceeded 10% of a Measurement Period (dBA)
L_{A50}	Sound Level Exceeded 50% of a Measurement Period (dBA)
L_{A90}	Sound Level Exceeded 90% of a Measurement Period (dBA)
L_{Aeq}	Equivalent Sound Level (dBA)
MEDEP	Maine Department of Environmental Protection
mph	Miles per hour
MRSA	Maine Revised Statutes Annotated
MW	Megawatt
RSE	Resource Systems Engineering

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1.0 INTRODUCTION

Resource Systems Engineering (RSE) began the Sound Level Study for the Mars Hill Wind Farm in December 2003 by developing a sound level prediction model for the project. The results of the initial study were submitted to the Maine Department of Environmental Protection (MEDEP) as part of the Site Location of Development Act Application. Subsequently, RSE has measured sound levels in the vicinity of the project site under both ambient and operating conditions. The overall objective of the Sound Level Study is to compare sound levels from operation of the Mars Hill Wind Farm (Wind Farm) with predicted estimates of Wind Farm sound levels and ambient sound levels in the vicinity of the Wind Farm. This report presents the results of the third set of quarterly sound level measurements taken during routine wind farm operations from January 9 through January 13, 2008.

EnRad Consulting of Old Town, Maine was retained by MEDEP to conduct a peer review of the Mars Hill Sound Level Study report by RSE dated June 21, 2007. Warren L. Brown of EnRad issued a peer review of this report on November 21, 2007. Although the second quarterly report was submitted to the MEDEP on November 2, 2007, it was not addressed in the initial peer review report by Mr. Brown. However, Mr. Brown issued a second peer review report to MEDEP on January 22, 2008 that provides comment on the 2nd quarterly Sound Level Study. Several peer review comments by Mr. Brown have been addressed by field procedures and data collection implemented by RSE/UPC during the 2nd and 3rd quarterly testing in September 2007 and January 2008. Additions to the 2nd quarterly test protocol were made pursuant to recommendations by RSE in the first quarterly report (June 21, 2007) and prior to issue of the initial peer review in late November. In preparation for 3rd quarterly testing, RSE/UPC worked with Mr. Brown and MEDEP staff to further refine the sound testing protocol. This resulted in selection of one additional monitoring position, the selected use of enhanced windscreens for elevated wind conditions, and relocation of two portable meteorological stations. These changes were implemented during 3rd quarterly testing and prior to issue of the second peer review report. Further details are provided in Section 7 of this report.[1]

Refer to the AMBIENT & OPERATIONS SOUND LEVEL MONITORING reports by RSE dated June 21, 2007 and November 2, 2007 for additional details concerning previous portions of the Sound Level Study and results of first and second quarterly sound testing.

2.0 SOUND AND DECIBELS

Refer to Section 2.0 of the AMBIENT & OPERATIONS SOUND LEVEL MONITORING report by RSE dated June 21, 2007.

3.0 SITE DESCRIPTION

Refer to Section 3.0 of the AMBIENT & OPERATIONS SOUND LEVEL MONITORING report by RSE dated June 21, 2007.

[1] *A reply to Warren L. Brown's second peer review was submitted under separate cover to the MEDEP on March 28, 2008.*

4.0 MEDEP STANDARDS

Refer to Section 4.0 of the AMBIENT & OPERATIONS SOUND LEVEL MONITORING report by RSE dated June 21, 2007.

5.0 SOUND LEVEL MODEL ESTIMATES FOR WIND FARM OPERATION

Refer to Section 5.0 of the AMBIENT & OPERATIONS SOUND LEVEL MONITORING report by RSE dated June 21, 2007.

6.0 AMBIENT SOUND LEVELS

Refer to Section 6.0 of the AMBIENT & OPERATIONS SOUND LEVEL MONITORING report by RSE dated June 21, 2007.

7.0 OPERATING SOUND LEVELS

Refer to Section 7.0 of the AMBIENT & OPERATIONS SOUND LEVEL MONITORING report by RSE dated June 21, 2007 for measurement results from May 2007 and the 2nd Quarterly Report dated November 2, 2007 for measurement results from September 2007. The following presents the results of the third set of quarterly sound level measurements from January 2008 routine wind farm operations.

RSE conducted 3rd quarterly operations sound testing starting the afternoon of January 9, 2008 and continuing through the afternoon of January 13, 2008. This 3rd quarterly monitoring period of approximately 96 hours exceeds the minimum 24-hour period prescribed under the sound level monitoring plan approved by MEDEP. (see Appendix I of RSE report of June 21, 2007). Sound levels were measured under varying wind and operating conditions in order to determine by measurement, sound levels at community monitoring positions during routine operation of the Wind Farm. Measured sound levels are compared to ambient sound levels and predicted sound levels of Wind Farm operation provided to the MEDEP as part of the Site Permit application.

As noted in the AMBIENT & OPERATIONS SOUND LEVEL MONITORING report by RSE dated June 21, 2007, the predicted sound levels were based on operation of 35 wind turbines compared to the 28 wind turbines operating in the as-built configuration of the Wind Farm. Six of the possible locations where wind turbines were not erected are near the north end of the Wind Farm and over 3,000 feet west of the as-built turbine locations. The seventh possible location is also toward the north end and approximately 1,200 feet west of as-built turbines. A review of these possible turbine sites relative to the sound level prediction model indicates that operation of the seven additional wind turbines would provide a minimal sound level contribution to the monitoring positions. This finding is based on the closer proximity of multiple wind turbines to monitoring positions.

7.1 Measurement Procedures

To the extent practicable, measurements were conducted in accordance with MEDEP Chapter 375.10 Section H.4, Measurement of Sound from Routine Operation of Developments. Consequently, a primary objective is to measure Wind Farm sound levels at nearby protected locations during conditions when the sound from the Wind Farm is most noticeable. This requires ample wind speeds at higher elevations for the wind turbines to operate at or near full power with less wind at the lower elevation, community monitoring positions. These conditions occurred during some daytime, evening and overnight hours of the 3rd quarterly measurement period.

Based on their proximity to wind turbines and accessibility, nine monitoring positions were originally selected for measurement to represent protected locations in the vicinity of the Wind Farm. The monitoring positions are either within the boundaries of the Wind Farm or permission to conduct measurements was granted by the landowner. Of the original nine measurement positions, two were discontinued (MP-3 and MP-6) and one (MP-7) was relocated nearby to a new position (MP-7A) to address landowner considerations. Positions MP-3 and MP-6 were discontinued as these positions are generally represented by other nearby monitoring positions (MP-6A and MP-4A). Wind noise in pine trees close to MP-6 more frequently masked turbine noise than at MP-6A.

In response to recommendations from MEDEP peer reviewer Warren Brown, position MP-1A was added to supplement measurements at position MP-1. The stated objectives were to establish a measurement location "to isolate free-flow surface wind speed measurements outside of significant obstruction wakes and ambient/operation noise levels away from localized sources (roadways, trees, etc.)."[2] RSE provided site maps, photographs and field observations to facilitate selection of position MP-1A by Mr. Brown to meet these objectives.

Figure 7-15 provides a map of the monitoring positions used during both ambient and operations sound level testing. The following provides a description of monitoring positions utilized during operations sound level testing and provides a distance to the nearest wind turbine:

Position	Description
MP-1*	Property line of the Wind Farm and abutting residential parcel off East Ridge Road at the north end of the Wind Farm. MP-1 is approximately 800 feet west of turbine nos. 1 and 2.
MP-1A*	In an open field approximately 250 feet west of position MP-1. Selected to be a sufficient distance from tree growth and roadways to reduce its influence on wind and sound levels. MP-1A is approximately 1050 feet west of turbine no.1.
MP-2*	Along the main Wind Farm access road and nearby a residential parcel off East Ridge Road and west of the Wind Farm. MP-2 is approximately 5900 feet west of turbine no. 17.
MP-3	At the base of Big Rock Ski Area and at the residential lot within the Big Rock Subdivision nearest to the Wind Farm. MP-3 is approximately 3400 feet west of turbine no. 28.
MP-4A*	Relocation of ambient position MP-4 approximately 2000 feet east toward the Wind Farm. Near golf course hole no. 12 approximately 3250 feet west of turbine no. 22.
MP-5*	At a residential property along Mountain Road east of the southern portion of the Wind Farm . MP-5 is approximately 3400 feet east of turbine no. 19.
MP-6	Residential parcel near the north end of Mountain Road and to the east of the Wind Farm. MP-6 is approximately 2050 feet east of turbine no. 6.
MP-6A*	Approximately 1200 feet south of position MP-6 and 2100 feet east of turbine no. 7.
MP-7	Near residential parcel off Mountain Road approximately 2500 feet east of turbine no. 11.
MP-7A*	Located near center of residential parcel off Mountain Road and approximately 2,500 feet east of turbine no. 12. Replaced position MP-7 beginning with second quarterly operations sound level testing.
MP-8*	Near property line an abutting residential parcel off East Ridge Road at the north end of the Wind Farm. Approximately 1200 feet east of turbine nos. 1 and 2.

*Positions utilized for 3rd Quarterly Operations Sound Level Testing

[2] *E-mail correspondence from W. Brown to S. Bodwell, RSE and R. Clukey, MEDEP, December 31, 2007.*

Sound measurement instrumentation consisted of six Larson-Davis (LD) Model 812 Integrating Sound Level Meters, one LD Model 824 Sound Level Meter/Real-Time Analyzer, one CEL 593 Sound Level Analyzer, and one LD Model 831 Sound Level Meter/Real-Time Analyzer. In addition to overall broadband sound levels, the LD 824, CEL 593, and LD 831 measure one-third octave band levels. The LD 812s and the CEL 593 were used for continuous sound level measurements at selected community monitoring positions. The LD 831 was used to conduct spot measurements at the positions on a rotating basis. The LD 824 was used to conduct long-term continuous measurements at position MP-1 and rotating spot measurements at several positions. The sound level meters meet Type 1 (precision) performance requirements of American National Standard Specification for Sound Level Meters, ANSI S1.4-1983. For most measurements, the microphones were fitted with standard 3.5-inch diameter spherical or cylindrical windscreens and mounted on tripods at a height of approximately five feet above the ground or snow. The sound level meters were field-calibrated before and after the monitoring period. Additionally, a certified laboratory performs a calibration of the sound level instrumentation within 12 months of the measurement period.

Pursuant to recommendations from Mr. Brown, the LD 831 was fitted with an enlarged 7-inch diameter foam windscreen to reduce potential for wind noise across the microphone. An enlarged foam windscreen was also used on the LD 824 for some spot measurements and some continuous measurements at MP-1. The acoustic performance of the 7-inch foam windscreen is comparable to large secondary windscreens.[3] Measurement results for 3rd quarterly testing have been annotated to indicate when the enlarged foam windscreen was used. While reducing the potential for wind noise, the large foam windscreens can also introduce additional insertion loss particularly at frequencies above 2,000 Hz. Measurements were conducted at both community positions and closer to wind turbines to compare the performance of standard and large wind screens and determine appropriate corrections, if any, for measurements using large windscreens. Simultaneous measurements were conducted using two adjacent tripod-mounted Type 1 sound level meters: one with a standard wind screen and the other with a 7" diameter foam windscreen. The results of windscreen testing and details concerning insertion loss corrections can be found in Section 7.2.

Measurements of surface weather conditions were recorded using portable meteorological (MET) stations at five of the eight monitoring positions. The MET stations were mounted on tripods and located within 50 feet of the monitoring positions to record "surface" conditions. RainWise Portable Weather Logger (PortLog) stations were deployed at positions MP-1, MP-2, MP-6A and MP-7A and a Casella Nomad Portable Weather Station was deployed at position MP-1A. Among other data, the PortLog MET stations were programmed to record temperature, humidity, wind speed and direction every two seconds and averaged these readings over one-minute periods. The Nomad was programmed to record wind speed and direction every 15 seconds with no data averaging. Beginning the afternoon of January 12, the Nomad recorded weather observations at five minute intervals. Wind data was measured at a height of 8 to 10 feet above grade.

Sound levels were simultaneously measured at eight monitoring positions over a period of approximately 96 hours representing a range of weather and Wind Farm operating conditions. Occasional lapses occurred during periods of precipitation, battery failures, and to download and reset instrumentation. Sound levels were measured every 1/8 second to record both short-term and hourly statistics at each position. A project engineer and field technician recorded field observations and weather conditions, and measured one-third octave band sound levels at each monitoring position on a rotating basis. Field observations supplement sound level data to determine the primary contributors to the measured sound levels. These contributors included sound from wind turbines and non-Wind Farm sources such as wind sound, wind-induced sound from trees, precipitation, road traffic, residential activity, aircraft traffic and other natural sounds such as birds and ice falling from trees.

[3] *Investigations of Wind Screens Insertion Loss and Attenuation of Wind Noise, Delta Acoustics & Vibration, 1997.*

UPC Operations recorded operating and meteorological data from each turbine every ten seconds and reported the average readings at ten-minute intervals. Data includes power production, hub height wind speed and direction, and rotor rpm. Graphs showing power production and wind speed data for each wind turbine can be found in Appendix III.

The following describes the measurement results, field observations, Wind Farm operating data, and meteorological data recorded during the measurement period at each monitoring position.

7.2 Measurement Results

During the 96-hour test period, sound levels were measured under a range of wind, weather and operating conditions. Wind turbine operating levels varied from full power production during periods of strong wind to low power production during periods of light or calm winds. There was also a 12-hour period that began at approximately 10 p.m. on January 11 when all wind turbines were shutdown by operations personnel due to significant blade icing from mixed precipitation. The periods of highest wind turbine operations occurred from the late afternoon of January 9 through midnight on January 10 and during the final overnight period (January 12 to 13). During these periods, winds were generally from the west/southwest and typically ranged from 10 to 20 meters/second (22 to 45 mph) at the turbine hubs, with the highest winds during the first 24 hours of testing. Also, for 12 hours beginning at noon on January 10 and during the overnight period of January 12 to 13, surface winds diminished and were relatively light while upper levels wind speeds remained strong.

To provide an overview of Wind Farm operations during the 3rd quarterly monitoring period, Figure 7 presents a graph showing the overall average power production of the Wind Farm, average wind speed at the turbine hubs, and surface wind speeds at MP-2 and at airport weather stations in Presque Isle and Caribou, Maine (ref. www.wunderground.com). Instrumentation problems hampered weather observations at MP-2 as the result of strong wind gusts and frozen ground and snow conditions that caused the MET station to become dislodged and topple over.

The airports in Presque Isle and Caribou measure wind speed and direction in open areas at a height of 30 feet above ground and represent general surface wind conditions in the vicinity of Mars Hill. Weather data from Caribou was used for January 11 and 12 due to apparent instrument problems with the Presque Isle station from freezing rain. Wind direction was taken from airport data, turbine records, and field observations. Additional wind speed data was recorded at sound level monitoring positions using portable meteorological stations and is presented in subsequent figures along with sound level measurement results. Wind speed and direction readings from wind turbine numbers 2 (north), 15 (mid), and 27 (south) and from portable MET stations can be found in Appendix III. With the exception of Presque Isle/Caribou wind speeds reported every 20 minutes, each data point in Figure 7 represents a ten-minute period of Wind Farm operation. Electric power production is presented in kilowatts (kW). With all 28 turbines operating at full load, the Wind Farm has the rated capacity to generate 7,000 kW of electric power during a 10-minute period.

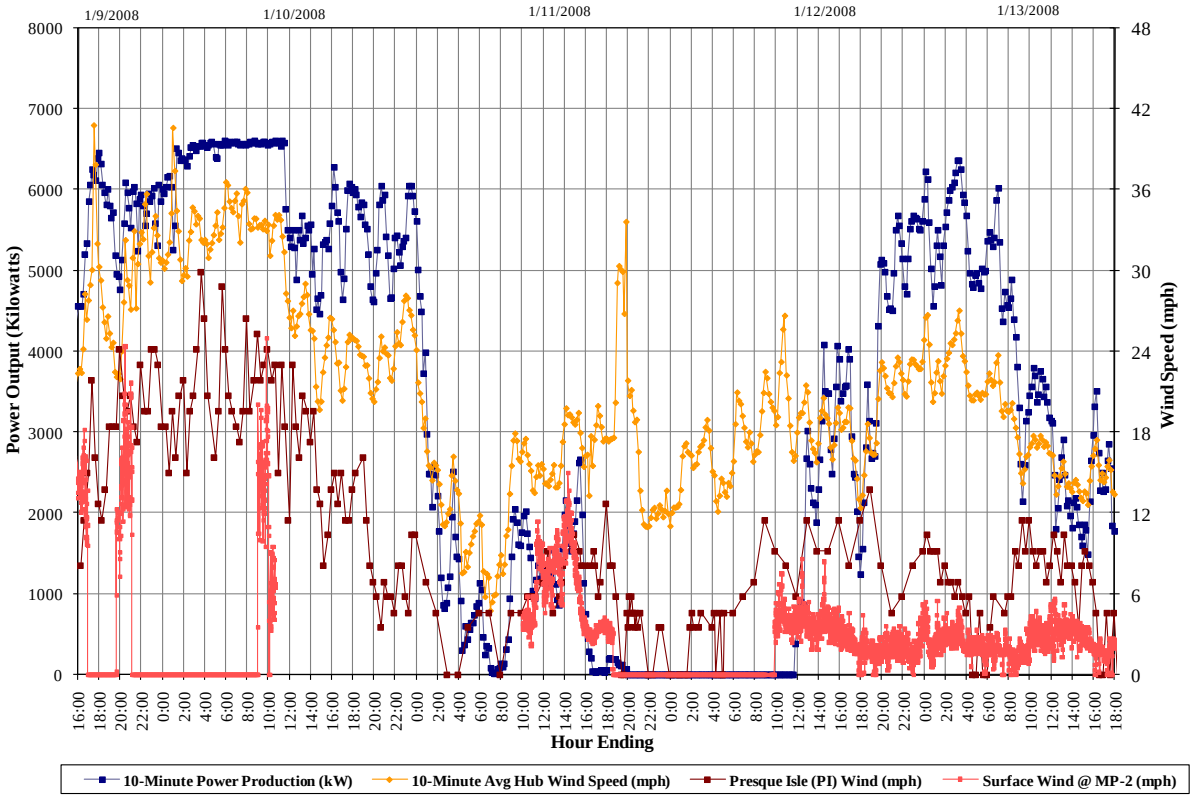
To determine the sound level contribution of the Wind Farm alone, ambient non-Wind Farm sound must be subtracted from measured sound levels at each position. During 3rd quarterly testing, the most prominent ambient sounds were from the action of wind on terrain and vegetation particularly at or near the tops of trees. Other ambient sounds included birds, precipitation, occasional aircraft, and local road traffic. Also, due to ground conditions, there were occasional sound events from RSE and UPC personnel approaching and departing from monitoring locations to download instrumentation or record observations and spot measurements. The sound was caused by walking or snow-shoeing on crusty snow.

Much like the sound from wind turbines, wind-induced sound also changes with wind conditions. Shielding from vegetation and terrain varies with wind direction and gradients, and can fluctuate

significantly over brief periods due to wind gusts and flow patterns around the ridge. Field and weather observations supplement sound level measurements to identify when wind turbine sound was predominant relative to ambient sound particularly from wind forces on trees and terrain. These conditions occur when surface winds diminish while upper level wind speeds operate wind turbines at or near full power.

Compared to wind data from the Presque Isle and Caribou airports and wind turbine hubs, surface data from portable MET stations at MP-1, MP-1A, MP-6A, and MP-7A generally showed lower wind speed readings. This would be expected since these monitoring positions are located at points partially shielded from wind by vegetation or terrain. Even though the range was lower, wind speeds at the monitoring positions trended higher and lower consistent with airport data. Compared to MP-1, a wider range of wind speeds was reported at MP-1A where there is less obstruction or shielding from surface winds. When not hindered by instrumentation problems, wind speeds at MP-2, located in an open, elevated farm field, were at times similar to readings from Presque Isle/Caribou. Due to instrumentation problems, MP-2 did not provide reliable wind data for further comparison to airport observations.

Figure 7. Wind Farm Power Generation, Average Turbine Wind Speed, and Surface Wind Speed



Note: MET station at MP-2 experienced frequent instrumentation problems.

A primary objective of continuously measuring wind speed at the monitoring positions was to determine the presence and contribution of non-turbine wind-induced sound to the measured sound levels. Field observations indicate that at most positions the majority of wind-induced sound resulted from wind near treetops at heights well above both the tripod-mounted microphones and anemometers. Consequently, periods when the contribution of non-turbine, wind-related sound increased could not be determined from the MET station data alone. However, the MET station data can be used to identify periods when wind incident on the microphone/windscreen is above the MEDEP 12 mph threshold. Wind speed data from the MET stations at MP-6A, and MP-7A indicate that, except for January 9-10 overnight period,

wind speeds were below the 12 mph threshold established for sound level measurements by MEDEP 375.10.H.2.4. At position MP-1, when field observations indicate both wind turbine and wind-induced sound contributed to the measured sound levels, wind speed readings from the portable MET station were generally at or below 12 mph. This occurred during daytime and overnight hours on January 9 and 10. Due to its close proximity and similar terrain features, wind speed and direction at MP-8 are expected to be relatively consistent with readings taken at MP-1.

From local and airport surface wind data, field observations and sound level measurements, the most significant periods of non-turbine, wind-induced sound began during late daytime hours on January 9 and persisted until mid-afternoon on January 10. Measured sound levels from these daytime and overnight periods, include significant contributions from both wind turbines and wind on trees as the most prominent source of non-turbine, ambient sound. From noon to midnight on January 10 and again during the evening and overnight period of January 12-13, surface wind speeds diminished to light or calm, while wind speeds aloft remained steady or increased resulting in operation of the Wind Farm from 80 to 90% of full power production (see Fig. 7). After midnight on January 10, winds quickly diminished and turbine output dropped below 30%. At 7 am on January 11, the southern half of the wind farm was shutdown for maintenance while turbines at the northern half saw variable daytime operations. Snow began falling at approximately 10:30 am followed by mixed precipitation with periods of freezing rain that caused icing of wind turbine blades. Extensive blade icing prompted UPC operations to shutdown all wind turbine operations from approximately 8 pm on January 11 until nearly 1 pm on January 12. Sound level measurements during the shutdown period represent ambient conditions without any contribution from wind turbines. During the day on January 12, clear skies and warmer temperatures lessened blade icing and turbines were brought on line from north to south. After startup, operating records indicate that notable blade icing persisted until 5 p.m. This was determined based on a comparison of expected and actual power output at turbine hub windspeeds encountered during this period. There may have been other occurrences of blade icing that did not significantly affect power output.

Surface conditions during 3rd quarterly testing began with a layer of soft and drifting snow followed by wet snow during periods of mixed precipitation on January 11. As temperatures dropped in the late afternoon on January 12, the wet snow became frozen resulting in hard surface conditions.

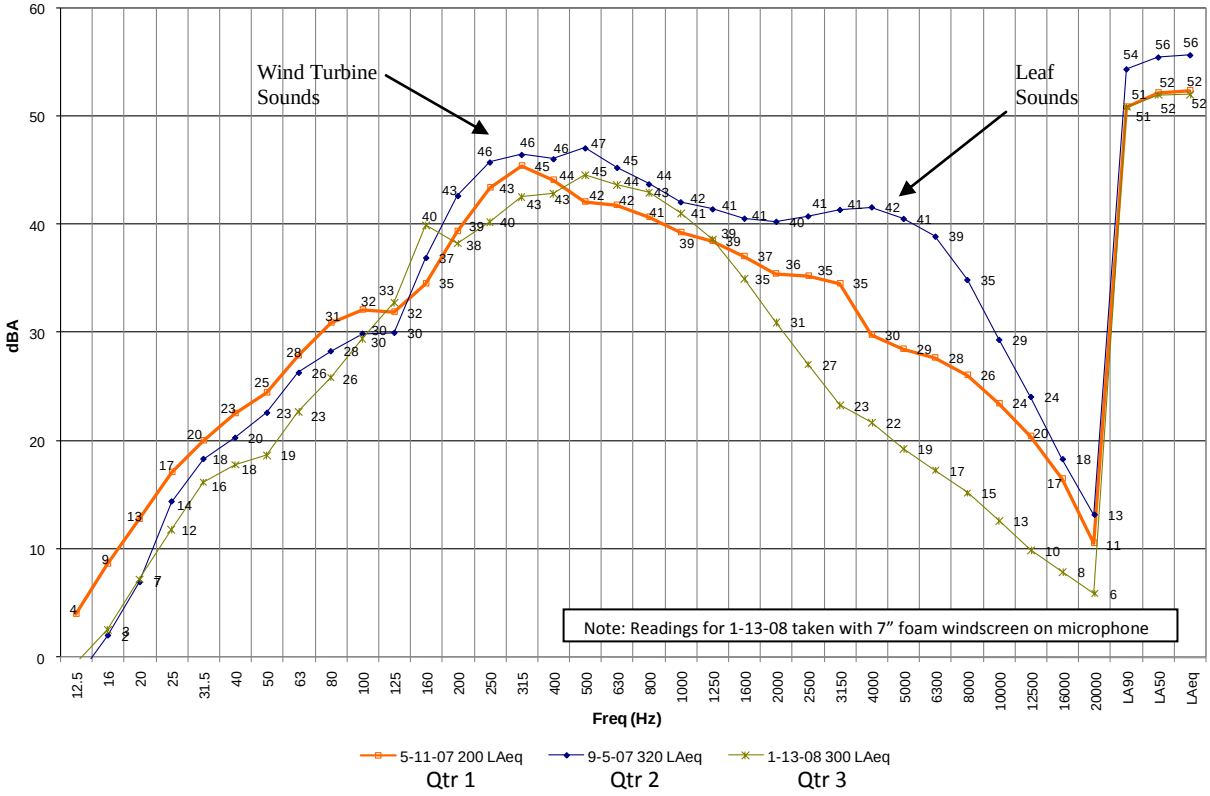
At most monitoring positions, sound levels during periods of near full Wind Farm operation with light surface winds were lower than sound levels during periods of high surface winds . Observations indicate that the higher sound levels were attributable to wind forces acting on trees and other terrain features. To track these winds, the 3rd quarterly testing protocol was refined to collect MET station data at locations MP-1A and MP-2 with less obstruction to wind flow. During high wind periods, wind speeds at MP-1A measured on the order of 5 mph greater than at MP-1 but still considerably lower than readings taken from 10-meter met towers at nearby airports. The MET station at MP-2 (elevated open field) was hampered by wind gusts overtopping the MET station which could not be fully anchored into frozen ground and snow. During brief periods, wind speeds measured at MP-2 reached levels comparable to readings from nearby airports. With more test data, a ground level MET station at MP-2 may prove to be a reliable indicator of unobstructed surface wind conditions in the vicinity of the Mars Hill Wind Farm.

At other locations, where the surface MET stations and monitoring positions are partially shielded from tree-height wind, it would be difficult to establish a relationship between non-turbine, ambient sound levels and measured wind speeds using ground level MET stations. In the future, it may be possible to establish this relationship by recording wind speed data at the height of nearby treetops or from "ground" level wind speed and direction data at MP-2.

The contributions of ambient, wind related sounds during wind farm operations have been difficult to determine due to varying surface winds and seasonal conditions, and similarities between these sources and the frequency spectra of Wind Farm sound. Examples of A-weighted third octave band sound

levels measured at MP-1 for 1st, 2nd and 3rd quarterly testing is presented as Figure 7-1. Measurements are for periods when wind turbine sound levels were prominent. Standard windscreens were used for 1st and 2nd quarterly measurements, whereas 3rd quarterly measurements were taken using a 7-inch diameter foam windscreen. Analysis of A-weighted, third-octave band sound levels from 2nd quarterly testing with full leaf out showed more prominent leaf sounds in higher frequencies ranging from 2000 to 6300 Hz. Field observations also indicated increased audibility of these leaf sounds relative to wind turbines as a result of the more prominent higher frequencies. Third quarterly testing shows the lowest contribution of sound levels in this upper frequency range including 1st quarterly testing in May 2007 prior to leaf out. This is due in part to use of the large windscreen and fewer wildlife sounds such as birds, crickets and insects during the winter.

Figure 7-1. Comparison of Third Octave Band Sound Levels (dBA) at MP-1 for 1st, 2nd and 3rd Quarterly Sound Testing

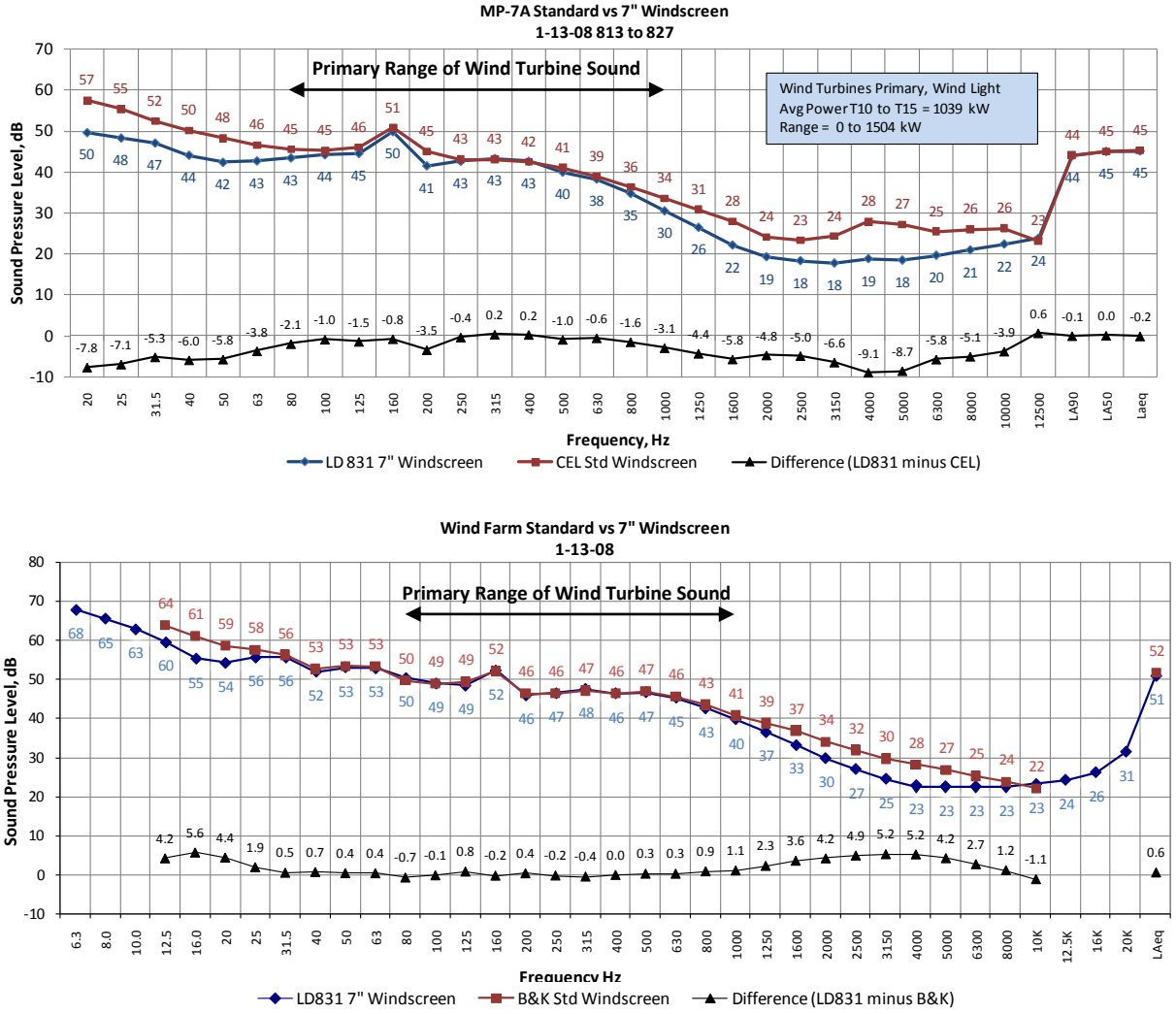


To remain conservative, ambient sound levels used to adjust 3rd quarterly nighttime measurements remain consistent with 1st and 2nd quarter results. The contribution of ambient sound levels during quarterly testing is estimated from typical hourly L_{Aeq} readings during periods of the May 2007 operations testing when winds were light or calm and wind turbines were not operating. This is a very conservative approach to estimating ambient sound levels that are likely to occur during periods of significant Wind Farm operation. Sound level monitoring results and field observations from December 2006 ambient monitoring and quarterly operations testing indicate that ambient (non-turbine) sound levels during wind conditions required for significant Wind Farm operation are generally higher than estimated by this method.

Windscreen test results showed notable insertion loss at frequencies below 80 Hz and above 1000 Hz when using the 7-inch foam windscreen. Insertion loss refers to the sound level reduction due to signal loss as sound passes through the windscreen material. When comparing measurements of overall A-weighted sound levels as used by the MEDEP noise standard, the differences were less than or equal to 1 dBA for measurements close to the wind turbines and less than 1 dBA at community monitoring

positions. Figure 7-1A shows comparisons of sound levels measured with standard and large (7 inch) windscreens and light surface winds (< 12 mph).

Figure 7-1A. Comparisons of Third Octave Band Sound Levels (dBA) for Standard and 7" Foam Windscreen



Figures 7-2 through 7-9 present measured hourly L_{Aeq}, L_{A50}, and L_{A90} readings at each position in relation to the average power output of nearby wind turbines, the average wind speed at the hub of the nearest or nearby turbine, and surface wind speeds. Surface wind speeds include airport data (Presque Isle and Caribou) and, where available, measurements from portable MET stations at the sound level monitoring positions. MEDEP regulations are based on the hourly L_{Aeq} attributable to the operation of the development and exclude sounds from exempt and other sources such as wind, traffic, and wildlife. As measured, the L_{Aeq} includes all sound energy present at any time during the measurement period including sound from wind turbines and ambient sources such as wind-induced noise. During 3rd quarterly testing, the most prominent non-turbine sounds were caused by high or gusting winds acting on trees and terrain features. Field observations and measurements suggest that comparison of L_{Aeq} readings with the L_{A50} and L_{A90} parameters can be used to identify operating periods with lower contributions of non-wind turbine sounds. As the differences between the L_{Aeq} and these percentiles diminish, so does the contribution of ambient, non-turbine sound levels such as tree noise from gusting winds. When ambient sounds from surface winds and other sources diminish while strong upper level winds drive turbines near full power, the L_{Aeq} and L_{A50} are nearly identical. This demonstrates that,

during periods when wind turbine sounds are predominant, the L_{A50} is a reliable indicator of the hourly equivalent sound level (L_{Aeq}) from operation of wind turbines.

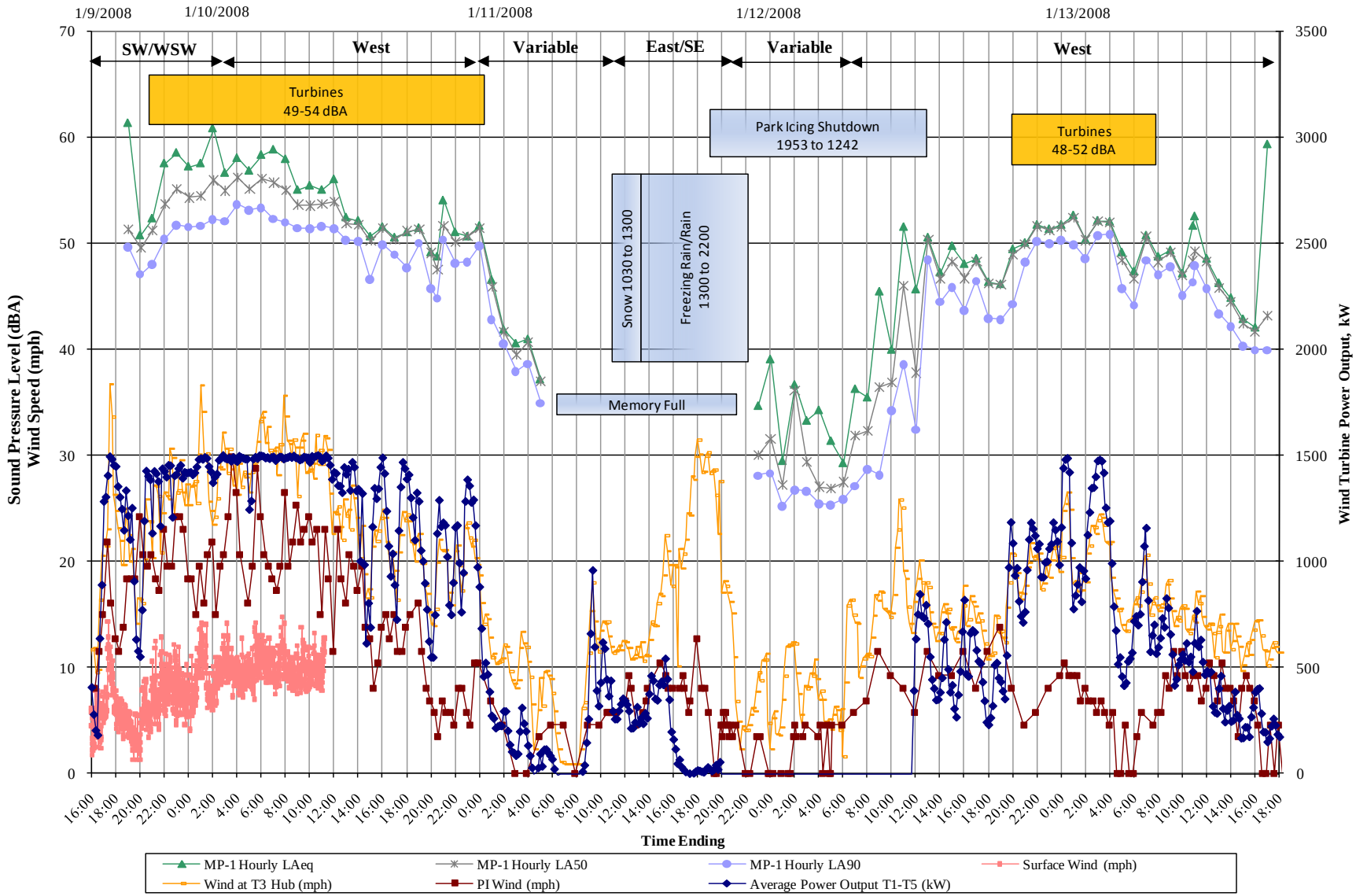
Appendix IV contains tables and graphs of sound level measurements during Wind Farm operations. The readings include hourly L_{Aeq}, L_{A1}, L_{A10}, L_{A50} and L_{A90} values for each measurement position. Figures 7-10 through 7-13 present measured hourly L_{Aeq} and L_{A90} readings at selected pairs or groups of measurement positions that have proximate locations, similar wind conditions and/or nearby turbine operations. When measurement results show that sound level fluctuations at similar positions do not coincide, periods of sound contributions from non-Wind Farm sources (*e.g.*, wind and precipitation) are likely to have occurred. Field observations at similar positions were also compared to determine the relative contributions of various sound sources.

The overall A-weighted sound level measurements, as presented in Figures 7-2 through 7-13, were supplemented with measurements of one-third octave band (third octave) sound levels, time history L_{Aeq} readings at five-second intervals, and field observations by RSE personnel. At positions MP-1 and MP-7A, third octave levels were measured on a nearly continuous basis throughout the 3rd quarterly monitoring period. At other positions, third octave levels were measured on a rotating basis coinciding with field observations. Appendix V contains a series of graphs presenting third octave sound level measurements at each monitoring position. In addition to third octave sound levels, each graph provides the overall A-weighted sound level, a summary of field observations, and turbine power production and wind speed data. Figure 7-14 presents sample time history graphs for positions MP-1 and MP-1A. These graphs show the L_{Aeq} readings as measured every five seconds over a one-hour period. During periods of high wind turbine output and blustery surface winds on January 9 and 10, the time history plots were used to identify increased sound levels from wind noise in relation to the steadier, background sound levels observed from wind turbines. Additional time history plots can be found in Appendix VI.

The results presented in Figures 7-2 through 7-13, third octave sound level measurements (Appendix V), time history measurements (Appendix VI), and field observations were used to determine the contribution of turbine sound levels at each monitoring position and evaluate the presence of short duration repetitive sounds. Measurements of third octave sound levels and field observations were also used to determine the presence of tonal sounds from the Wind Farm. An evaluation of short duration repetitive and tonal sounds in accordance with MEDEP 375.10 can be found in Section 7.2.

Field observations and measurements indicate that similar to 1st and 2nd quarterly testing, when the differences between the L_{Aeq}, L_{A50} and L_{A90} readings were small, sound from the Wind Farm was a primary source at the monitoring positions. For these periods, hourly L_{A50} readings represent sound levels from wind turbine operations at each position. During periods of high turbine operation and blustery surface winds, field observations indicate a variable mix of both wind and turbine sound. At most positions, this occurred from the start of quarterly testing on January 9 until approximately noon on January 10. To help differentiate between turbine and non-turbine sounds, time history plots were reviewed and sound levels compared to hourly L_{A50} and L_{A90} percentiles. For these blustery periods, wind turbine sound levels appear to be between the hourly L_{A50} and L_{A90} readings. Figures 7-2 through 7-9 indicates the range of wind turbine sound levels prior to ambient correction determined by hourly measurements and examination of time history plots.

Figure 7-2. Sound Levels at MP-1 in Relation to Wind Turbine Power Output and Wind Speed



Microphone with 7" Foam Windscreen 1/10 600 to 2000 and 1/12 2300 to 1/13 1100

Figure 7-3. Sound Levels at MP-1A in Relation to Wind Turbine Power Output and Wind Speed

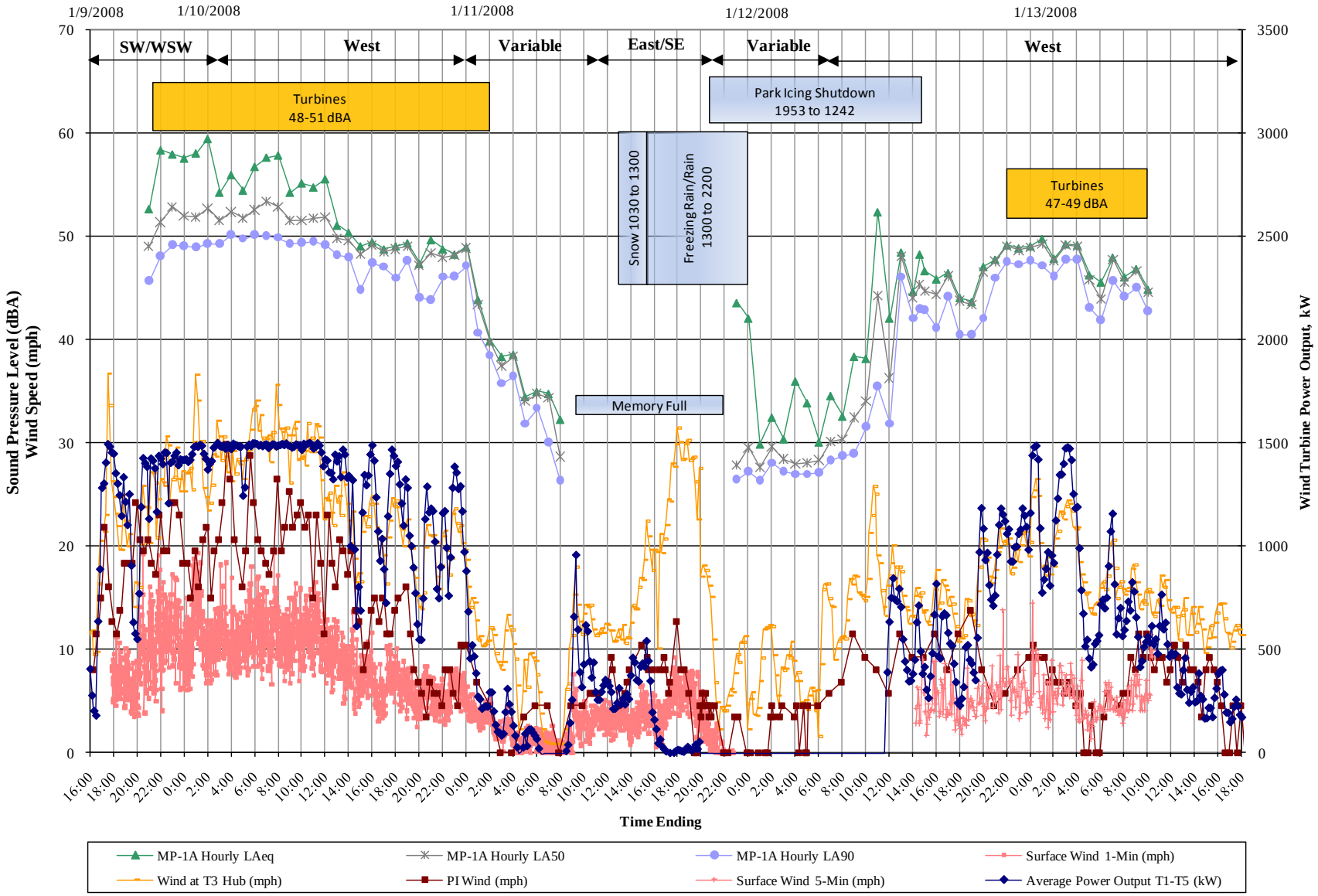
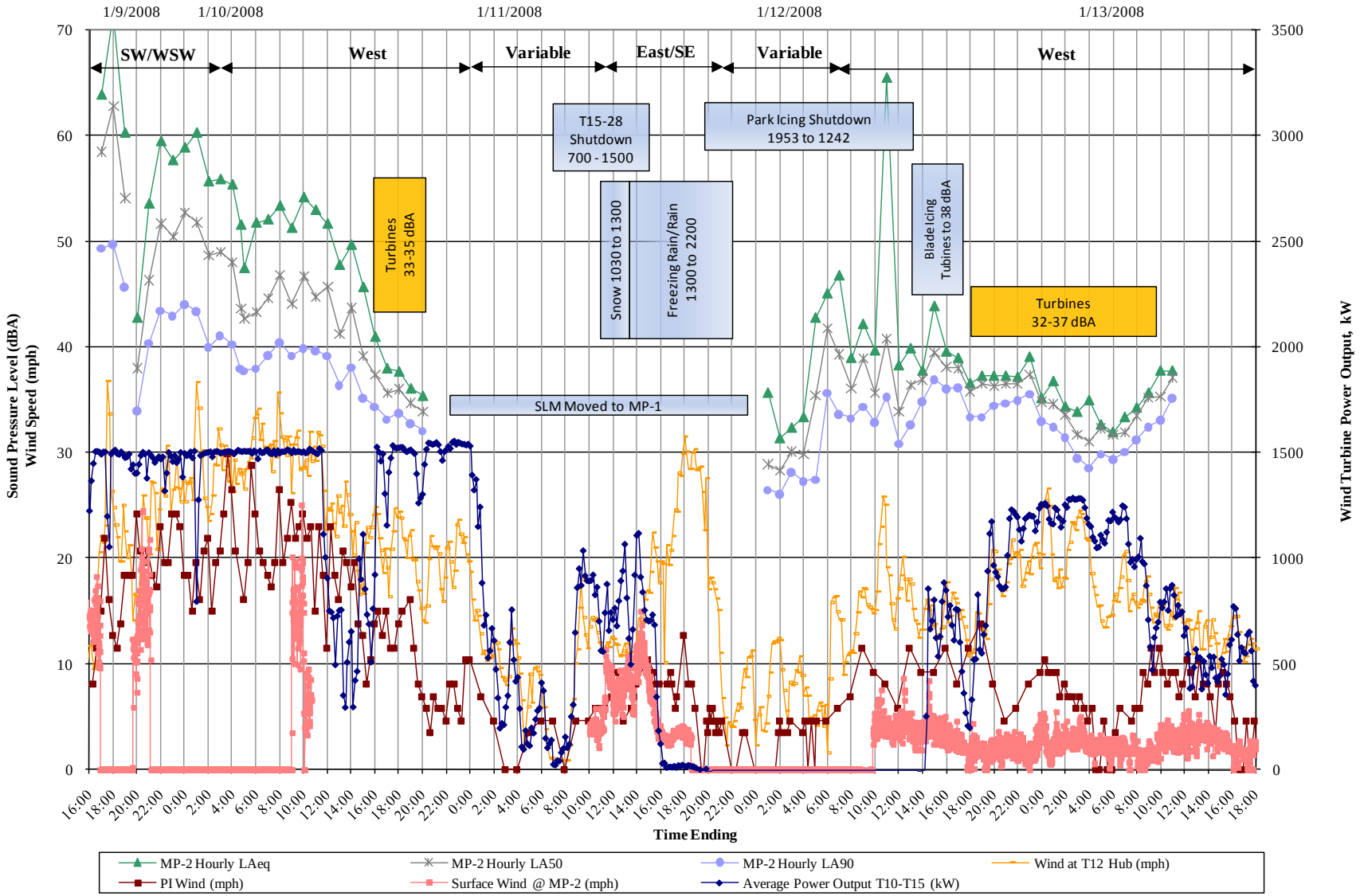
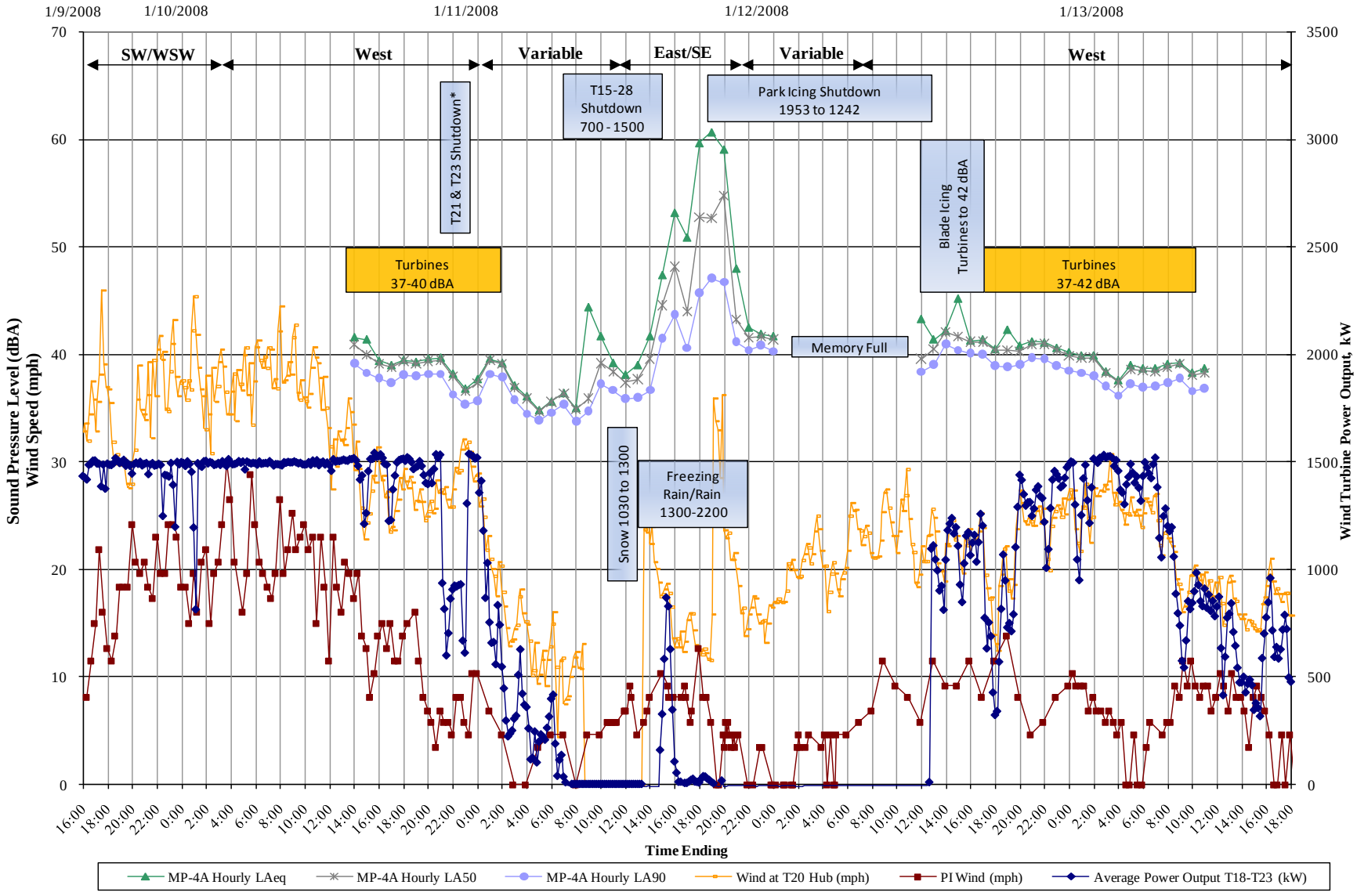


Figure 7-4. Sound Levels at MP-2 in Relation to Wind Turbine Power Output and Wind Speed



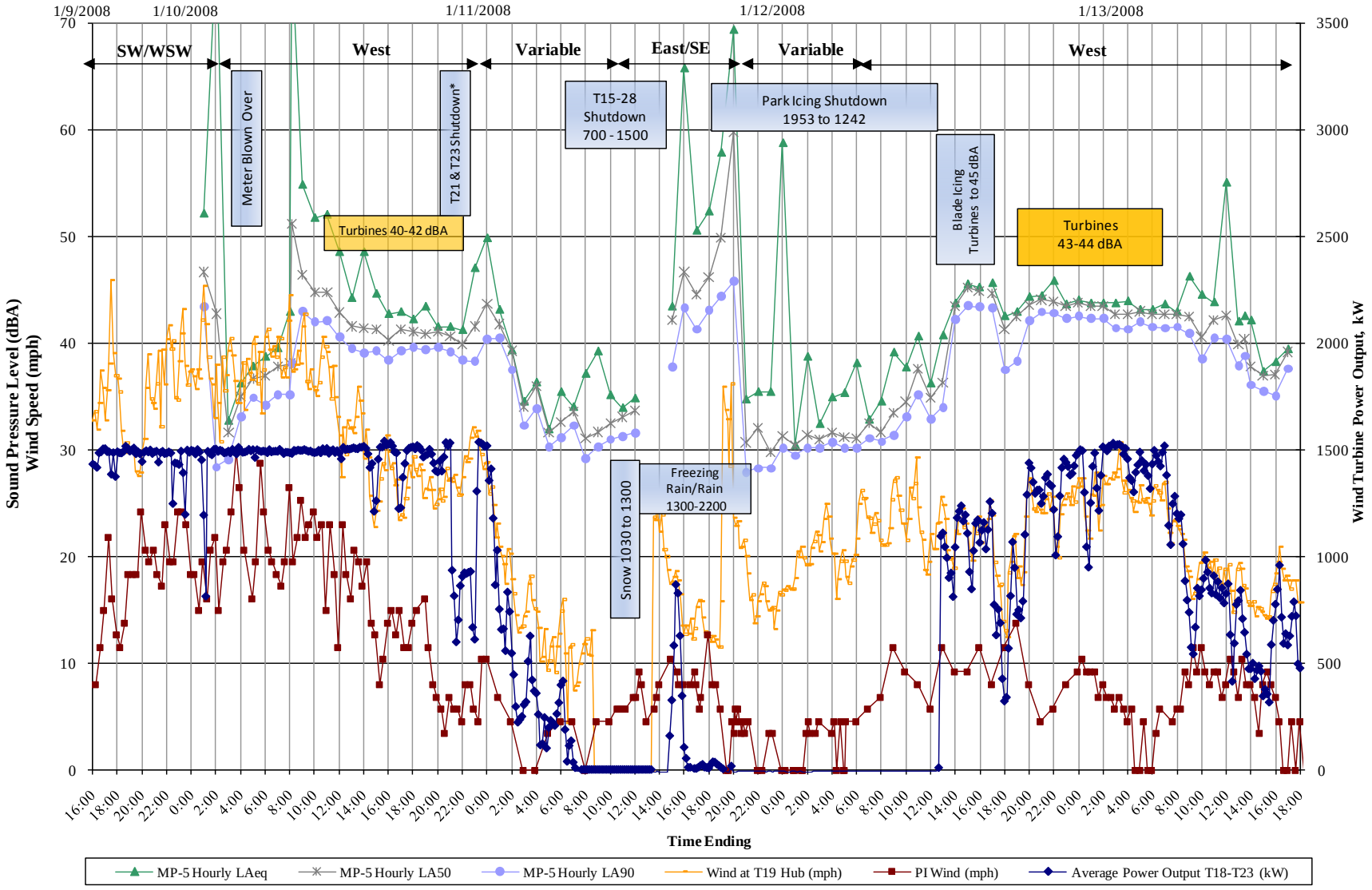
MET Station Dislodged due to High Winds and Winter Ground Conditions - Intermittent Readings Only

Figure 7-5. Sound Levels at MP-4A in Relation to Wind Turbine Power Output and Wind Speed



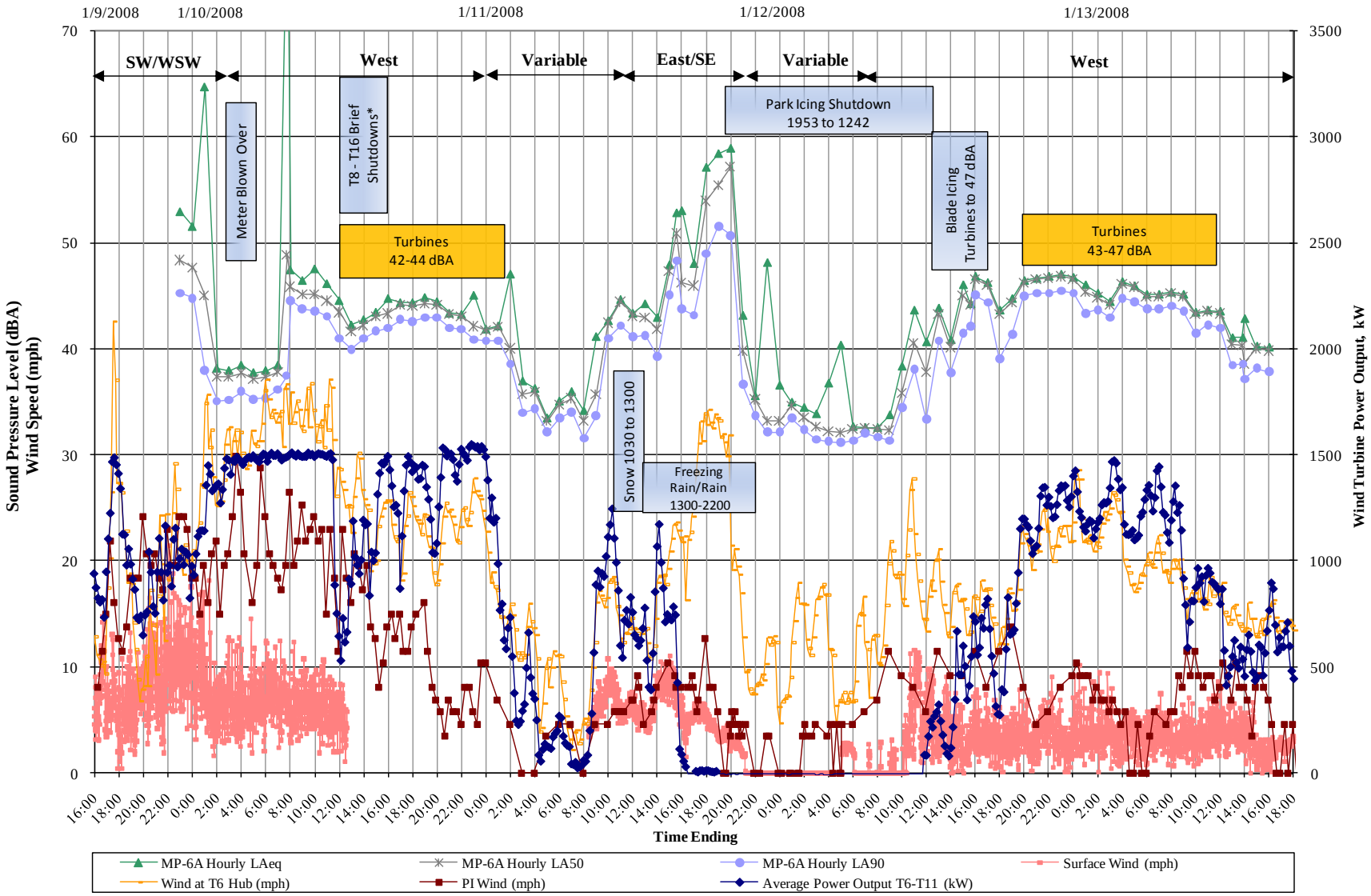
*For Individual Testing of Wind Turbine 22 with GE.

Figure 7-6. Sound Levels at MP-5 in Relation to Wind Turbine Power Output and Wind Speed



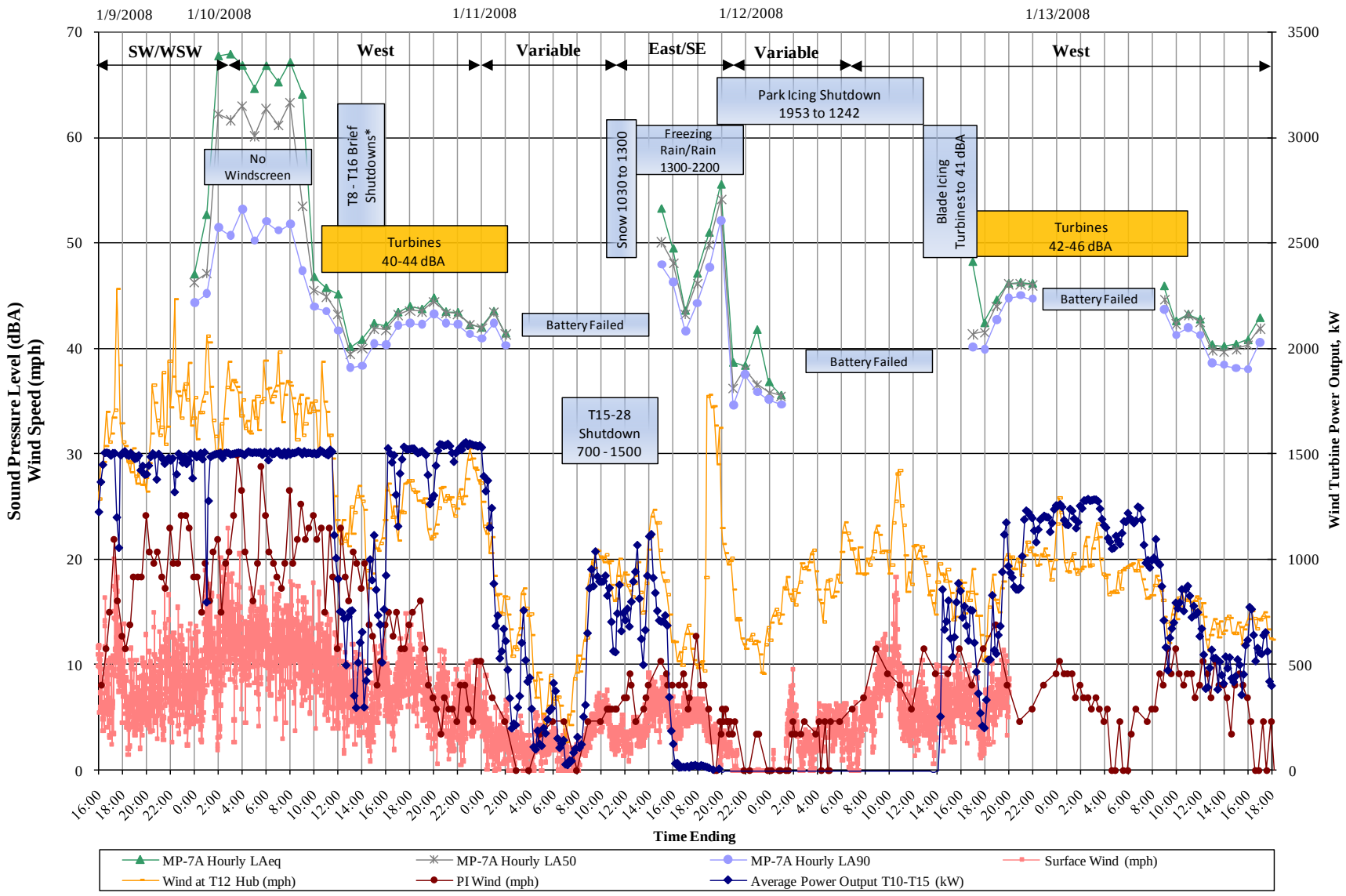
*For Individual Testing of Wind Turbine 22 with GE.

Figure 7-7. Sound Levels at MP-6A in Relation to Wind Turbine Power Output and Wind Speed



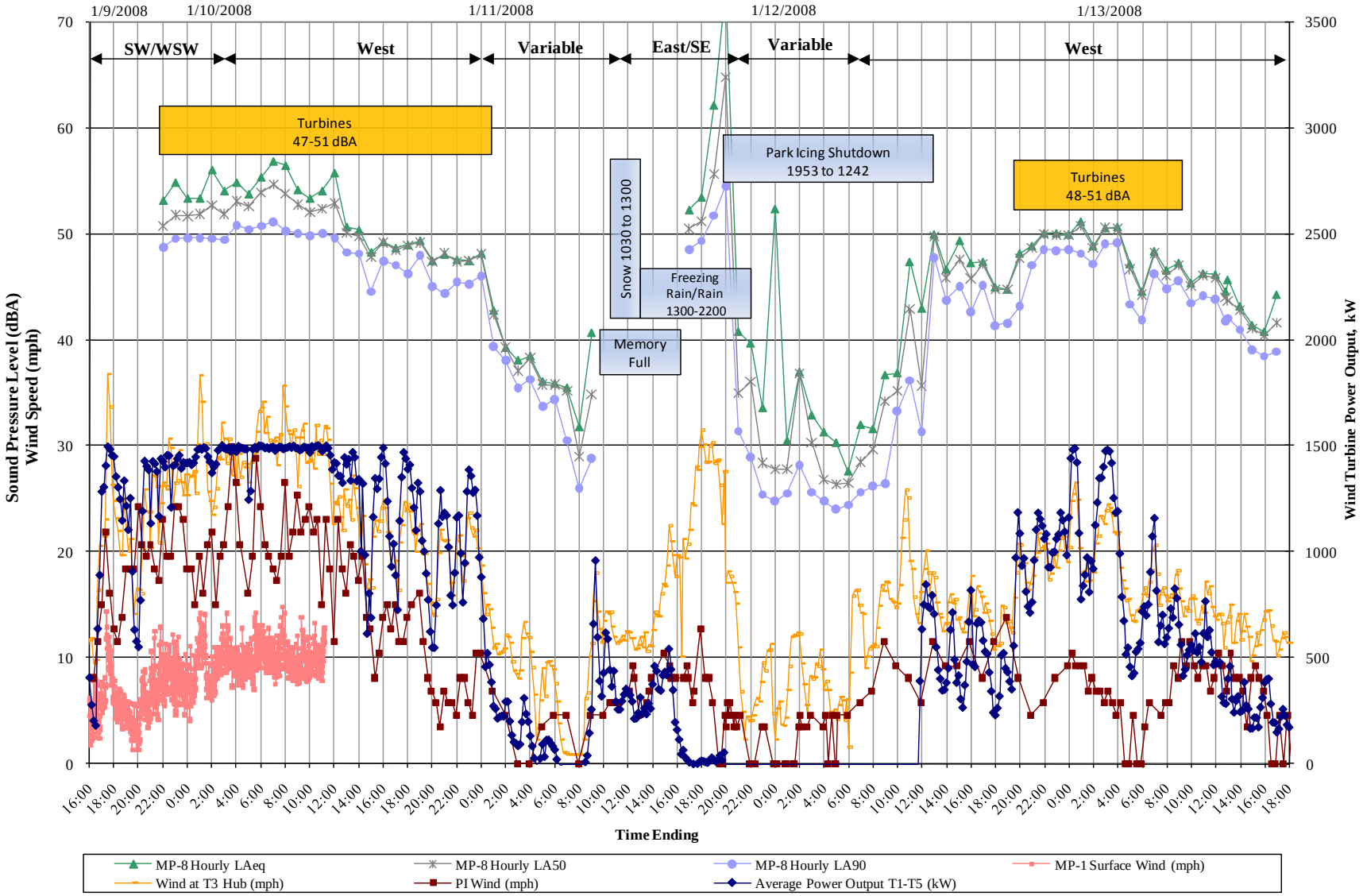
*For Individual Testing of Wind Turbines 10-14 with GE.

Figure 7-8. Sound Levels at MP-7A in Relation to Wind Turbine Power Output and Wind Speed



*For Individual Testing of Wind Turbines 10-14 with GE.

Figure 7-9. Sound Levels at MP-8 in Relation to Wind Turbine Power Output and Wind Speed



MET Station Failure shortly after 1100 on 1/10

Figure 7-10. Sound Levels at MP-1, MP-1A and MP-8 in Relation to Wind Turbine Power Output and Wind Speed

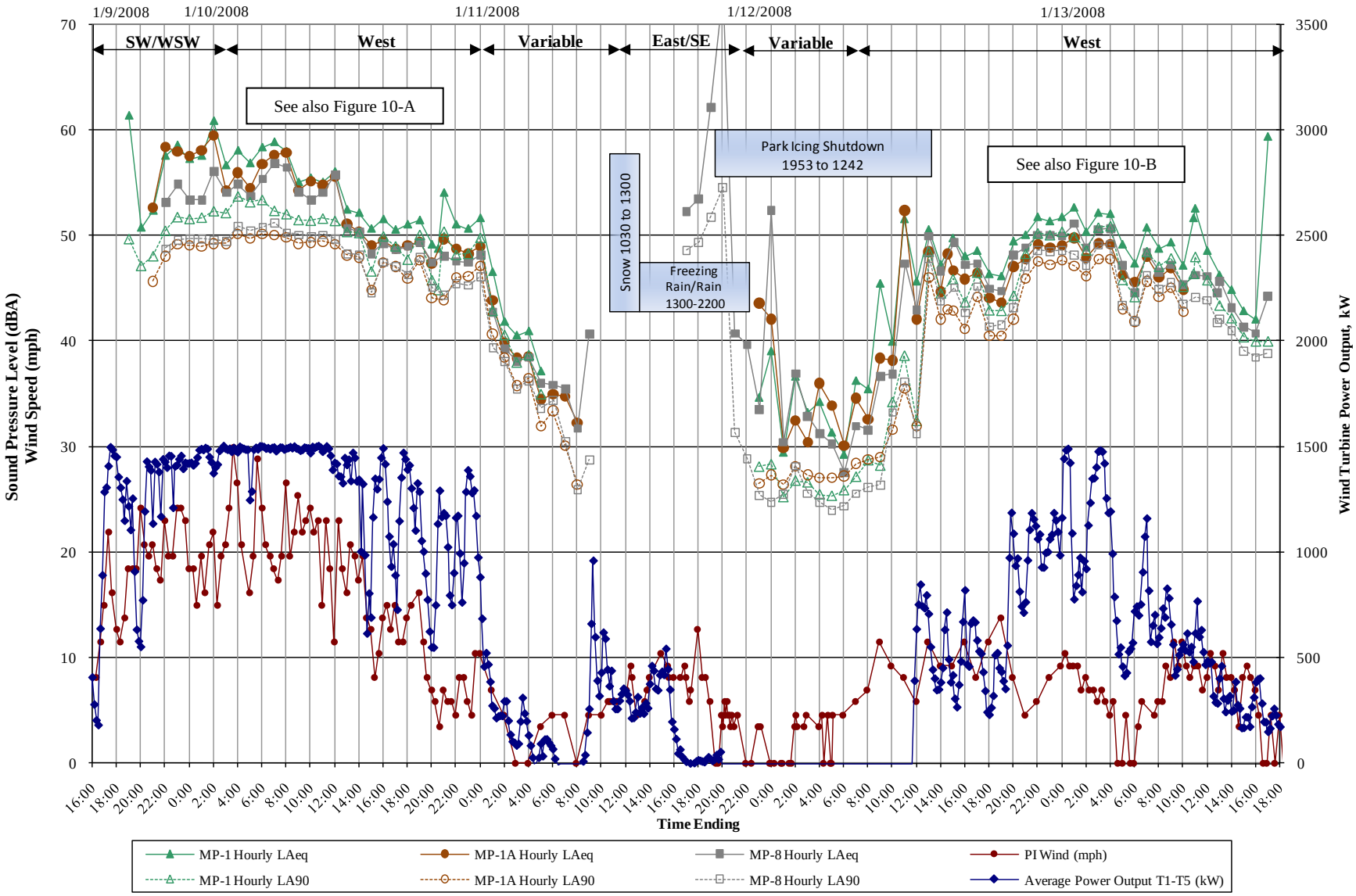


Figure 7-10A. Sound Levels at MP-1, MP-1A and MP-8 in Relation to Wind Turbine Power Output and Wind Speed

1/9/08 1600 to 1/11/08 1200

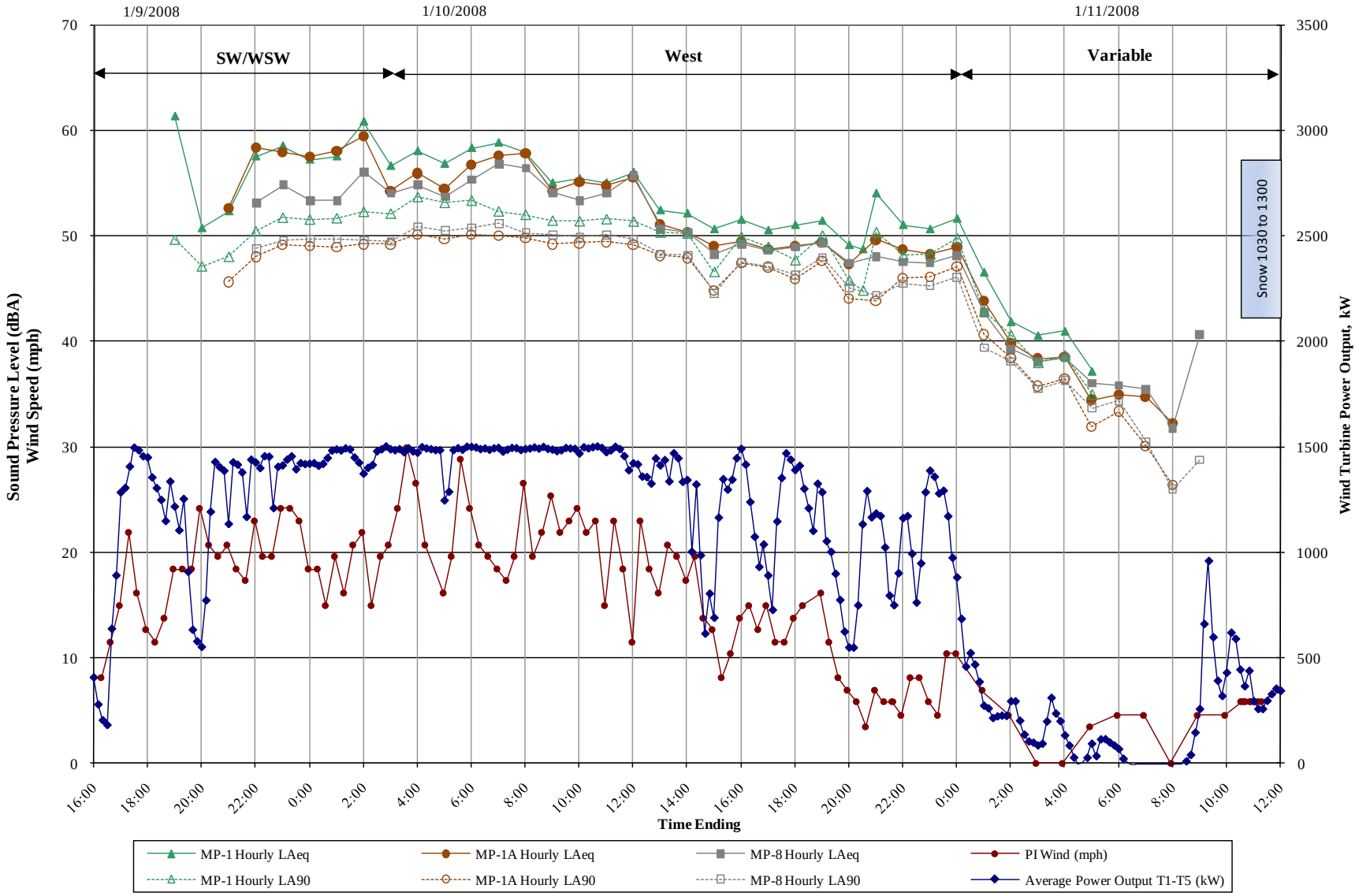


Figure 7-10B. Sound Levels at MP-1, MP-1A and MP-8 in Relation to Wind Turbine Power Output and Wind Speed
1/12/08 000 to 1/13/08 1800

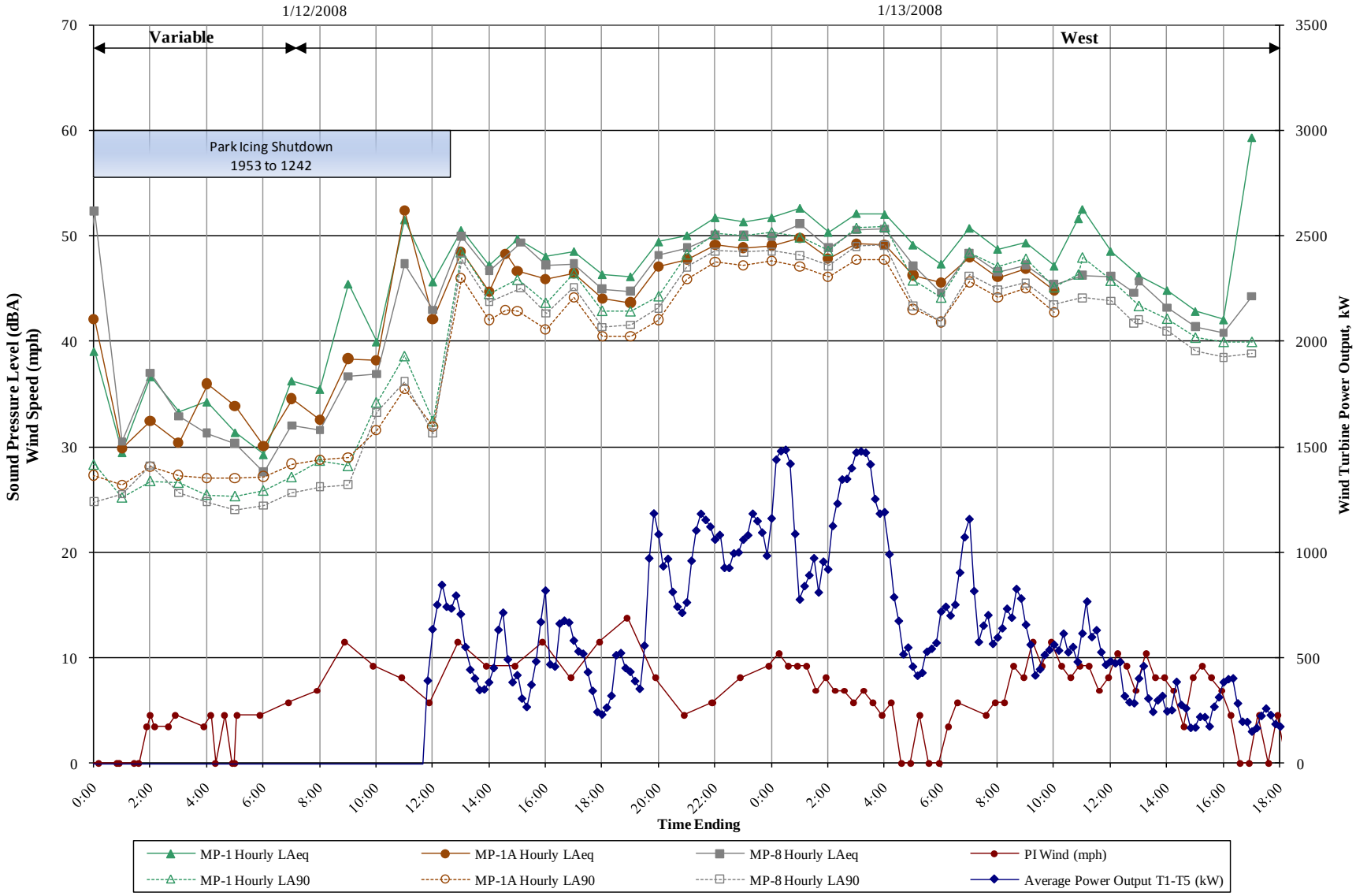


Figure 7-11. Sound Levels at MP-6A and MP-7A in Relation to Wind Turbine Power Output and Wind Speed

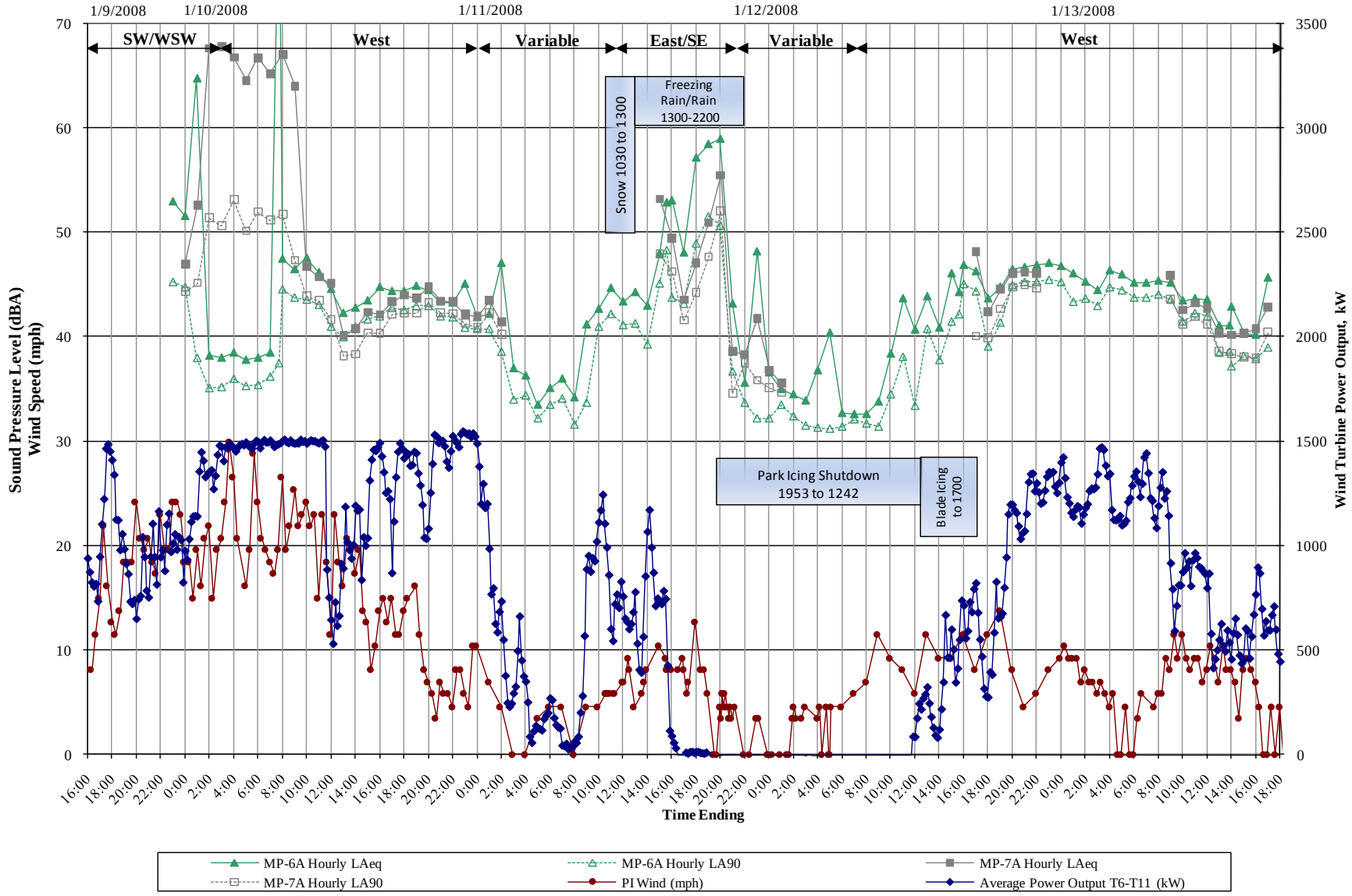


Figure 7-12. Sound Levels at MP-5 and MP-7A in Relation to Wind Turbine Power Output and Wind Speed

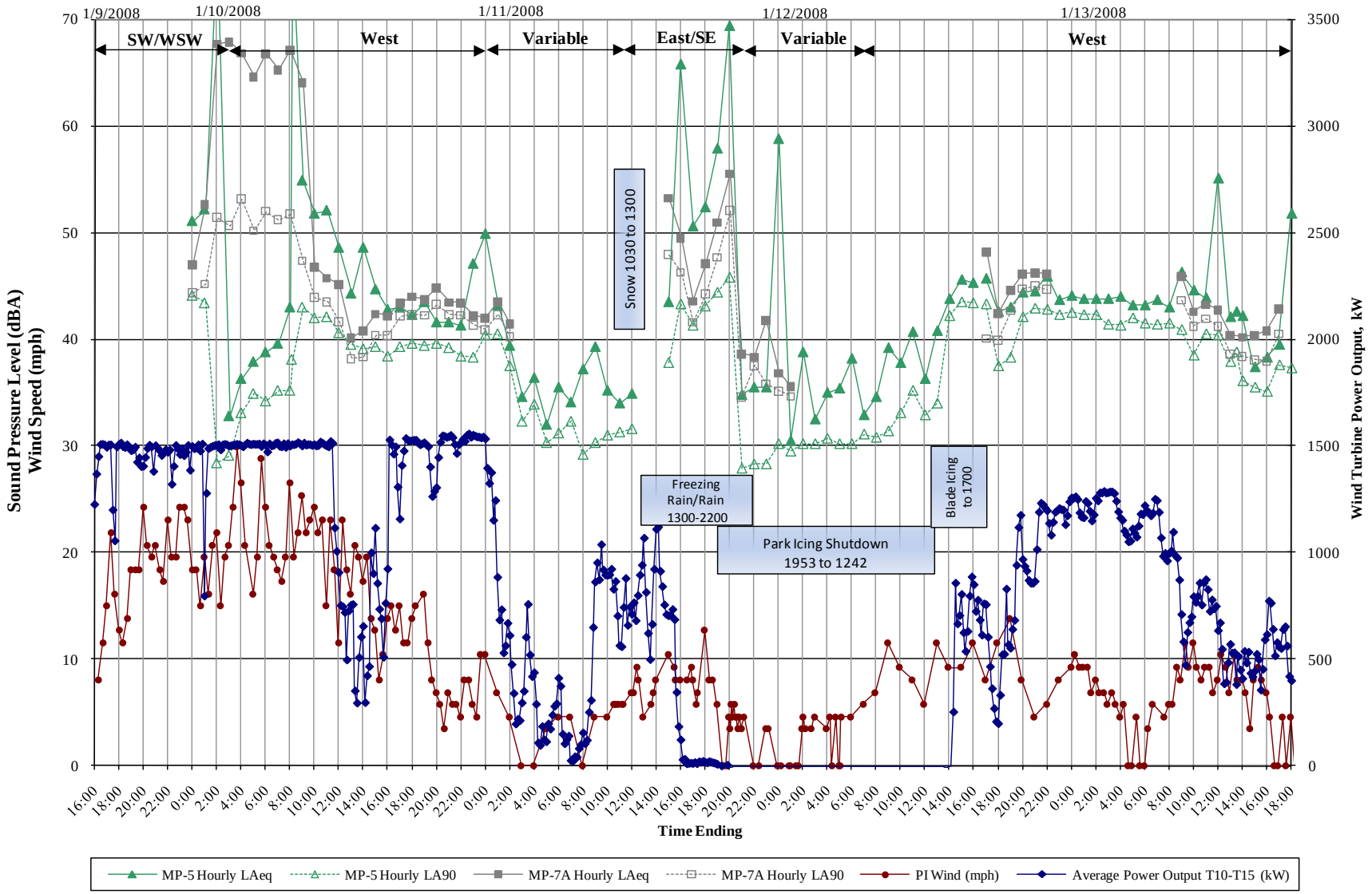


Figure 7-13. Sound Levels at MP-2 and MP-4A in Relation to Wind Turbine Power Output and Wind Speed

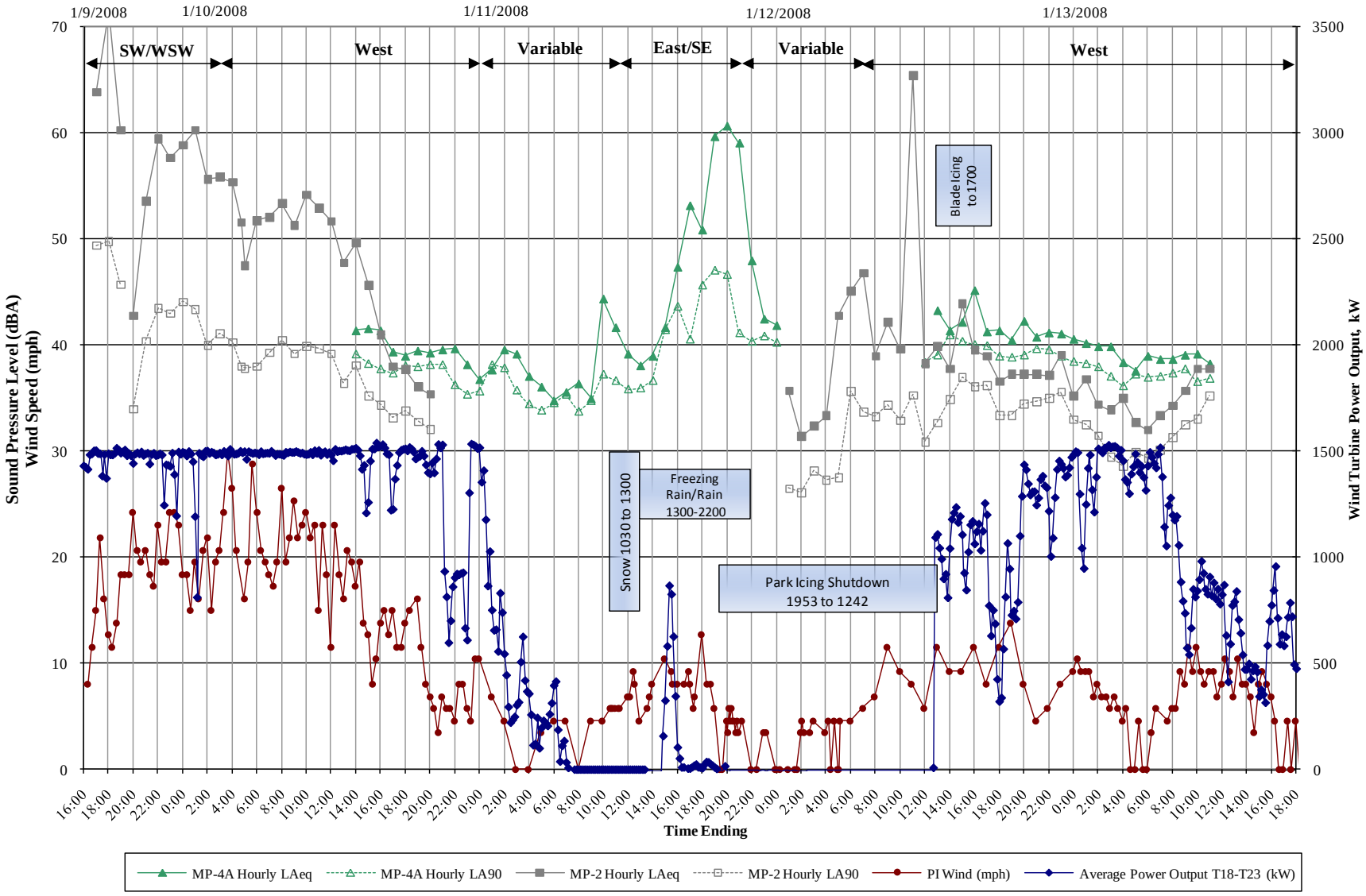
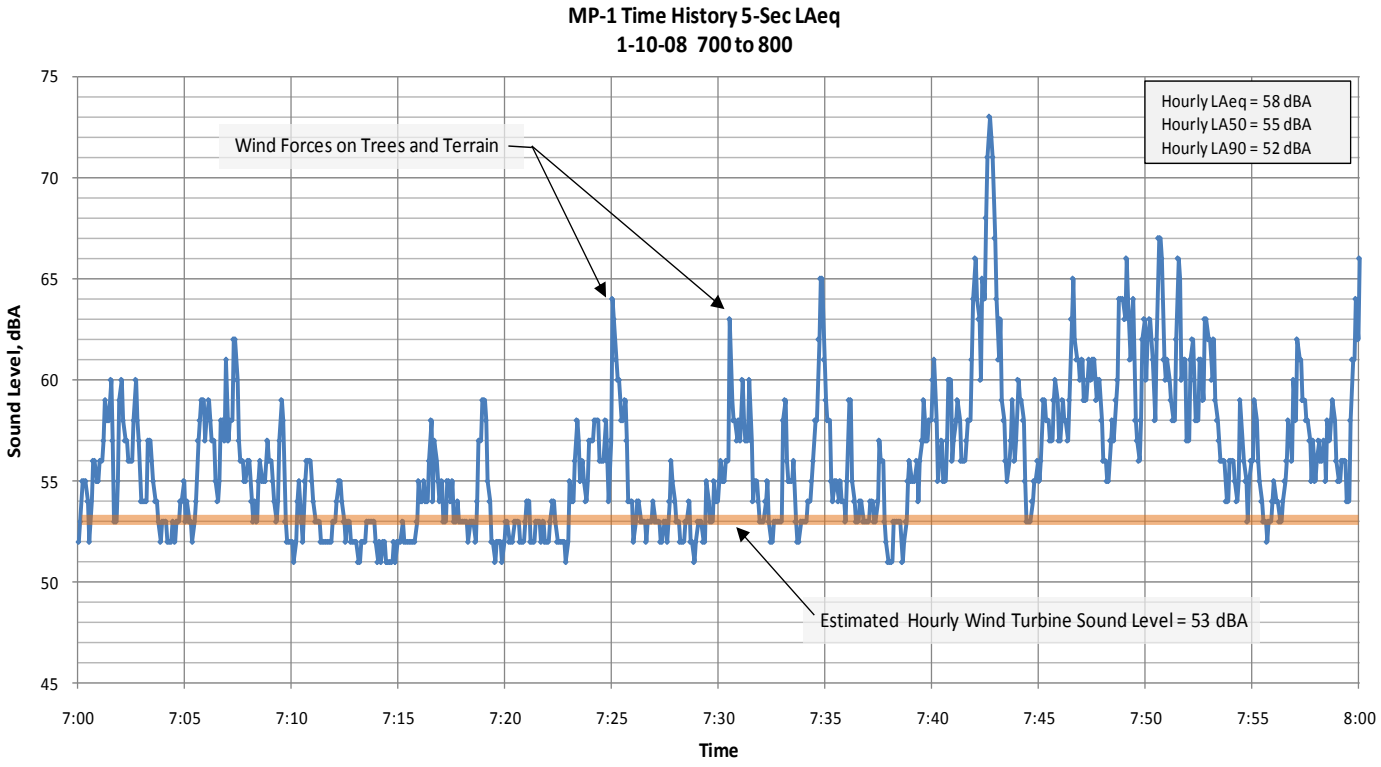
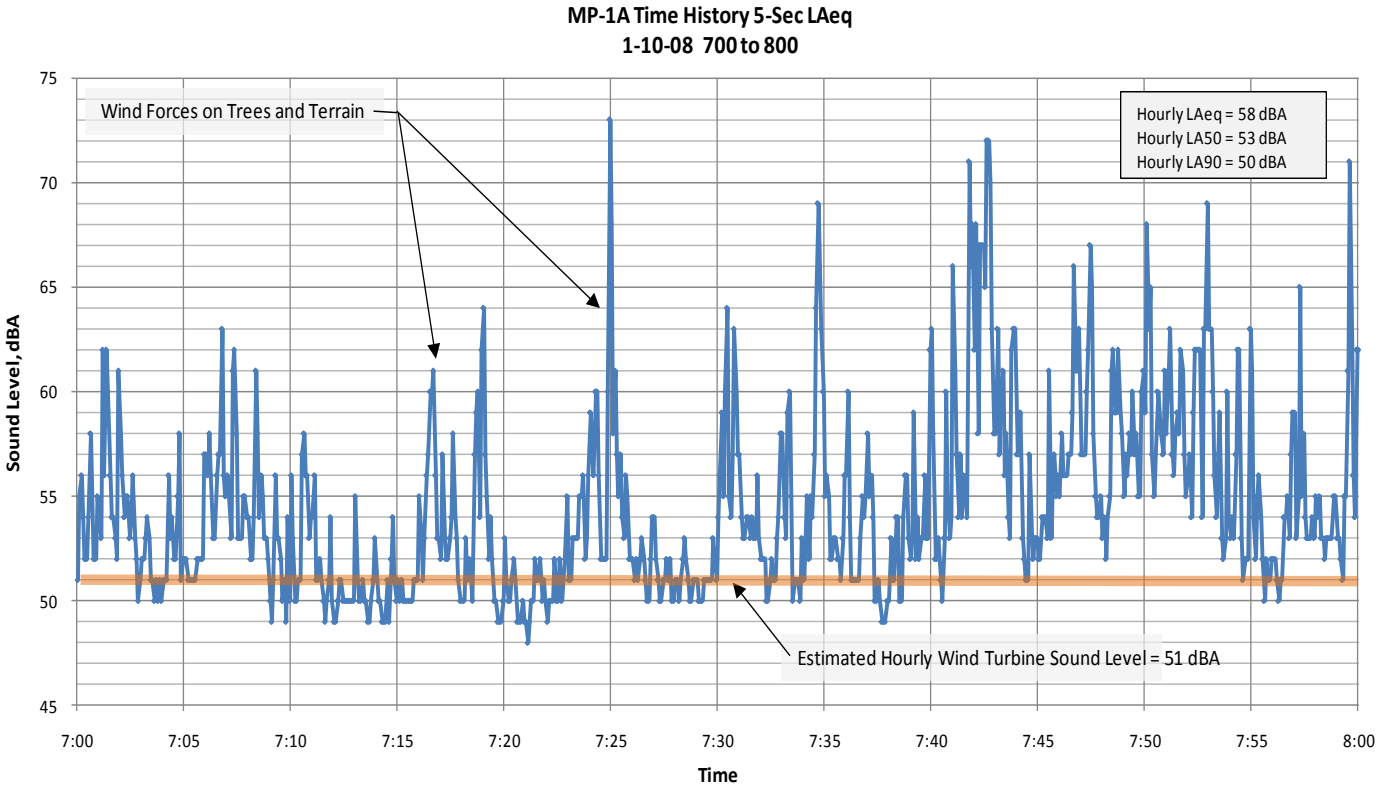


Figure 7-14. Sample Time History Plots for Positions MP-1 and MP-1A





For comparison to 2003 model estimates, the ambient sound level from non-Wind Farm sounds, based on May 2007 readings, was subtracted from the estimated wind turbine sound levels. An exception was made at MP-2, where May 2007 ambient sound levels were similar to 3rd quarterly operating sound levels. To remain conservative, in this case, no ambient adjustment was made. The largest ambient correction made to Wind Farm sound levels resulted in only a 1 dBA reduction to the wind turbine sound levels. Further, except for position MP-4A, the ambient adjustment did not result in a change to the upper range of sound level readings from the Wind Farm. During the January 2008 icing shutdown, ambient sound levels with winds capable of moderate to full turbine operation were at or above ambient measurements from May 2007. Despite the correction for ambient, and because it is done so conservatively, it is likely that the sound contribution due to Wind Farm operation has been over-estimated in some cases.

The following provides a summary of 3rd quarterly operating conditions and measurement results at each monitoring position and comparisons of operations test data with 1st and 2nd quarterly sound test results, ambient sound level readings, and 2003 sound level model estimates. Some of the ambient measurements from December 2006 were affected by wind forces acting on the windscreen and microphone. With the exception of positions MP-2 and MP-4, the wind influence was diminished due to shielding by terrain and vegetation. This was confirmed during 2nd and 3rd quarterly operations testing through the use of portable MET stations.

Results from positions MP-1 and MP-8 were compared with readings from new position MP-1A established based on peer review recommendations. As shown by Figure 7-10, 10A and 10B, wind turbine sound levels at MP-1A tracked closely with readings at both MP-1 and MP-8. As expected, Wind Farm sound levels were slightly higher at MP-1 due to its closer location to the wind turbines. Wind Farm sound levels at MP-1A were nearly identical to MP-8. During periods of high surface wind from the south and southwest (January 9-10), hourly equivalent sound levels (L_{Aeq}) at MP-1 and MP-1A measured with standard windscreens were also very close and approximately 5 dBA higher than at MP-8. Yet, the hourly L_{A90} percentile readings at MP-1A and MP-8 were nearly identical and slightly below L_{A90} readings at MP-1. Further, the differences between hourly L_{A50} and L_{A90} readings were generally larger than during other periods when surface winds diminished. This suggests that hourly L_{A90} readings at MP-1, MP-1A and MP-8 during this blustery period were more indicative of sound levels from wind turbines than hourly L_{A50} readings. Examination of time history plots for this period (see Appendix VI) indicates that wind turbine sound levels were most likely between the hourly L_{A50} and L_{A90} percentiles. Once the winds shifted to be directly from the west, hourly L_{Aeq} readings were similar at all three positions implying that the lower sound levels at MP-8 were due to partial shielding of southwest winds by terrain (north-south ridge) and that less shielding occurs at MP-8 with winds directly from the west. Conversely, the L_{A90} readings after winds shifted were consistent with earlier hourly L_{A90} readings with southwest winds, suggesting that the primary contributor to the hourly L_{A90} readings was wind turbine sound.

At Position MP-1 hourly sound levels from representative 3rd quarterly Wind Farm operations ranged from 47 to 54 dBA with west wind and 60 to 95% output from nearby turbines. Second quarterly nighttime Wind Farm operations ranged from 53 to 55 dBA with NW wind and 75 to 90% output from nearby turbines. During the first quarterly sound test Wind Farm sound levels ranged from 47 to 51 dBA with SW wind and near full operations, ranged from 48 to 52 with SE wind and variable operation (50 to 75% power output) and 42 to 47 dBA with NNW wind and nearby power output of 50 to 60%. Sound level model estimates at this location were 51 dBA at 95% operation. Ambient hourly L_{Aeq} readings at MP-1 during the 3rd quarterly icing shutdown ranged from 29 to 52 dBA and ranged from 33 to 56 dBA in December 2006 with higher readings noted during daytime periods and when wind speeds increased.

At nearby Position MP-1A hourly sound levels from representative 3rd quarterly Wind Farm operations ranged from 46 to 51 dBA with west wind and 60 to 95% output from nearby turbines. Ambient hourly L_{Aeq} readings during the icing shutdown ranged from 30 to 52 dBA.

The standard microphone windscreen at MP-1 was changed to a 7" foam windscreen shortly after 6:00 am on January 10. The purpose of using a larger windscreen is to reduce wind noise across the microphone. Until surface winds diminished about noontime on January 10, sound level readings at MP-1, using the large windscreen, were consistent with earlier 3rd quarterly measurements using a standard windscreen. MET station data also shows winds at MP-1 during this period were mostly 12 mph or less while at the same time wind speeds at MP-1A routinely exceeded 12 mph (see Appendix III for wind data). Observations, time history results, and L_n percentile readings indicate that wind turbines were not the predominant noise source for these hours. By reducing the potential for wind noise on the microphone, it can be seen that during high surface winds hourly L_{Aeq} readings resulted from wind forces acting on trees and other terrain features. Furthermore, L_{Aeq} readings during this period were consistently at or above the highest ambient readings measured in December 2006 during high surface winds and no turbine operations.

At Position MP-2 hourly sound levels from representative 3rd quarterly Wind Farm operations ranged from 32 to 37 dBA with west wind and 60 to 100% output from nearby turbines. With notable icing on the blades of some nearby turbines, wind farm sound levels were up to 38 dBA or 1 dBA above other operating periods. Second quarterly nighttime Wind Farm operations ranged from 30 to 31 dBA with NW wind and 100% output from nearby wind turbines. During the first quarterly sound test Wind Farm sound levels were approximately 30 dBA with SW wind and near full operations, could not be isolated from non-turbine sound sources with SE wind and variable operation (50 to 75% power output) and were 36 dBA with NNW wind and power output of 75 to 100%. Sound level model estimates at this location were 35 dBA at 95% operation. During the 3rd quarterly icing shutdown, ambient hourly L_{Aeq} readings ranged from 31 to 49 dBA with local wind speeds at or below 12 mph. Ambient sound levels measured at MP-2 in December 2006 ranged from 28 to 60 dBA with higher readings noted during daytime periods and when local wind speeds increased. Due to minimal wind obstruction, there is potential for wind noise across the microphone when using a standard windscreen for measurements at MP-2 with local wind speeds above 12 mph.

Second and third quarterly sound testing was not conducted at Position MP-3. Hourly sound levels from representative first quarterly Wind Farm operations were approximately 30 dBA with SW wind and near full operations, 33 dBA with SE wind and variable operation (50 to 75% power output) and 37 dBA with NNW wind and power output of 75 to 100%. Sound level model estimates at this location were 36 dBA at 95% operation. Ambient sound levels measured at MP-3 in December 2006 ranged from 35 to 51 dBA with higher readings noted during daytime periods and when wind speeds increased.

At Position MP-4A hourly sound levels from representative 3rd quarterly Wind Farm operations ranged from 36 to 41 dBA with west wind and 60 to 100% output from nearby turbines. A similar range of Wind Farm sound levels occurred during operations with notable blade icing. Second quarterly nighttime Wind Farm operations ranged from 38 to 40 dBA with NW wind and 95 to 100% output from nearby wind turbines. No adjustment was made for the contribution of ambient sound levels. During the first quarterly sound test Wind Farm sound levels were difficult to isolate from other sound sources due to frogs and wind. A possible exception was with NNW wind and power output of 75 to 100% when wind farm sound levels were approximately 37 dBA compared with sound level model estimates of 37 dBA at this location during 95% operation. During the 3rd quarterly icing shutdown, hourly ambient L_{Aeq} readings ranged from 41 to 43 dBA at MP-4A with local wind speeds at or below 12 mph. In December 2006, ambient sound levels at MP-4A are represented by measurements at MP-4 where hourly L_{Aeq}s ranged from 29 to 59 dBA with higher readings noted during daytime periods and when local wind speeds increased. Due to minimal wind obstruction, there is also potential for wind noise

across the microphone when using a standard windscreen for measurements at MP-4 with local wind speeds above 12 mph.

At Position MP-5 hourly sound levels from representative 3rd quarterly Wind Farm operations ranged from 39 to 44 dBA with west wind and 60 to 100% output from nearby turbines. A similar range of Wind Farm sound levels occurred during operations with notable blade icing. Second quarterly nighttime Wind Farm operations ranged from 43 to 44 dBA with NW wind and 90 to 100% output from nearby wind turbines. During the first quarterly sound test Wind Farm sound levels were difficult to isolate from other sound sources due to sounds from frogs and wind. With SW wind and near full operations, RSE observed approximately equal contributions from wind turbines and non-Wind Farm sources. With combined sound levels of 42 to 43 dBA, this would result in a sound level from the Wind Farm of 39 to 40 dBA. With SE wind and variable operation (50 to 75% power output) Wind Farm sound levels were the predominant sound source measuring 39 dBA. Sound level model estimates at this location were 39 dBA during 95% operation. During the 3rd quarterly icing shutdown, hourly ambient L_{Aeq} readings ranged from 30 to 41 dBA at MP-5 with local wind speeds at or below 12 mph. Ambient sound levels measured at MP-5 in December 2006 ranged from 30 to 53 dBA with higher readings noted during daytime periods and when local wind speeds increased.

Second and third quarterly sound testing was not conducted at Position MP-6. Hourly sound levels from representative first quarterly Wind Farm operations ranged from 44 to 45 dBA with SW wind and near full operations, ranged from 42 to 45 with SE wind and variable operation (50 to 75% power output) and 38 to 41 dBA with NNW wind and nearby power output of 50 to 75%. Sound level model estimates at this location were 43 dBA at 95% operation. Ambient sound levels measured at MP-6 in December 2006 ranged from 27 to 55 dBA, with higher readings noted during daytime periods and when wind speeds increased.

At Position MP-6A hourly sound levels from representative 3rd quarterly Wind Farm operations ranged from 41 to 47 dBA with west wind and 65 to 100% output from nearby turbines. A similar range of Wind Farm sound levels occurred during operations with notable blade icing. Second quarterly Wind Farm operations ranged from 43 to 45 dBA with NW wind and 90 to 100% output from nearby turbines. During the first quarterly sound test Wind Farm sound levels ranged from 42 to 44 dBA with SW wind and near full operations and with SE wind and variable operation (50 to 75% power output), and ranged 38 to 40 dBA with NNW wind and nearby power output of 50 to 75%. level model estimates at this location were 42 dBA at 95% operation. During the 3rd quarterly icing shutdown, hourly ambient L_{Aeq} readings ranged from 33 to 44 dBA at MP-6A with local wind speeds at or below 12 mph. In December 2006, ambient sound levels at MP-6A were represented by MP-6 where hourly L_{Aeqs} ranged from 27 to 55 dBA, with higher readings noted during daytime periods and when wind speeds increased.

At Position MP-7A hourly sound levels from representative 3rd quarterly Wind Farm operations ranged from 39 to 46 dBA with west wind and 60 to 100% output from nearby turbines. With notable icing on the blades of some nearby turbines, wind farm sound levels were 41 dBA. Second quarterly Wind Farm operations ranged from 43 to 45 dBA with NW wind and 90 to 100% output from nearby wind turbines. During the first quarterly sound test Wind Farm sound levels at MP-7 ranged from 43 to 44 dBA with SW wind and near full operations, ranged from 42 to 43 with SE wind and variable operation (50 to 75% power output) and 39 to 40 dBA with NNW wind and nearby power output of 75 to 100%. Sound level model estimates at MP-7A were 41 dBA and at MP-7 were 40 dBA at 95% operation. During the 3rd quarterly icing shutdown, hourly ambient L_{Aeq} readings ranged from 36 to 42 dBA at MP-7A with local wind speeds at or below 12 mph. A battery failure limited the duration of these ambient measurements. In December 2006, ambient sound levels measured at MP-7/7A are represented by nearby measurements at MP-5 ranging from 30 to 53 dBA and MP-6 ranging from 27 to 55 dBA, with higher readings noted during daytime periods and when wind speeds increased.

At Position MP-8 hourly sound levels from representative 3rd quarterly Wind Farm operations ranged from 46 to 51 dBA with west wind and 60 to 95% output from nearby turbines. Second quarterly Wind Farm operations ranged from 48 to 50 dBA with NW wind and 75 to 90% output from nearby wind turbines. During the first quarterly sound test Wind Farm sound levels ranged from 47 to 50 dBA with SW wind and near full operations, ranged from 46 to 50 with SE wind and variable operation (50 to 75% power output) and 41 to 47 dBA with NNW wind and nearby power output of 50 to 60%. Sound level model estimates at this location were 47.5 dBA at 95% operation. During the 3rd quarterly icing shutdown, hourly ambient L_{Aeq} readings ranged from 28 to 47 dBA at MP-8 with local wind speeds at or below 12 mph. In December 2006, ambient sound levels at MP-8 are represented by measurements at nearby MP-1, where hourly L_{Aeqs} ranged from 33 to 56 dBA with higher readings noted during daytime periods and when wind speeds increased.

An overall results summary for the first quarterly sound test is presented in Table 7-1 and for the second quarterly sound test is in Table 7-2. Overall results from the third quarterly sound test are presented in Table 7-3. These tables compare sound level measurements of Wind Farm operation with sound level model predictions from 2003 prior to construction and ambient monitoring results from 2006. The estimated non-Wind Farm sound level from May 2007 measurements, used to subtract ambient sound level, is also shown for each position. Figure 7-15 (attached) provides a site map comparing sound levels measured during each quarterly test (May 2007, September 2007, and January 2008) during Wind Farm operations with sound level model estimates from 2003.

Table 7-1

First Quarterly Hourly Sound Levels from Wind Farm Operation in Relation to Sound Model Estimates and Ambient Conditions (Sound Levels in dBA)

Monitoring Position	SW Wind Near Full	SE Wind Variable Ops.	NNW Wind Variable Ops.	Non-Wind Farm Sound Level	2006 Hourly Ambient Readings	Sound Model Estimates	Actual vs Model
MP-1	47-51	48-52 50 to 75%	42-47 50 to 60%	40	33-56	51	-8 to +1
MP-2	30	NI 50 to 75%	36 75 to 100%	30	28-60	35	-5 to +1
MP-3	30	33 50 to 75%	37 75 to 100%	31	35-51	36	-5 to +1
MP-4A	NI	NI 50 to 75%	37 75 to 100%	34	29-59[A]	37	0
MP-5	39-40	39 50 to 75%	NI 75 to 100%	34	30-53	39	0 to +1
MP-6	44-45	42-45 50 to 75%	39-42 50 to 75%	33	27-55	43	-5 to +2
MP-6A	41-44	41-44 50 to 75%	38-40 50 to 75%	33	27-55[B]	42	-4 to +2
MP-7	43-44	42-43 50 to 75%	39-40 75 to 100%	32	30-53 / 27-55[C]	40	-1 to +4
MP-8	47-50	46-50 50 to 75%	41-47 50 to 60%	39	33-56[D]	47.5	-6.5 to +2.5

[A]From ambient measurements at MP-4.
[B]From ambient measurements at MP-6.
[C]From ambient measurements at M-5 & MP-6.
[D]From ambient measurements at MP-1.
Wind Farm Hourly Sound Levels (per MEDEP 375.10) = Hourly L_{A50} – Non-Wind Farm Sound Level from May 2007 (per standard decibel subtraction)

Table 7-2

Second Quarterly Hourly Sound Levels from Wind Farm Operation in Relation to Sound Model Estimates and Ambient Conditions (Sound Levels in dBA)

Monitoring Position	NW Wind Near Full	Non-Wind Farm Sound Level	2006 Hourly Ambient Readings	Sound Model Estimates	Actual vs Model
MP-1	53-55	40	33-56	51	+2 to +4
MP-2	30-31	Not Used	28-60	35	-5 to -4
MP-4A	38-40	Not Used	29-59[A]	37	+1 to +3
MP-5	43-44	34	30-53	39	+4 to +5
MP-6A	43-45	33	27-55[B]	42	+1 to +3
MP-7A	43-45	32	30-53 / 27-55[C]	41	+2 to +4
MP-8	48-50	39	33-56[D]	47.5	+0.5 to +2.5

[A]From ambient measurements at MP-4.
[B]From ambient measurements at MP-6.
[C]From ambient measurements at M-5 & MP-6.
[D]From ambient measurements at MP-1.
Wind Farm Hourly Sound Levels (per MEDEP 375.10) = Hourly L_{A50} – Non-Wind Farm Sound Level from May 2007

Table 7-3

Third Quarterly Hourly Sound Levels from Wind Farm Operation in Relation to Sound Model Estimates and Ambient Conditions (Sound Levels in dBA)

Monitoring Position	Measured Sound Level[A] West Wind	Non-Wind Farm Sound Level	Resulting Wind Farm Sound Level Range	2006 Hourly Ambient	Sound Model Estimates	Actual vs Model
MP-1	48-54 60 to 95%	40	47-54	33-56	51	-4 to +3
MP-1A	47- 51 60 to 95%	40	46-51	33-56[C]	48	-2 to +3
MP-2	32-37/38[B] 60 to 100%	Not Used	32-37	28-60[D]	35	-3 to +2
MP-4A	37-42/42[B] 60 to 100%	34	36-41	29-59[D,E]	37	0 to +4
MP-5	40-44/45[B] 60 to 100%	34	39-44	30-53	39	+1 to +5
MP-6A	42-47/47[B] 65 to 100%	33	41-47	27-55[F]	42	-1 to +5
MP-7A	40-46/41[B] 60 to 100%	32	39-46	30-53 / 27-55[G]	41	-2 to +5
MP-8	47-51 60 to 95%	39	46-51	33-56[C]	47.5	-1.5 to +3.5

[A]Estimated Wind Farm sound level from L_{A50} Readings or Time History Plots (see Figure 7-14 and Apppendix VI)
[B]Wind Farm sound level during blade icing (Other columns without blade icing)
[C]From ambient measurements at MP-1.
[D]Potential for wind noise across microphone with local wind speed over 12 mph.
[E]From ambient measurements at MP-4.
[F]From ambient measurements at MP-6.
[G]From ambient measurements at M-5 & MP-6.
Resulting Wind Farm Sound Level (per MEDEP 375.10) = Hourly L_{A50} or Estimate from Time History minus Non-Wind Farm Sound Level from May 2007 (per standard decibel subtraction)

7.3 Short Duration Repetitive and Tonal Sounds

MEDEP noise regulation requires that 5 dBA be added to short duration repetitive (SDR) and tonal sounds when they occur at a protected location. The presence of SDR and tonal sounds is determined from sound level measurements and field observations. For identification of tonal sounds, analysis of one-third octave band measurements is also required.

SDR sounds are a sequence of repetitive sounds each clearly discernible as an event that causes an increase in sound level of at least 6 dBA above the sound level observed before and after the event. SDR sounds are typically less than ten seconds in duration and occur more than once within an hour (ref. MEDEP 375.10.G.19). Measurements and field observations during 1st, 2nd and 3rd quarterly testing indicate that sound levels from wind turbines can fluctuate over brief periods as noted by the passage of wind turbine blades. Observed measurements from quarterly testing further indicate that these sound level fluctuations typically range from 2 to 4 dBA and thus do not result in sound level increases of 6 dBA or more. Therefore, the Wind Farm did not generate SDR sounds during the quarterly test periods as set forth in MEDEP 375.10.

A tonal sound occurs when the sound level in a one-third octave band exceeds the arithmetic average of the sound levels in the two adjacent one-third octave bands by a specified dB amount based on the octave band center frequencies (ref. MEDEP 375.10.G.24). These criteria were compared against the third-octave band sound level measurements and observations contained in Appendix V. Results from

first quarterly sound testing indicated some potential for tonal sounds to occur in the third-octave band with a center frequency of 160 Hz particularly at position MP-7. This potential for tonality was found to be intermittent at MP-7 and was not observed to occur at all positions or all periods when the wind turbines were a primary sound source.

For more details regarding analysis of tonal sounds for first quarterly testing refer to Section 7.2 of the AMBIENT & OPERATIONS SOUND LEVEL MONITORING report by RSE dated June 21, 2007.

Measurement results for the second quarterly test show the potential for tonal sounds to be less prevalent than during first quarterly testing. For more details regarding analysis of tonal sounds for second quarterly testing refer to Section 7.2 of the AMBIENT & OPERATIONS SOUND LEVEL MONITORING report by RSE dated November 2, 2007.

Similar to first quarterly testing, third quarterly test results showed the potential for tonal sounds to occur in the 160 Hz bandwidth at several community positions. At Position MP-1, MP-5, MP-7A and MP-8, sound levels at 160 Hz were as much as 5 to 7 dBA above the average sound levels of the adjacent 125 and 200 Hz bandwidths. To meet the definition of a tonal sound at 160 Hz requires this differential to exceed 8 dB, which did not occur in any measurement period.

Although the measurement results and GE specification data shows that the potential to generate a tonal sound exists, the tonal differentials do not meet the MEDEP criteria for tonal sounds.

7.4 Operating Conditions and Wind Predictions

Results of wind predictions by GHA were reviewed to determine the relationship between expected wind and operating conditions and operating conditions during the quarterly operations sound level monitoring. The predominant wind directions predicted by the GHA report were from the northwest, west, and southeast, with the northwest being the most prominent. Periods of significant Wind Farm operations during third quarterly testing occurred with winds primarily from the west and southwest. During second quarterly testing, winds were primarily from the northwest. During first quarterly testing, three overnight test periods with significant Wind Farm operations, the wind directions ranged from southwest/west-southwest, southeast/south-southeast, and northwest/north-northwest. The wind directions during the three first quarterly nighttime periods align closely with the expected predominant wind directions.

Similar to first and second quarterly testing, turbine wind speeds during periods of third quarterly testing upon which Wind Farm sound levels are based were well above the mean wind speeds predicted by GHA. These wind conditions maintained Wind Farm operations at or near full power output for more than 24 hours during 3rd quarterly testing.

8.0 FINDINGS AND RECOMMENDATIONS

Sound level estimates for the Mars Hill Wind Farm were calculated in 2003 using a sound level prediction model developed for the project and sound performance data from the turbine manufacturer (GE). In December 2006, RSE conducted ambient sound level monitoring with construction of the Wind Farm substantially complete and the wind turbines shutdown. In May 2007, September 2007, and January 2008 sound level monitoring was conducted during routine operation of the Wind Farm. In May 2007 and January 2008, wind turbines were shutdown due to low wind or blade icing for significant portions of the quarterly testing. As such, ambient non-turbine sound levels were measured during these shutdown periods. Both ambient and operating sound levels were measured under a variety of wind and weather conditions. Sound level measurements of routine Wind Farm operations were

compared with non-Wind Farm ambient sound levels and sound level estimates for the Wind Farm calculated using the CADNA sound level prediction model.

Wind turbine sound levels during moderate to full operation ranged from 8 dBA below to 5 dBA above the sound level model estimates (see Table 7-1, 7-2, and 7-3). For comparison, a sound level change of 3 dBA is considered to be just perceptible and a change of 5 dBA is a noticeable difference. Sound level measurements farthest below the model estimates occurred at MP-1 and MP-8 during periods when nearby turbines were generally operating at less than 60% power. These reduced operating levels were not modeled but are consistent with the sound power levels provided in performance specifications by GE.

Comparing operating conditions with annual predictions from the GHA wind study indicates that sound level measurements of Wind Farm operations were taken during wind conditions at or exceeding the predicted mean wind speeds and with wind from predicted predominant directions.

Similar to Wind Farm sound levels, ambient sound levels vary with wind speed. At each of the monitoring positions, sound levels from Wind Farm operations were within the range of ambient sound levels. Due to their lower elevations, wind speeds at the monitoring positions are typically five to ten miles per hour less than at the turbine hubs. As shown by quarterly test results, this difference can increase depending upon the general wind direction, wind gradients, and amount of blockage by the terrain and vegetation. At monitoring positions where wind turbine sound was more prominent, the winds were generally light compared to wind incident at the turbine hubs. In these instances, measured sound levels from the Wind Farm were above sound levels from other sources. A direct comparison of operating and ambient (non-turbine) sound levels is complicated by the wide range of ambient sound levels that can occur during wind conditions that support moderate to full Wind Farm operations.

Evaluation of measurement results for the presence of short duration repetitive sounds indicates that although sound levels from wind turbines can fluctuate over brief periods (as noted by the passage of wind turbine blades), these fluctuations do not increase sound levels by 6 dBA or more, and therefore, the wind farm does not generate short duration repetitive sounds as set forth in MEDEP 375.10. Analysis of third-octave band sound levels for tonal sound indicates some potential for tonal sounds to primarily occur at a center frequency of 160 Hz. This potential was generally found to be intermittent and was not observed to occur at all positions or all periods when the wind turbines were a primary sound source. Third-octave band sound levels were also compared to frequency spectra for the 1.5sle wind turbines provided in performance specifications from GE (ref. Figure 7-13 of AMBIENT & OPERATIONS SOUND LEVEL MONITORING report by RSE dated June 21, 2007). Although the measurement results and GE specification data show that the potential to generate a tonal sound exists, the results did not meet the criteria for tonal sounds as set forth in MEDEP 375.10.

Third quarterly Wind Farm sound levels were generally consistent with results from 1st and 2nd quarterly testing. This occurred under mid-winter site conditions characterized by low natural sounds from both wildlife and wind acting on seasonal foliage, snow and frozen ground conditions, and periods of turbine blade icing. When blade icing was heavy, wind turbines were shut down. For several hours after re-start, sound levels during blade icing were similar to other periods. Results at new monitoring position MP-1A were found to be consistent with results at nearby monitoring positions (MP-1 and MP-8) for this and previous quarterly testing, with possible exception of slightly higher results at MP-1 during 2nd quarterly testing.

Based on the findings of three rounds of quarterly sound testing, RSE recommends that UPC Wind conduct its fourth quarterly testing in early spring following the same measurement protocol as was used during the third quarterly testing. Performance and reliability of field instrumentation should improve with warmer weather. As an additional option, UPC Wind should shut down selected turbines for brief periods (e.g. 10 minutes) of fourth quarterly testing. This would enable measurement of near

"real-time" ambient sound levels during operating periods for purposes of adjusting sound levels measured while wind turbines are at moderate to full operations.

GE is investigating wind turbine performance in parallel with quarterly sound testing. UPC Wind should continue to provide measurement results to GE and for further evaluation of turbine performance and additional sound reduction options that may be available to address specific operating conditions.

9.0 REFERENCES

Acoustical Society of America, American National Standard Specification for Octave-Band and Fractional-Octave-Band Analog and Digital Filters (ASA 65-1986), New York, New York, 1986.

Code of Maine Regulations, Site Location of Development Regulations - Chapter 375.10, Control of Noise.

Delta Acoustics & Vibration, Investigations of Wind Screens Insertion Loss and Attenuation of Wind Noise, 1997.

Garrad Hassan America, Assessment of the Energy Production of the Proposed Mars Hill Wind Farm, 2006.

General Electric Technical Documentation Wind Turbine Generator Systems GE 1.5 sl/sle 50 & 60 Hz, 2004.

General Electric 1.5 MW Series Wind Turbine Brochure (www.gepower.com/prod_serv/products/wind_turbines/en/downloads/ge_15_brochure.pdf)

IEC International Standard 61400-11, Wind Turbine Generator Systems – Acoustic Noise Measurement Techniques, Edition 2.1, 2006.

Maine Department of Environmental Protection, Site Location of Development, Findings of Fact and Order, No. L-21635-26-A-N, June 2004.

Resource Systems Engineering, Ambient & Operations Sound Level Monitoring Report, June 21, 2007 and November 2, 2007.

FIGURE 7–15. 2003 WIND FARM MODEL ESTIMATES AND MEASURED OPERATING SOUND LEVELS FROM JANUARY 2008

0 600 1200
SCALE IN FEET

APPROXIMATE LOCATION OF RESIDENCE

APPROXIMATE LOCATION OF RESIDENCE CONSTRUCTED SINCE 2003

T3 AS-BUILT WIND TURBINE SITE

COMMUNITY SOUND LEVEL MONITORING POSITION

51/42–52 MODEL ESTIMATE/RANGE OF MEASURED SOUND LEVELS

MET STATION

N

WIND FARM PROPERTY BOUNDARY

MP-1A 48/46–51

MP-1 51/47–52

MP-8 47.5/46–51

MP-6

MP-6A 42/41–47

MP-7

MP-7A 41/39–46

MP-5 39/39–44

MP-2 35/32–37

MP-4

MP-4A 37/36–41

MP-3

EAST RIDGE ROAD

COUNTRY CLUB ROAD

BELL HILL ROAD

BOYNTON ROAD

MOUNTAIN ROAD

BIG ROCK SUBDIVISION

35 dBA

40 dBA

45 dBA

50 dBA

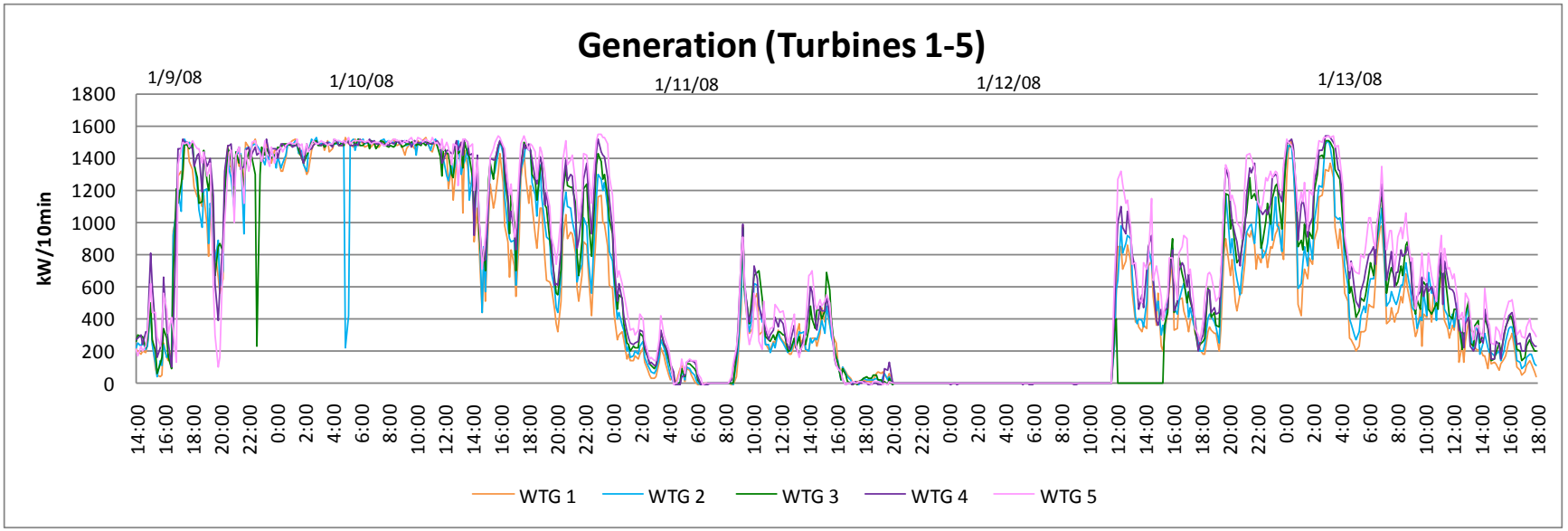
55 dBA

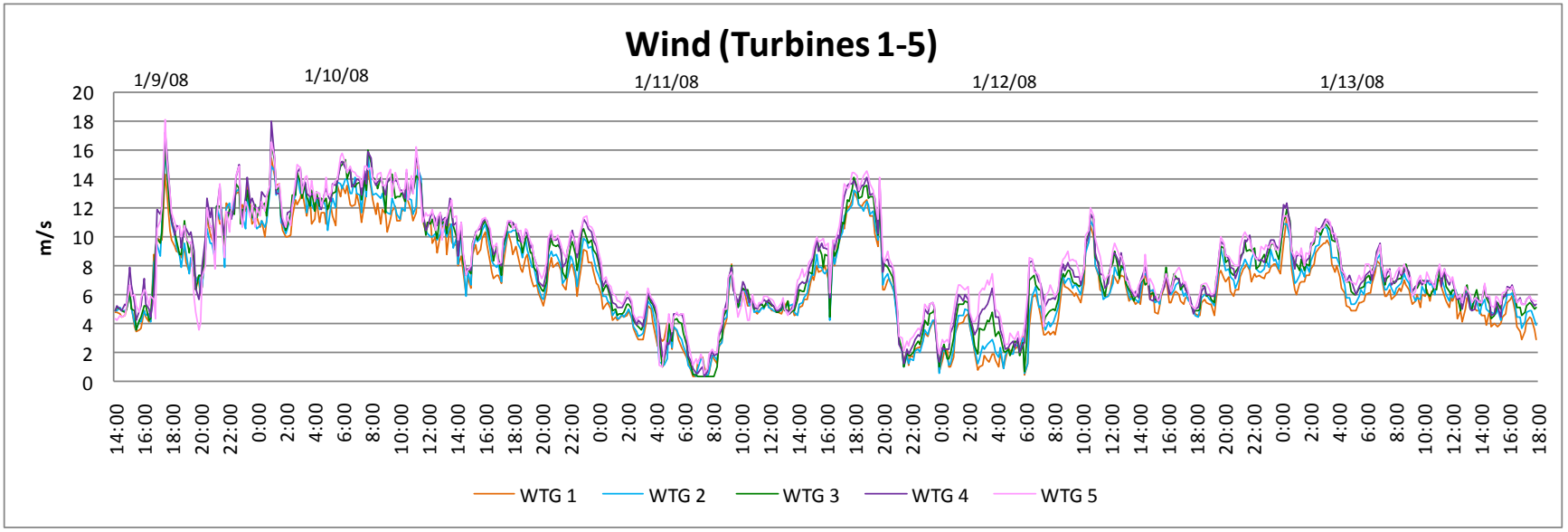
SOUND LEVEL CONTOURS FROM 2003 SOUND MODEL ESTIMATES

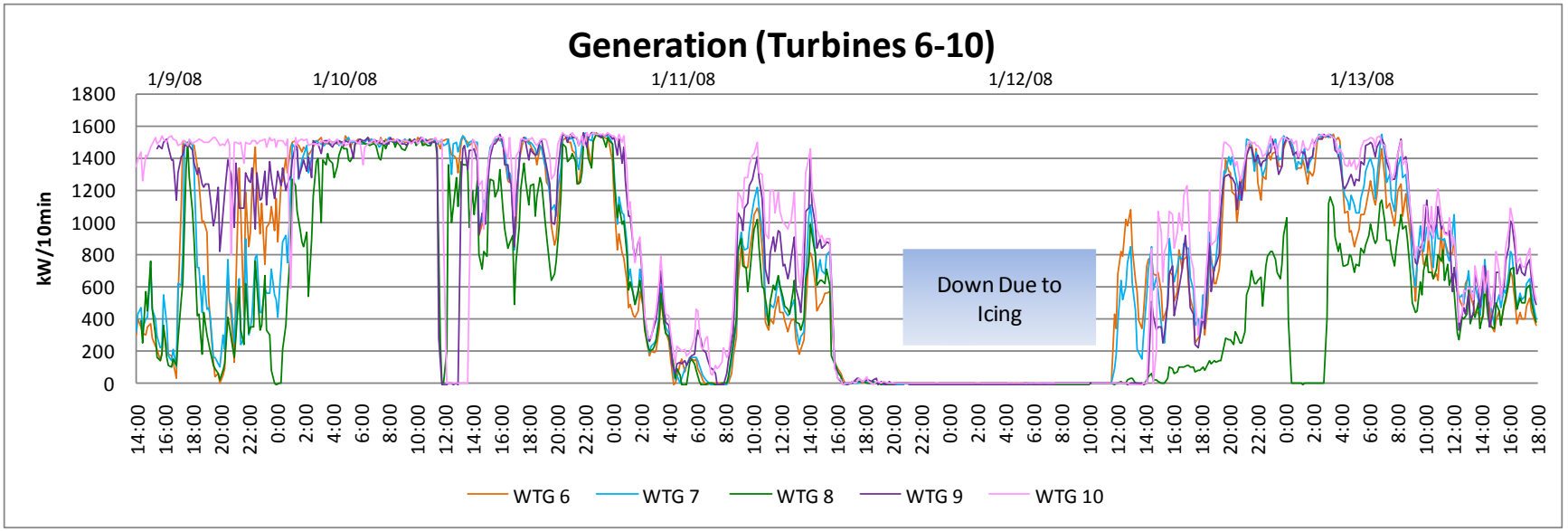
55 dBA
50 dBA
45 dBA
40 dBA
35 dBA
1 dBA Interval

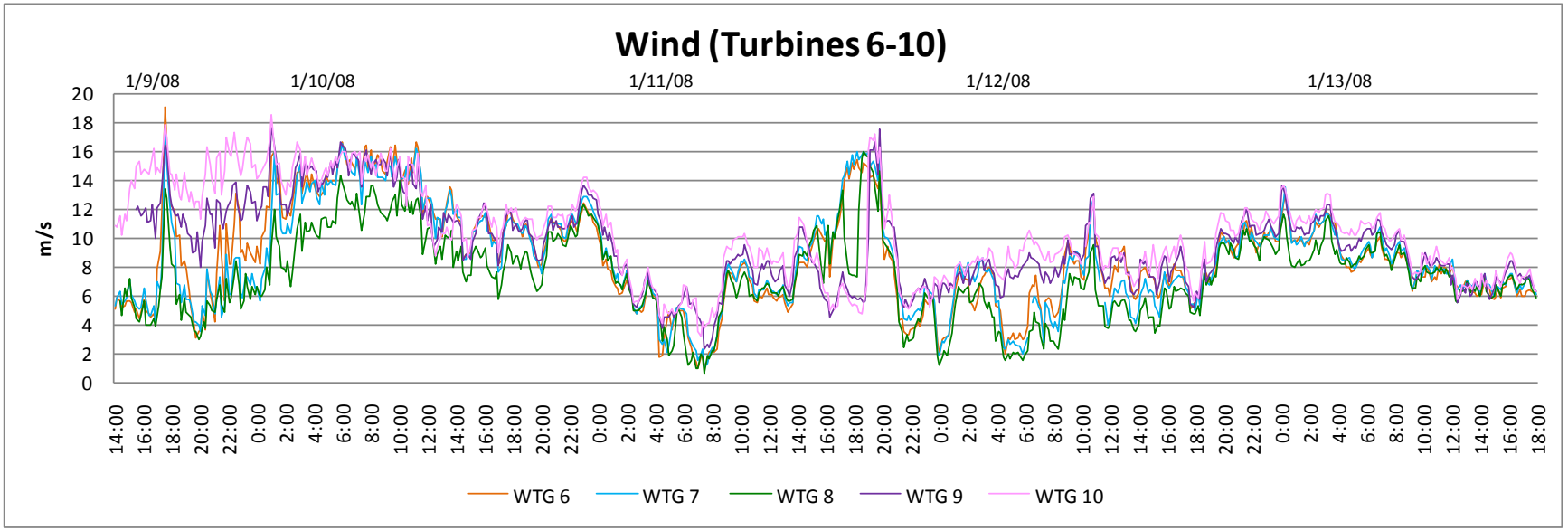
Revised 4–8–08

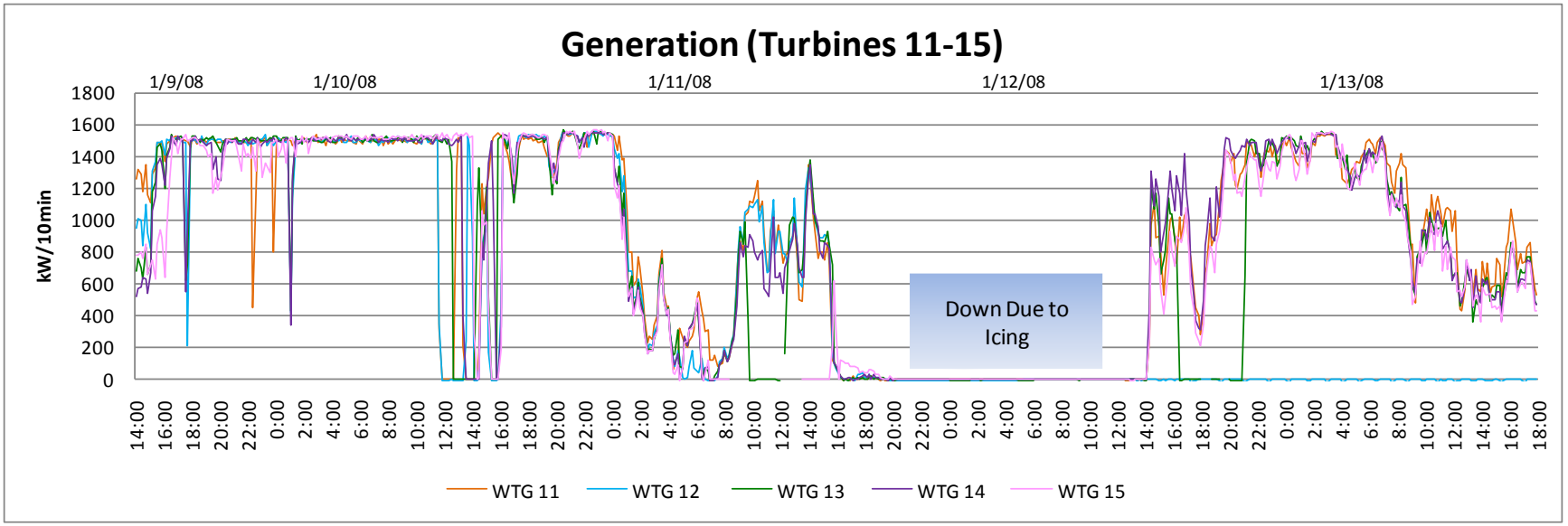
APPENDIX III
WIND TURBINE POWER PRODUCTION, WIND SPEED AND DIRECTION (Turbine Hubs and MET Stations)
JANUARY 9 to 13, 2008
(compiled by UPC Operations and RSE)

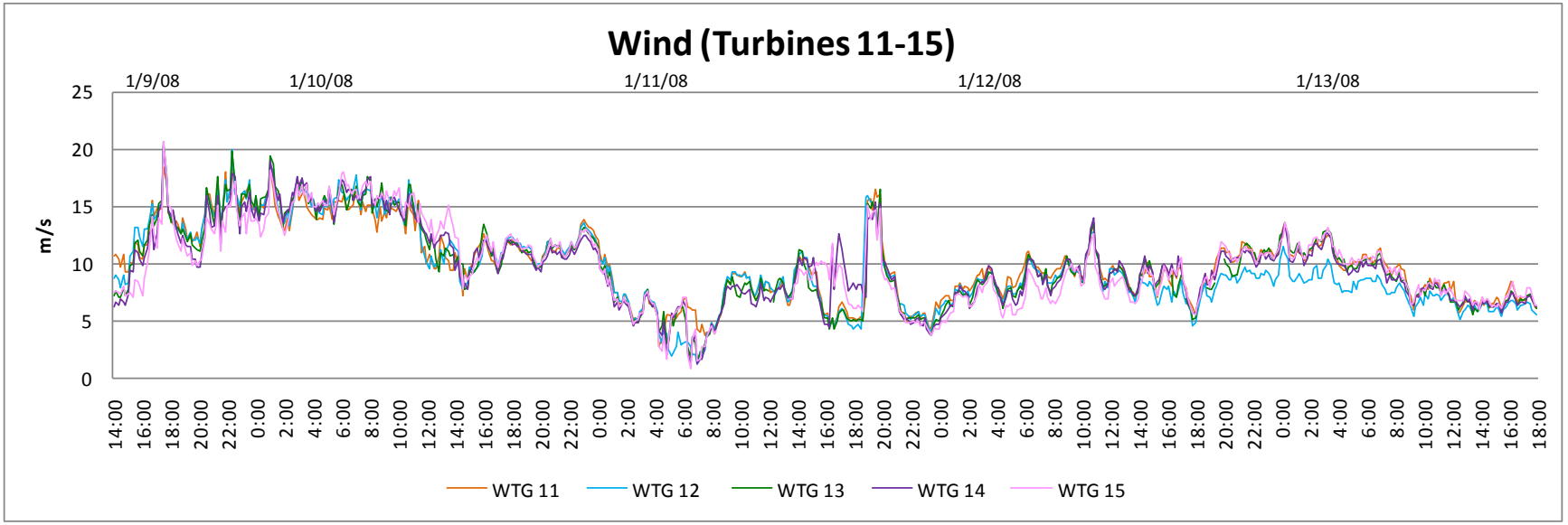

Generation (Turbines 1-5)
1/9/08
1/10/08
1/11/08
1/12/08
1/13/08
kW/10min
1800
1600
1400
1200
1000
800
600
400
200
0
14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00
WTG 1
WTG 2
WTG 3
WTG 4
WTG 5

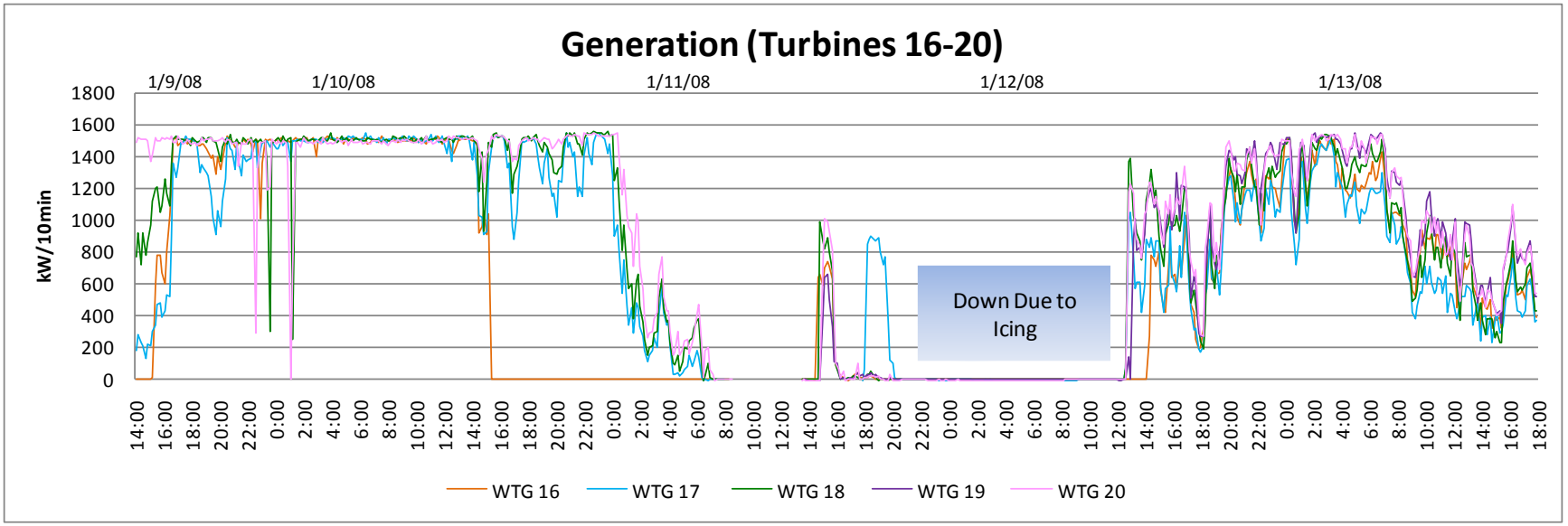

Wind (Turbines 1-5)
1/9/08
1/10/08
1/11/08
1/12/08
1/13/08
m/s
20
18
16
14
12
10
8
6
4
2
0
14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00
WTG 1
WTG 2
WTG 3
WTG 4
WTG 5

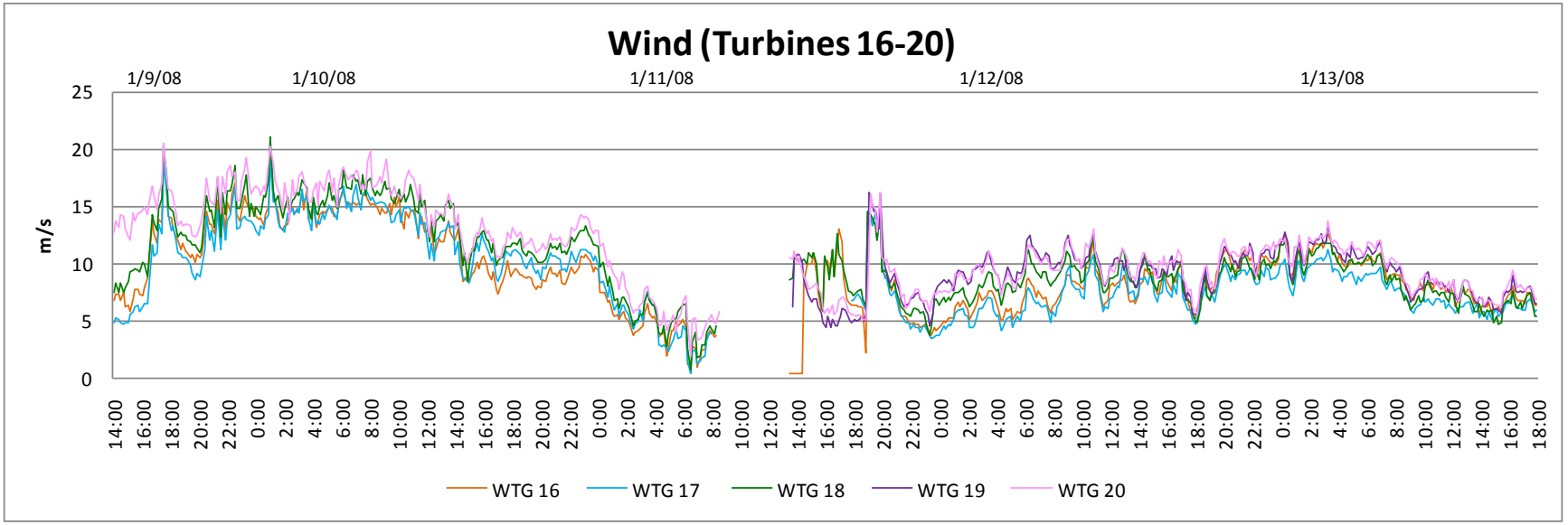

Generation (Turbines 6-10)
1/9/08
1/10/08
1/11/08
1/12/08
1/13/08
kW/10min
1800
1600
1400
1200
1000
800
600
400
200
0
Down Due to Icing
WTG 6
WTG 7
WTG 8
WTG 9
WTG 10

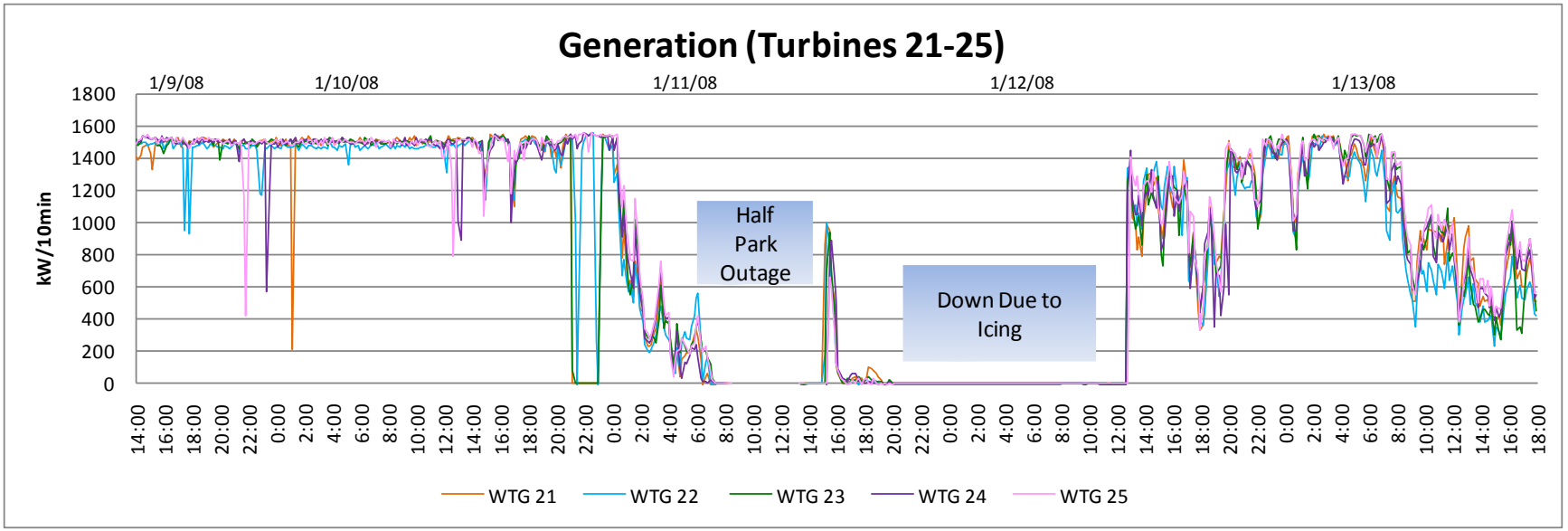

Wind (Turbines 6-10)
1/9/08
1/10/08
1/11/08
1/12/08
1/13/08
m/s
20
18
16
14
12
10
8
6
4
2
0
WTG 6
WTG 7
WTG 8
WTG 9
WTG 10

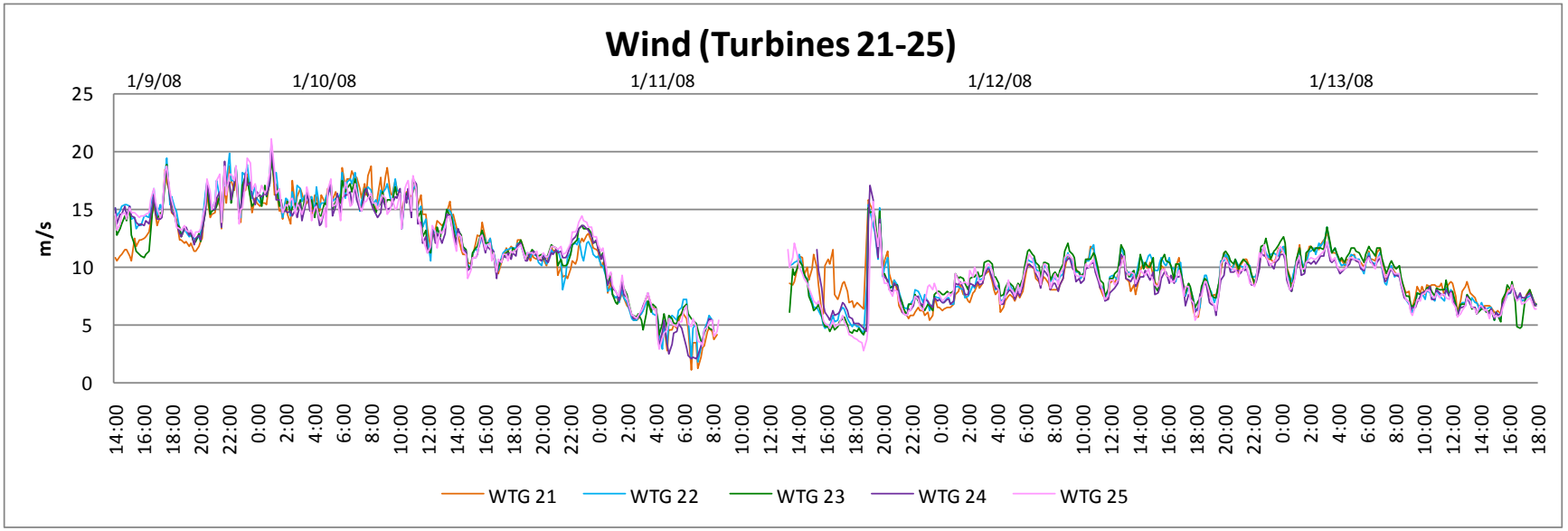

Generation (Turbines 11-15)
1/9/08
1/10/08
1/11/08
1/12/08
1/13/08
kW/10min
1800
1600
1400
1200
1000
800
600
400
200
0
Down Due to Icing
WTG 11
WTG 12
WTG 13
WTG 14
WTG 15

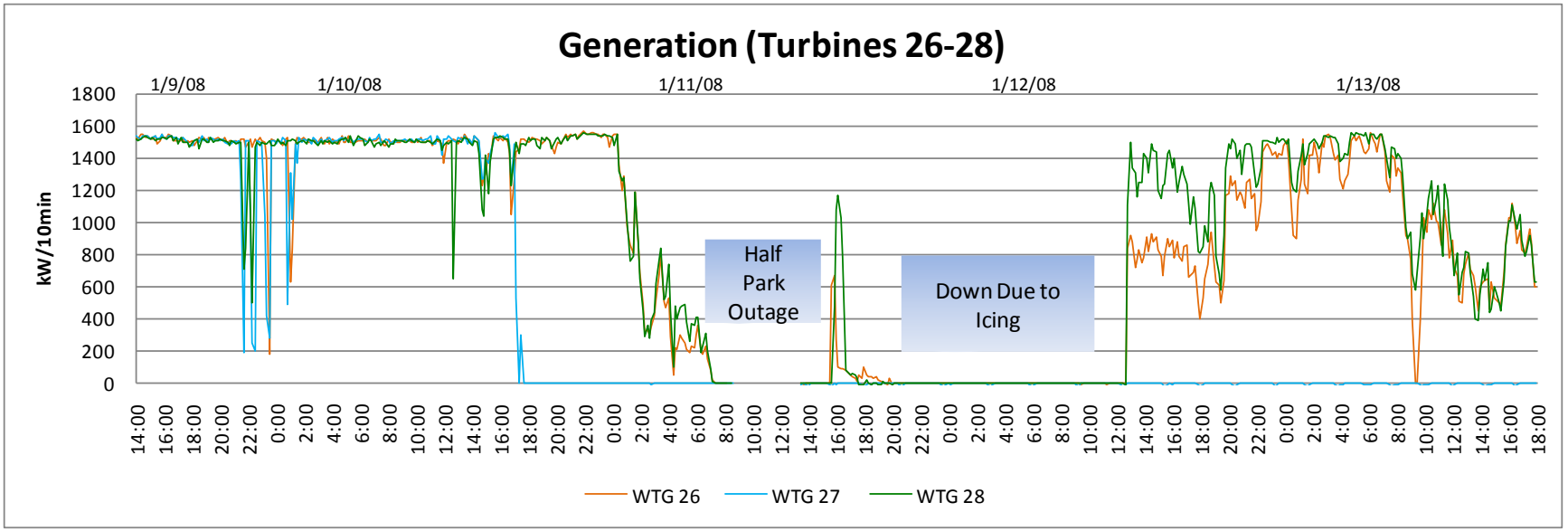

Wind (Turbines 11-15)
1/9/08
1/10/08
1/11/08
1/12/08
1/13/08
m/s
25
20
15
10
5
0
WTG 11
WTG 12
WTG 13
WTG 14
WTG 15

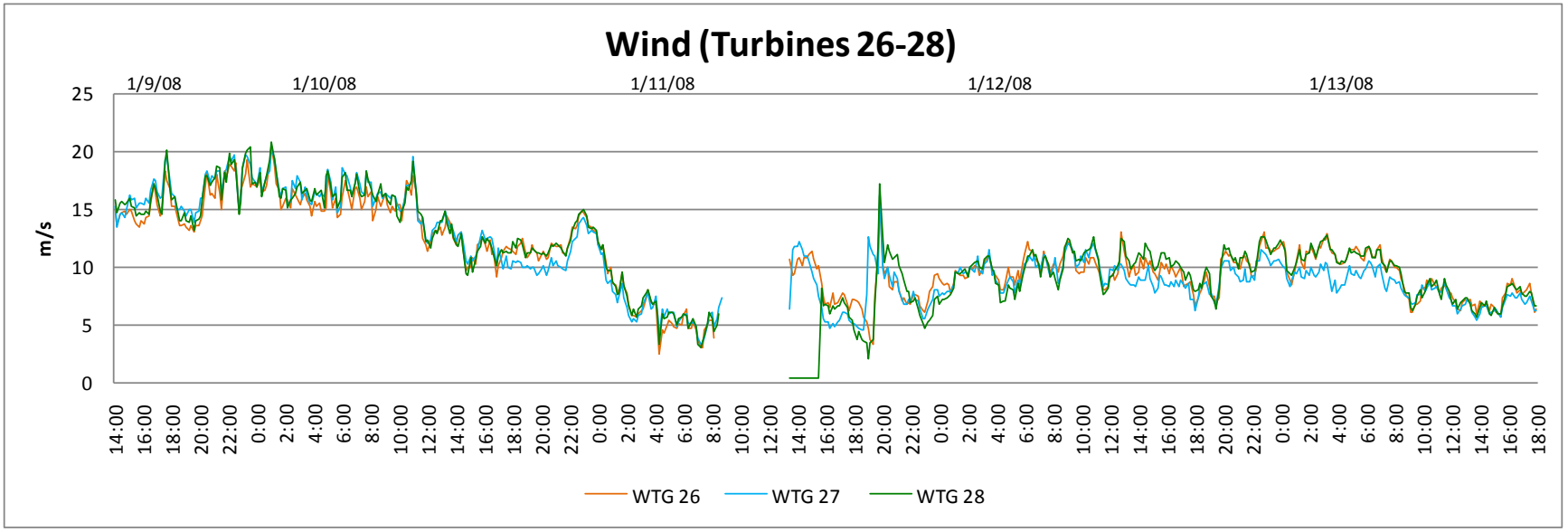

Generation (Turbines 16-20)
1/9/08
1/10/08
1/11/08
1/12/08
1/13/08
kW/10min
1800
1600
1400
1200
1000
800
600
400
200
0
Down Due to Icing
WTG 16
WTG 17
WTG 18
WTG 19
WTG 20


Wind (Turbines 16-20)
1/9/08
1/10/08
1/11/08
1/12/08
1/13/08
m/s
25
20
15
10
5
0
WTG 16
WTG 17
WTG 18
WTG 19
WTG 20

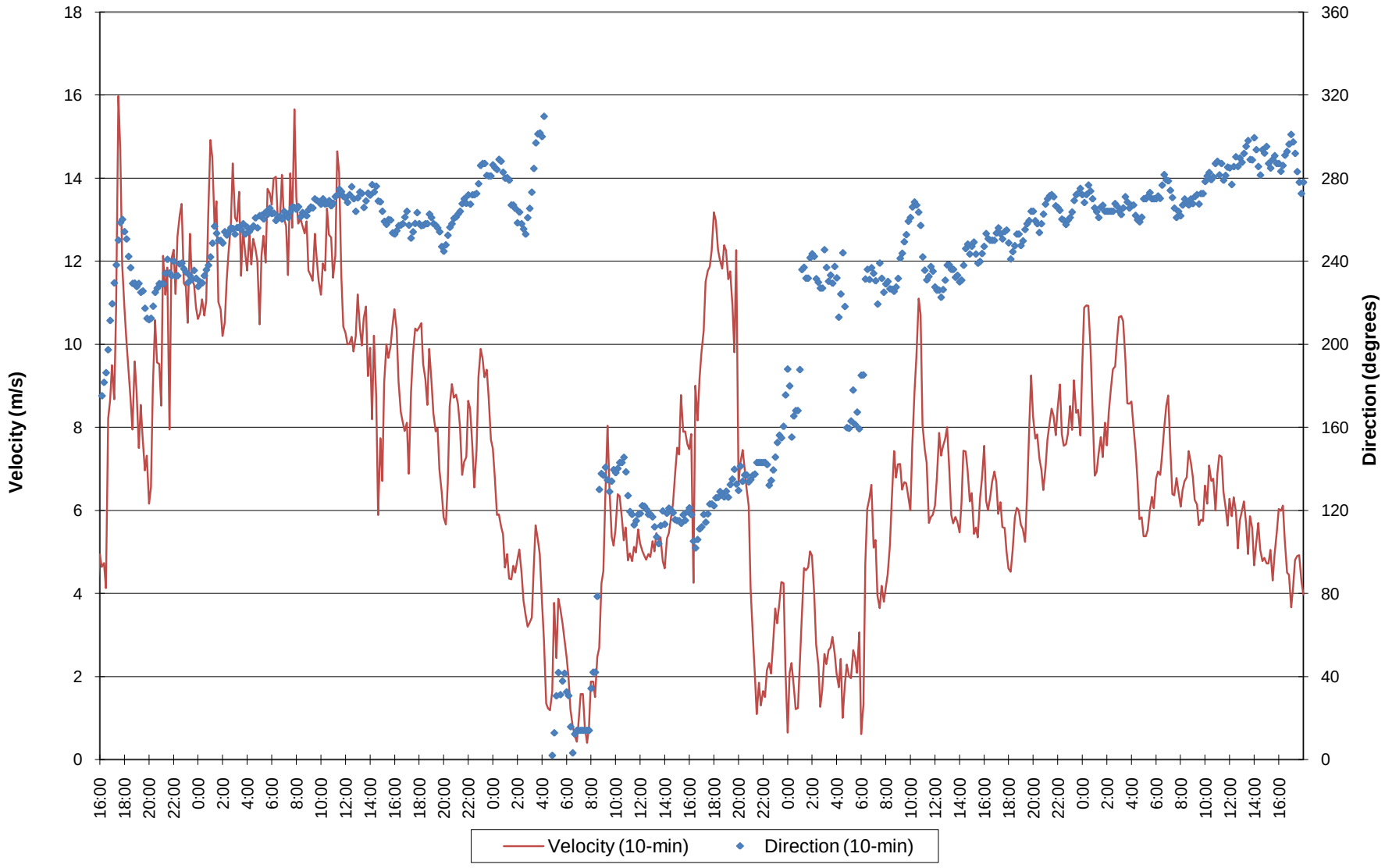

Generation (Turbines 21-25)
1/9/08
1/10/08
1/11/08
1/12/08
1/13/08
kW/10min
1800
1600
1400
1200
1000
800
600
400
200
0
Half Park Outage
Down Due to Icing
14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00
WTG 21
WTG 22
WTG 23
WTG 24
WTG 25


Wind (Turbines 21-25)
1/9/08
1/10/08
1/11/08
1/12/08
1/13/08
m/s
25
20
15
10
5
0
14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00
WTG 21
WTG 22
WTG 23
WTG 24
WTG 25

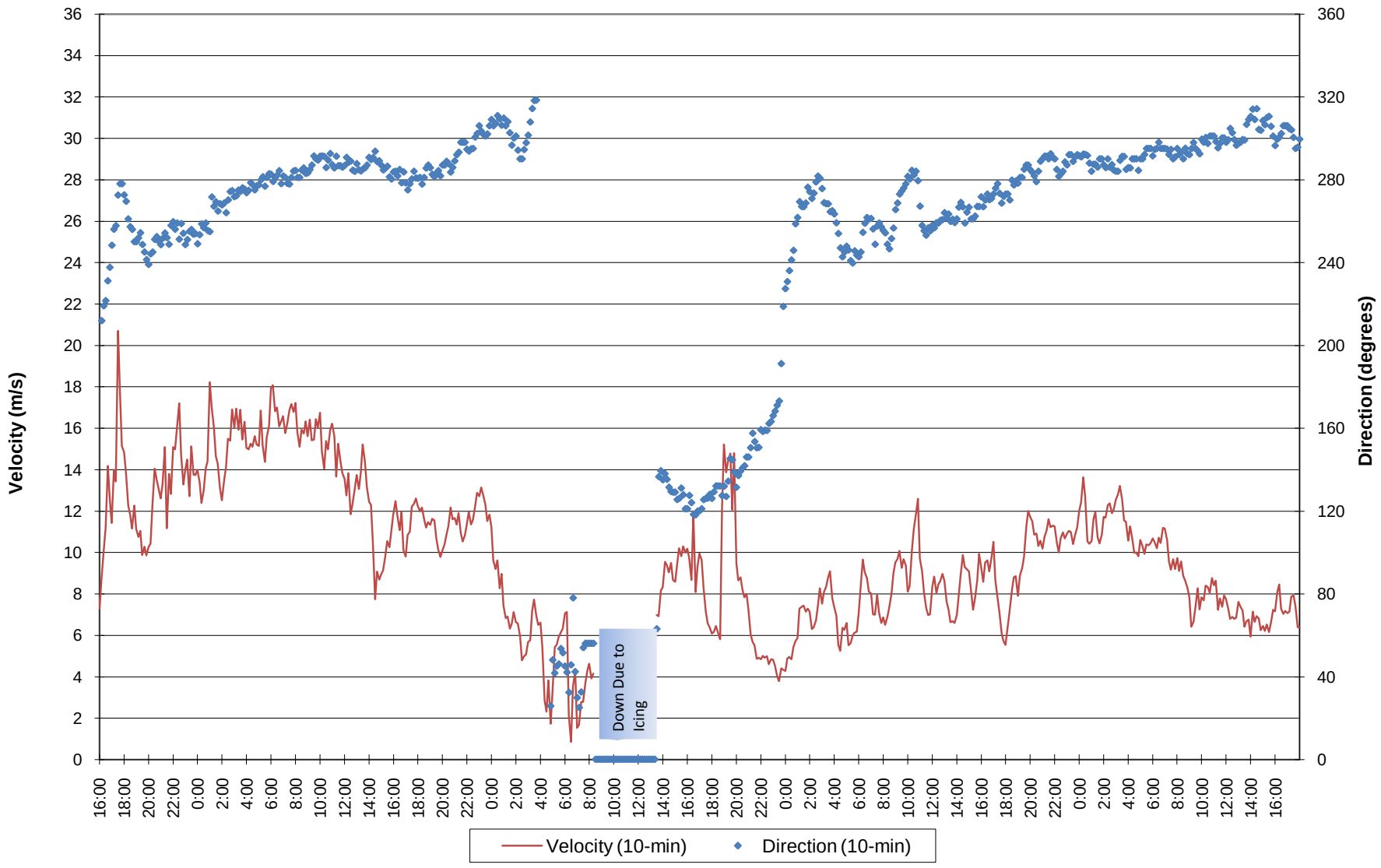

Generation (Turbines 26-28)
1/9/08
1/10/08
1/11/08
1/12/08
1/13/08
kW/10min
1800
1600
1400
1200
1000
800
600
400
200
0
Half Park Outage
Down Due to Icing
14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00
WTG 26
WTG 27
WTG 28

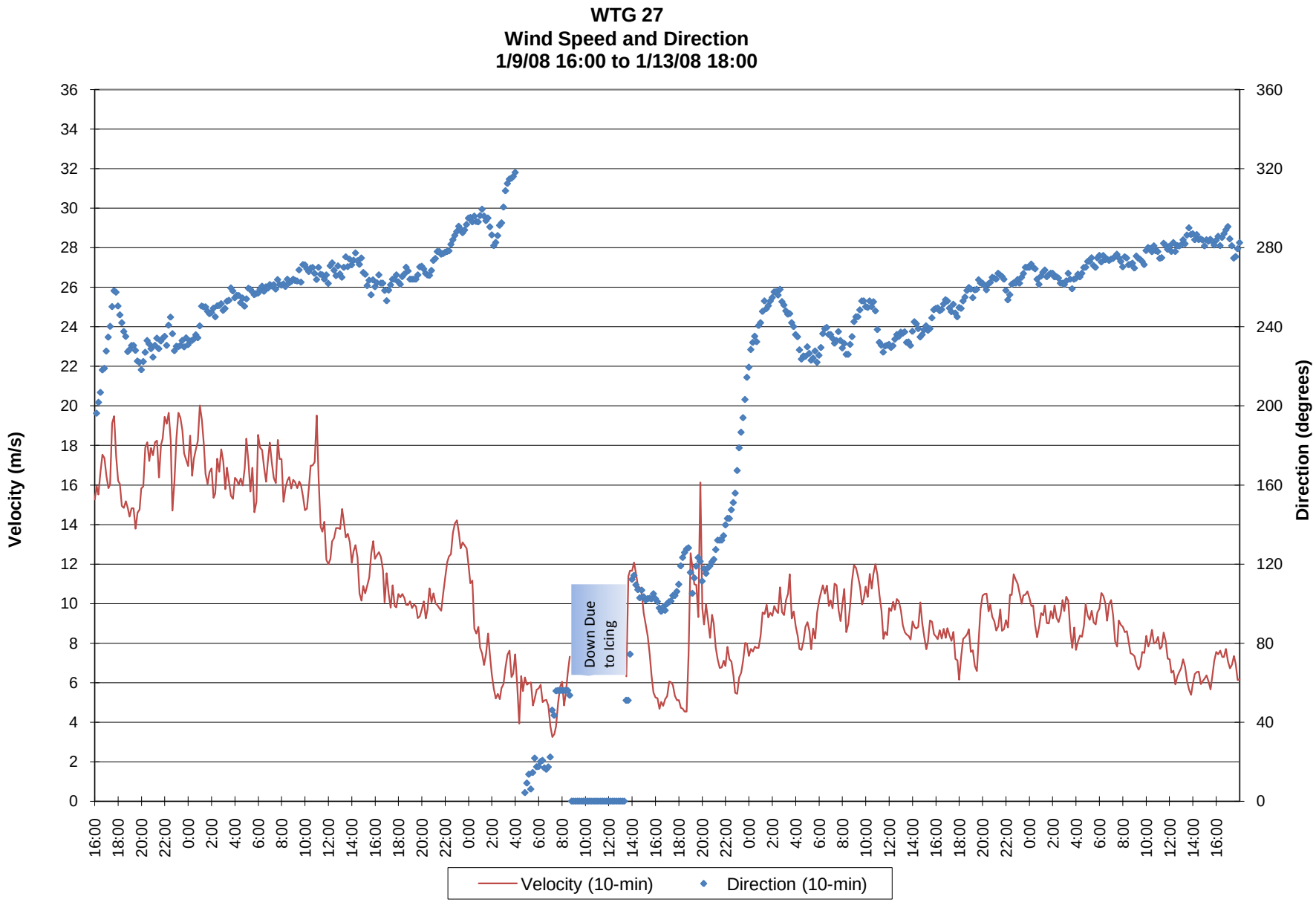

Wind (Turbines 26-28)
1/9/08
1/10/08
1/11/08
1/12/08
1/13/08
m/s
25
20
15
10
5
0
14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 0:00 2:00 4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00
WTG 26
WTG 27
WTG 28

WTG 2
Wind Speed and Direction
1/9/08 16:00 to 1/13/08 18:00

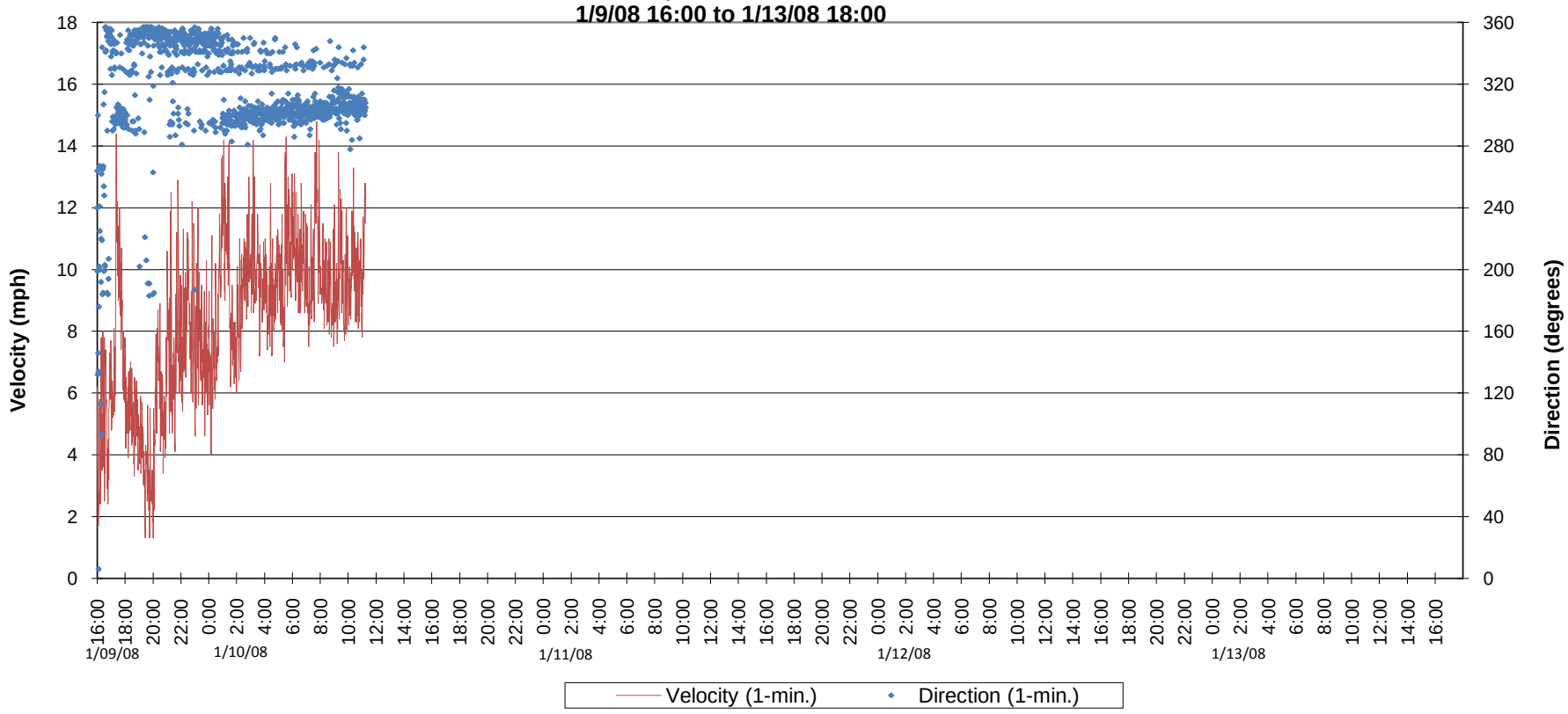


WTG 15
Wind Speed and Direction
1/9/08 16:00 to 1/13/08 18:00

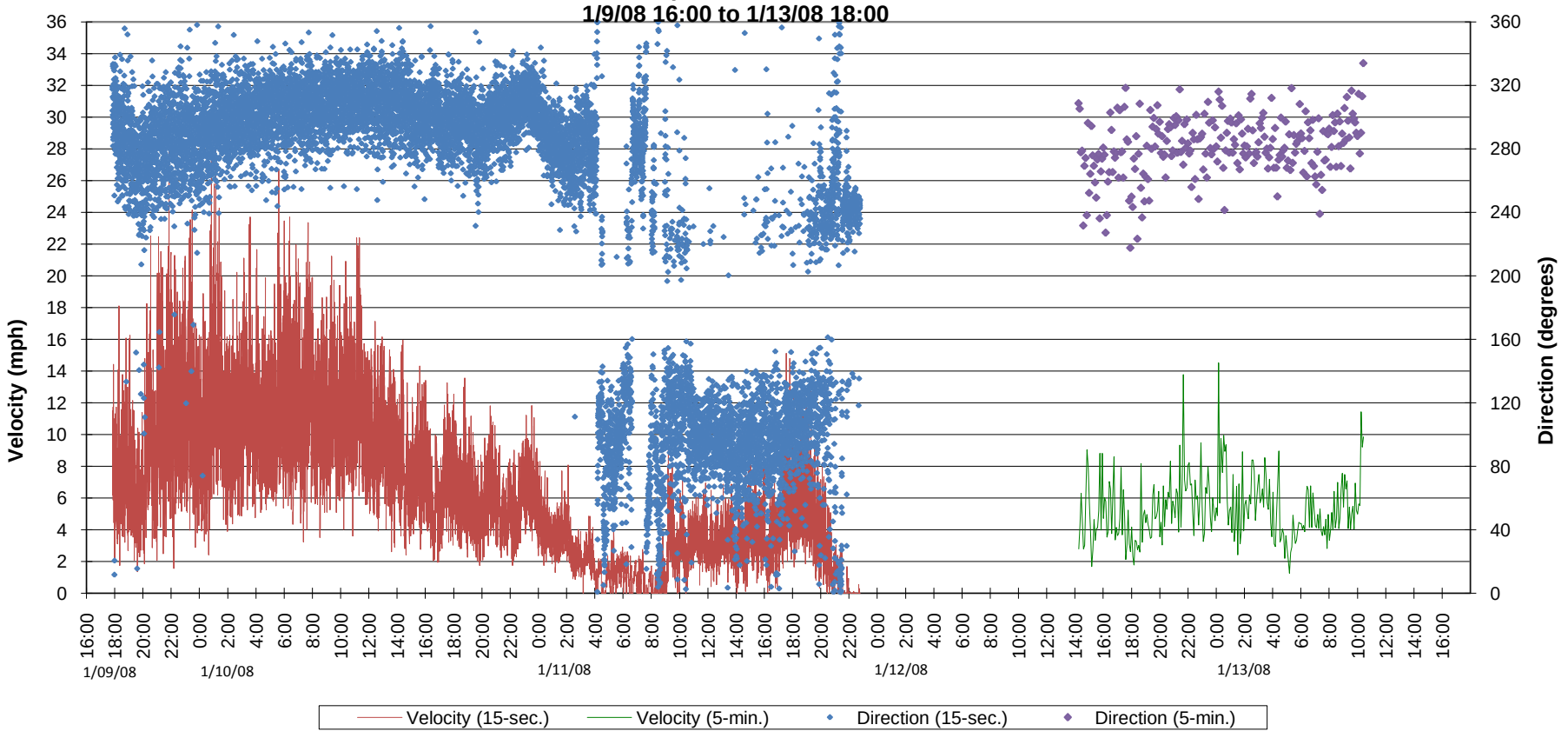



WTG 27
Wind Speed and Direction
1/9/08 16:00 to 1/13/08 18:00
Velocity (m/s)
Direction (degrees)
Down Due to Icing
Velocity (10-min)
Direction (10-min)

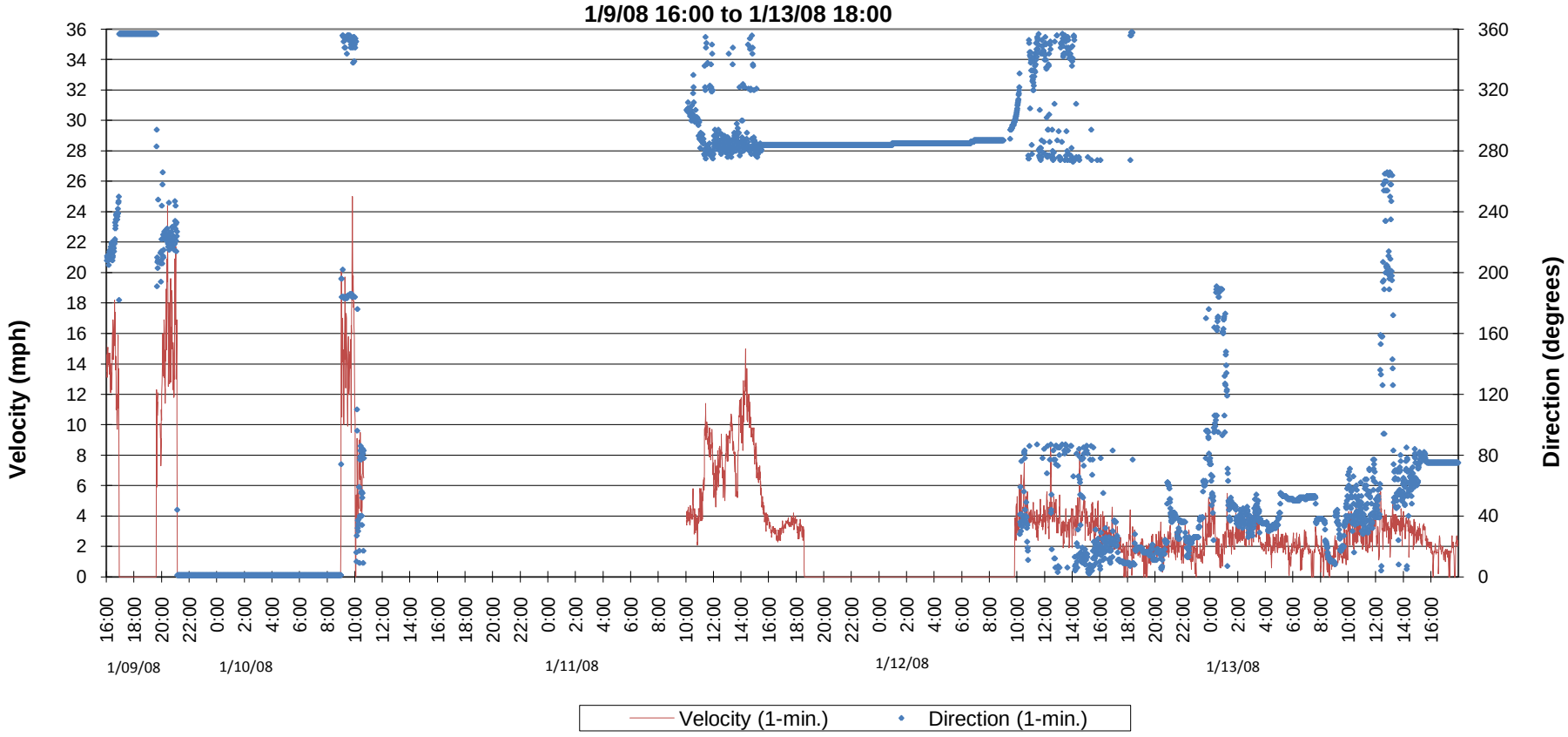
MP-1
Wind Speed and Direction
1/9/08 16:00 to 1/13/08 18:00



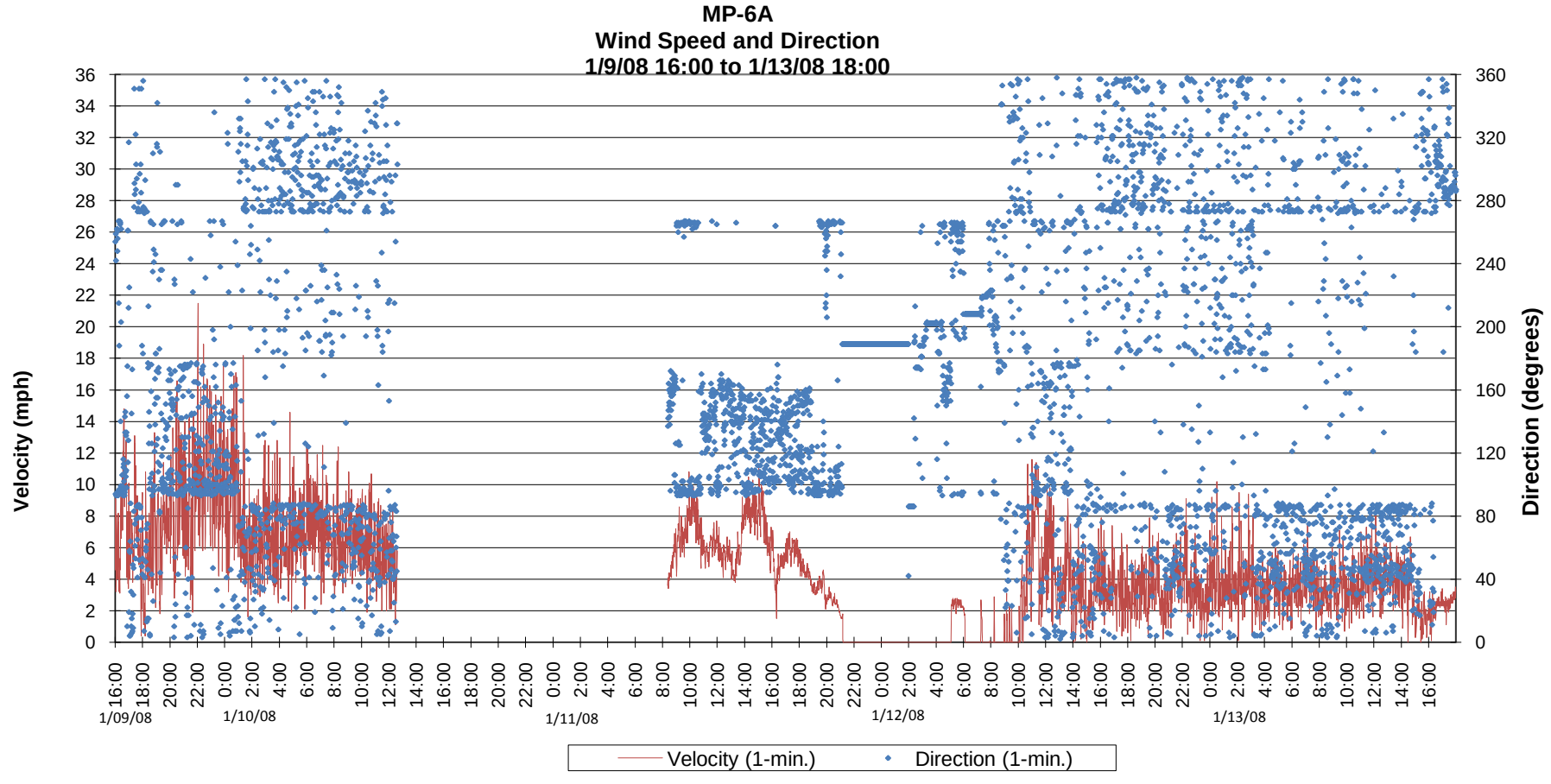
MP-1A
Wind Speed and Direction
1/9/08 16:00 to 1/13/08 18:00

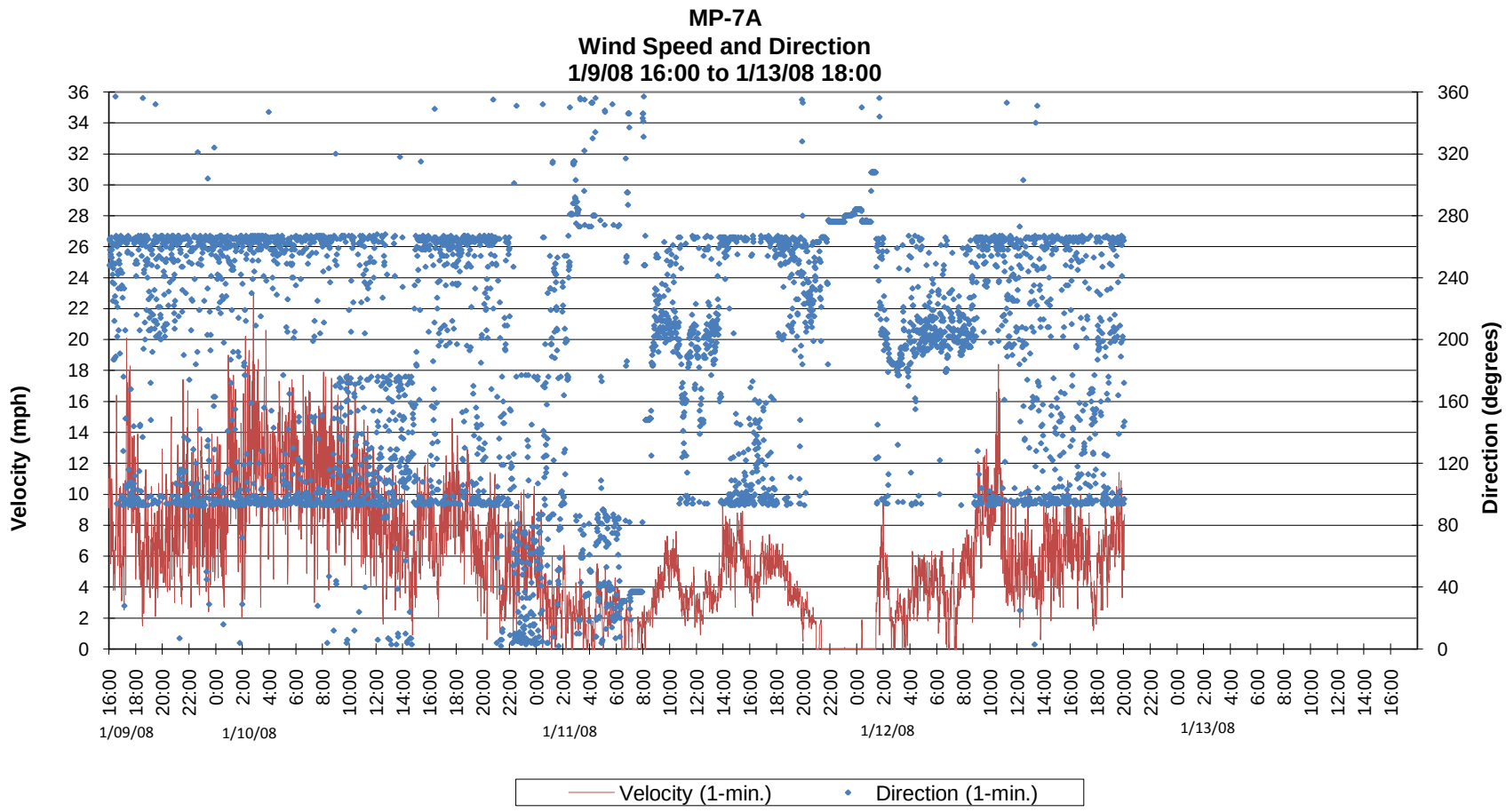


MP-2
Wind Speed and Direction
1/9/08 16:00 to 1/13/08 18:00



MP-6A
Wind Speed and Direction
1/9/08 16:00 to 1/13/08 18:00




MP-7A
Wind Speed and Direction
1/9/08 16:00 to 1/13/08 18:00
Velocity (mph)
Direction (degrees)
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
360
320
280
240
200
160
120
80
40
0
16:00
18:00
20:00
22:00
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
1/09/08
1/10/08
1/11/08
1/12/08
1/13/08
Velocity (1-min.)
Direction (1-min.)

APPENDIX IV

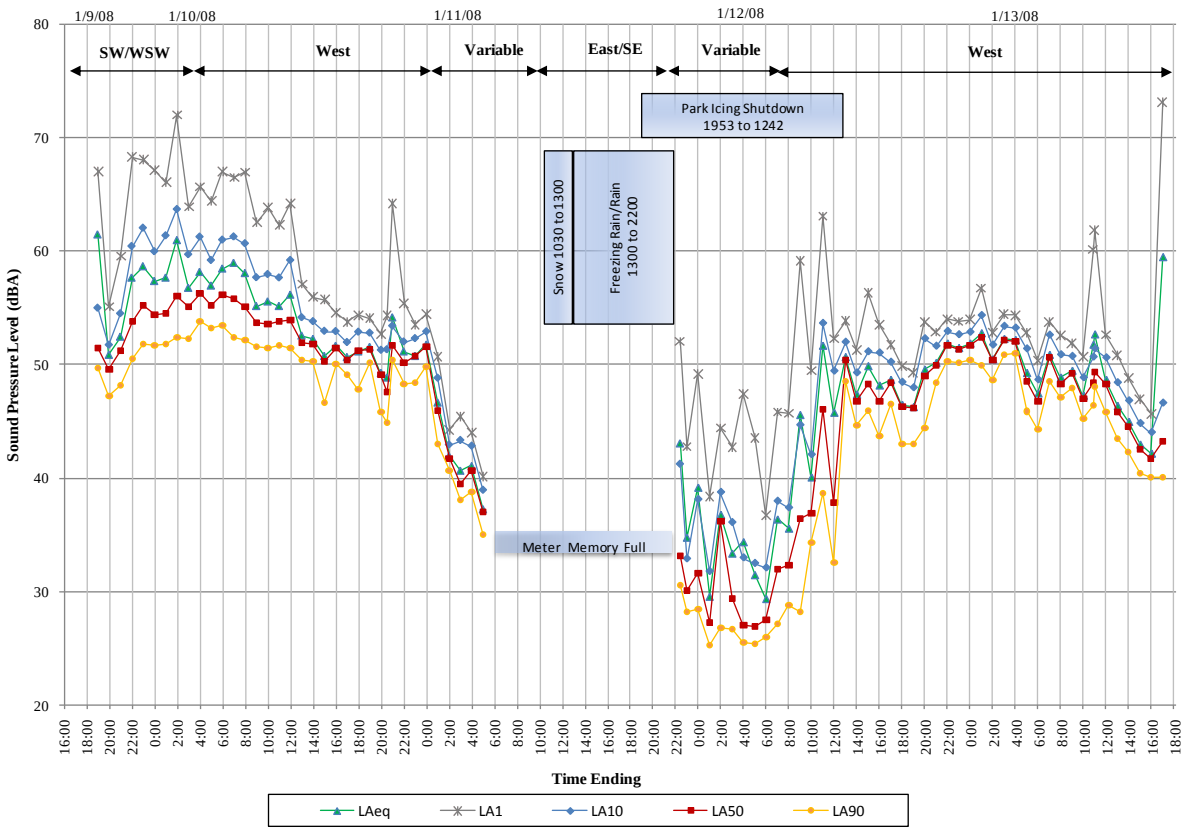
SOUND LEVEL MEASUREMENTS OF WIND FARM

OPERATION –JANUARY 2008

Position MP-1

Date	Start Time	Duration (min.)	Measured Sound Levels (dBA) L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}
1/9/08	18:00	60	61	67	55	51	50
	19:00	60	51	55	52	50	47
	20:00	60	52	60	54	51	48
	21:00	60	58	68	60	54	50
	22:00	60	59	68	62	55	52
	23:00	60	57	67	60	54	52
1/10/08	0:00	60	58	66	61	55	52
	1:00	60	61	72	64	56	52
	2:00	60	57	64	60	55	52
	3:00	60	58	66	61	56	54
	4:00	60	57	64	59	55	53
	5:00	60	58	67	61	56	53
	Replace 3" windscreen with 7" windscreen (0602)						
	6:00	60	59	66	61	56	52
	7:00	60	58	67	61	55	52
	8:00	60	55	62	58	54	52
	9:00	60	56	64	58	54	51
	10:00	60	55	62	58	54	52
	11:00	60	56	64	59	54	51
	12:00	60	53	57	54	52	50
	13:00	60	52	56	54	52	50
	14:00	60	51	56	53	50	47
	15:00	60	52	55	53	51	50
	16:00	60	51	54	52	50	49
	17:00	60	51	54	53	51	48
	18:00	60	52	54	53	51	50
	19:00	60	49	53	51	49	46
	20:00	31	49	54	51	48	45
	Replace LD824 with LD812						
	20:30	29	54	64	53	52	50
	21:00	60	51	55	52	50	48
	22:00	60	51	54	52	51	48
1/11/08	23:00	60	52	54	53	52	50
	0:00	60	47	51	49	46	43
	1:00	60	42	44	43	42	41
	2:00	60	41	45	43	40	38
	3:00	60	41	44	43	41	39
	4:00	60	37	40	39	37	35
	Re-install LD824						
	22:22	37	35	43	33	30	28
	23:00	60	39	49	38	32	28

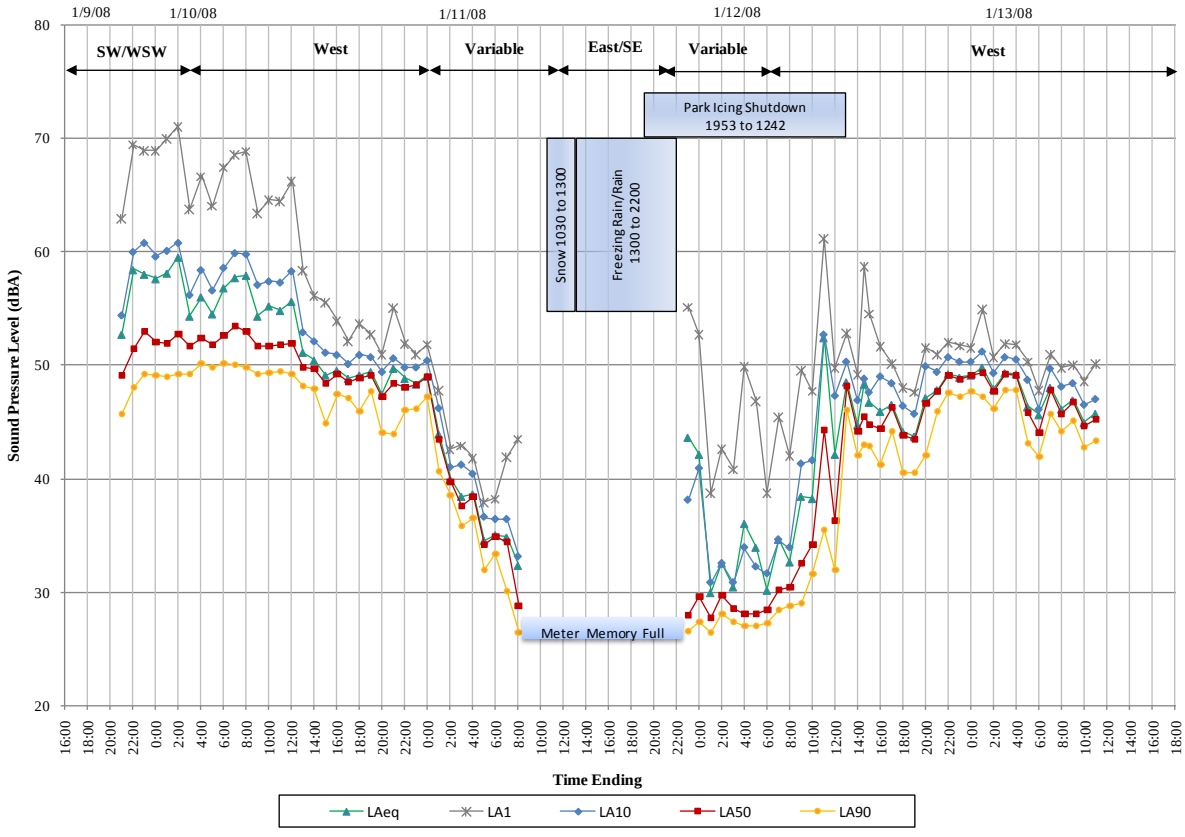
Date	Start Time	Duration (min.)	Measured Sound Levels (dBA) L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}
1/12/08	0:00	60	30	38	32	27	25
	1:00	60	37	44	39	36	27
	2:00	60	33	43	36	29	27
	3:00	60	34	47	33	27	26
	4:00	60	31	43	32	27	25
	5:00	60	29	37	32	28	26
	6:00	60	36	46	38	32	27
	7:00	60	36	46	37	32	29
	8:00	60	46	59	45	36	28
	9:00	60	40	49	42	37	34
	10:00	60	52	63	54	46	39
	11:00	60	46	52	49	38	32
	12:00	60	51	54	52	50	49
	13:00	60	47	51	49	47	45
	14:00	60	50	56	51	48	46
	15:00	60	48	54	51	47	44
	16:00	60	49	52	50	48	47
	17:00	60	46	50	48	46	43
	18:00	60	46	49	48	46	43
	19:00	60	50	54	52	49	44
	20:00	60	50	53	52	50	48
	21:00	60	52	54	53	52	50
	22:00	60	51	54	53	51	50
	23:00	60	52	54	53	52	50
1/13/08	0:00	60	53	57	54	52	50
	1:00	60	50	53	52	50	49
	2:00	60	52	54	53	52	51
	3:00	60	52	54	53	52	51
	4:00	60	49	53	51	48	46
	5:00	60	47	50	49	47	44
	6:00	60	51	54	53	51	48
	7:00	60	49	53	51	48	47
	8:00	60	49	52	51	49	48
	9:00	60	47	51	49	47	45
	10:00	47	52	60	51	48	46
	10:51	8	53	62	51	49	48
	11:00	60	49	53	51	48	46
	12:00	60	46	51	48	46	43
	13:00	60	45	49	47	45	42
	14:00	60	43	47	45	43	40
	15:00	60	42	46	44	42	40
	16:00	58	59	73	47	43	40



Position MP-1A

Date	Start Time	Duration (min.)	Measured Sound Levels (dBA) L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}
1/9/08	20:00	60	53	63	54	49	46
	21:00	60	58	69	60	51	48
	22:00	60	58	69	61	53	49
	23:00	60	58	69	60	52	49
1/10/08	0:00	60	58	70	60	52	49
	1:00	60	60	71	61	53	49
	2:00	60	54	64	56	52	49
	3:00	60	56	67	58	52	50
	4:00	60	55	64	57	52	50
	5:00	60	57	67	59	53	50
	6:00	60	58	69	60	53	50
	7:00	60	58	69	60	53	50
	8:00	60	54	63	57	52	49
	9:00	60	55	65	57	52	49
	10:00	60	55	64	57	52	50
	11:00	60	56	66	58	52	49
	12:00	60	51	58	53	50	48
	13:00	60	50	56	52	50	48
	14:00	60	49	56	51	48	45
	15:00	60	50	54	51	49	48
	16:00	60	49	52	50	49	47
	17:00	60	49	54	51	49	46
	18:00	60	49	53	51	49	48
	19:00	60	47	51	49	47	44
	20:00	60	50	55	51	48	44
	21:00	60	49	52	50	48	46
	22:00	60	48	51	50	48	46
	23:00	60	49	52	50	49	47
1/11/08	0:00	60	44	48	46	43	41
	1:00	60	40	43	41	40	39
	2:00	60	38	43	41	38	36
	3:00	60	39	42	40	38	37
	4:00	60	35	38	37	34	32
	5:00	60	35	38	36	35	33
	6:00	60	35	42	36	34	30
	7:00	60	32	44	33	29	26
			meter memory full				
	22:40	20	44	55	38	28	27
	23:00	60	42	53	41	30	27
1/12/08	0:00	60	30	39	31	28	26
	1:00	60	33	43	33	30	28

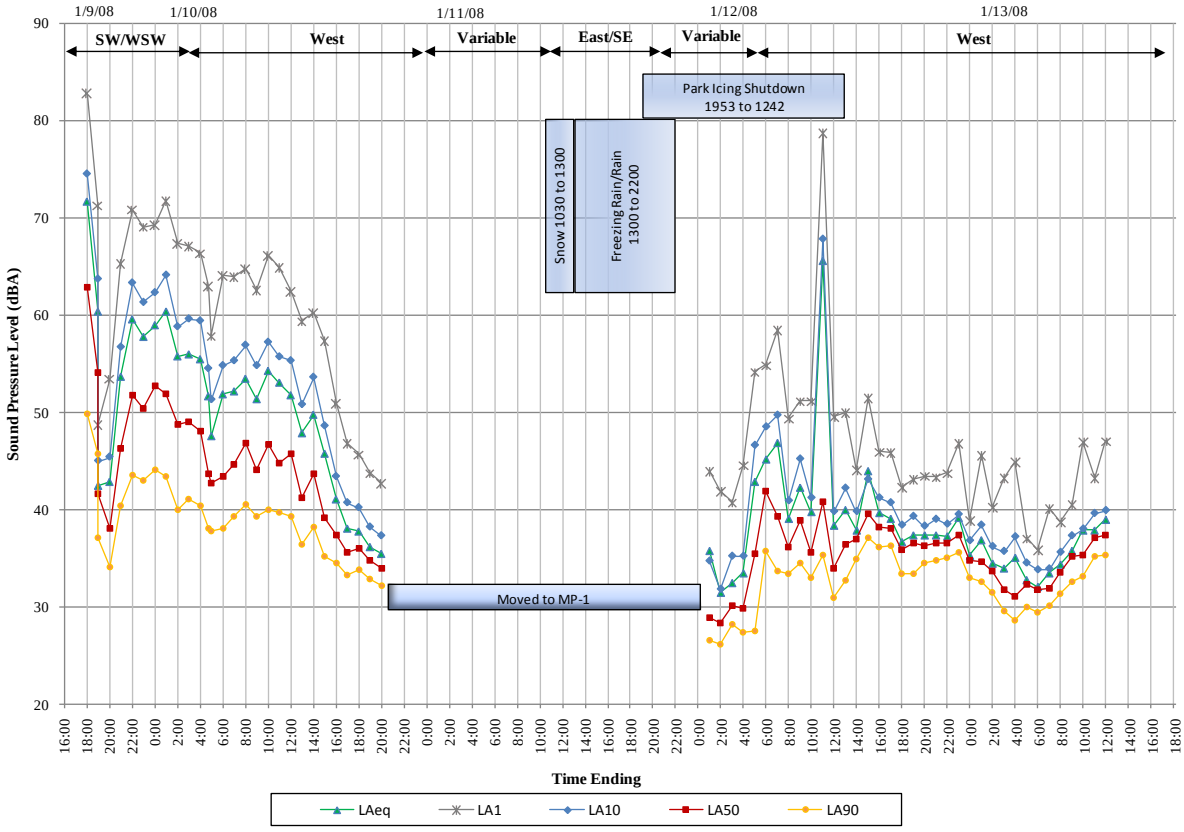
Date	Start Time	Duration (min.)	Measured Sound Levels (dBA) L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}
1/12/08	2:00	60	30	41	31	29	27
	3:00	60	36	50	34	28	27
	4:00	60	34	47	32	28	27
	5:00	60	30	39	32	28	27
	6:00	60	35	45	35	30	28
	7:00	60	33	42	34	30	29
	8:00	60	38	50	41	33	29
	9:00	60	38	48	42	34	32
	10:00	60	52	61	53	44	36
	11:00	60	42	50	47	36	32
	12:00	60	49	53	50	48	46
	13:00	60	45	49	47	44	42
	14:00	17	48	59	49	45	43
	14:34	25	47	55	48	45	43
	15:00	60	46	52	49	44	41
	16:00	60	47	50	48	46	44
	17:00	60	44	48	46	44	41
	18:00	60	44	48	46	43	41
	19:00	60	47	52	50	47	42
	20:00	60	48	51	49	48	46
	21:00	60	49	52	51	49	48
	22:00	60	49	52	50	49	47
	23:00	60	49	52	50	49	48
1/13/08	0:00	60	50	55	51	49	47
	1:00	60	48	51	49	48	46
	2:00	60	49	52	51	49	48
	3:00	60	49	52	51	49	48
	4:00	60	46	50	49	46	43
	5:00	60	46	48	46	44	42
	6:00	60	48	51	50	48	46
	7:00	60	46	50	48	46	44
	8:00	60	47	50	48	47	45
	9:00	60	45	49	47	45	43
	10:00	47	46	50	47	45	43



Position MP-2

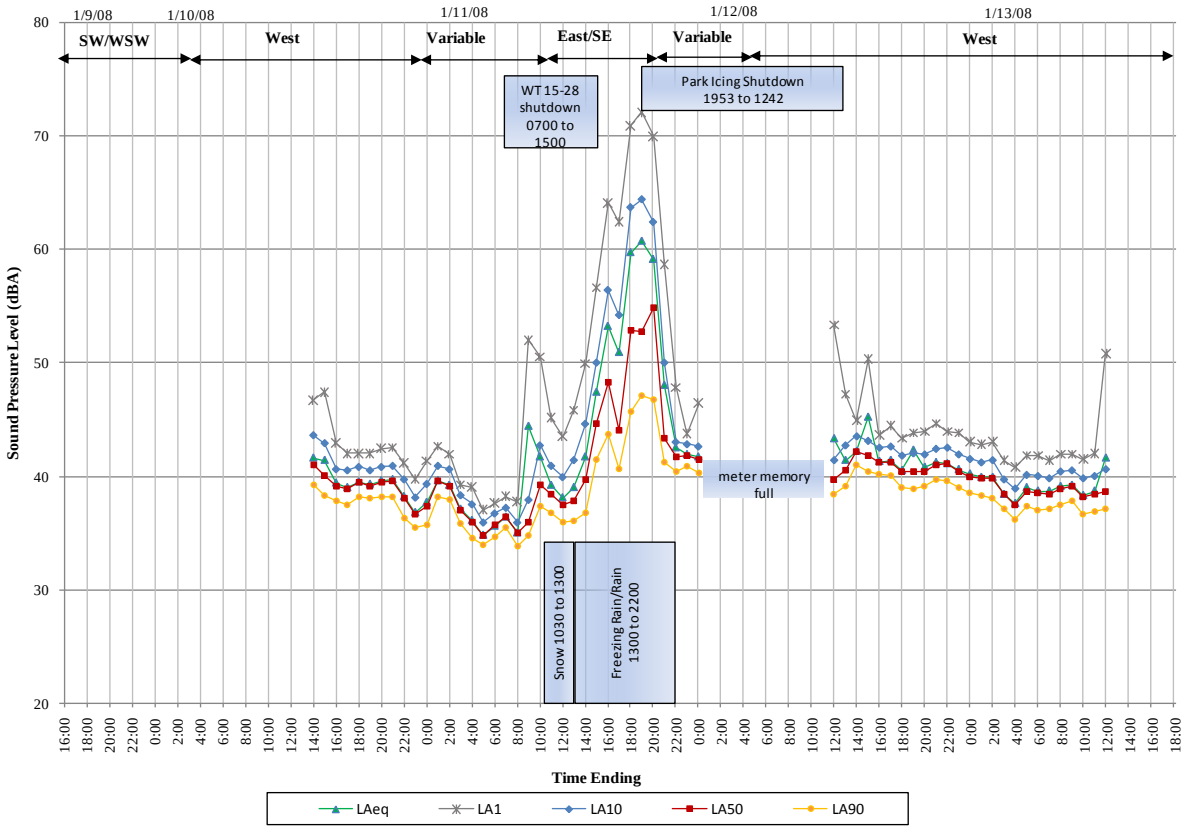
Date	Start Time	Duration (min.)	Measured Sound Levels (dBA) L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}
1/9/08	17:00	60	72	83	75	63	50
	18:00	57	60	71	64	54	46
	18:58	2	42	49	45	42	37
	19:00	60	43	53	45	38	34
	20:00	60	54	65	57	46	40
	21:00	60	60	71	63	52	44
	22:00	60	58	69	61	50	43
	23:00	60	59	69	62	53	44
1/10/08	0:00	60	60	72	64	52	43
	1:00	60	56	67	59	49	40
	2:00	60	56	67	60	49	41
	3:00	60	55	66	59	48	40
	4:00	35	52	63	55	44	38
	4:43	17	48	58	51	43	38
	5:00	60	52	64	55	43	38
	6:00	60	52	64	55	45	39
	7:00	60	53	65	57	47	41
	8:00	60	51	63	55	44	39
	9:00	60	54	66	57	47	40
	10:00	60	53	65	56	45	40
	11:00	60	52	62	55	46	39
	12:00	60	48	59	51	41	36
	13:00	60	50	60	54	44	38
	14:00	60	46	57	49	39	35
	15:00	60	41	51	43	37	34
	16:00	60	38	47	41	36	33
	17:00	60	38	46	40	36	34
	18:00	60	36	44	38	35	33
	19:00	58	35	43	37	34	32
	moved LD812 to MP-1						
	returned LD812 to MP-2						
1/12/08	0:17	42	36	44	35	29	27
	1:00	60	31	42	32	28	26
	2:00	60	32	41	35	30	28

Date	Start Time	Duration (min.)	Measured Sound Levels (dBA) L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}
1/12/08	3:00	60	33	45	35	30	27
	4:00	60	43	54	47	35	28
	5:00	60	45	55	49	42	36
	6:00	60	47	58	50	39	34
	7:00	60	39	49	41	36	33
	8:00	60	42	51	45	39	34
	9:00	60	40	51	41	36	33
	10:00	60	66	79	68	41	35
	11:00	60	38	50	40	34	31
	12:00	60	40	50	42	36	33
	13:00	60	38	44	40	37	35
	14:00	60	44	51	43	40	37
	15:00	60	40	46	41	38	36
	16:00	60	39	46	41	38	36
	17:00	60	37	42	38	36	33
	18:00	60	37	43	39	37	33
	19:00	60	37	43	38	36	35
	20:00	60	37	43	39	37	35
	21:00	60	37	44	39	37	35
	22:00	60	39	47	40	37	36
	23:00	60	35	39	37	35	33
1/13/08	0:00	60	37	46	38	35	33
	1:00	60	34	40	36	34	32
	2:00	60	34	43	36	32	30
	3:00	60	35	45	37	31	29
	4:00	60	33	37	35	32	30
	5:00	60	32	36	34	32	29
	6:00	60	33	40	34	32	30
	7:00	60	34	39	36	34	31
	8:00	60	36	41	37	35	33
	9:00	60	38	47	38	35	33
	10:00	60	38	43	40	37	35
	11:00	23	39	47	40	37	35



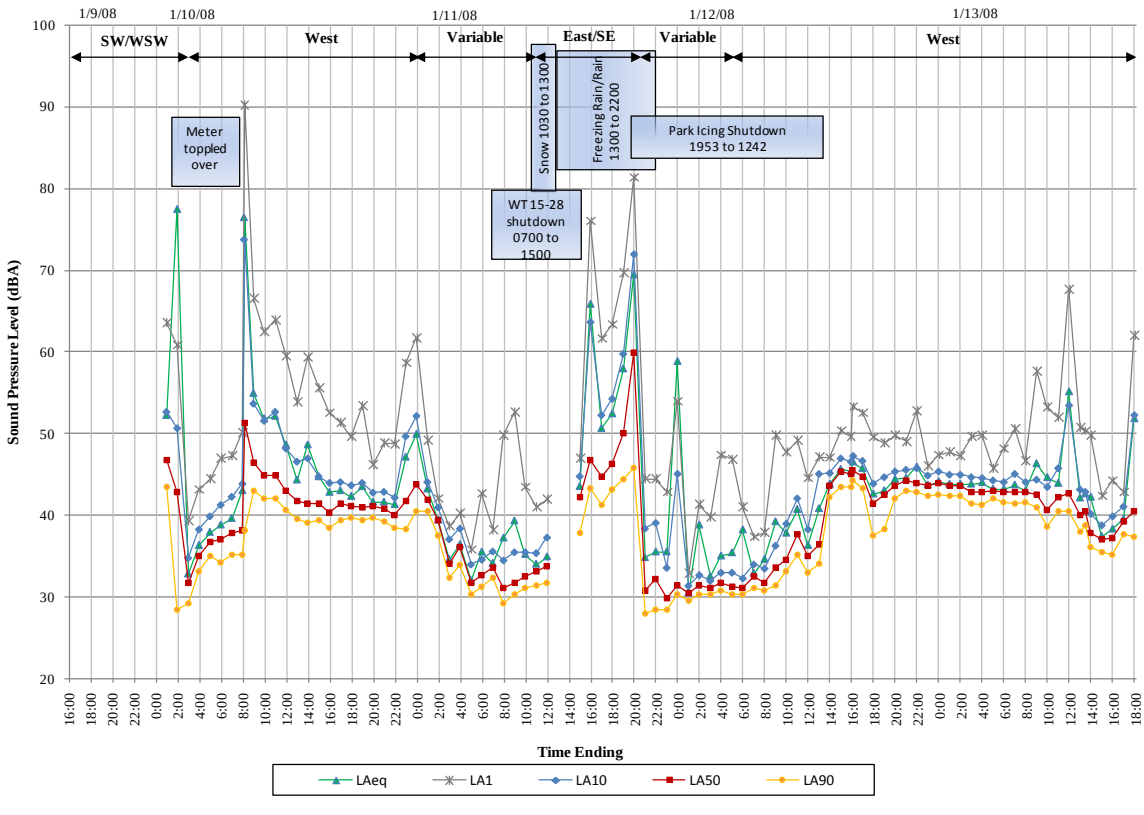
Position MP-4A

Date	Start Time	Duration (min.)	Measured Sound Levels (dBA)				
			L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}
1/10/08	13:00	60	42	47	44	41	39
	14:00	60	41	47	43	40	38
	15:00	60	39	43	41	39	38
	16:00	60	39	42	41	39	37
	17:00	60	40	42	41	39	38
	18:00	60	39	42	41	39	38
	19:00	60	40	42	41	39	38
	20:00	60	40	43	41	40	38
	21:00	60	38	41	40	38	36
	22:00	60	37	40	38	37	35
	23:00	60	38	41	39	37	36
1/11/08	0:00	60	40	43	41	40	38
	1:00	60	39	42	41	39	38
	2:00	60	37	39	38	37	36
	3:00	60	36	39	38	36	35
	4:00	60	35	37	36	35	34
	5:00	60	36	38	37	36	35
	6:00	60	36	38	37	36	35
	7:00	60	35	38	36	35	34
	8:00	60	44	52	38	36	35
	9:00	60	42	51	43	39	37
	10:00	60	39	45	41	38	37
	11:00	60	38	44	40	37	36
	12:00	60	39	46	41	38	36
	13:00	60	42	50	45	40	37
	14:00	60	47	57	50	45	42
	15:00	60	53	64	56	48	44
	16:00	60	51	62	54	44	41
	17:00	60	60	71	64	53	46
	18:00	60	61	72	64	53	47
	19:00	60	59	70	62	55	47
	20:00	60	48	59	50	43	41
	21:00	60	43	48	43	42	40
	22:00	60	42	44	43	42	41
	23:00	60	42	46	43	41	40
	meter memory full						
1/12/08	11:12	47	43	53	41	40	38
	12:00	60	41	47	43	41	39
	13:00	60	42	45	44	42	41
	14:00	60	45	50	43	42	40
	15:00	60	41	44	43	41	40
	16:00	60	41	44	43	41	40
	17:00	60	41	43	42	40	39
	18:00	60	42	44	42	40	39
	19:00	60	41	44	42	40	39
	20:00	60	41	45	42	41	40
	21:00	60	41	44	43	41	40
	22:00	60	41	44	42	40	39
	23:00	60	40	43	42	40	39
1/13/08	0:00	60	40	43	41	40	38
	1:00	60	40	43	41	40	38
	2:00	60	38	41	40	38	37
	3:00	60	38	41	39	37	36
	4:00	60	39	42	40	39	37
	5:00	60	39	42	40	39	37
	6:00	60	39	41	40	38	37
	7:00	60	39	42	40	39	37
	8:00	60	39	42	41	39	38
	9:00	60	38	42	40	38	37
	10:00	60	39	42	40	38	37
	11:00	42	42	51	41	39	37



Position MP-5

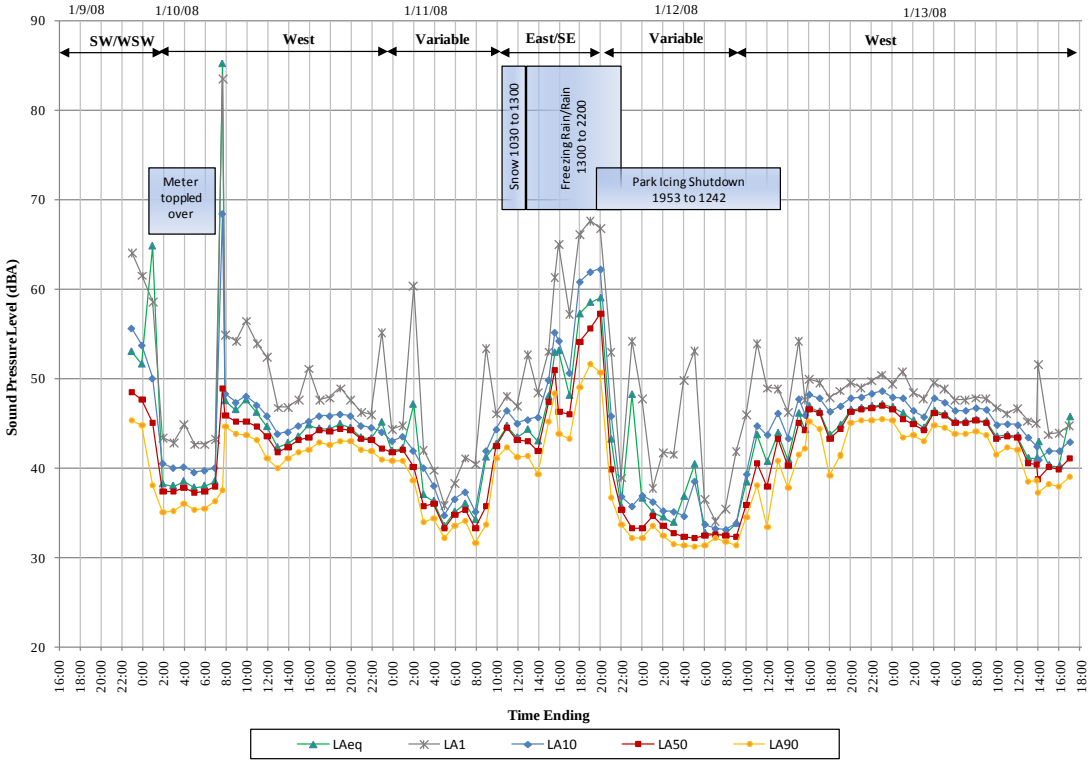
Date	Start Time	Duration (min.)	Measured Sound Levels (dBA) L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}
1/10/08	0:00	60	52	64	53	47	43
	1:00	60	77	61	51	43	28
	2:00	60	33	39	35	32	29
	3:00	60	36	43	38	35	33
	4:00	60	38	44	40	37	35
	5:00	60	39	47	41	37	34
	6:00	60	40	47	42	38	35
	7:00	60	43	50	44	38	35
toppled over	8:00	5	76	90	74	51	38
re-start	8:08	51	55	67	54	46	43
	9:00	60	52	62	52	45	42
	10:00	60	52	64	53	45	42
	11:00	60	49	60	48	43	41
	12:00	60	44	54	47	42	40
	13:00	60	49	59	47	41	39
	14:00	60	45	56	45	41	39
	15:00	60	43	53	44	40	38
	16:00	60	43	51	44	41	39
	17:00	60	42	50	44	41	40
	18:00	60	44	53	44	41	39
	19:00	60	42	46	43	41	40
	20:00	60	42	49	43	41	39
	21:00	60	41	49	42	40	38
	22:00	60	47	59	50	42	38
	23:00	60	50	62	52	44	40
1/11/08	0:00	60	43	49	44	42	41
	1:00	60	39	42	41	39	38
	2:00	60	35	39	37	34	32
	3:00	60	36	40	38	36	34
	4:00	60	32	36	34	32	30
	5:00	60	36	43	35	33	31
	6:00	60	34	38	36	34	32
	7:00	60	37	50	34	31	29
	8:00	60	39	53	35	32	30
1/11/08	9:00	60	35	43	35	33	31
	10:00	60	34	41	35	33	31
	11:00	60	35	42	37	34	32
			meter memory full				
	14:54	5	44	47	45	42	38
	15:00	60	66	76	64	47	43
	16:00	60	51	62	52	45	41
	17:00	60	52	63	54	46	43
	18:00	60	58	70	60	50	44
	19:00	60	69	81	72	60	46
	20:00	60	35	44	38	31	28
	21:00	60	36	44	39	32	28
	22:00	60	36	43	34	30	28
	23:00	60	59	54	45	31	30
1/12/08	0:00	60	31	33	31	30	30
	1:00	60	39	41	33	31	30
	2:00	60	33	40	32	31	30
	3:00	60	35	47	33	32	31
	4:00	60	35	47	33	31	30
	5:00	60	38	41	32	31	30
	6:00	60	33	37	34	33	31
	7:00	60	35	38	33	32	31
	8:00	60	39	50	36	34	31
	9:00	60	38	48	39	35	33
	10:00	60	41	49	42	38	35
	11:00	60	36	45	38	35	33
	12:00	60	41	47	45	36	34
	13:00	60	44	47	45	44	42
	14:00	60	46	50	47	45	44
	15:00	55	45	50	47	45	43
	15:55	3	47	53	47	46	44
	16:08	51	46	53	47	45	43
	17:00	60	43	50	44	41	38
	18:00	60	43	49	45	43	38
	19:00	60	44	50	45	44	42
	20:00	60	45	49	46	44	43
	21:00	60	46	53	46	44	43
	22:00	60	44	46	45	44	42
	23:00	60	44	47	45	44	43
1/13/08	0:00	60	44	48	45	44	42
	1:00	60	44	47	45	44	42
	2:00	60	44	50	45	43	41
	3:00	60	44	50	45	43	41
	4:00	60	43	46	44	43	42
	5:00	60	43	48	44	43	42
	6:00	60	44	51	45	43	41
	7:00	60	43	47	44	43	42
	8:00	60	46	58	44	43	41
	9:00	60	45	53	43	41	39
	10:00	60	44	52	46	42	41
	11:00	60	55	68	53	43	40
	12:00	60	42	51	43	40	38
	13:00	23	43	50	43	40	39
	13:29	30	42	50	40	38	36
	14:00	60	37	42	39	37	36
	15:00	60	38	44	40	37	35
	16:00	60	40	43	41	39	38
	17:00	3	52	62	52	40	37



Position MP-6A

Date	Start Time	Duration (min.)	Measured Sound Levels (dBA) L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}
1/9/08	22:00	60	53	64	56	48	45
	23:00	60	52	62	54	48	45
1/10/08	0:00	60	65	59	50	45	38
	1:00	60	38	43	41	37	35
	2:00	60	38	43	40	37	35
	3:00	60	39	45	40	38	36
	4:00	60	38	43	40	37	35
	5:00	60	38	43	40	37	35
	6:00	60	39	43	40	38	36
toppled over	7:00	32	85	84	68	49	38
re-start	7:42	18	48	55	48	46	45
	8:00	60	47	54	47	45	44
	9:00	60	48	56	48	45	44
	10:00	60	46	54	47	45	43
	11:00	60	45	52	46	44	41
	12:00	60	42	47	44	42	40
	13:00	60	43	47	44	42	41
	14:00	60	44	48	45	43	42
	15:00	60	45	51	45	43	42
	16:00	60	44	48	46	44	43
	17:00	60	44	48	46	44	43
	18:00	60	45	49	46	44	43
	19:00	60	45	48	46	44	43
	20:00	60	43	46	45	43	42
	21:00	60	43	46	45	43	42
	22:00	60	45	55	44	42	41
	23:00	60	42	44	43	42	41
1/11/08	0:00	60	42	45	44	42	41
	1:00	60	47	60	42	40	39
	2:00	60	37	42	40	36	34
	3:00	60	36	40	38	36	34
	4:00	60	34	36	35	33	32
	5:00	60	35	38	37	35	34
	6:00	60	36	41	37	35	34
	7:00	60	34	40	35	33	32
	8:00	60	41	53	42	36	34
	9:00	60	43	46	44	43	41
	10:00	60	45	48	46	44	42
	11:00	60	43	47	45	43	41
	12:00	60	44	53	45	43	41
	13:00	60	43	48	46	42	39
	14:00	60	48	53	50	47	45
	15:00	36	53	61	55	51	48
	15:34	25	53	65	54	46	44
	16:00	60	48	57	51	46	43
	17:00	60	57	66	61	54	49
	18:00	60	59	68	62	56	52
	19:00	60	59	67	62	57	51
	20:00	60	43	53	46	40	37
	21:00	60	36	39	37	35	34
	22:00	60	48	54	36	33	32

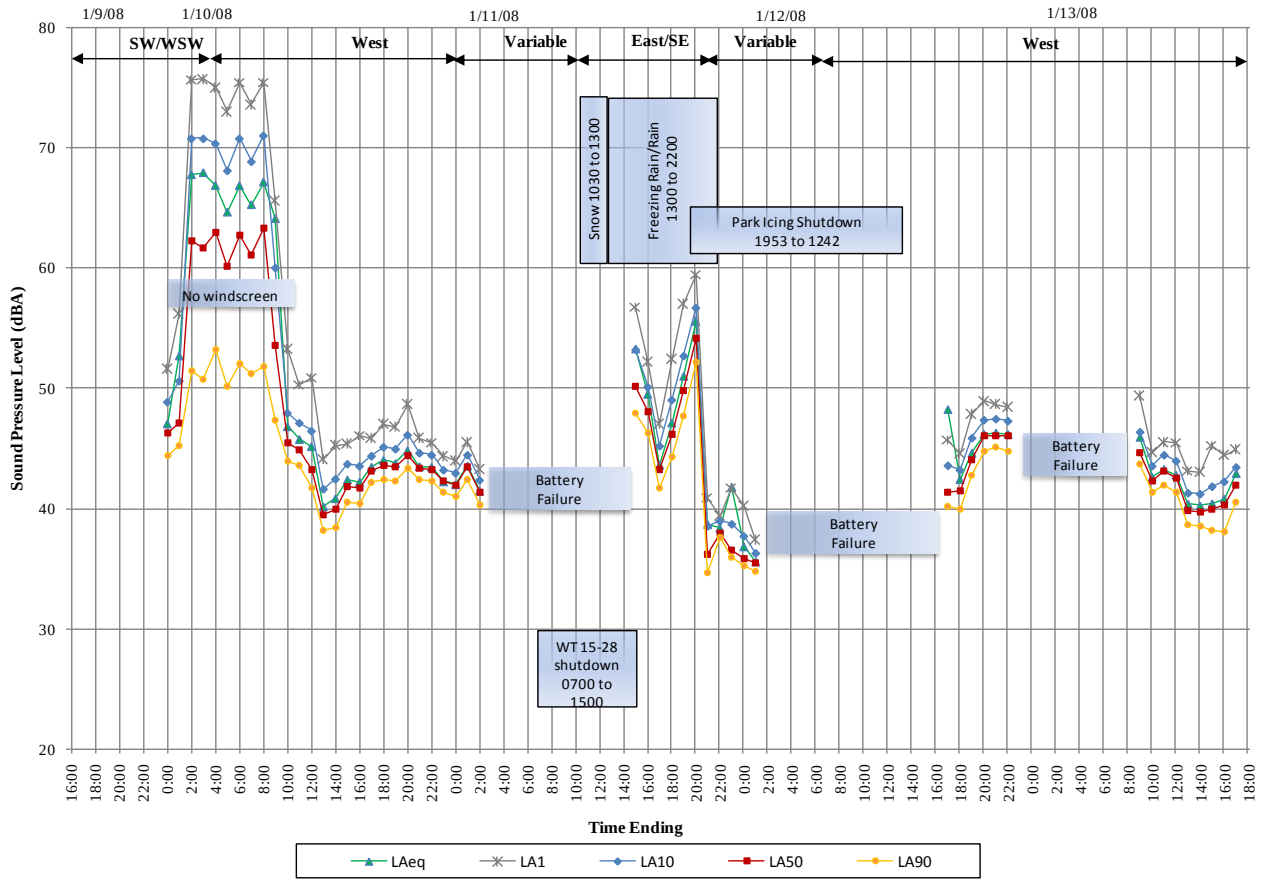
Date	Start Time	Duration (min.)	Measured Sound Levels (dBA) L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}
	23:00	60	37	48	37	33	32
1/12/08	0:00	60	35	38	36	35	34
	1:00	60	35	42	35	34	32
	2:00	60	34	42	35	33	32
	3:00	60	37	50	35	32	31
	4:00	60	40	53	39	32	31
	5:00	60	33	37	34	33	31
	6:00	60	33	34	33	33	32
	7:00	60	33	35	33	33	32
	8:00	60	34	42	34	32	31
	9:00	60	38	46	39	36	35
	10:00	60	44	54	45	41	38
	11:00	60	41	49	44	38	33
	12:00	60	44	49	46	43	41
	13:00	60	41	46	43	40	38
	14:00	60	46	54	48	45	42
	15:00	28	44	48	46	44	42
	15:36	23	47	50	48	47	45
	16:00	60	46	50	48	46	44
	17:00	60	44	48	46	43	39
	18:00	60	45	49	47	44	41
	19:00	60	47	50	48	46	45
	20:00	60	47	49	48	47	45
	21:00	60	47	50	48	47	45
	22:00	60	47	50	49	47	46
	23:00	60	47	49	48	47	45
	0:00	60	46	51	48	45	43
1/13/08	1:00	60	45	48	46	45	44
	2:00	60	45	48	46	44	43
	3:00	60	46	50	48	46	45
	4:00	60	46	49	47	46	45
	5:00	60	45	48	46	45	44
	6:00	60	45	48	46	45	44
	7:00	60	45	48	47	45	44
	8:00	60	45	48	47	45	44
	9:00	60	44	47	45	43	42
	10:00	60	44	46	45	44	42
	11:00	60	44	47	45	43	42
	12:00	60	41	45	43	41	39
	13:00	41	41	45	42	40	39
	13:50	10	43	52	41	39	37
	14:00	60	40	44	42	40	38
	15:00	60	40	44	42	40	38
	16:00	50	46	45	43	41	39



Position MP-7A

Date	Start Time	Duration (min.)	Measured Sound Levels (dBA)				
			L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}
1/9/08	23:00	60	47	52	49	46	44
	0:00	60	53	56	51	47	45
1/10/08	1:00	60	68	76	71	62	51
	2:00	60	68	76	71	62	51
	3:00	60	67	75	70	63	53
	4:00	60	65	73	68	60	50
	5:00	60	67	75	71	63	52
	6:00	60	65	74	69	61	51
	7:00	60	67	75	71	63	52
	8:00	60	64	66	60	54	47
	9:00	32	47	53	48	46	44
	10:00	18	46	50	47	45	44
	11:00	60	45	51	46	43	42
	12:00	60	40	44	42	40	38
	13:00	60	41	45	42	40	38
	14:00	60	42	45	44	42	40
	15:00	60	42	46	44	42	40
	16:00	60	43	46	44	43	42
	17:00	60	44	47	45	44	42
	18:00	60	44	47	45	44	42
	19:00	60	45	49	46	44	43
	20:00	60	43	46	45	43	42
	21:00	60	43	45	44	43	42
	22:00	60	42	44	43	42	41
	23:00	60	42	44	43	42	41
1/11/08	0:00	60	44	46	44	43	42
	1:00	60	41	43	42	41	40
			battery failed				

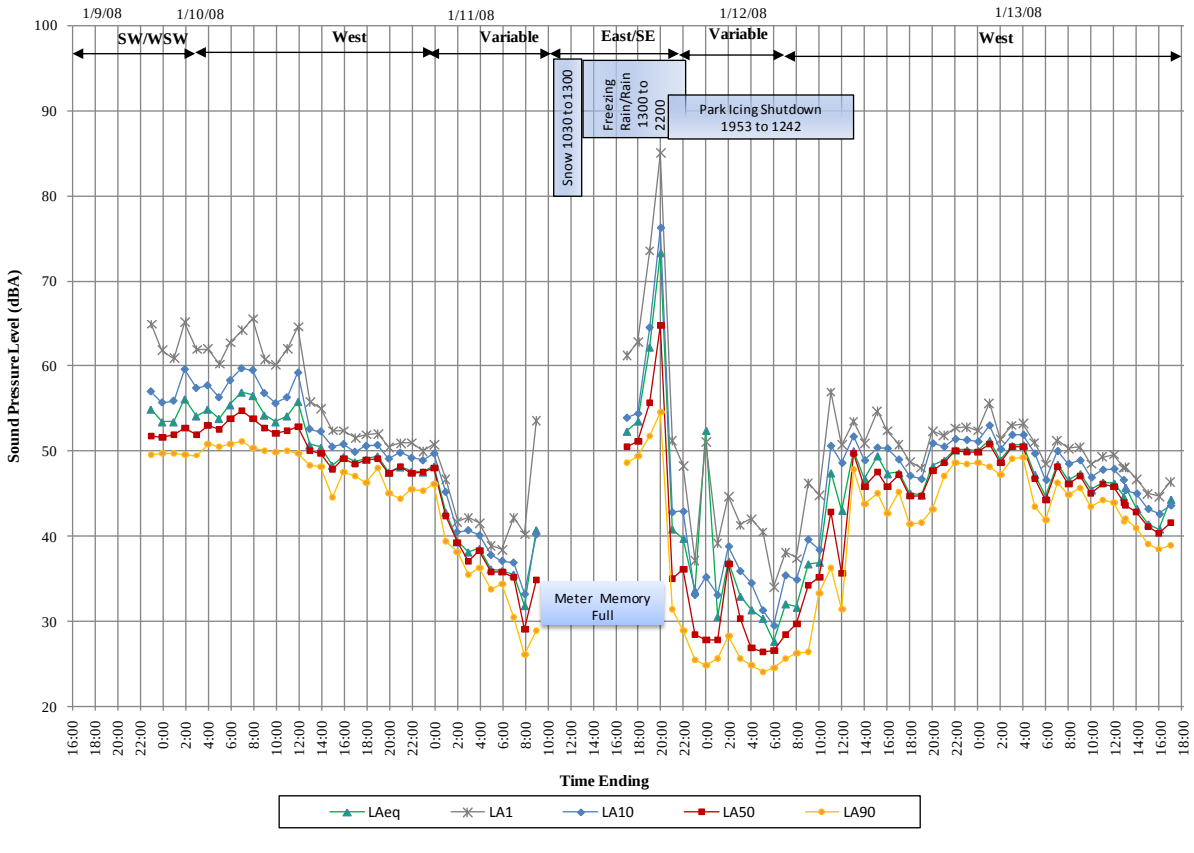
Date	Start Time	Duration (min.)	Measured Sound Levels (dBA)				
			L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}
	14:00	60	53	57	53	50	48
	15:00	60	49	52	50	48	46
	16:00	60	44	47	45	43	42
	17:00	60	47	52	49	46	44
	18:00	60	51	57	53	50	48
	19:00	60	56	59	57	54	52
	20:00	60	39	41	39	36	35
	21:00	60	38	39	39	38	38
	22:00	60	42	42	39	37	36
	23:00	60	37	40	38	36	35
1/12/08	0:00	60	36	37	36	36	35
			battery failed				
	16:00	60	48	46	44	41	40
	17:00	60	42	45	43	42	40
	18:00	60	45	48	46	44	43
	19:00	60	46	49	47	46	45
	20:00	60	46	49	47	46	45
	21:00	60	46	48	47	46	45
			battery failed				
1/13/08	8:00	60	46	49	46	45	44
	9:00	60	43	45	44	42	41
	10:00	60	43	46	44	43	42
	11:00	60	43	45	44	43	41
	12:00	60	40	43	41	40	39
	13:00	60	40	43	41	40	38
	14:00	60	40	45	42	40	38
	15:00	60	41	44	42	40	38
	16:00	36	43	45	43	42	41



Position MP-8

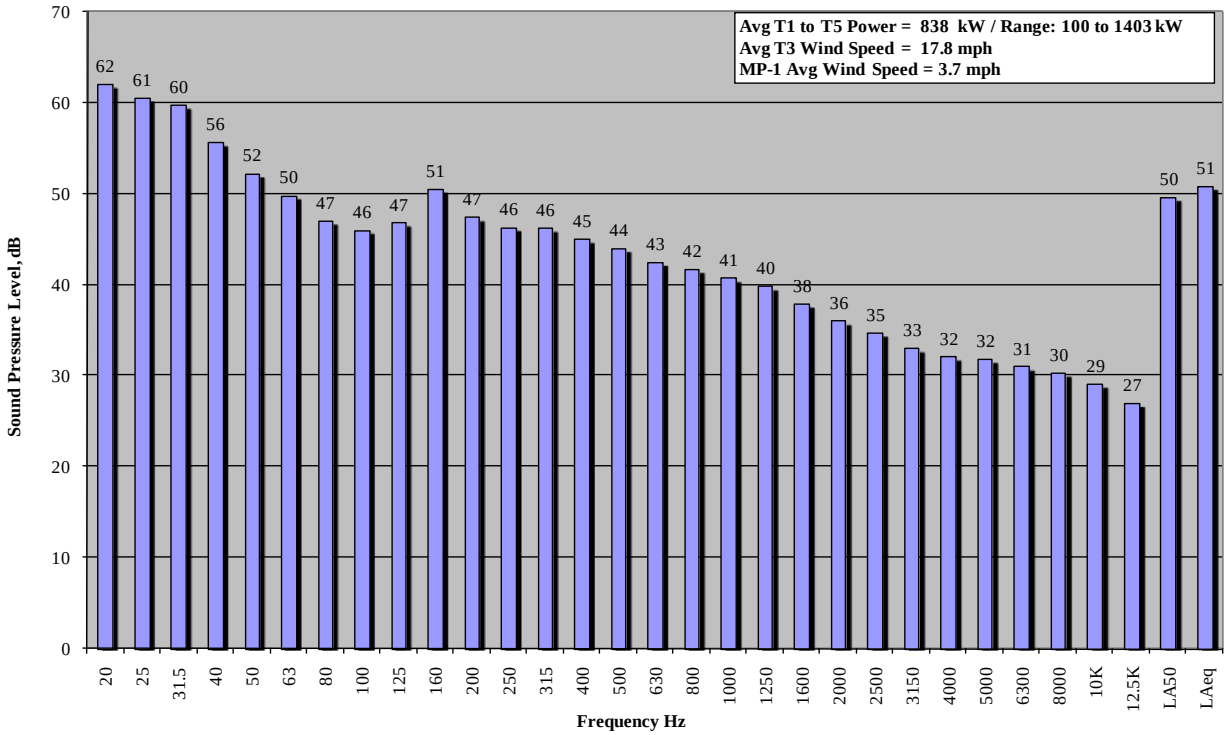
Date	Start Time	Duration (min.)	Measured Sound Levels (dBA) L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}
	22:00	60	55	65	57	52	50
	23:00	60	53	62	56	52	50
1/10/08	0:00	60	53	61	56	52	50
	1:00	60	56	65	60	53	50
	2:00	60	54	62	57	52	50
	3:00	60	55	62	58	53	51
	4:00	60	54	60	56	53	51
	5:00	60	55	63	58	54	51
	6:00	60	57	64	60	55	51
	7:00	60	57	66	60	54	50
	8:00	60	54	61	57	53	50
	9:00	60	53	60	56	52	50
	10:00	60	54	62	56	52	50
	11:00	60	56	65	59	53	50
	12:00	60	51	56	53	50	48
	13:00	60	50	55	52	50	48
	14:00	60	48	52	51	48	45
	15:00	60	49	52	51	49	48
	16:00	60	49	52	50	49	47
	17:00	60	49	52	51	49	46
	18:00	60	49	52	51	49	48
	19:00	60	48	50	49	47	45
	20:00	60	48	51	50	48	44
	21:00	60	48	51	49	47	46
	22:00	60	48	50	49	48	45
	23:00	60	48	51	50	48	46
1/11/08	0:00	60	43	47	45	42	39
	1:00	60	39	42	41	39	38
	2:00	60	38	42	41	37	36
	3:00	60	39	42	40	38	36
	4:00	60	36	39	38	36	34
	5:00	60	36	38	37	36	34
	6:00	60	36	42	37	35	31
	7:00	60	32	40	33	29	26
	8:00	60	41	54	40	35	29
			meter memory full				
	16:30	29	52	61	54	51	49
	17:00	60	54	63	54	51	49
	18:00	60	62	74	65	56	52
	19:00	60	73	85	76	65	55
	20:00	60	41	51	43	35	31
	21:00	60	40	48	43	36	29
	22:00	60	34	37	33	28	25
	23:00	60	52	51	35	28	25

Date	Start Time	Duration (min.)	Measured Sound Levels (dBA) L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}
1/12/08	0:00	60	31	39	33	28	26
	1:00	60	37	45	39	37	28
	2:00	60	33	41	36	30	26
	3:00	60	31	42	35	27	25
	4:00	60	30	41	31	26	24
	5:00	60	28	34	30	27	24
	6:00	60	32	38	35	29	26
	7:00	60	32	37	35	30	26
	8:00	60	37	46	40	34	26
	9:00	60	37	45	38	35	33
	10:00	60	47	57	51	43	36
	11:00	60	43	51	49	36	31
	12:00	60	50	54	52	50	48
	13:00	60	47	51	49	46	44
	14:00	59	49	55	50	48	45
	15:06	53	47	52	50	46	43
	16:00	60	47	51	49	47	45
	17:00	60	45	49	47	45	41
	18:00	60	45	48	47	45	42
	19:00	60	48	52	51	48	43
	20:00	60	49	52	51	49	47
	21:00	60	50	53	51	50	49
	22:00	60	50	53	51	50	49
	23:00	60	50	52	51	50	49
1/13/08	0:00	60	51	56	53	51	48
	1:00	60	49	51	50	49	47
	2:00	60	51	53	52	51	49
	3:00	60	51	53	52	51	49
	4:00	60	47	51	50	47	43
	5:00	60	45	49	47	44	42
	6:00	60	48	51	50	48	46
	7:00	60	47	50	49	46	45
	8:00	60	47	50	49	47	46
	9:00	60	45	49	47	45	44
	10:00	60	46	49	48	46	44
	11:00	60	46	50	48	46	44
	12:00	41	45	48	47	44	42
	12:49	10	46	48	45	44	42
	13:00	60	43	47	45	43	41
	14:00	60	41	45	43	41	39
	15:00	60	41	45	43	40	39
	16:00	50	44	46	44	42	39

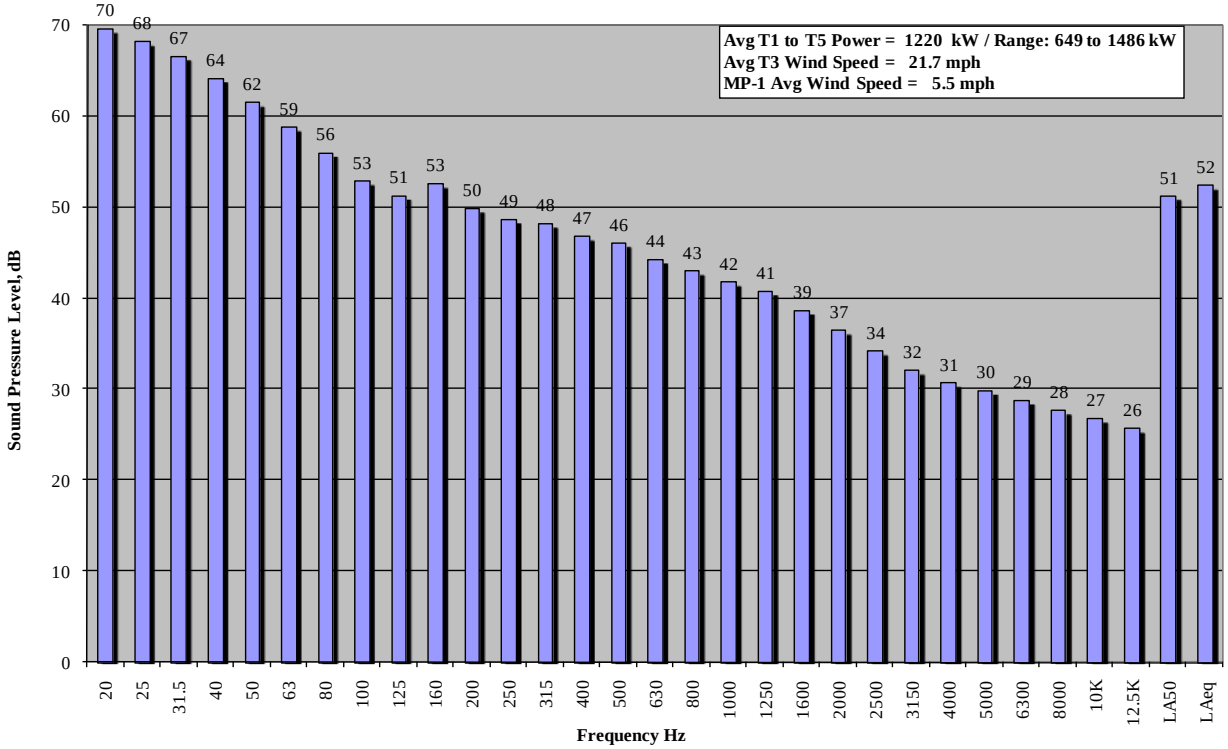


APPENDIX V – Rev. 1
ONE-THIRD OCTAVE BAND SOUND LEVEL MEASUREMENTS – JANUARY 2008

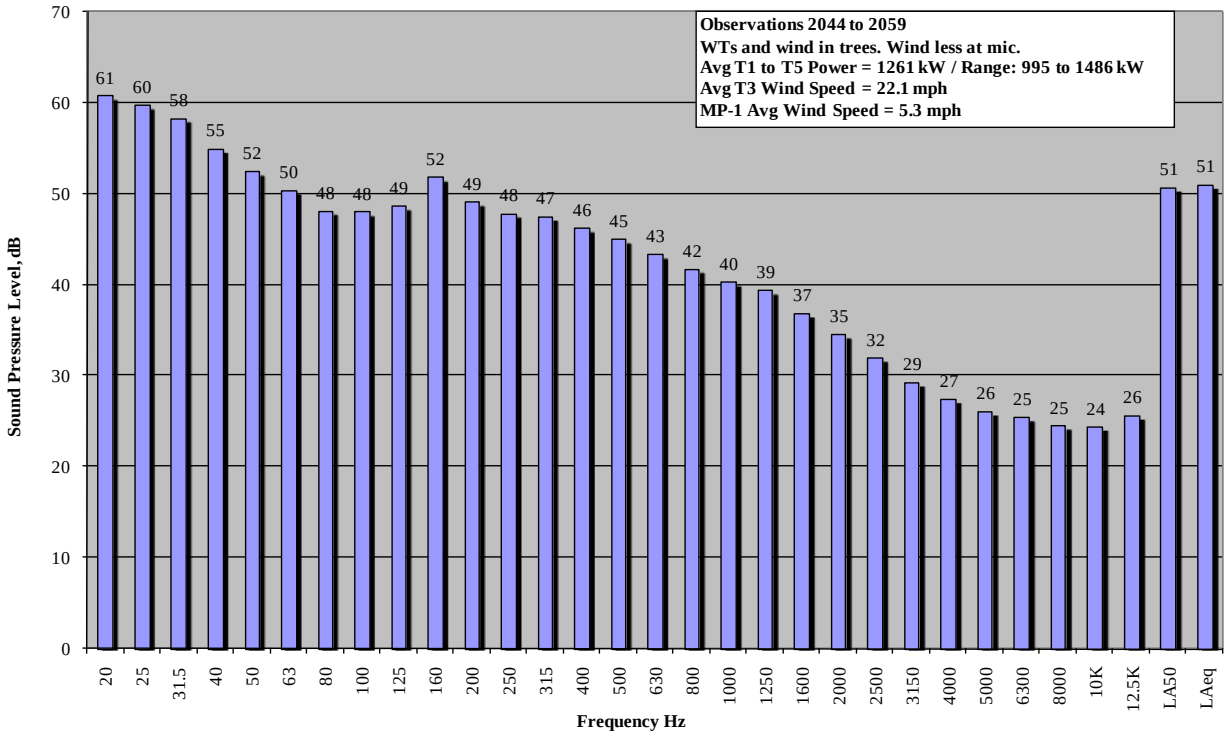
MP-1
9-Jan-08 19:00 to 20:00



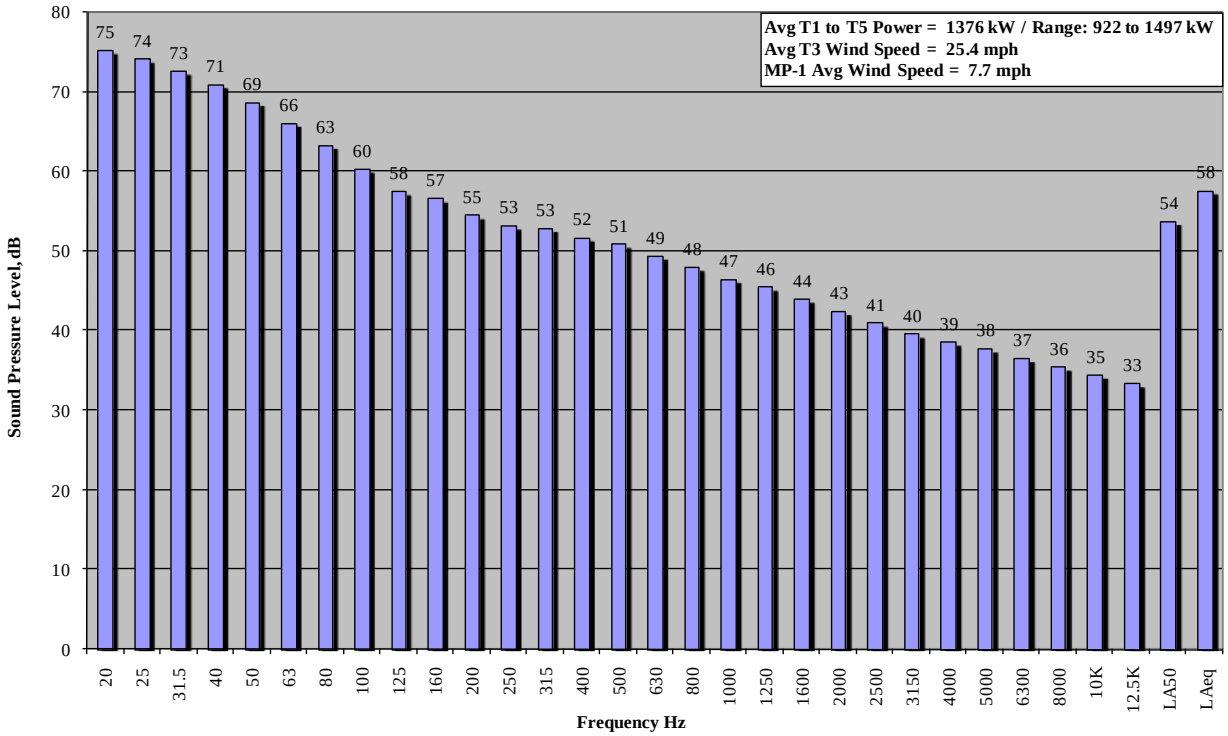
MP-1
9-Jan-08 20:00 to 21:00



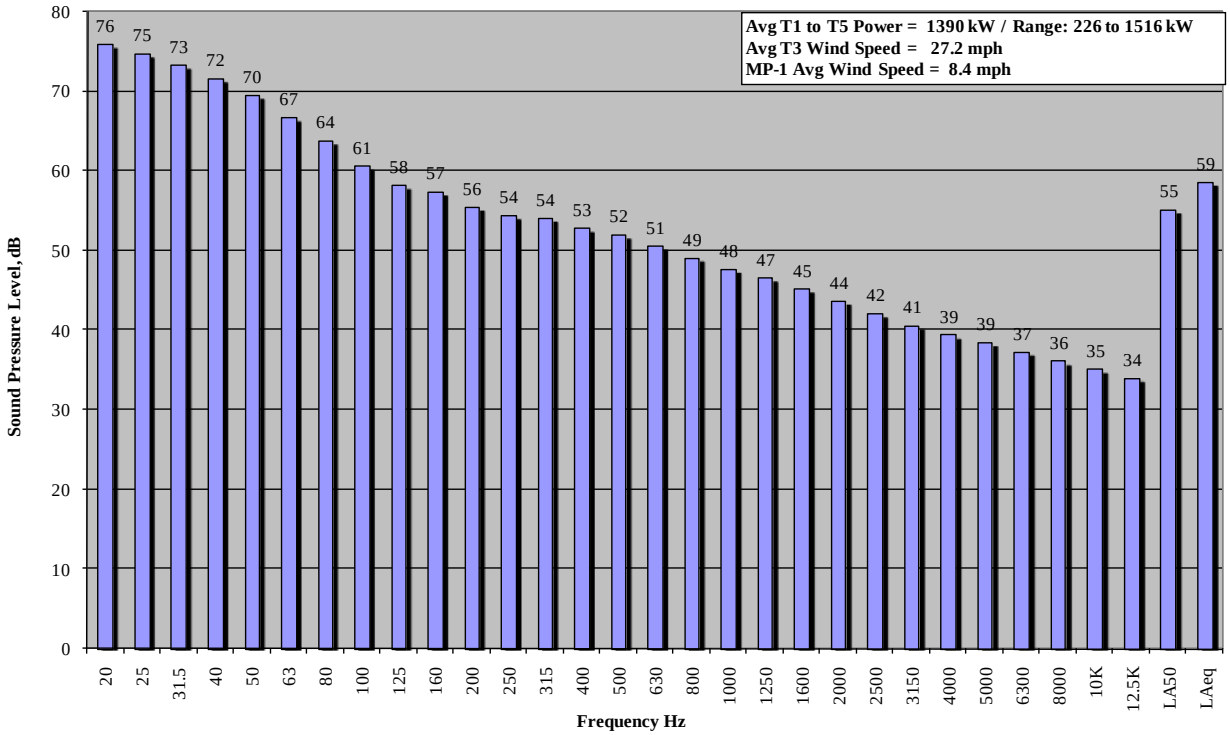
MP-1
9-Jan-08 20:44 to 20:59



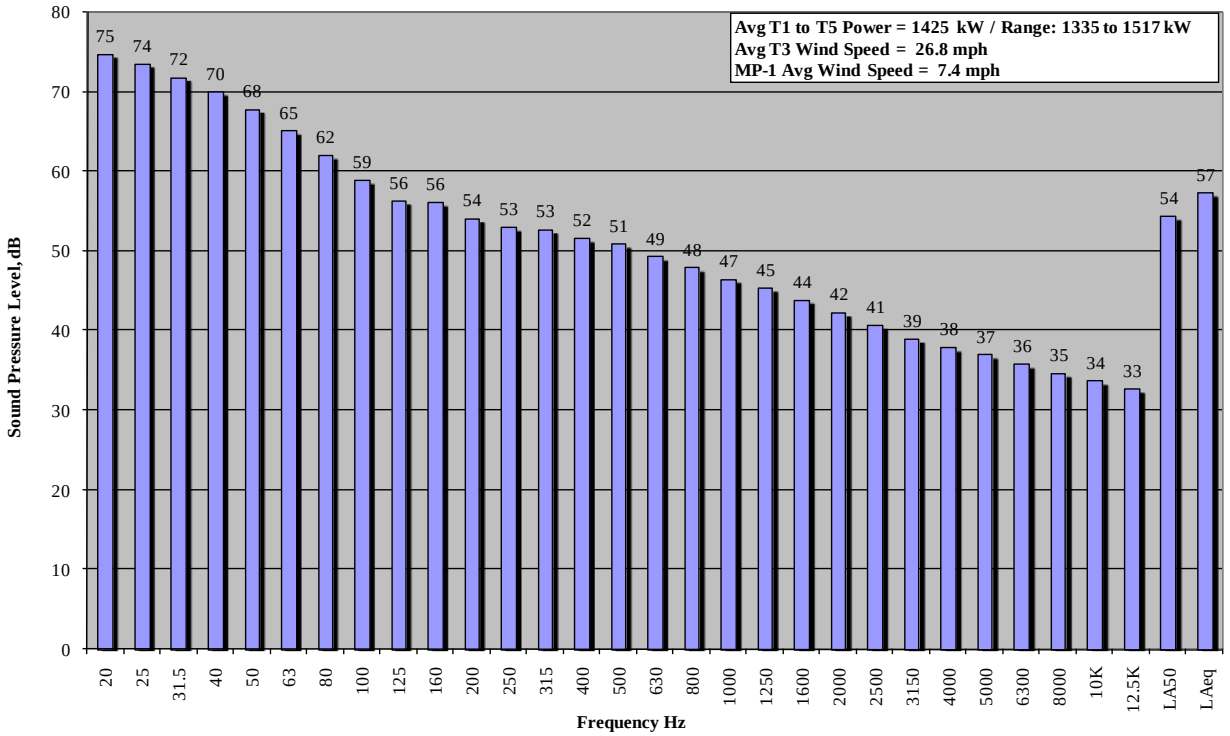
MP-1
9-Jan-08 21:00 to 22:00



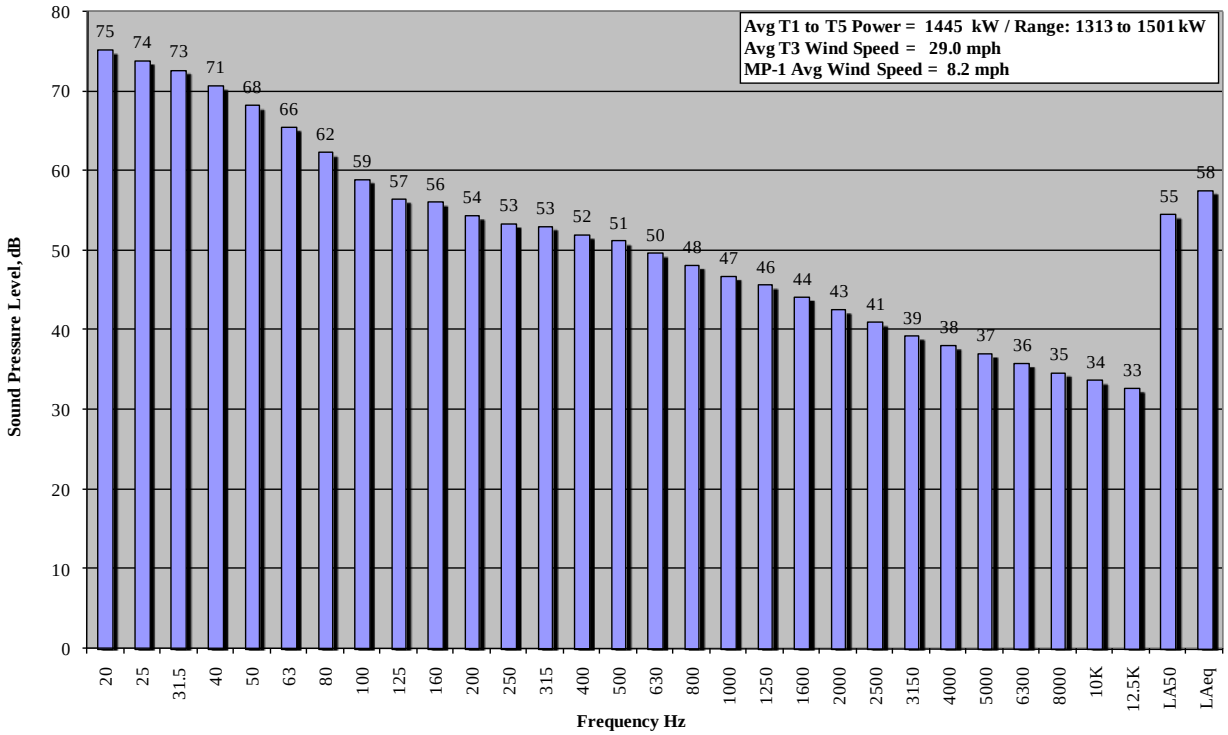
MP-1
9-Jan-08 22:00 to 23:00



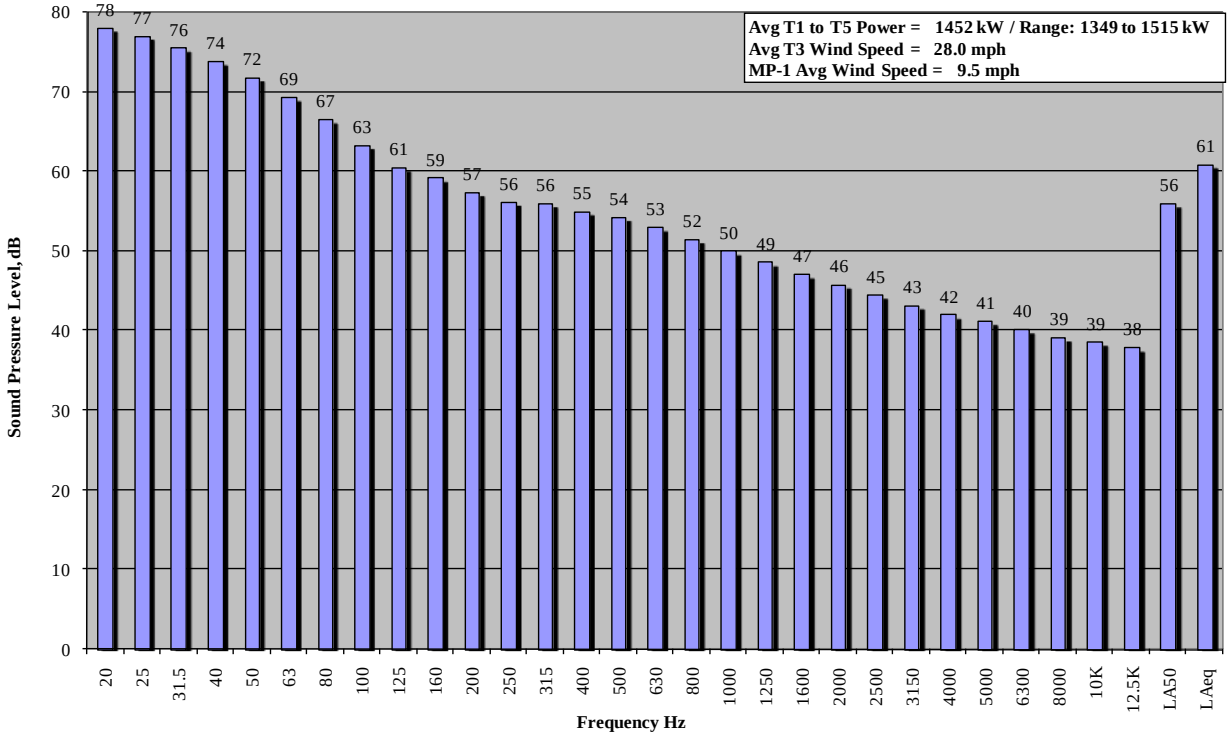
MP-1
9-Jan-08 23:00 to 00:00



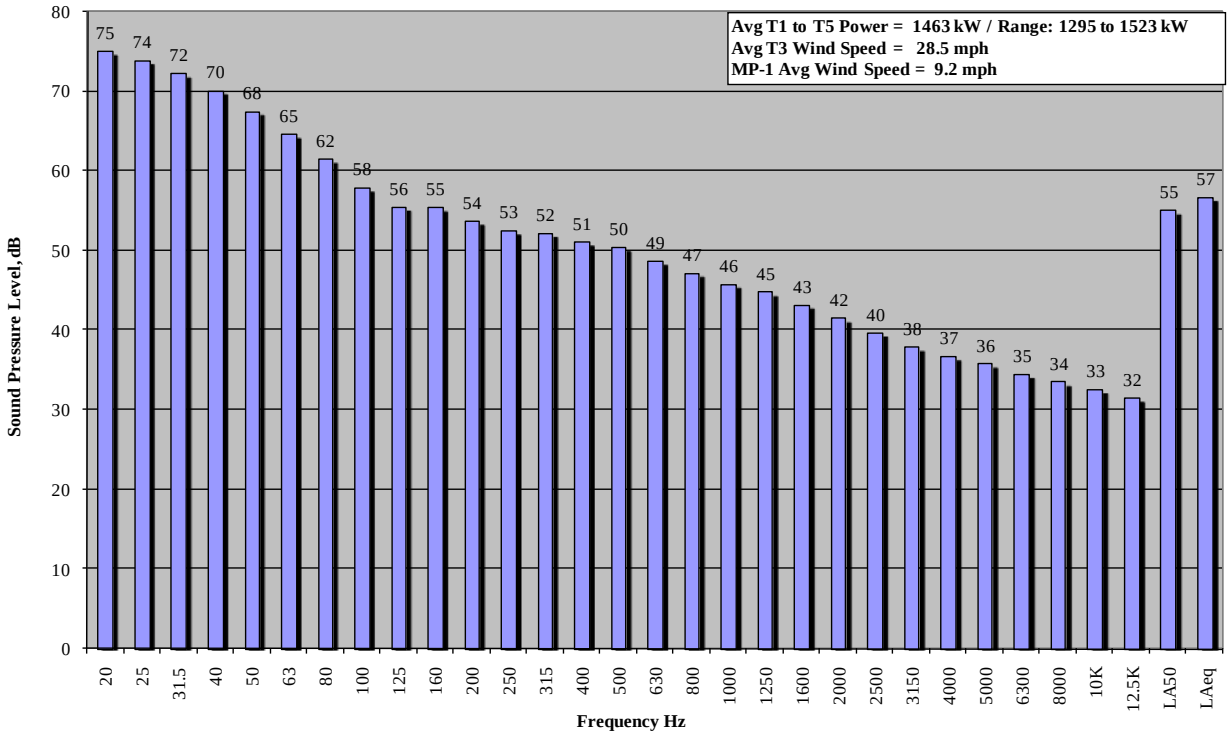
MP-1
10-Jan-08 00:00 to 01:00



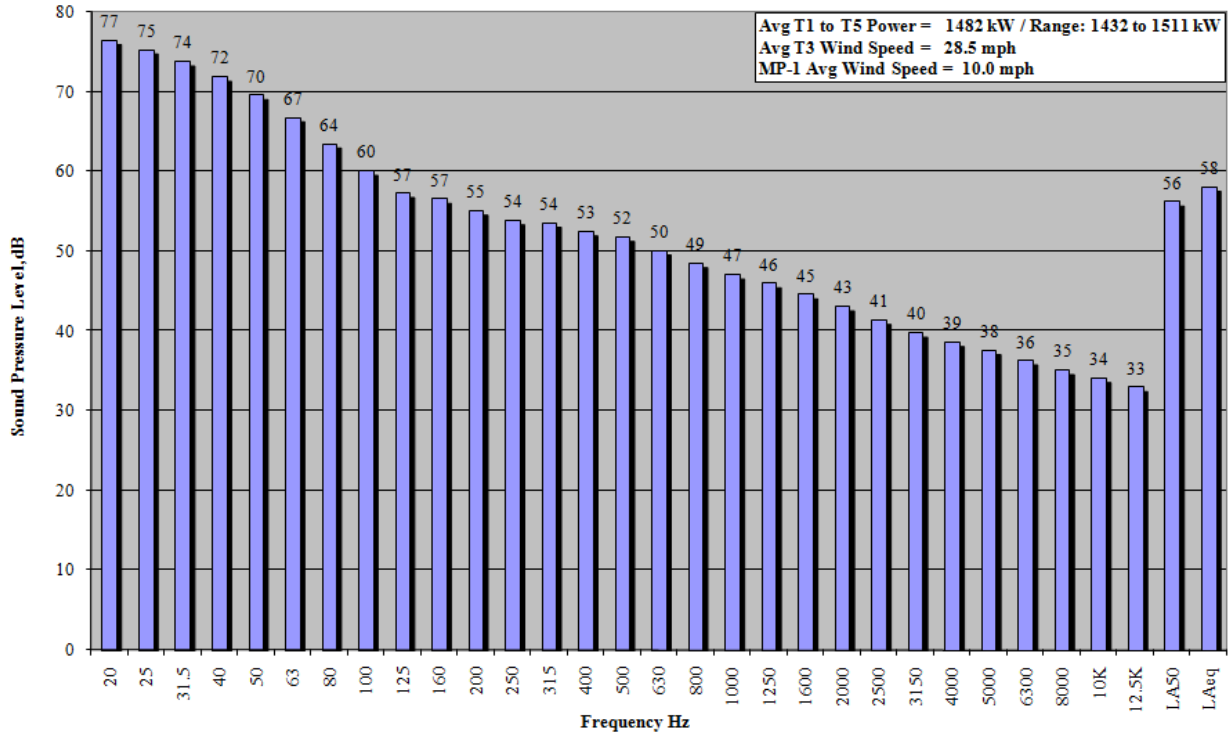
MP-1
10-Jan-08 01:00 to 02:00



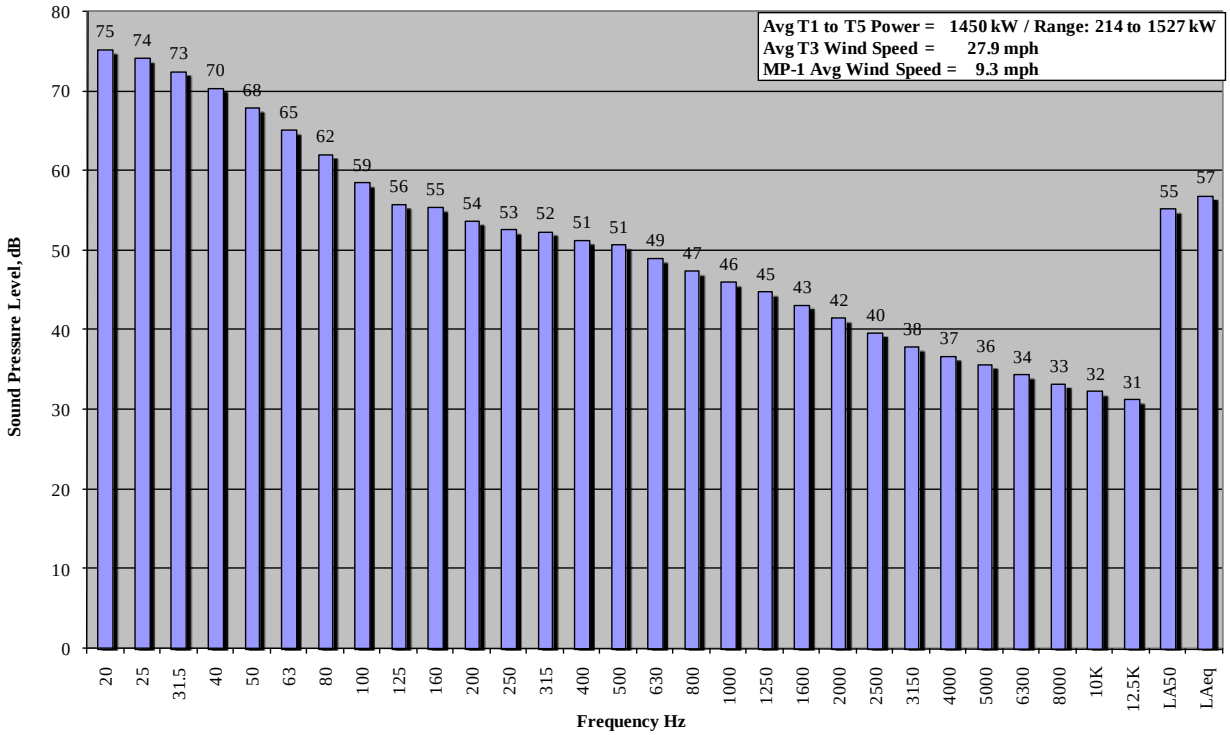
MP-1
10-Jan-08 02:00 to 03:00



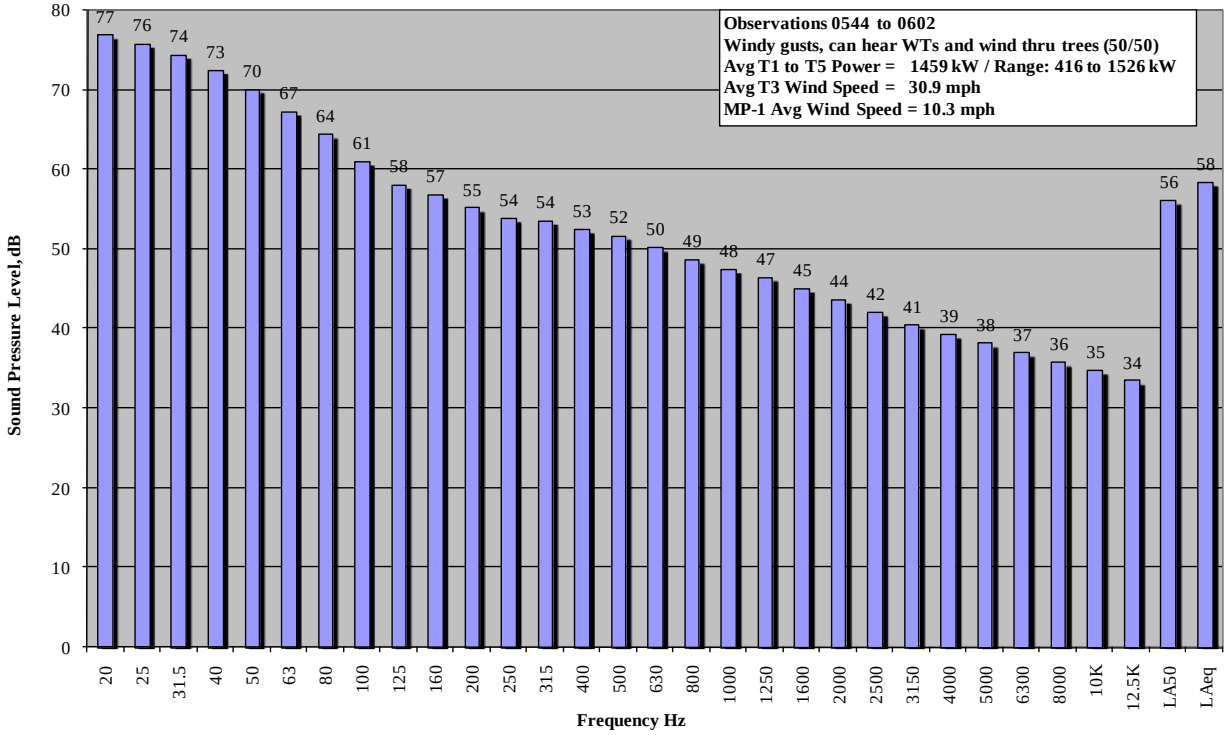
MP-1
10-Jan-08 03:00 to 04:00

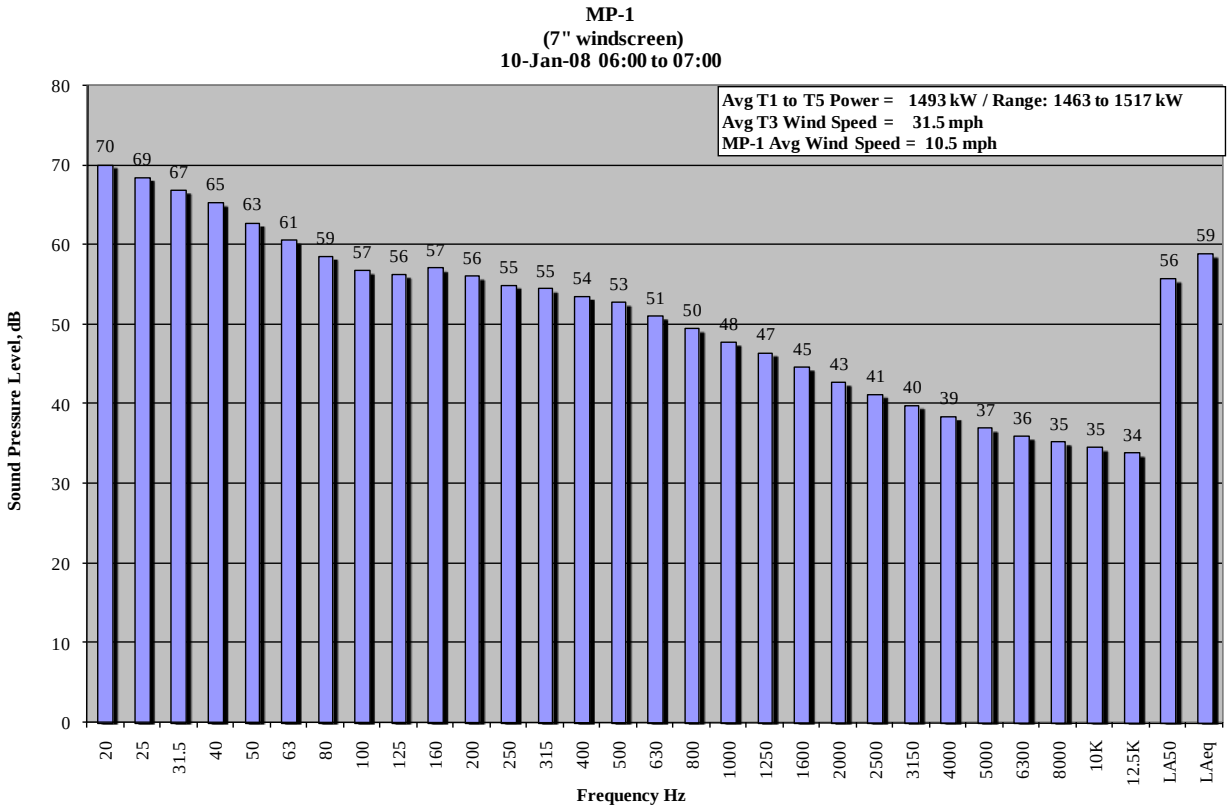


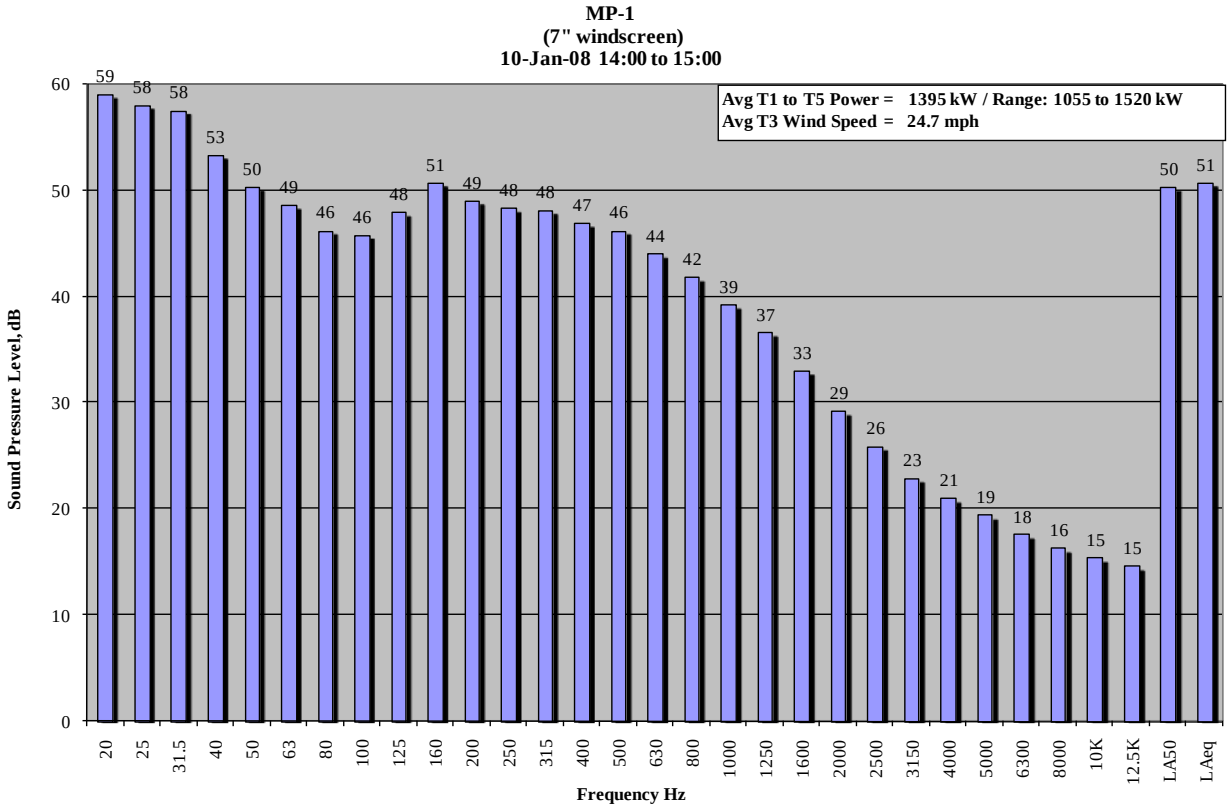
MP-1
10-Jan-08 04:00 to 05:00

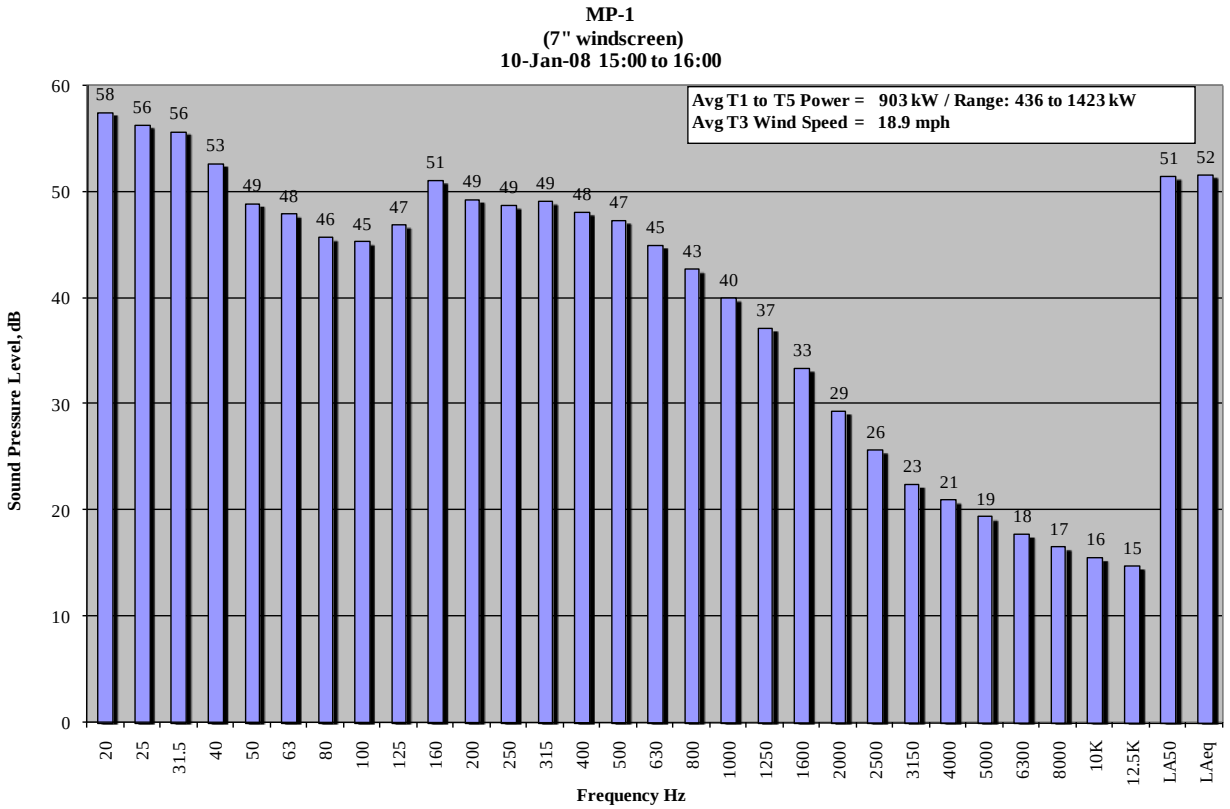


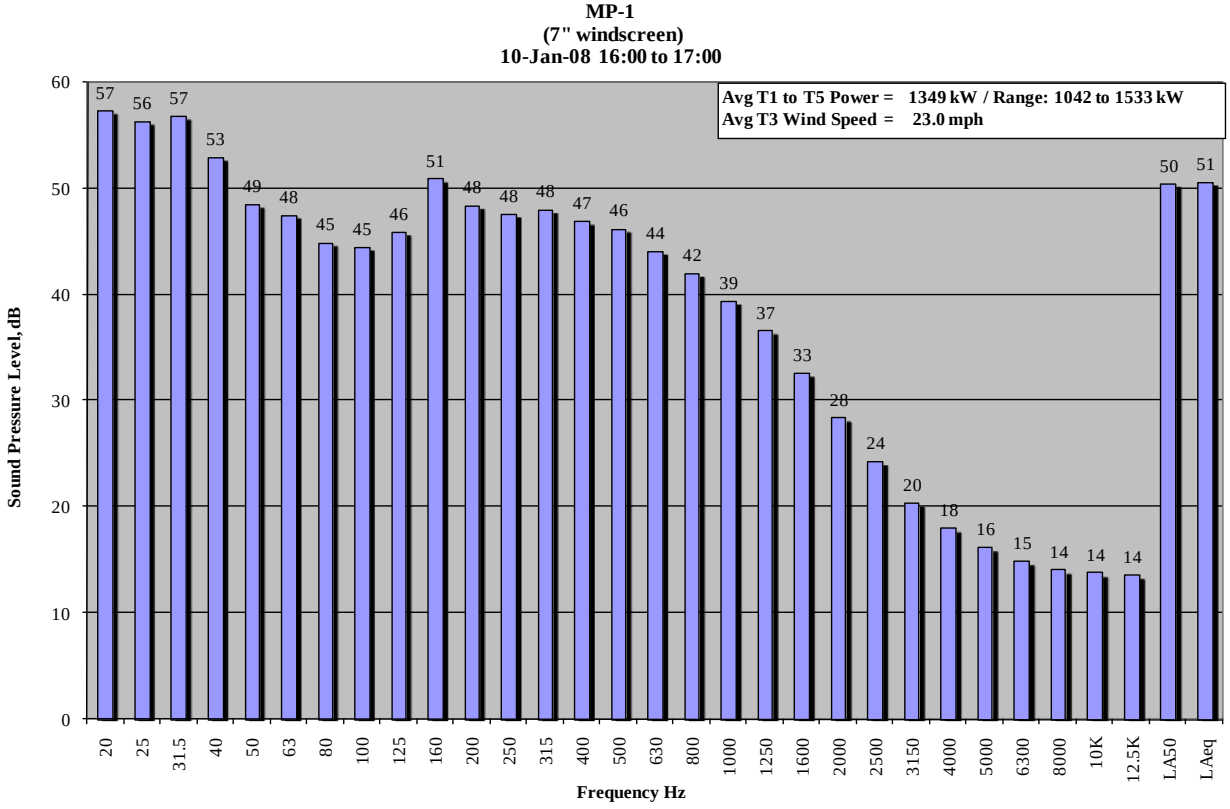
MP-1
10-Jan-08 05:00 to 06:00

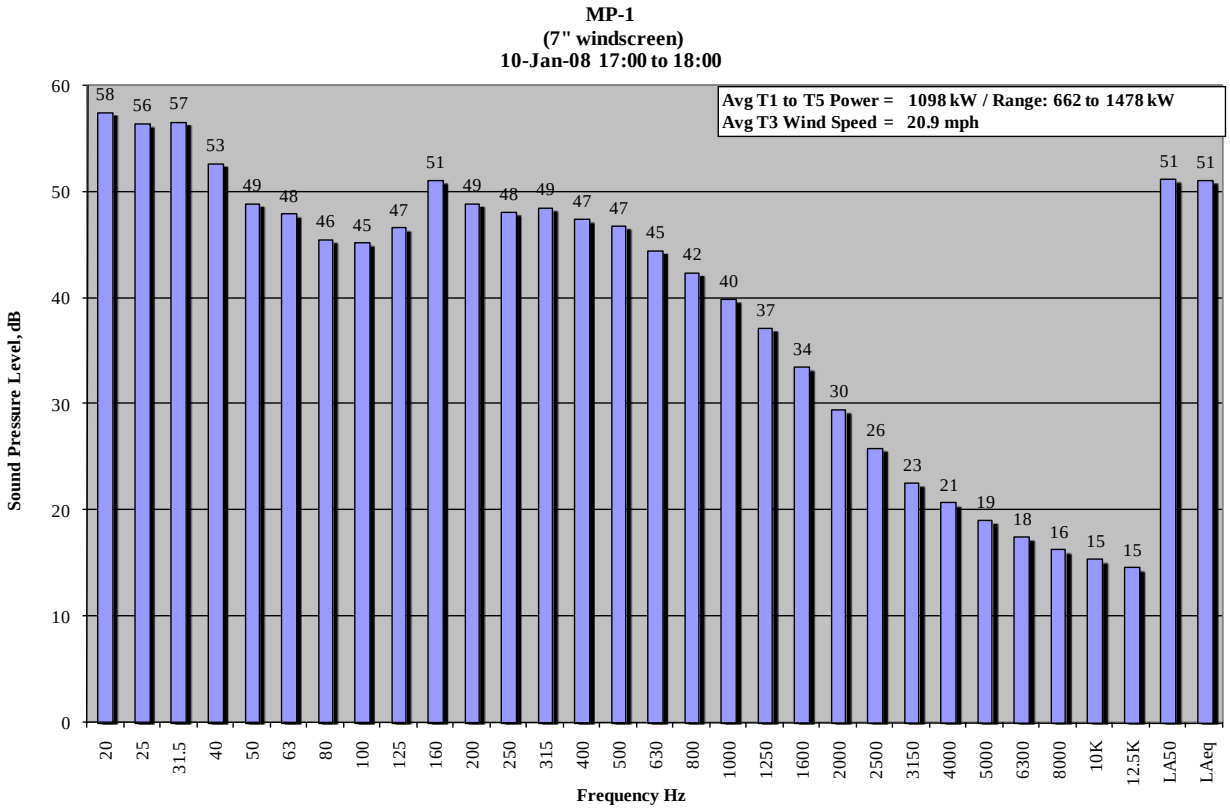


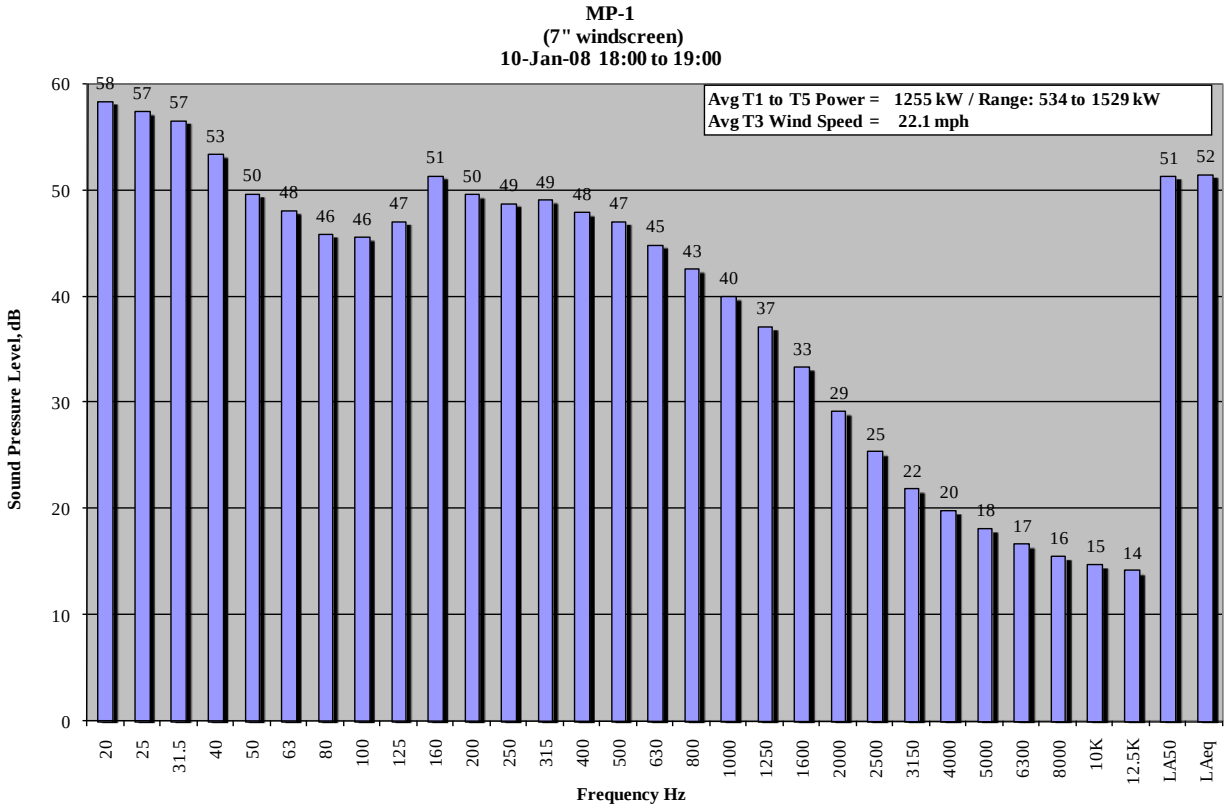

MP-1
(7" windscreen)
10-Jan-08 06:00 to 07:00
Avg T1 to T5 Power = 1493 kW / Range: 1463 to 1517 kW
Avg T3 Wind Speed = 31.5 mph
MP-1 Avg Wind Speed = 10.5 mph
Sound Pressure Level, dB
Frequency Hz
0 10 20 30 40 50 60 70 80
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
70 69 67 65 63 61 59 57 56 57 56 55 55 54 53 51 50 48 47 45 43 41 40 39 37 36 35 35 34 56 59


MP-1
(7" windscreen)
10-Jan-08 14:00 to 15:00
Avg T1 to T5 Power = 1395 kW / Range: 1055 to 1520 kW
Avg T3 Wind Speed = 24.7 mph
Sound Pressure Level, dB
Frequency Hz
0 10 20 30 40 50 60
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
59 58 58 53 50 49 46 46 48 51 49 48 48 47 46 44 42 39 37 33 29 26 23 21 19 18 16 15 15 50 51

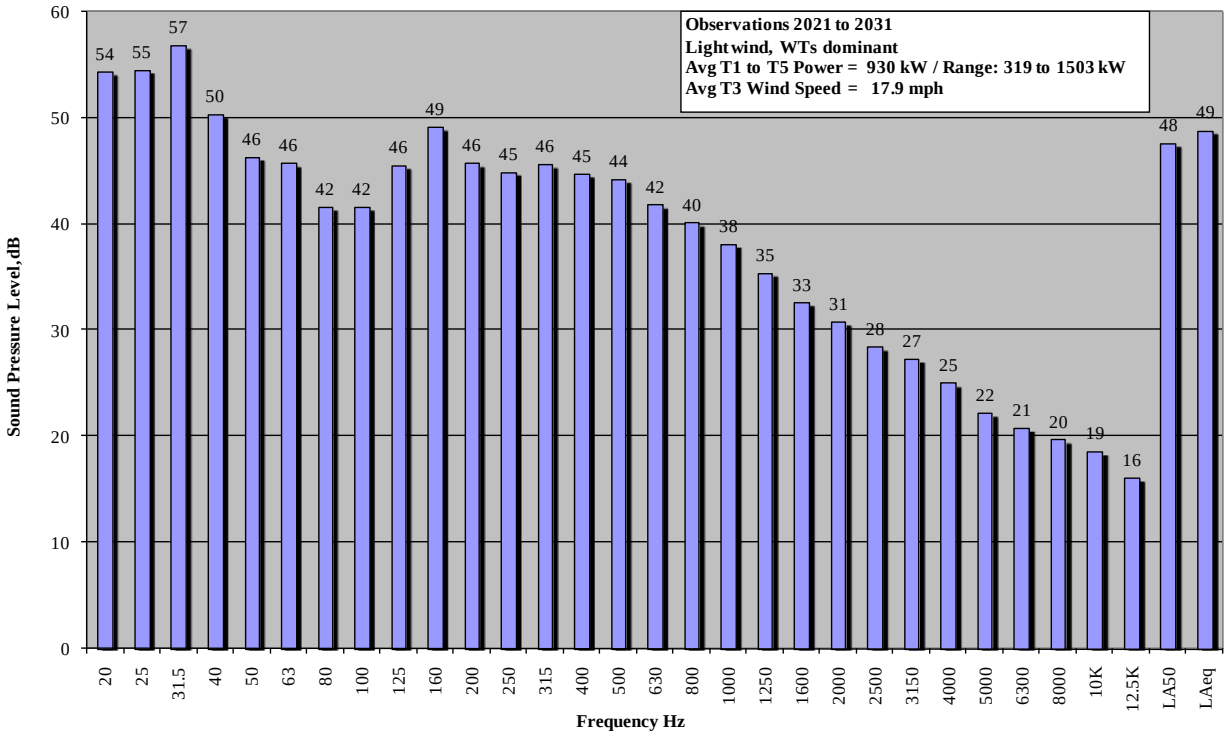

MP-1
(7" windscreen)
10-Jan-08 15:00 to 16:00
Avg T1 to T5 Power = 903 kW / Range: 436 to 1423 kW
Avg T3 Wind Speed = 18.9 mph
Sound Pressure Level, dB
Frequency Hz
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
58 56 56 53 49 48 46 45 47 51 49 49 49 48 47 45 43 40 37 33 29 26 23 21 19 18 17 16 15 51 52


MP-1
(7" windscreen)
10-Jan-08 16:00 to 17:00
Avg T1 to T5 Power = 1349 kW / Range: 1042 to 1533 kW
Avg T3 Wind Speed = 23.0 mph
Sound Pressure Level, dB
Frequency Hz
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
57 56 57 53 49 48 45 45 46 51 48 48 48 47 46 44 42 39 37 33 28 24 20 18 16 15 14 14 14 50 51

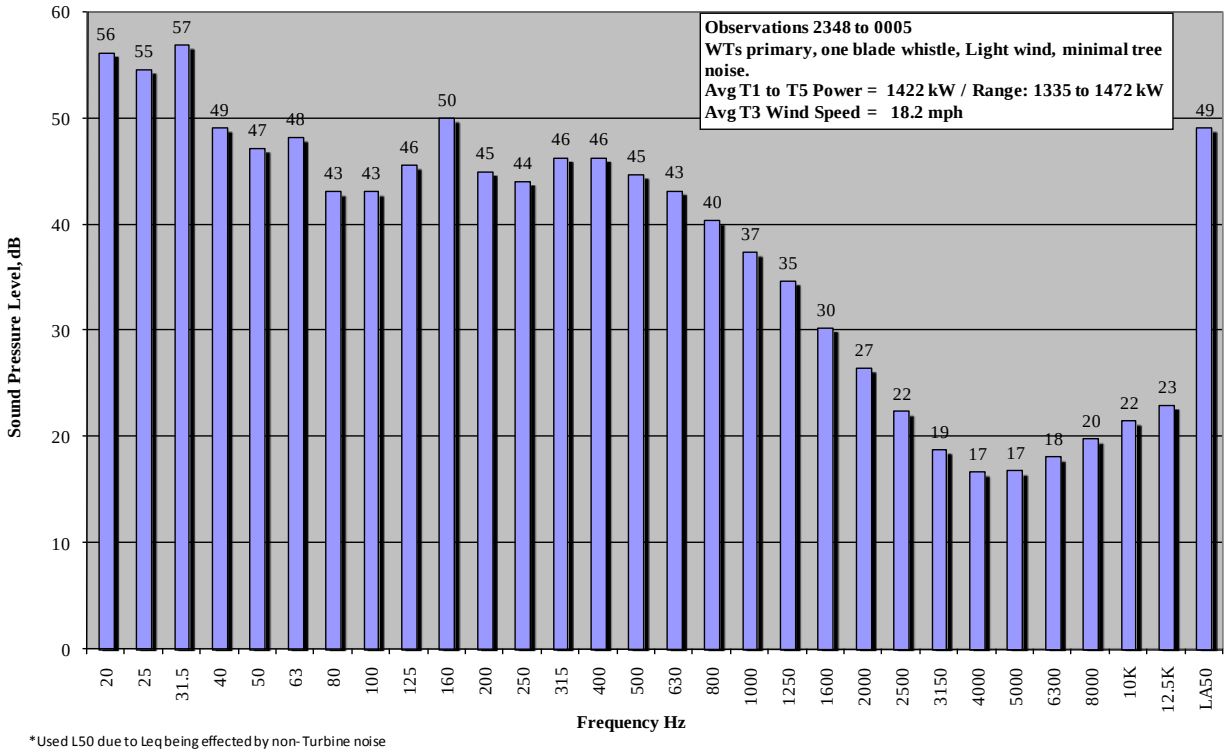

MP-1
(7" windscreen)
10-Jan-08 17:00 to 18:00
Avg T1 to T5 Power = 1098 kW / Range: 662 to 1478 kW
Avg T3 Wind Speed = 20.9 mph
Sound Pressure Level, dB
Frequency Hz
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
58 56 57 53 49 48 46 45 47 51 49 48 49 47 47 45 42 40 37 34 30 26 23 21 19 18 16 15 15 51 51


MP-1
(7" windscreen)
10-Jan-08 18:00 to 19:00
Avg T1 to T5 Power = 1255 kW / Range: 534 to 1529 kW
Avg T3 Wind Speed = 22.1 mph
Sound Pressure Level, dB
Frequency Hz
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
58 57 57 53 50 48 46 46 47 51 50 49 49 48 47 45 43 40 37 33 29 25 22 20 18 17 16 15 14 51 52

MP-1
(7" windscreen)
10-Jan-08 20:00 to 20:31

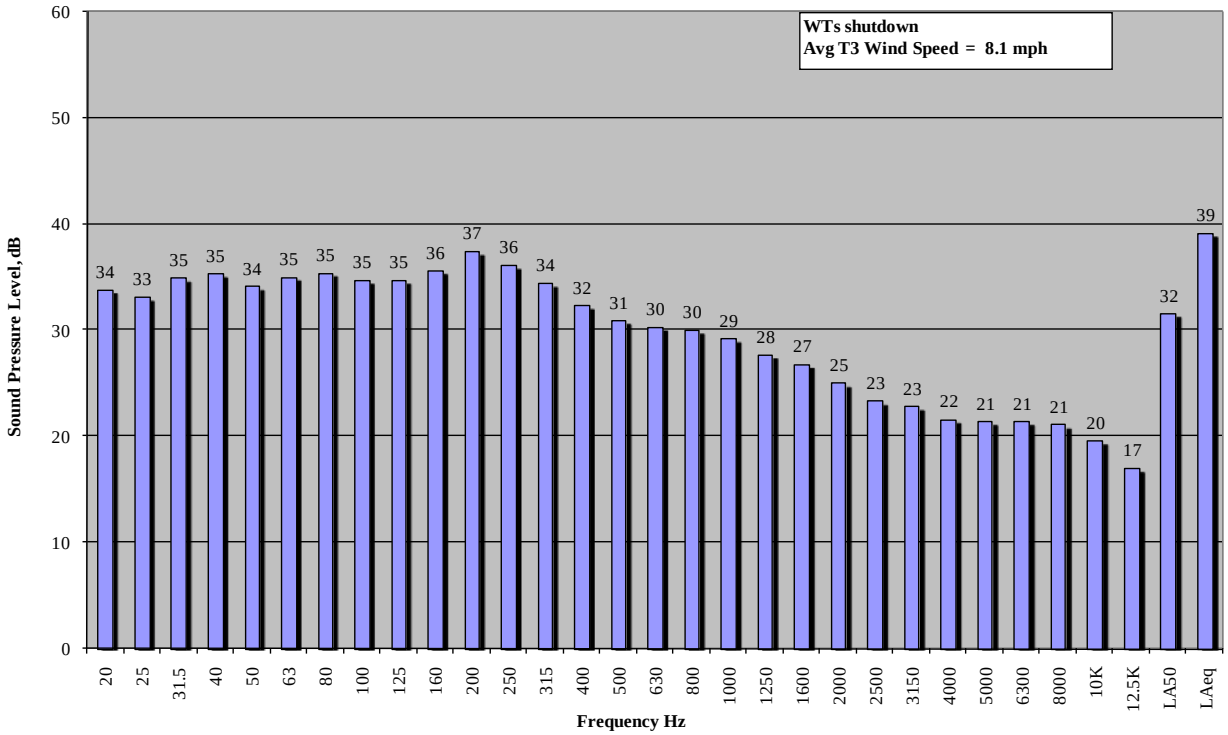


MP-1
10-Jan-08 23:48 to 00:05

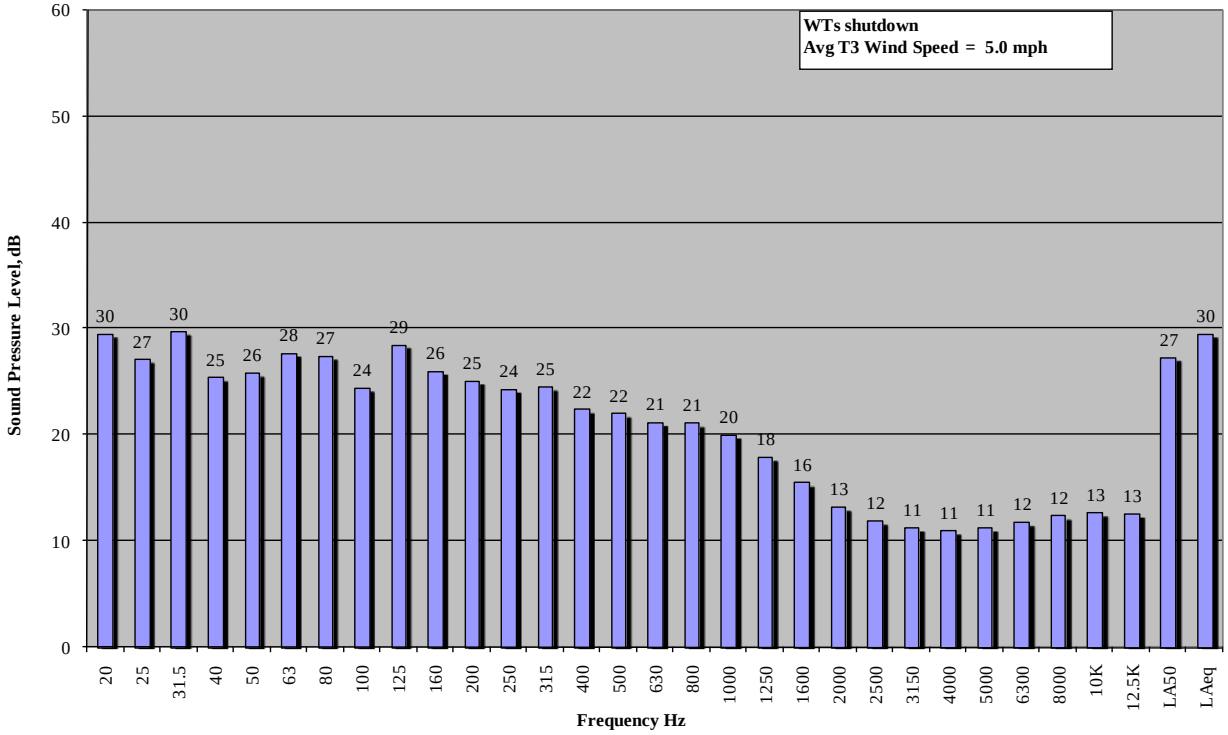


*Used L50 due to Leq being effected by non-Turbine noise

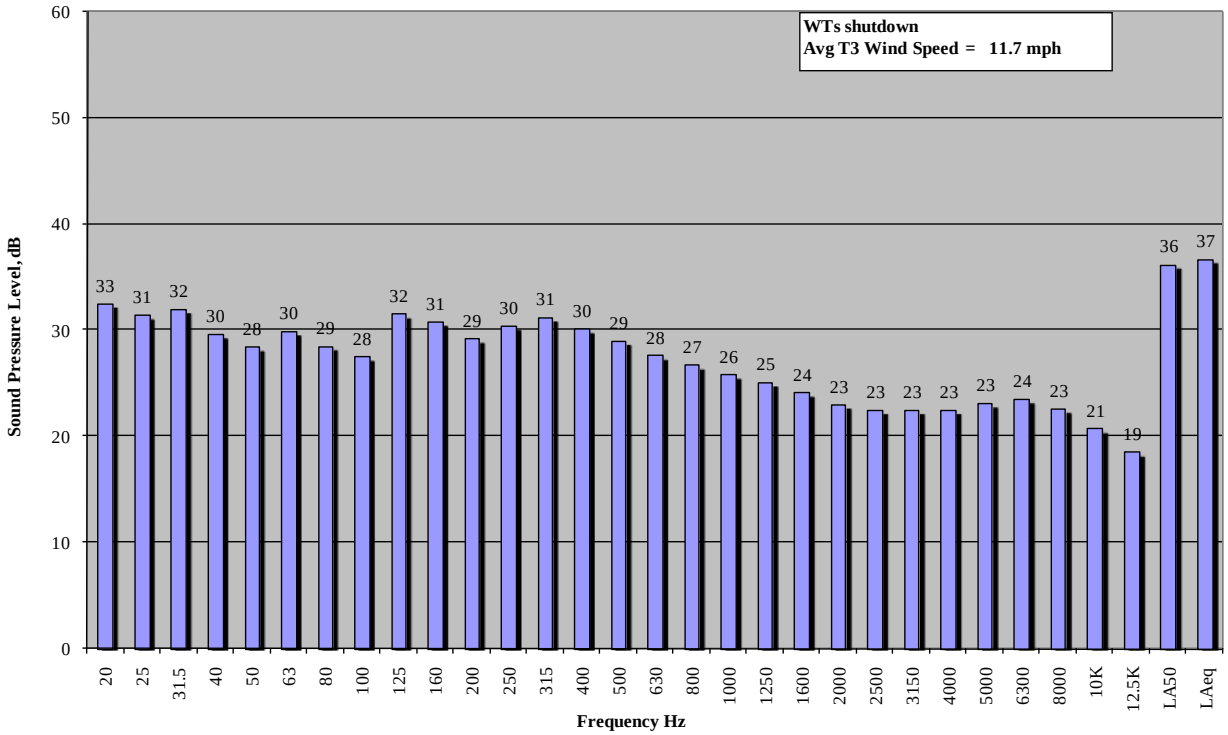
MP-1
(7" windscreen)
11-Jan-08 23:00 to 00:00



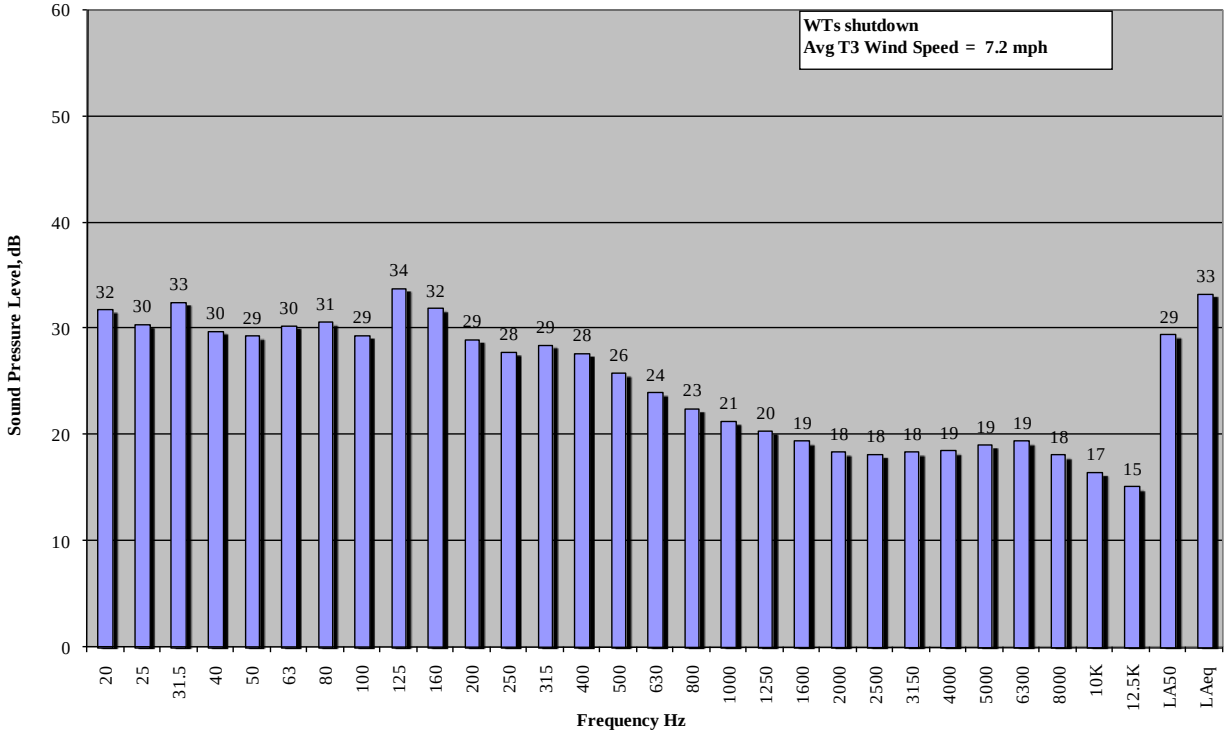
MP-1
(7" windscreen)
12-Jan-08 00:00 to 01:00



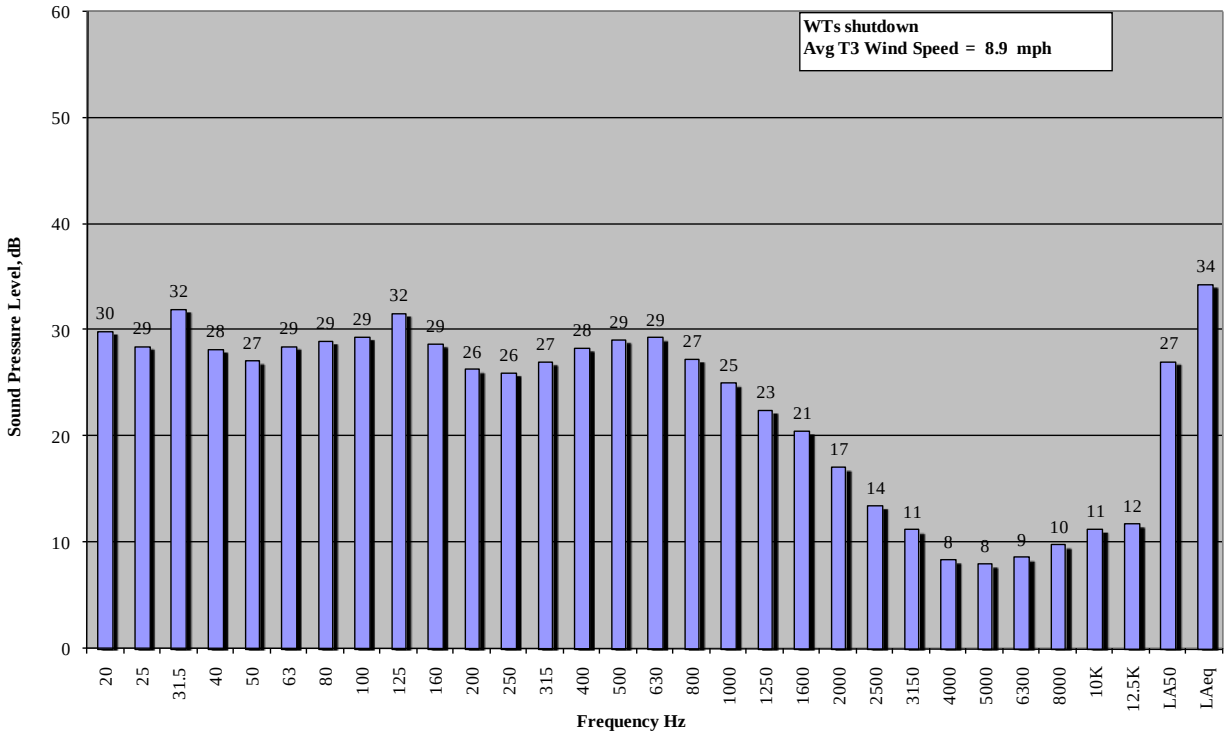
MP-1
(7" windscreen)
12-Jan-08 01:00 to 02:00



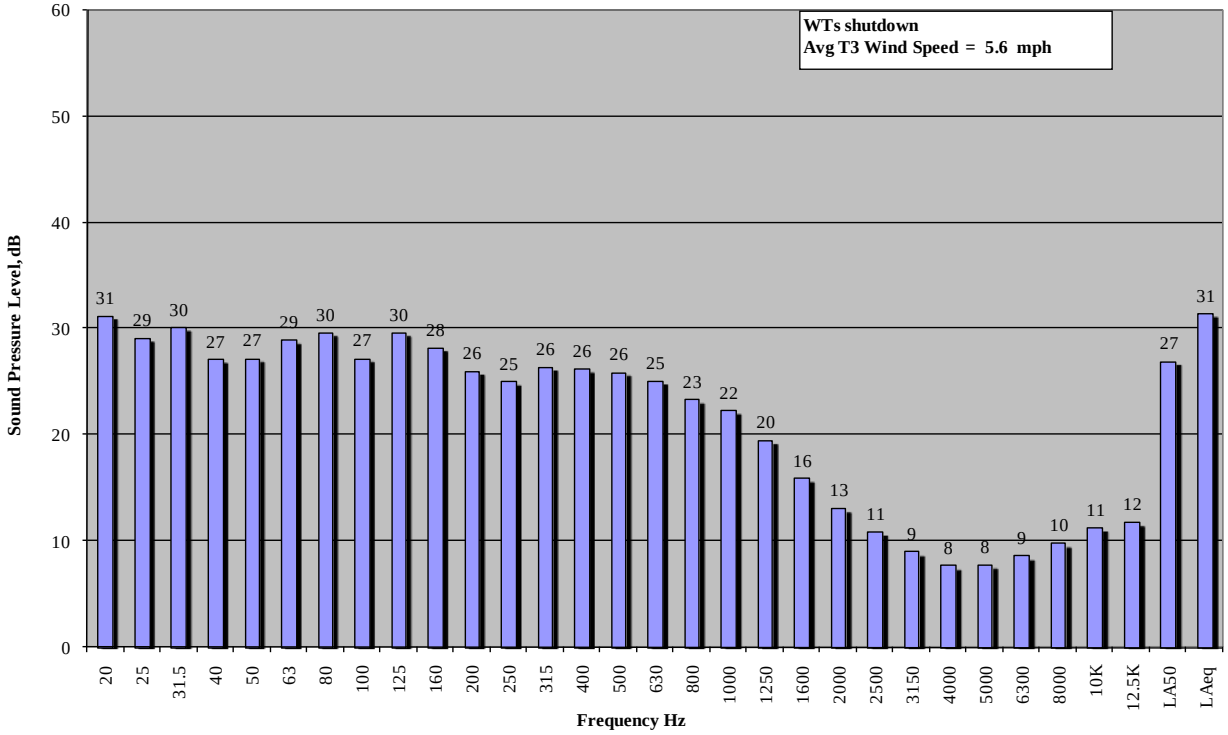
MP-1
(7" windscreen)
12-Jan-08 02:00 to 03:00



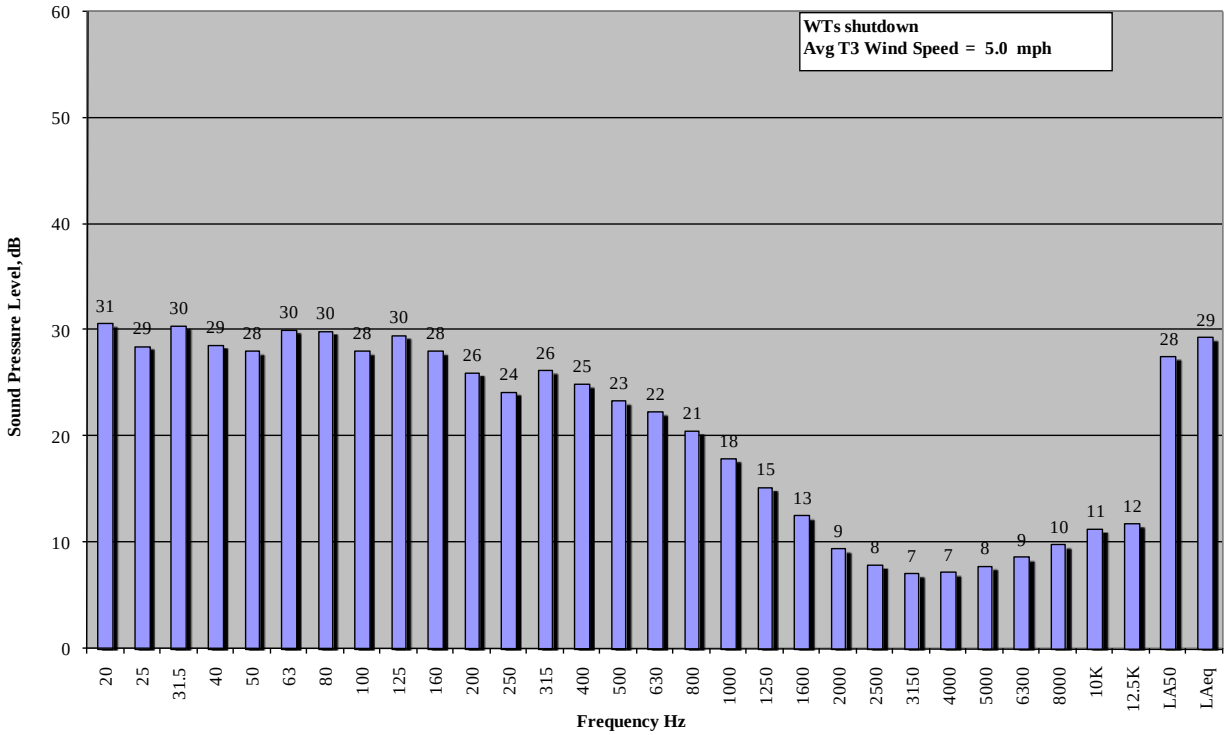
MP-1
(7" windscreen)
12-Jan-08 03:00 to 04:00



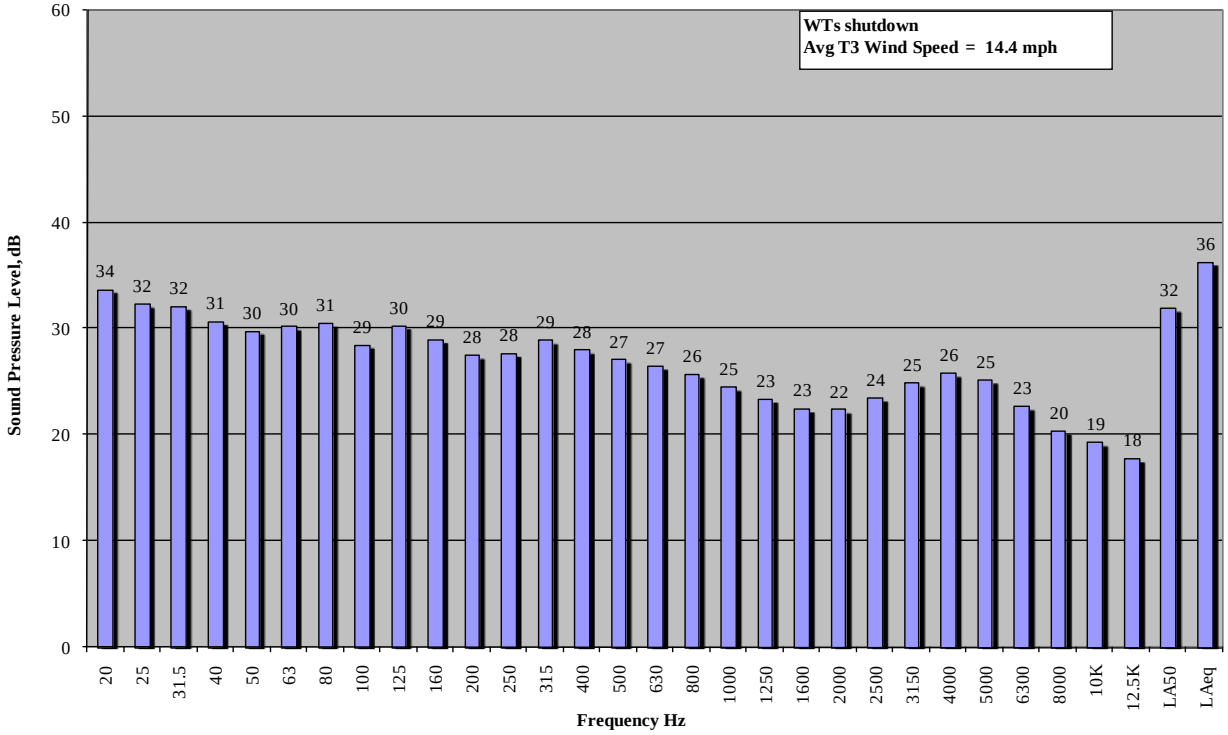
MP-1
(7" windscreen)
12-Jan-08 04:00 to 05:00

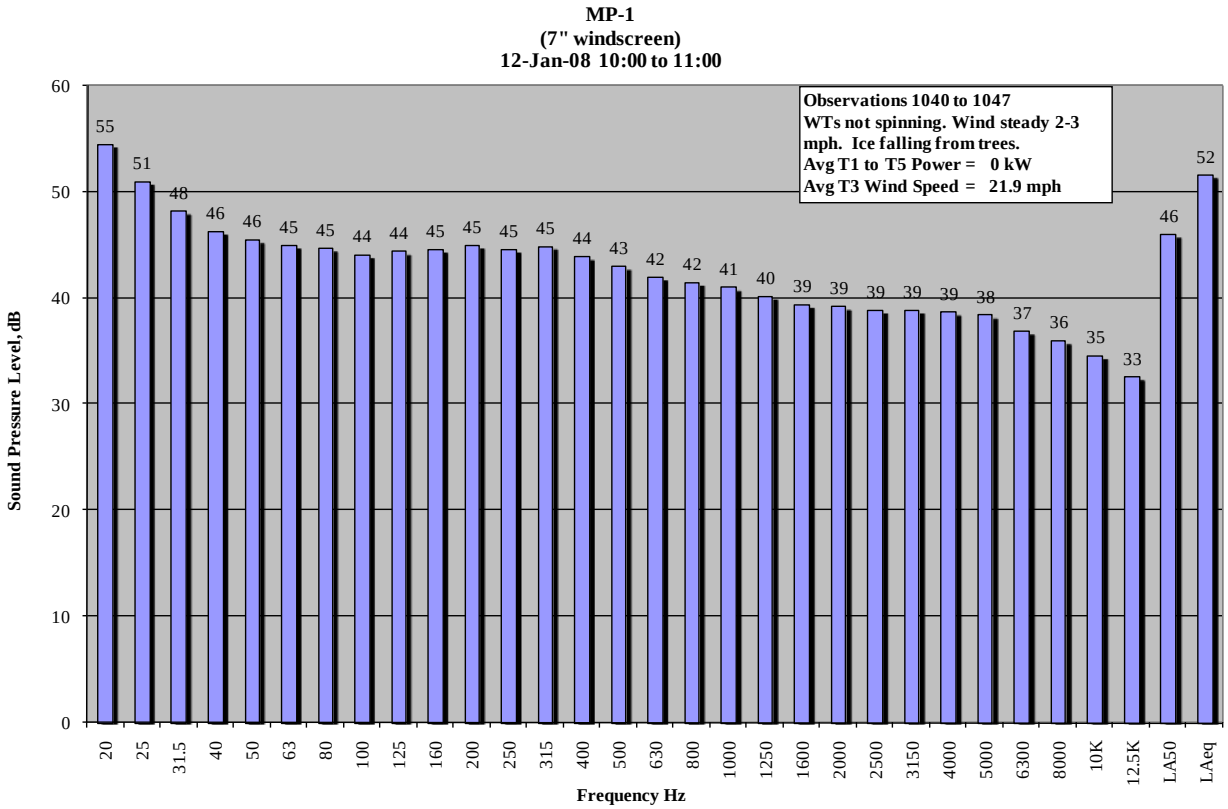


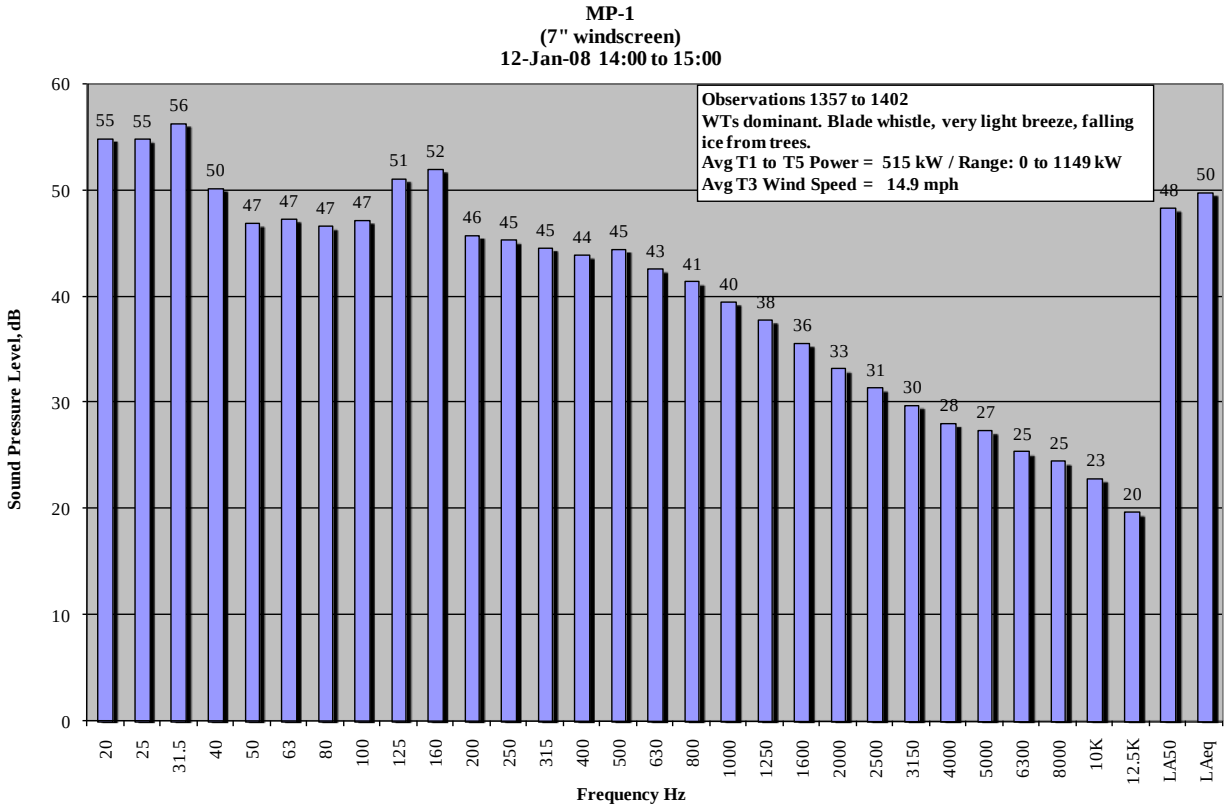
MP-1
(7" windscreen)
12-Jan-08 05:00 to 06:00

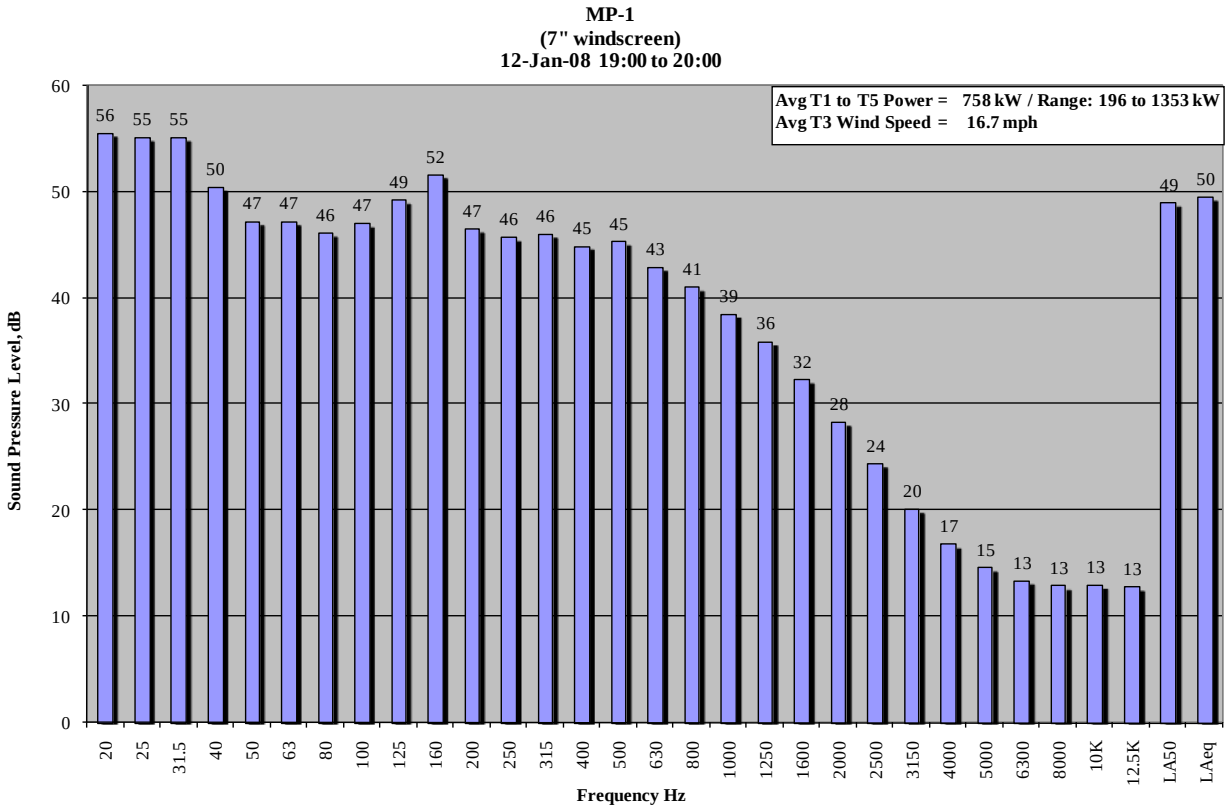


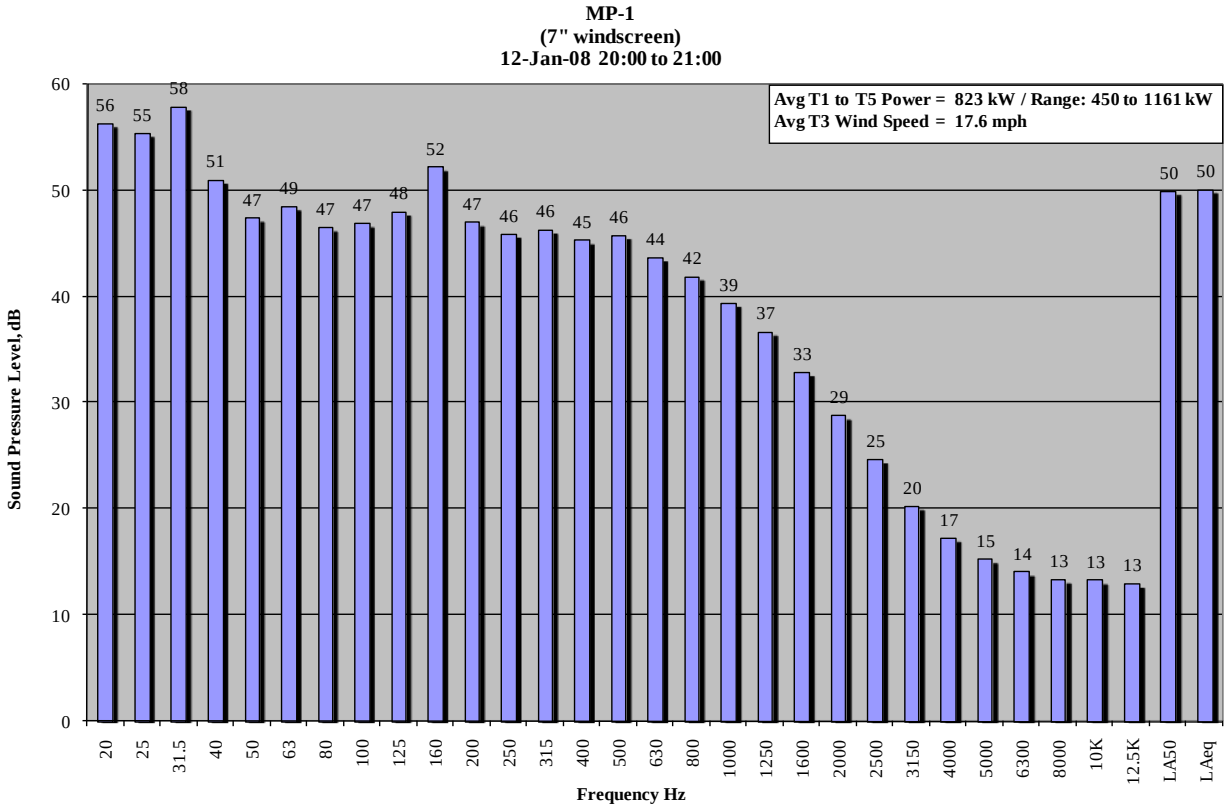
MP-1
(7" windscreen)
12-Jan-08 06:00 to 07:00

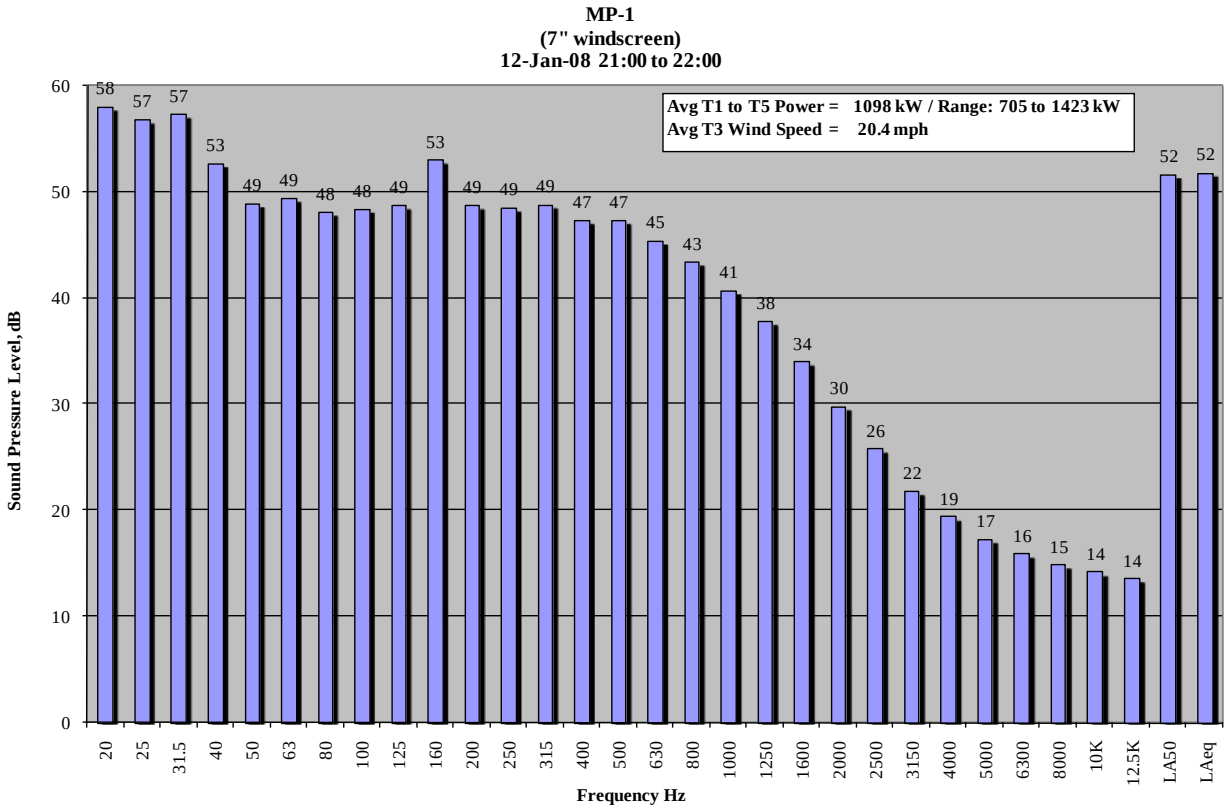


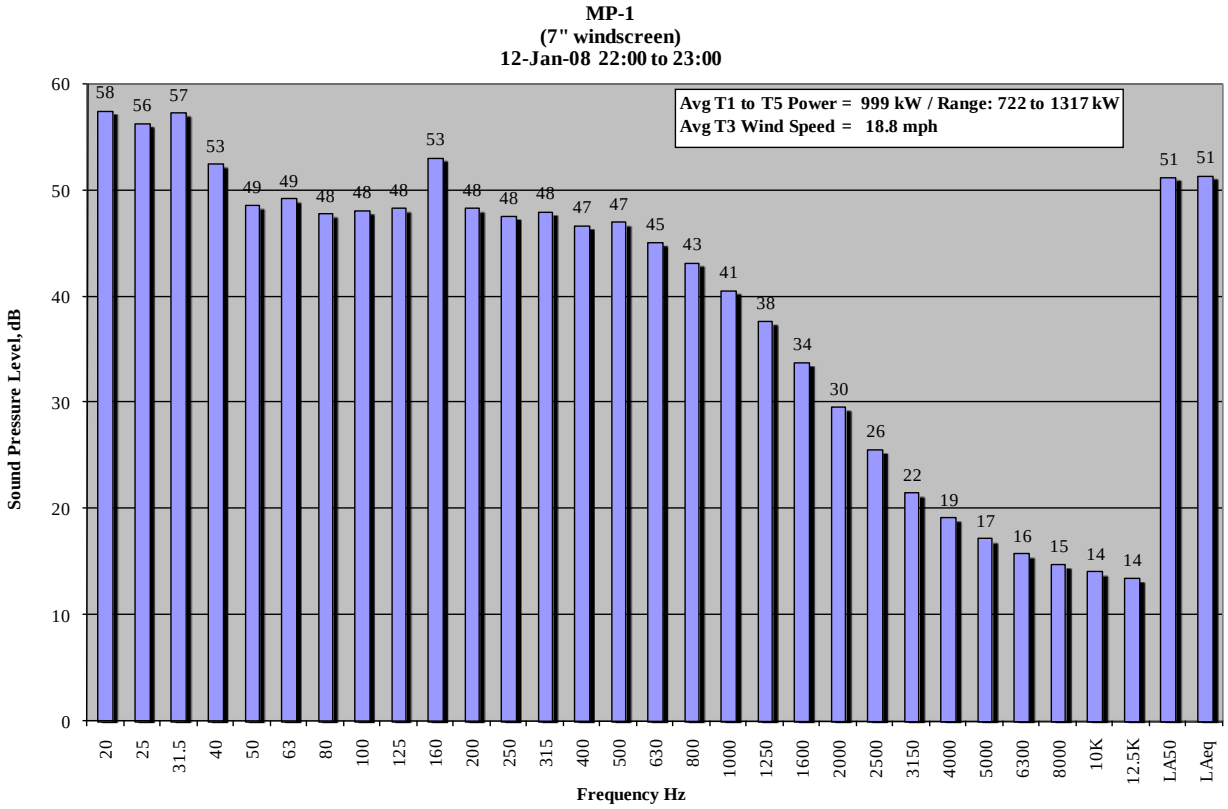

MP-1
(7" windscreen)
12-Jan-08 10:00 to 11:00
Observations 1040 to 1047
WTs not spinning. Wind steady 2-3 mph. Ice falling from trees.
Avg T1 to T5 Power = 0 kW
Avg T3 Wind Speed = 21.9 mph
Sound Pressure Level, dB
Frequency Hz
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
55 51 48 46 46 45 45 44 44 45 45 45 45 44 43 42 42 41 40 39 39 39 39 39 38 37 36 35 33 46 52


MP-1
(7" windscreen)
12-Jan-08 14:00 to 15:00
Observations 1357 to 1402
WTs dominant. Blade whistle, very light breeze, falling ice from trees.
Avg T1 to T5 Power = 515 kW / Range: 0 to 1149 kW
Avg T3 Wind Speed = 14.9 mph
Sound Pressure Level, dB
Frequency Hz
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
55 55 56 50 47 47 47 47 51 52 46 45 45 44 45 43 41 40 38 36 33 31 30 28 27 25 25 23 20 48 50

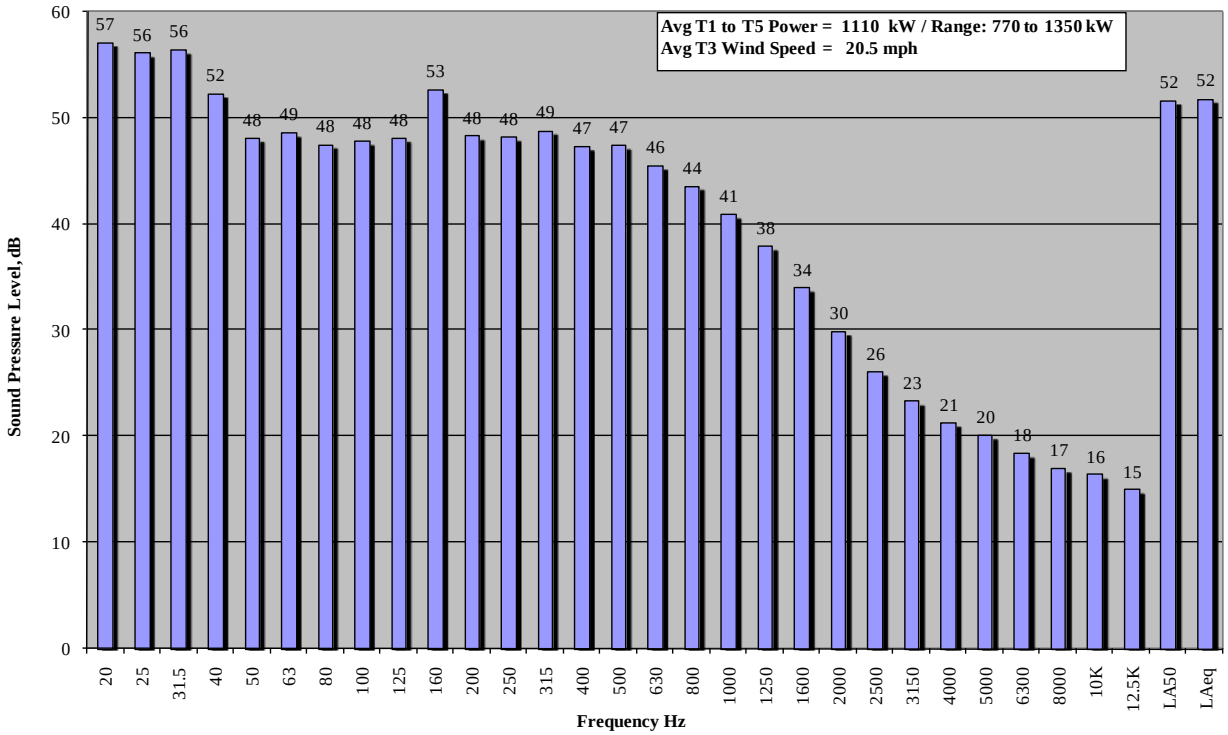

MP-1
(7" windscreen)
12-Jan-08 19:00 to 20:00
Avg T1 to T5 Power = 758 kW / Range: 196 to 1353 kW
Avg T3 Wind Speed = 16.7 mph
Sound Pressure Level, dB
Frequency Hz
0
10
20
30
40
50
60
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
56 55 55 50 47 47 46 47 49 52 47 46 46 45 45 43 41 39 36 32 28 24 20 17 15 13 13 13 13 49 50


MP-1
(7" windscreen)
12-Jan-08 20:00 to 21:00
Avg T1 to T5 Power = 823 kW / Range: 450 to 1161 kW
Avg T3 Wind Speed = 17.6 mph
Sound Pressure Level, dB
Frequency Hz
0
10
20
30
40
50
60
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
56 55 58 51 47 49 47 47 48 52 47 46 46 45 46 44 42 39 37 33 29 25 20 17 15 14 13 13 13 50 50

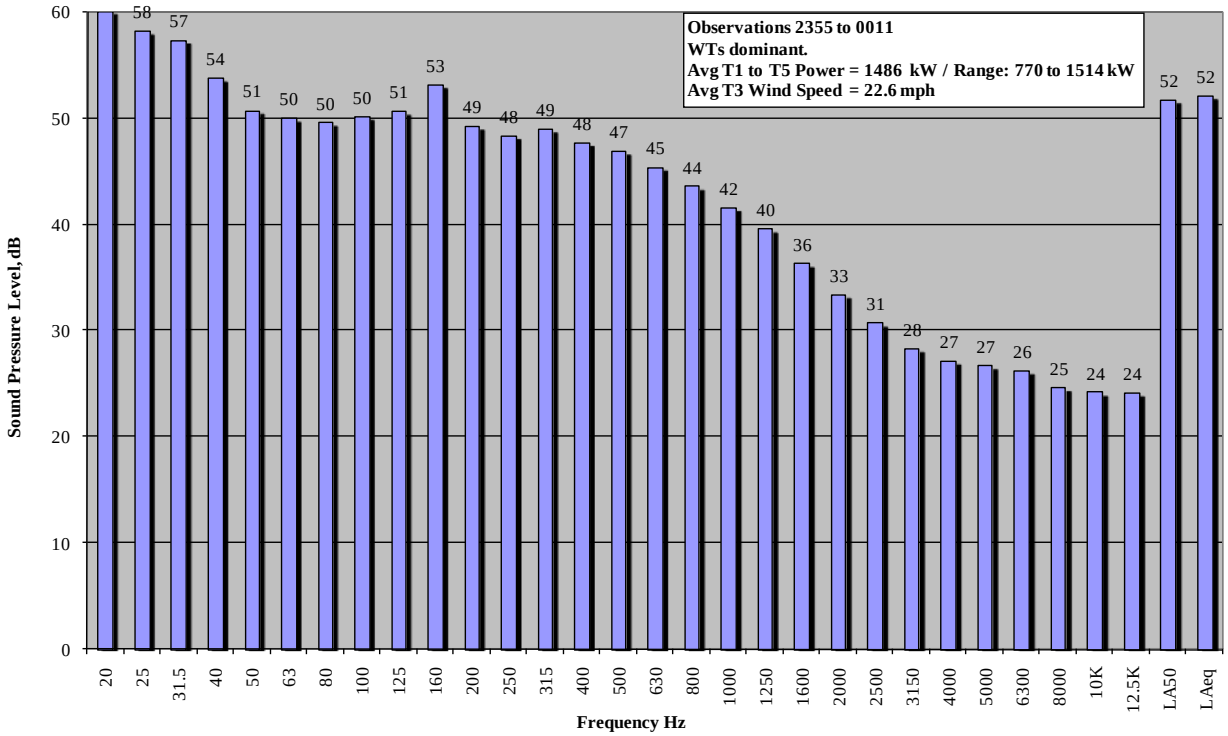

MP-1
(7" windscreen)
12-Jan-08 21:00 to 22:00
Avg T1 to T5 Power = 1098 kW / Range: 705 to 1423 kW
Avg T3 Wind Speed = 20.4 mph
Sound Pressure Level, dB
Frequency Hz
0
10
20
30
40
50
60
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
58 57 57 53 49 49 48 48 49 53 49 49 49 47 47 45 43 41 38 34 30 26 22 19 17 16 15 14 14 52 52

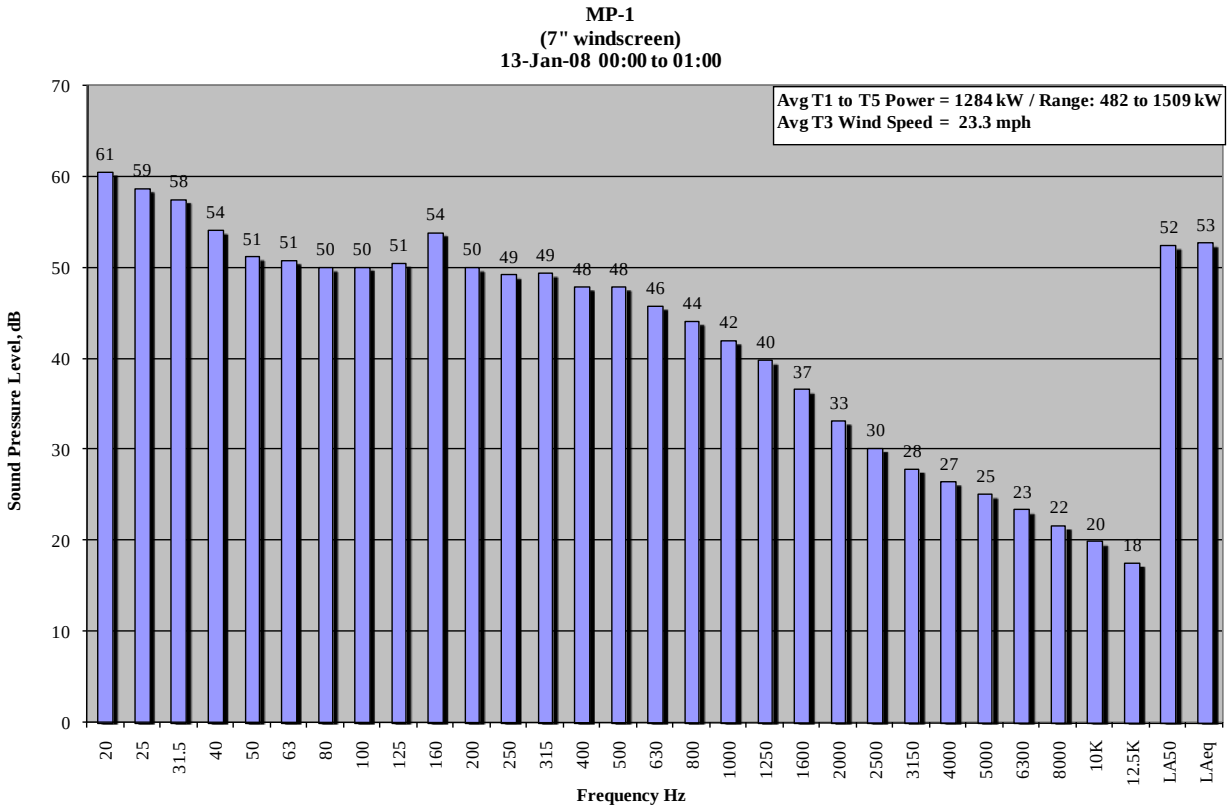

MP-1
(7" windscreen)
12-Jan-08 22:00 to 23:00
Avg T1 to T5 Power = 999 kW / Range: 722 to 1317 kW
Avg T3 Wind Speed = 18.8 mph
Sound Pressure Level, dB
Frequency Hz
0
10
20
30
40
50
60
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
58 56 57 53 49 49 48 48 48 53 48 48 48 47 47 45 43 41 38 34 30 26 22 19 17 16 15 14 14 51 51

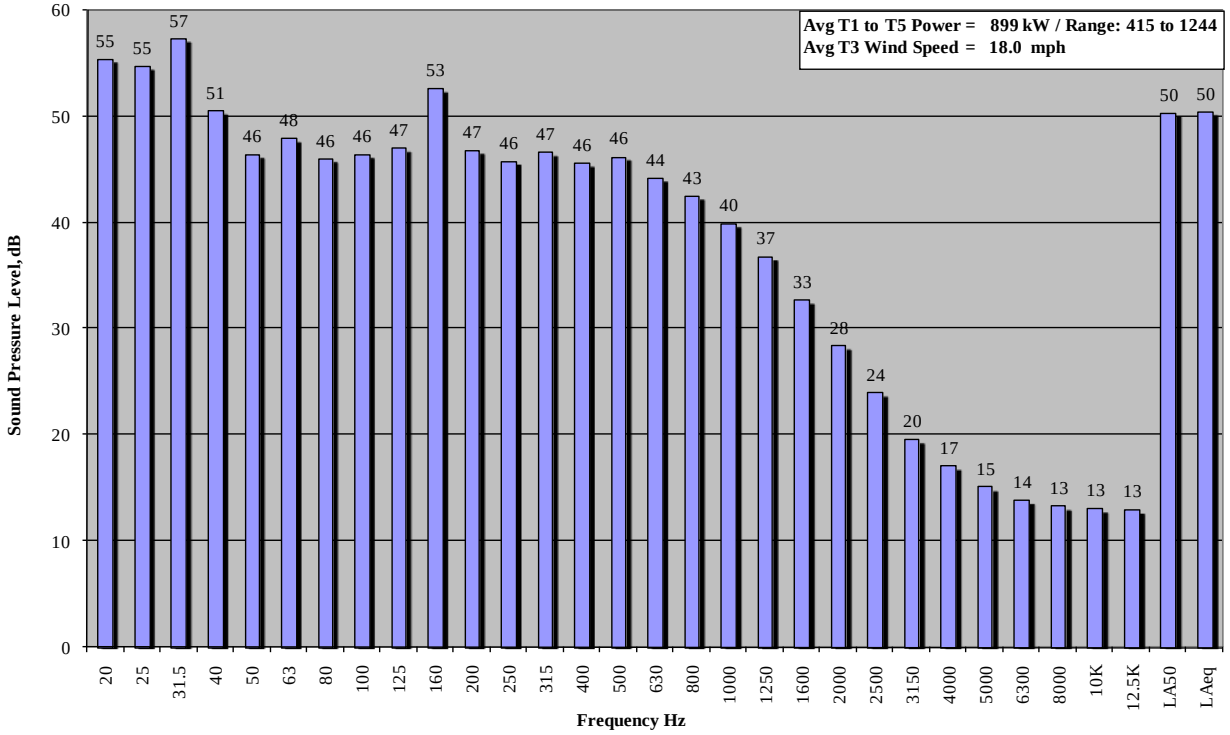
MP-1
(7" windscreen)
12-Jan-08 23:00 to 00:00

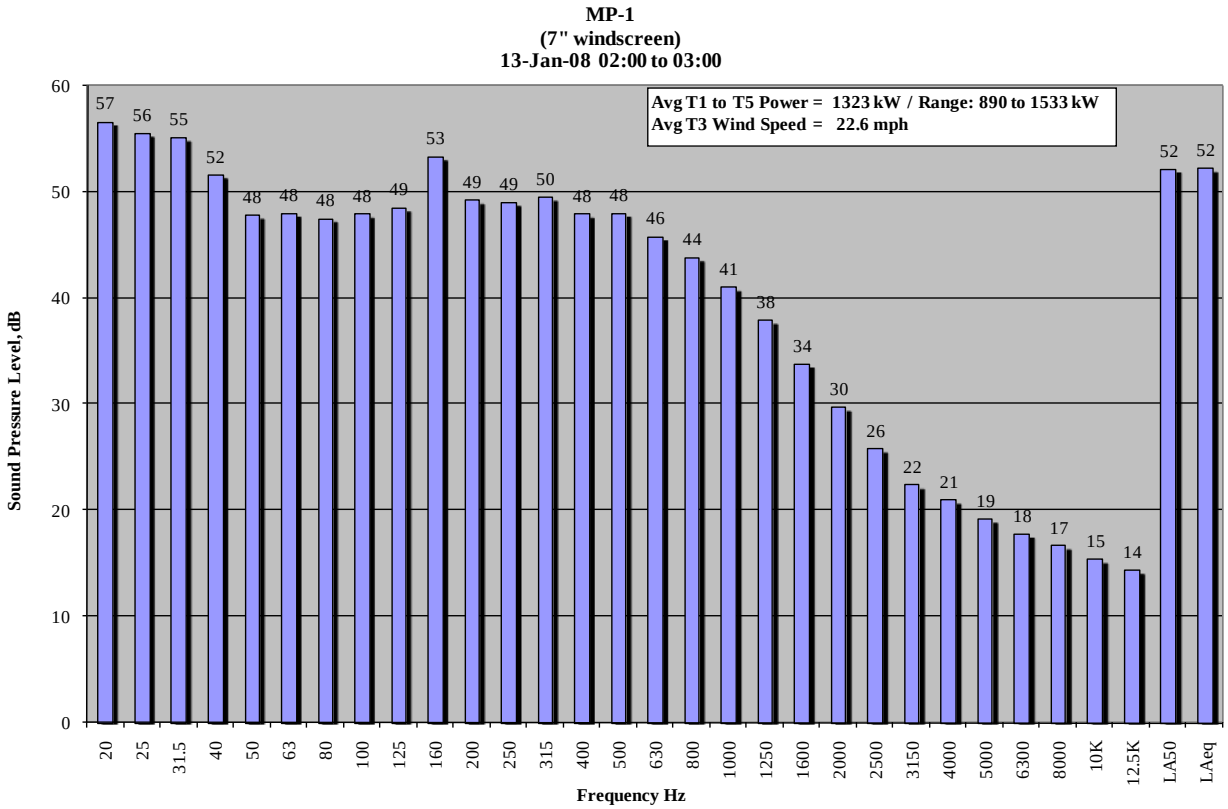


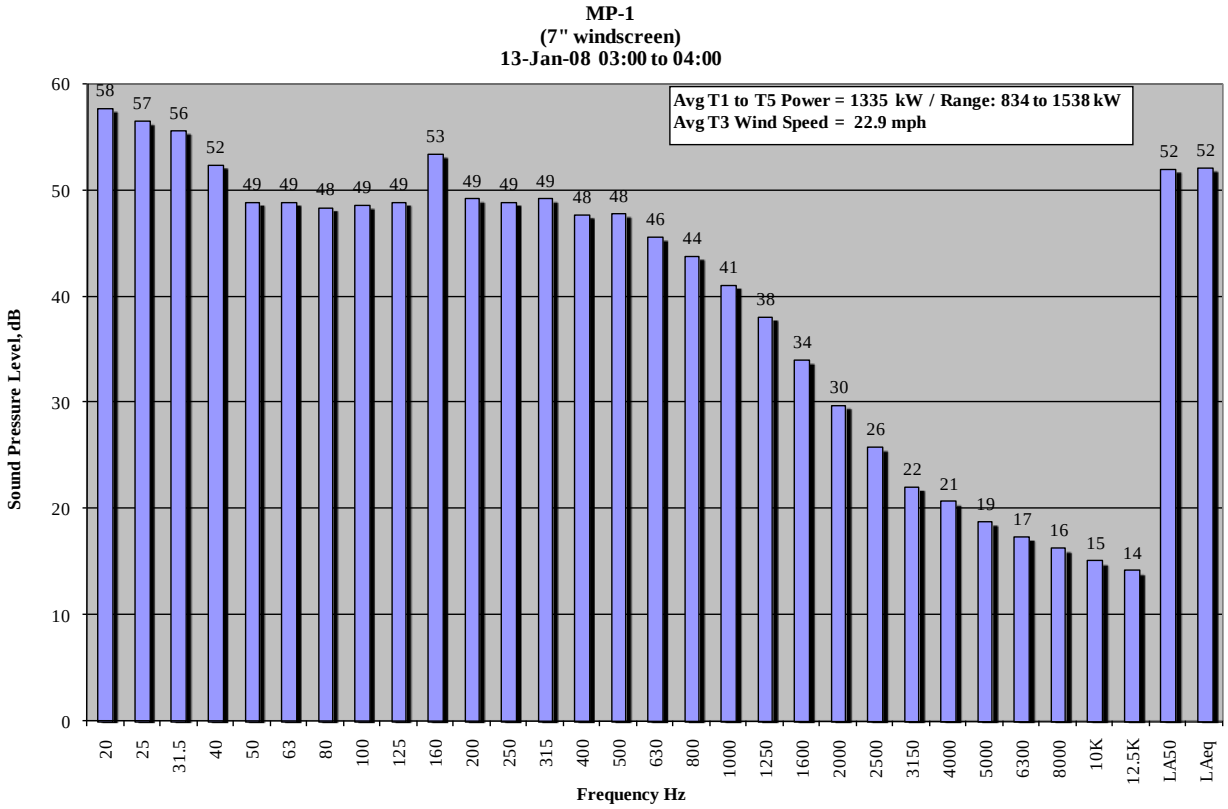
MP-1(LD831)
(7" windscreen)
12-Jan-08 23:55 to 00:11

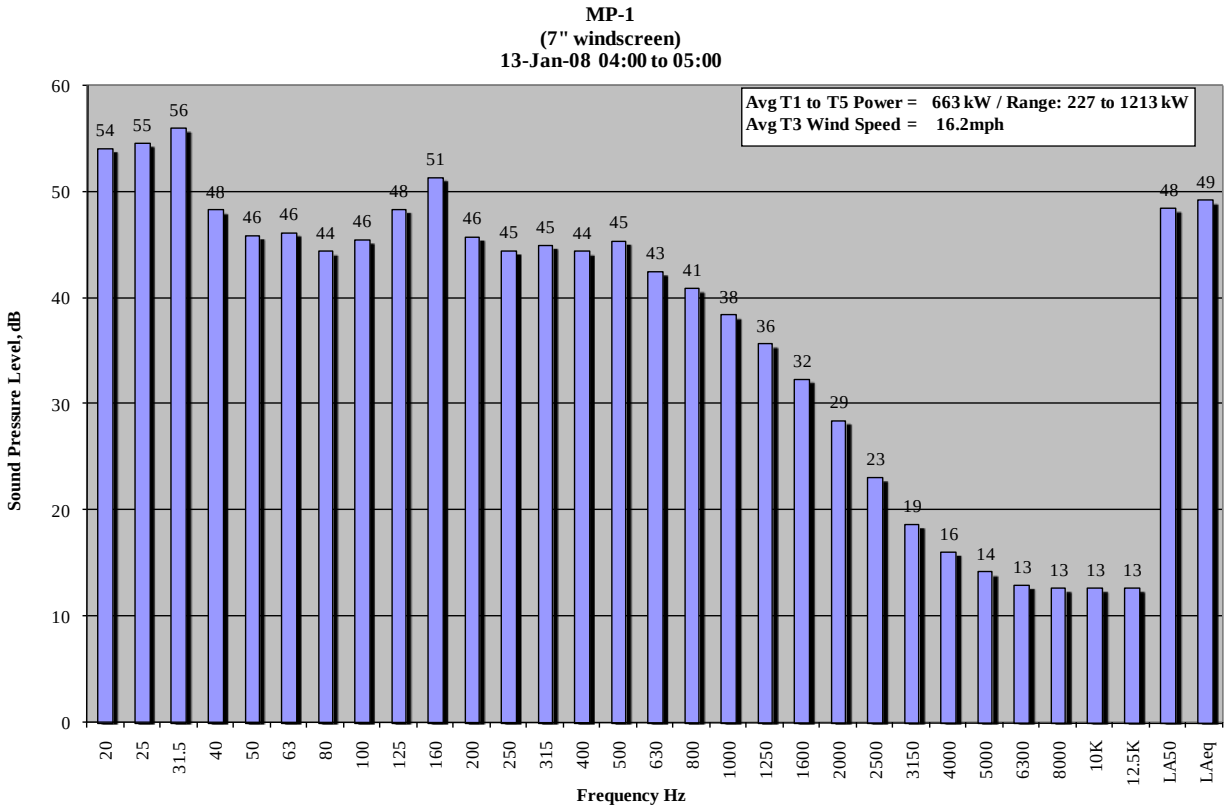


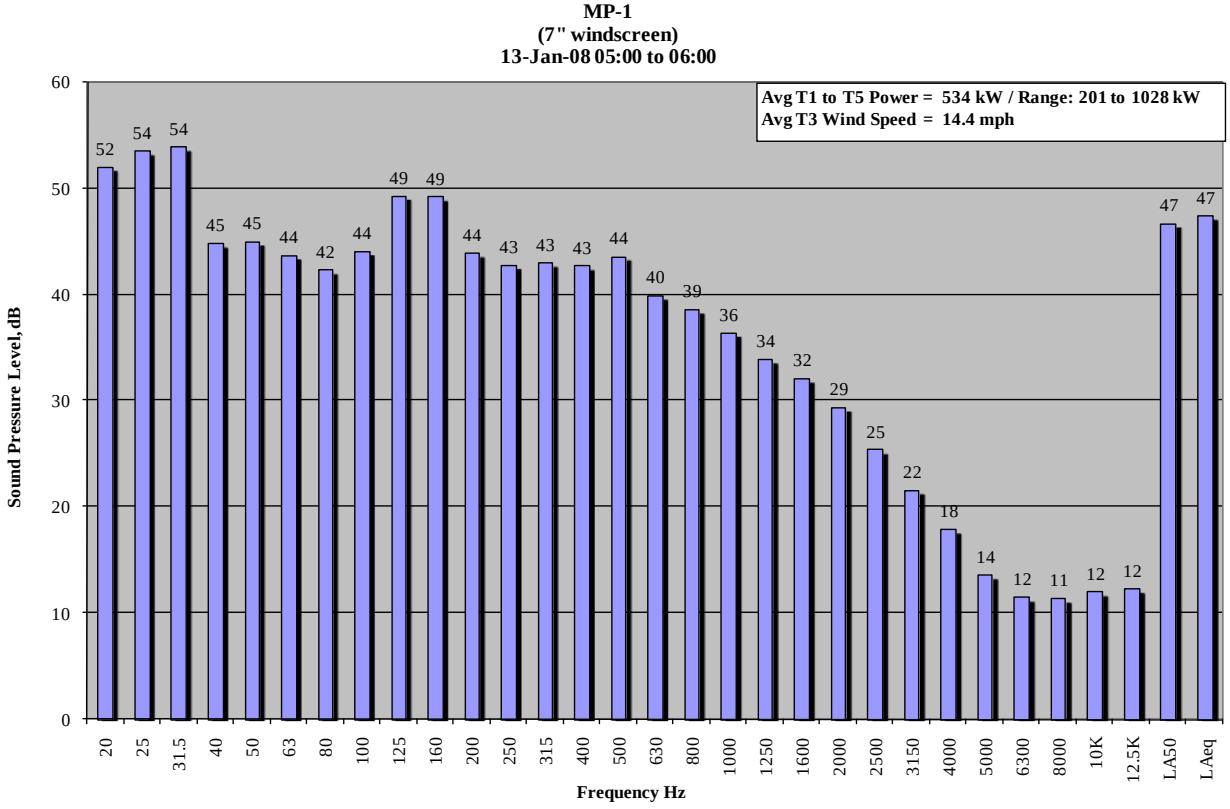

MP-1
(7" windscreen)
13-Jan-08 00:00 to 01:00
Avg T1 to T5 Power = 1284 kW / Range: 482 to 1509 kW
Avg T3 Wind Speed = 23.3 mph
Sound Pressure Level, dB
Frequency Hz
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
61 59 58 54 51 51 50 50 51 54 50 49 49 48 48 46 44 42 40 37 33 30 28 27 25 23 22 20 18 52 53

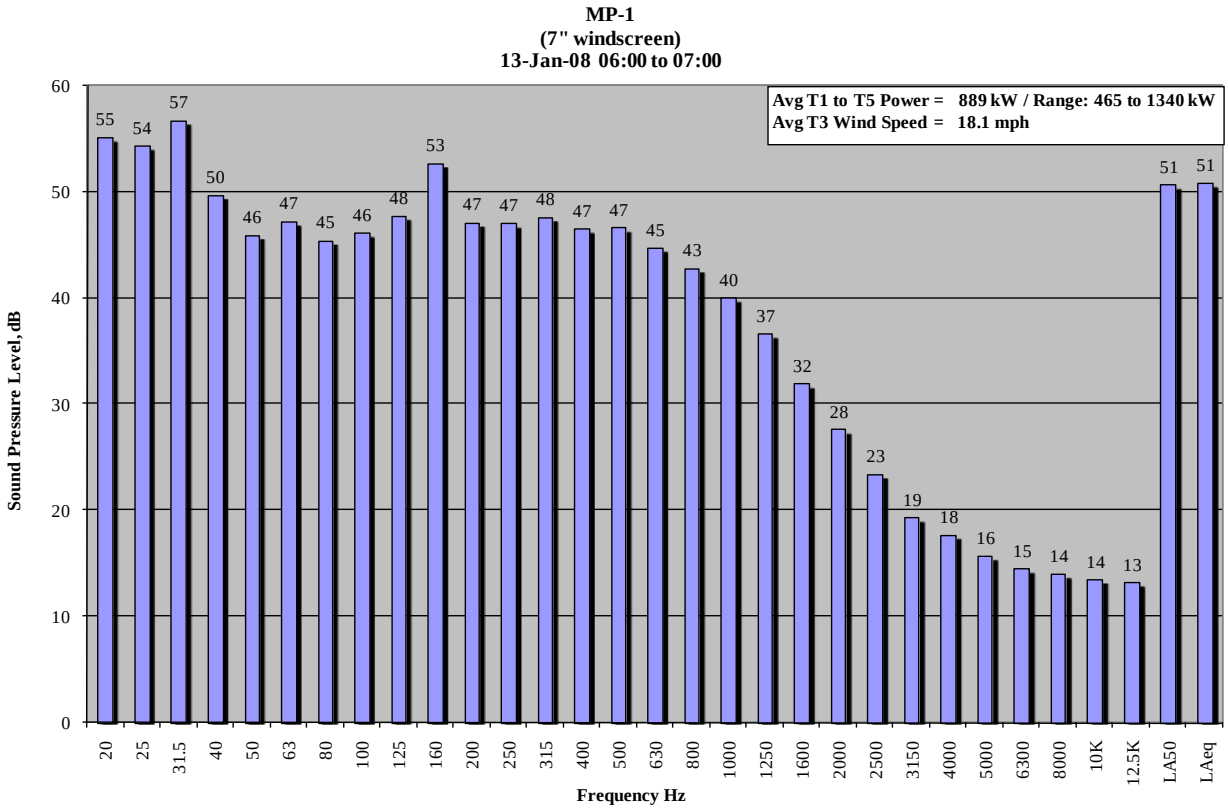

MP-1
(7" windscreen)
13-Jan-08 01:00 to 02:00
Avg T1 to T5 Power = 899 kW / Range: 415 to 1244
Avg T3 Wind Speed = 18.0 mph
Sound Pressure Level, dB
Frequency Hz
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
55 55 57 51 46 48 46 46 47 53 47 46 47 46 46 44 43 40 37 33 28 24 20 17 15 14 13 13 13 50 50


MP-1
(7" windscreen)
13-Jan-08 02:00 to 03:00
Avg T1 to T5 Power = 1323 kW / Range: 890 to 1533 kW
Avg T3 Wind Speed = 22.6 mph
Sound Pressure Level, dB
Frequency Hz
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
57 56 55 52 48 48 48 48 49 53 49 49 50 48 48 46 44 41 38 34 30 26 22 21 19 18 17 15 14 52 52

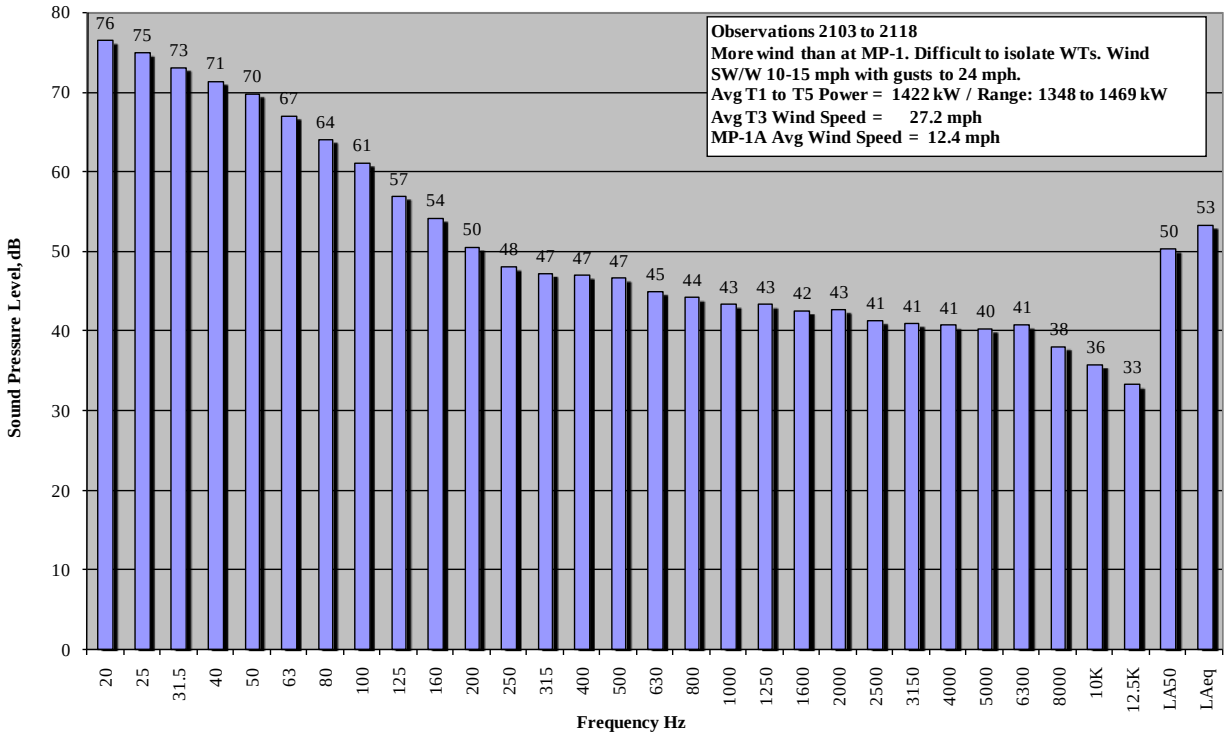

MP-1
(7" windscreen)
13-Jan-08 03:00 to 04:00
Avg T1 to T5 Power = 1335 kW / Range: 834 to 1538 kW
Avg T3 Wind Speed = 22.9 mph
Sound Pressure Level, dB
Frequency Hz
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
58 57 56 52 49 49 48 49 49 53 49 49 49 48 48 46 44 41 38 34 30 26 22 21 19 17 16 15 14 52 52


MP-1
(7" windscreen)
13-Jan-08 04:00 to 05:00
Avg T1 to T5 Power = 663 kW / Range: 227 to 1213 kW
Avg T3 Wind Speed = 16.2mph
Sound Pressure Level, dB
Frequency Hz
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
54 55 56 48 46 46 44 46 48 51 46 45 45 44 45 43 41 38 36 32 29 23 19 16 14 13 13 13 13 48 49

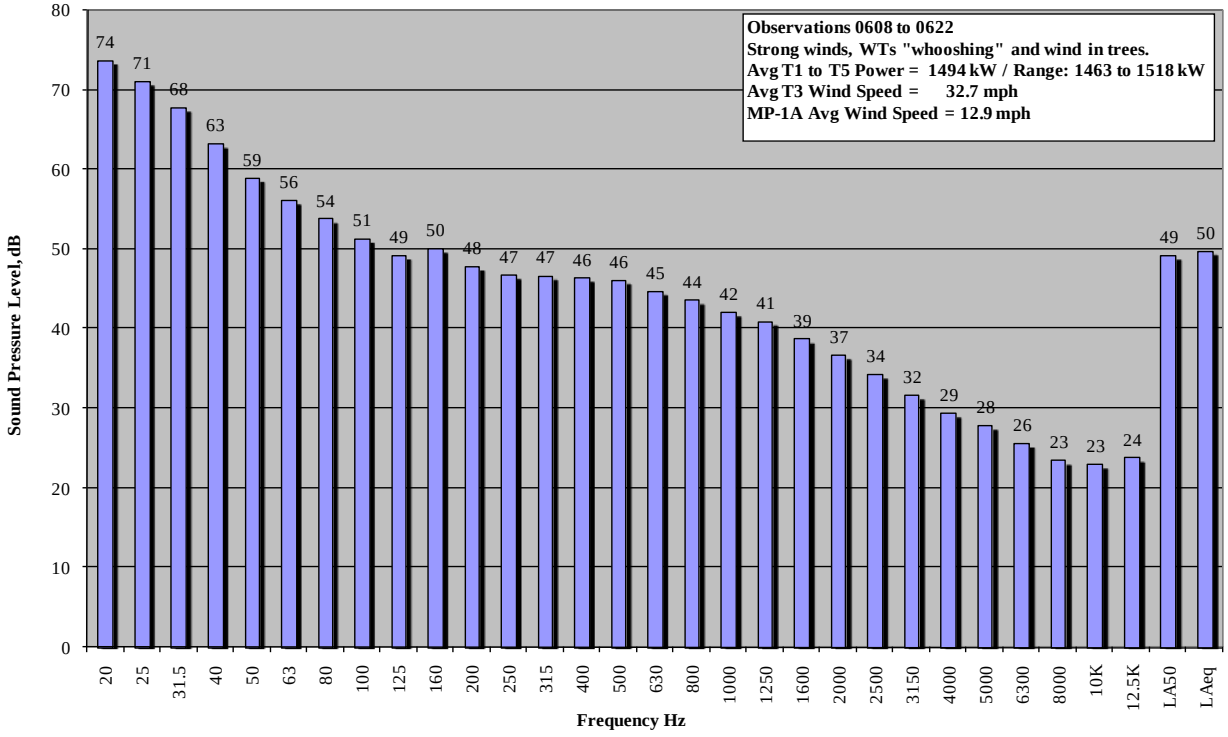

MP-1
(7" windscreen)
13-Jan-08 05:00 to 06:00
Avg T1 to T5 Power = 534 kW / Range: 201 to 1028 kW
Avg T3 Wind Speed = 14.4 mph
Sound Pressure Level, dB
Frequency Hz
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
52 54 54 45 45 44 42 44 49 49 44 43 43 43 44 40 39 36 34 32 29 25 22 18 14 12 11 12 12 47 47


MP-1
(7" windscreen)
13-Jan-08 06:00 to 07:00
Avg T1 to T5 Power = 889 kW / Range: 465 to 1340 kW
Avg T3 Wind Speed = 18.1 mph
Sound Pressure Level, dB
Frequency Hz
0
10
20
30
40
50
60
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
55 54 57 50 46 47 45 46 48 53 47 47 48 47 47 45 43 40 37 32 28 23 19 18 16 15 14 14 13 51 51

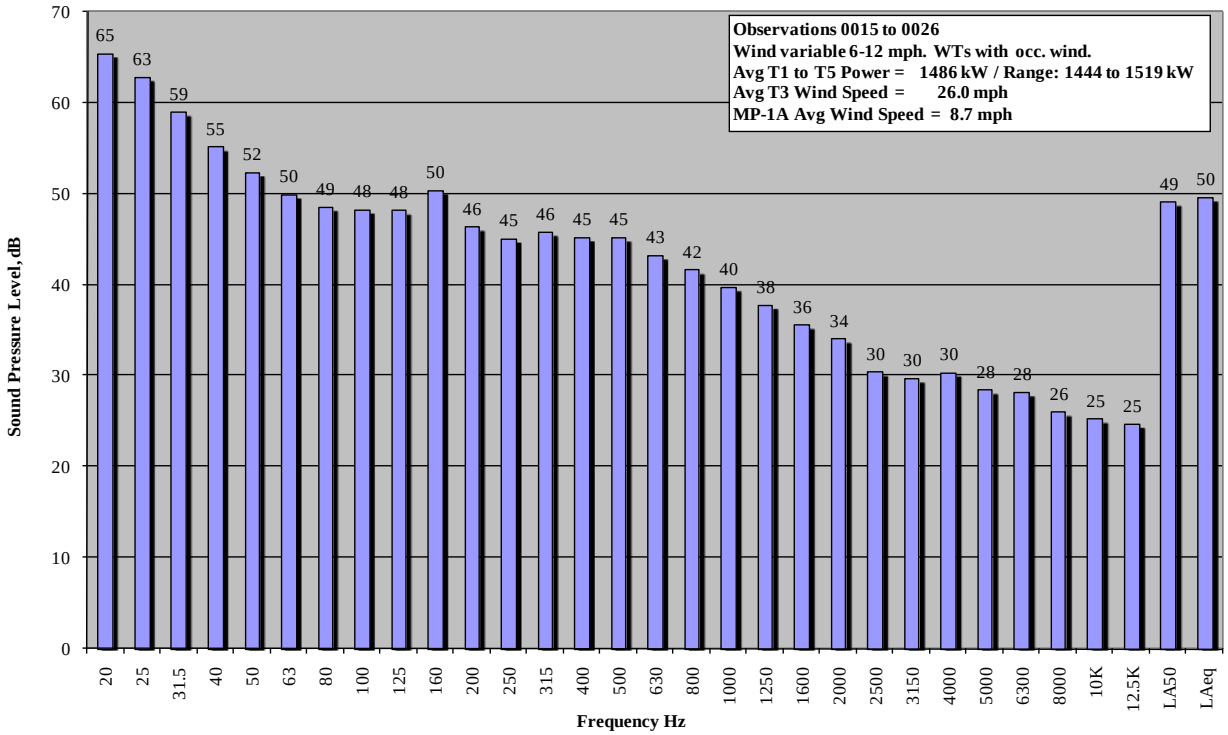
MP-1A
9-Jan-08 21:03 to 21:18



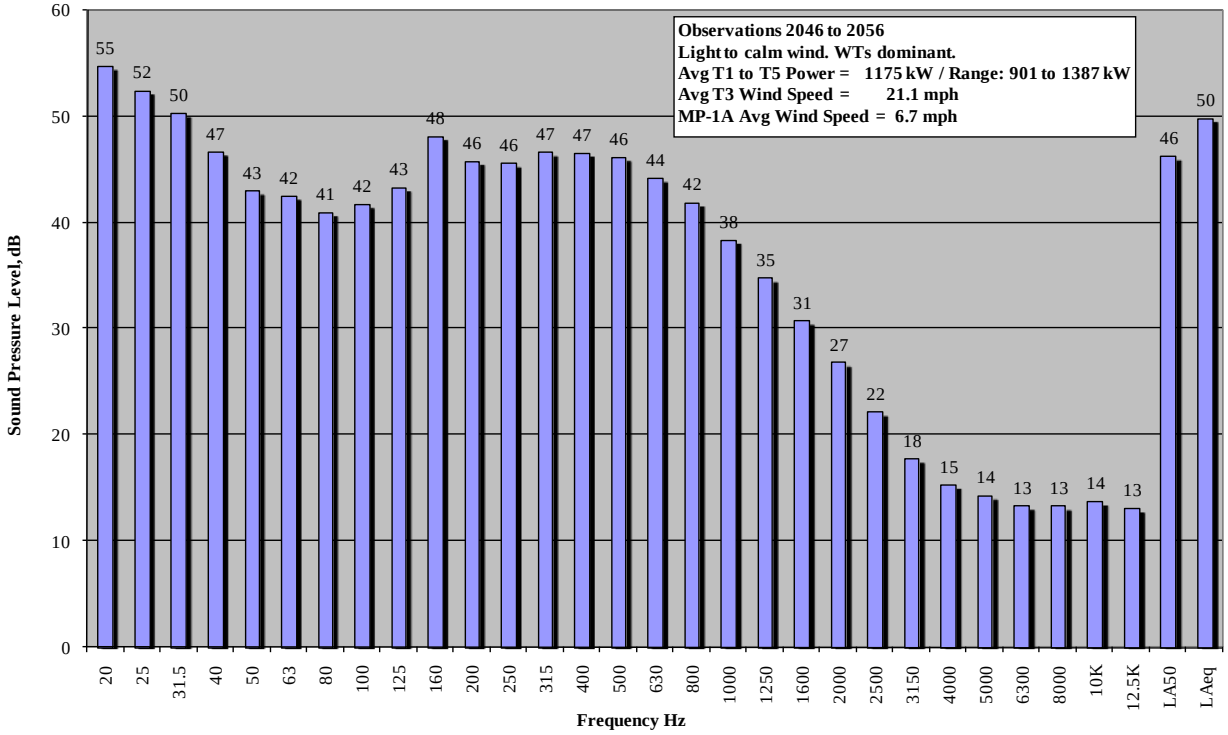
MP-1A
10-Jan-08 06:08 to 06:22



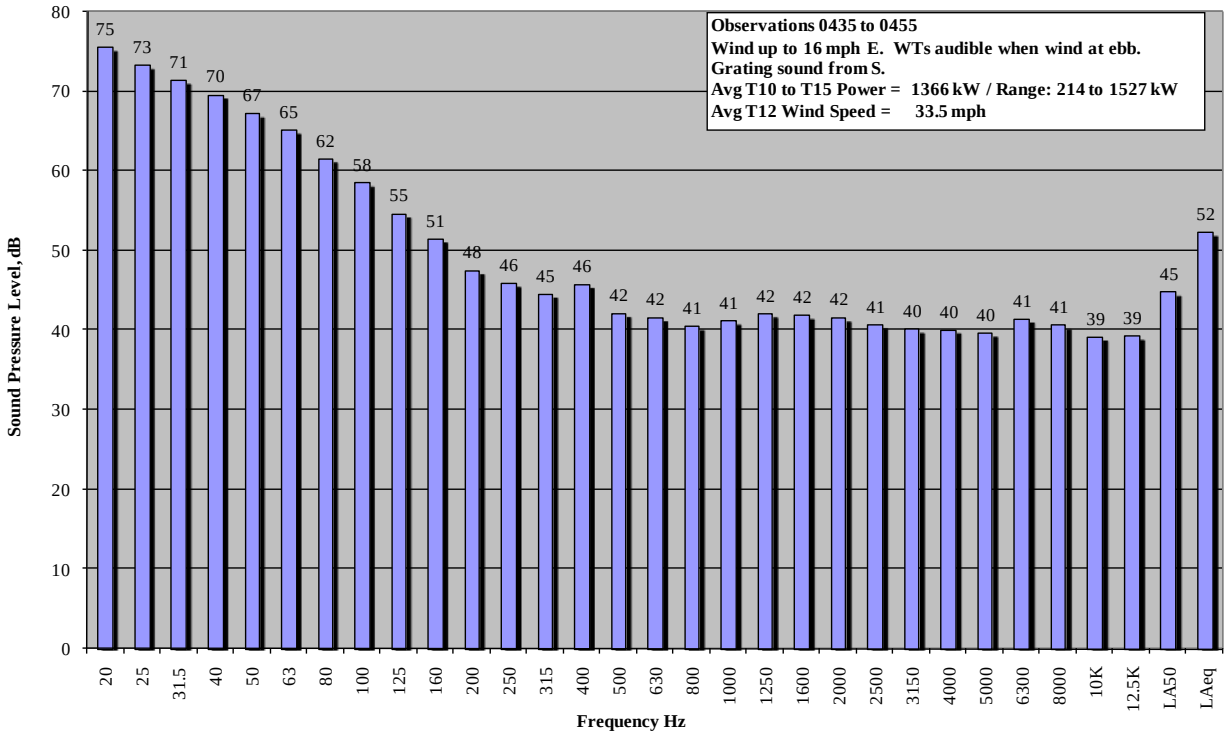
MP-1A
(7" windscreen)
13-Jan-08 00:15 to 00:26



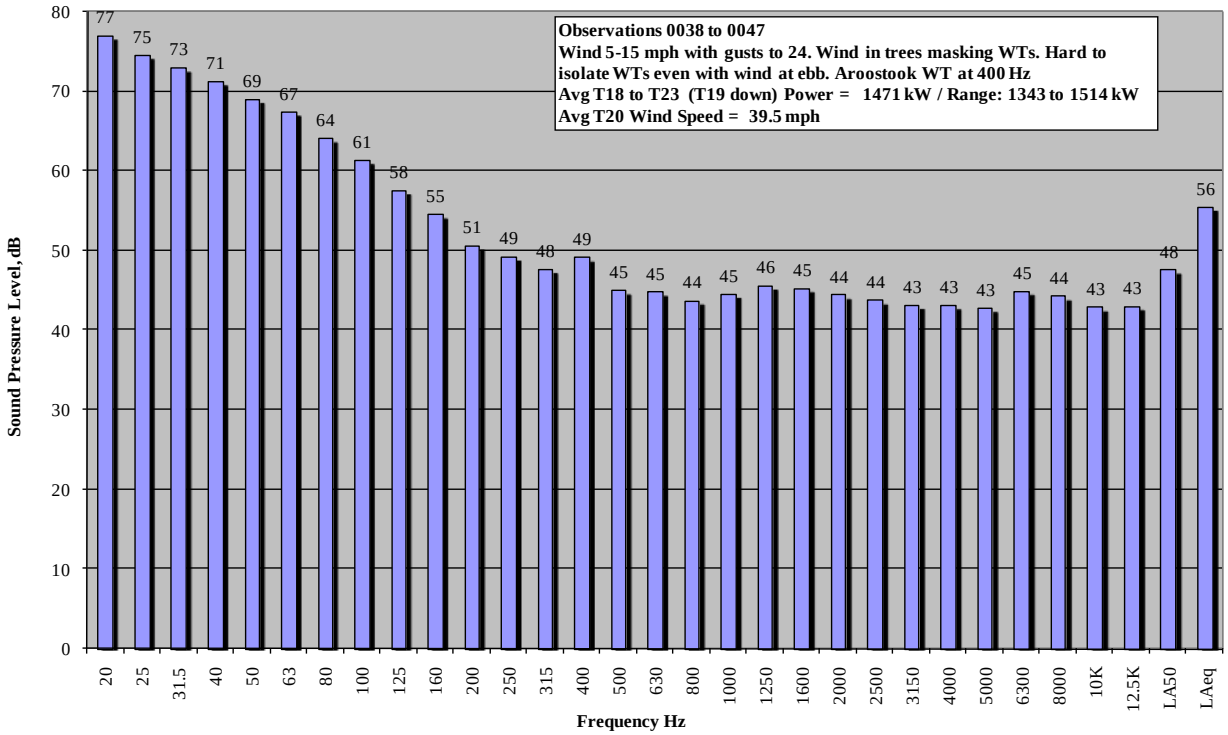
MP-1A
(7" windscreen)
10-Jan-08 20:46 to 20:56



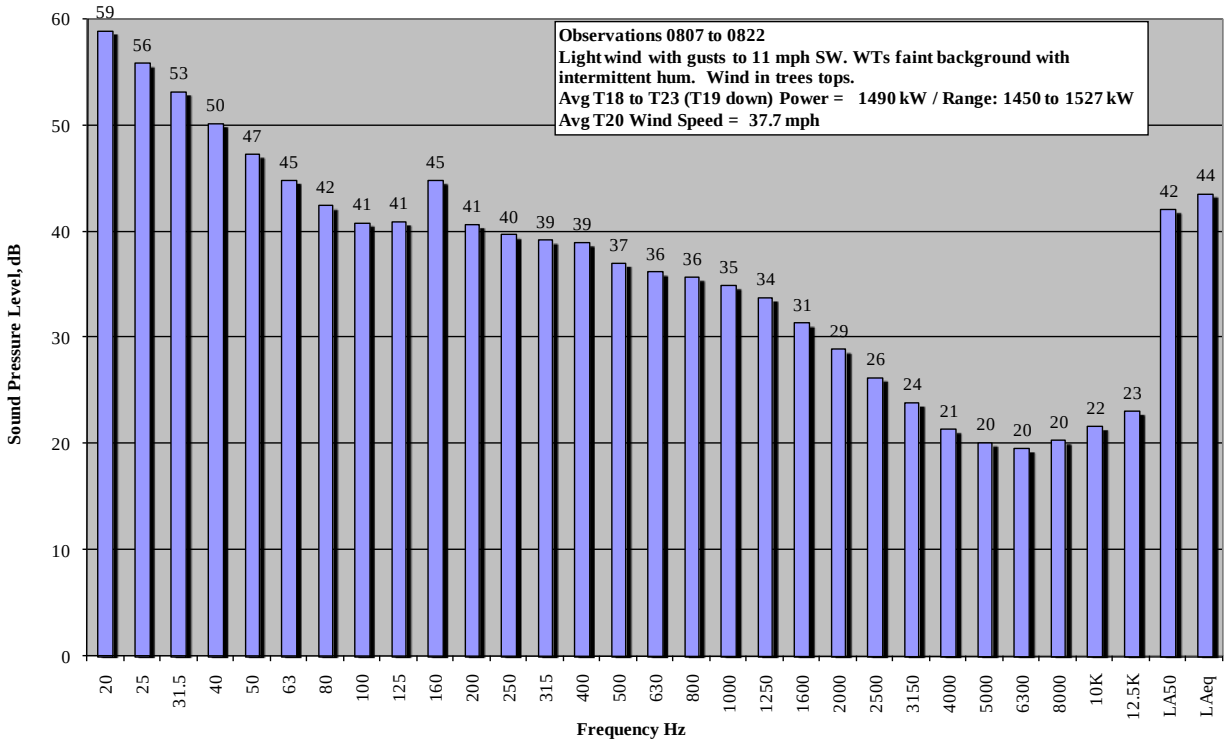
MP-2
10-Jan-08 04:35 to 04:55



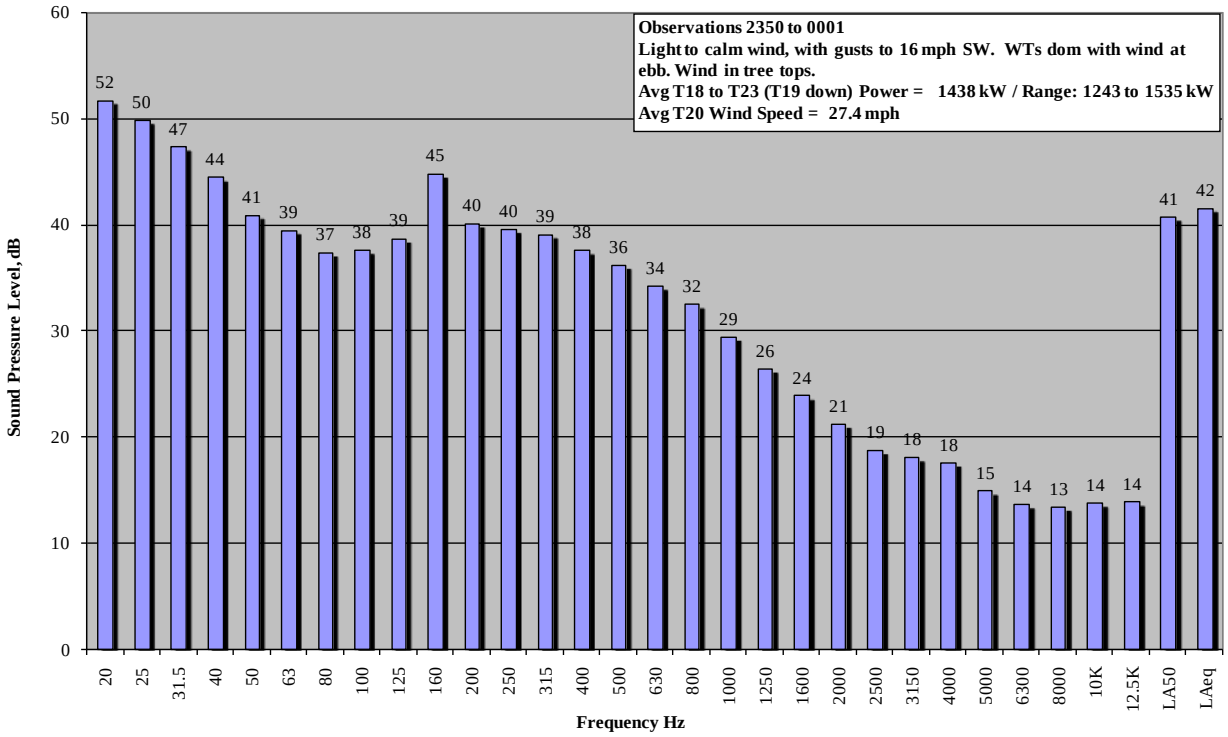
MP-5
10-Jan-08 00:38 to 00:47



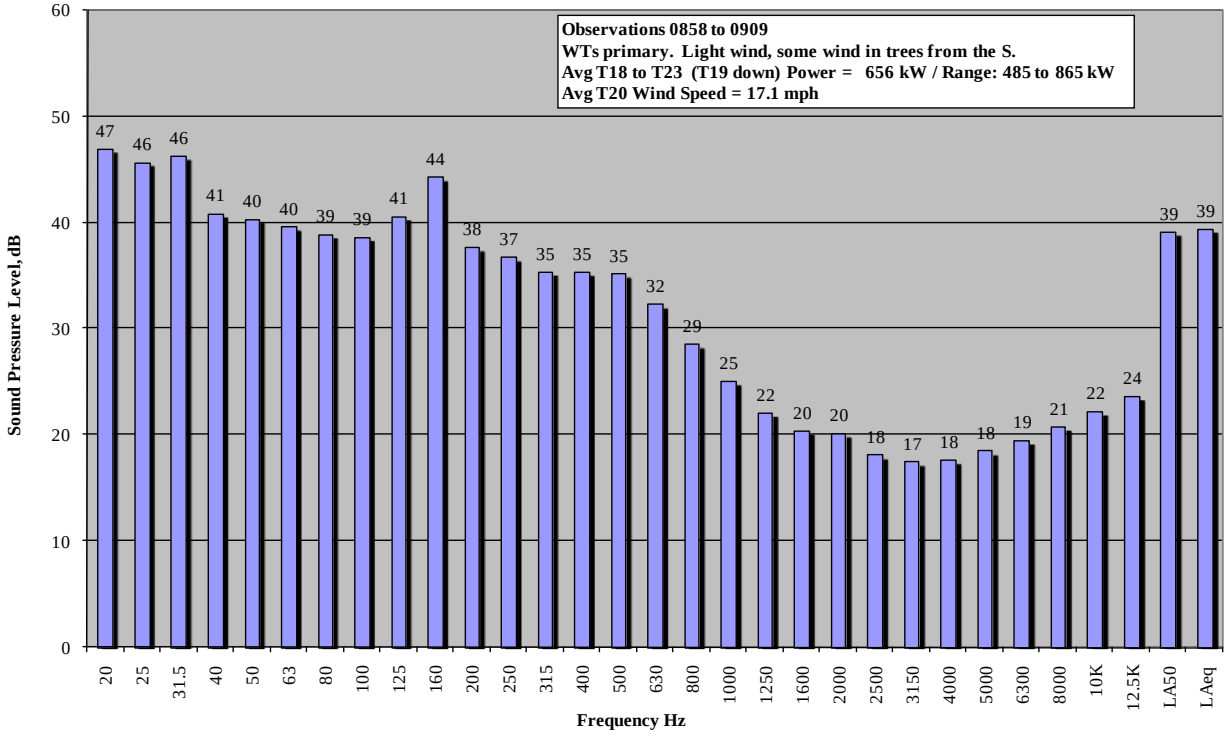
MP-5
10-Jan-08 08:07 to 08:22



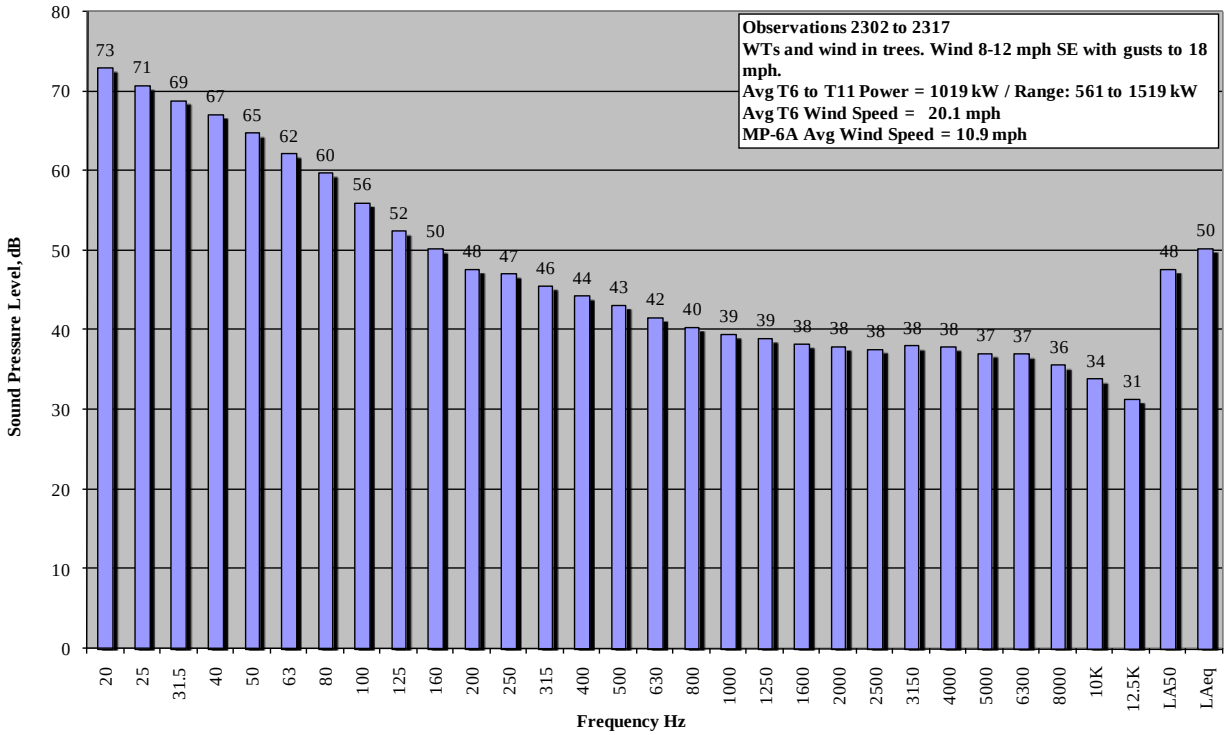
MP-5
(7" windscreen)
10-Jan-08 23:50 to 00:01



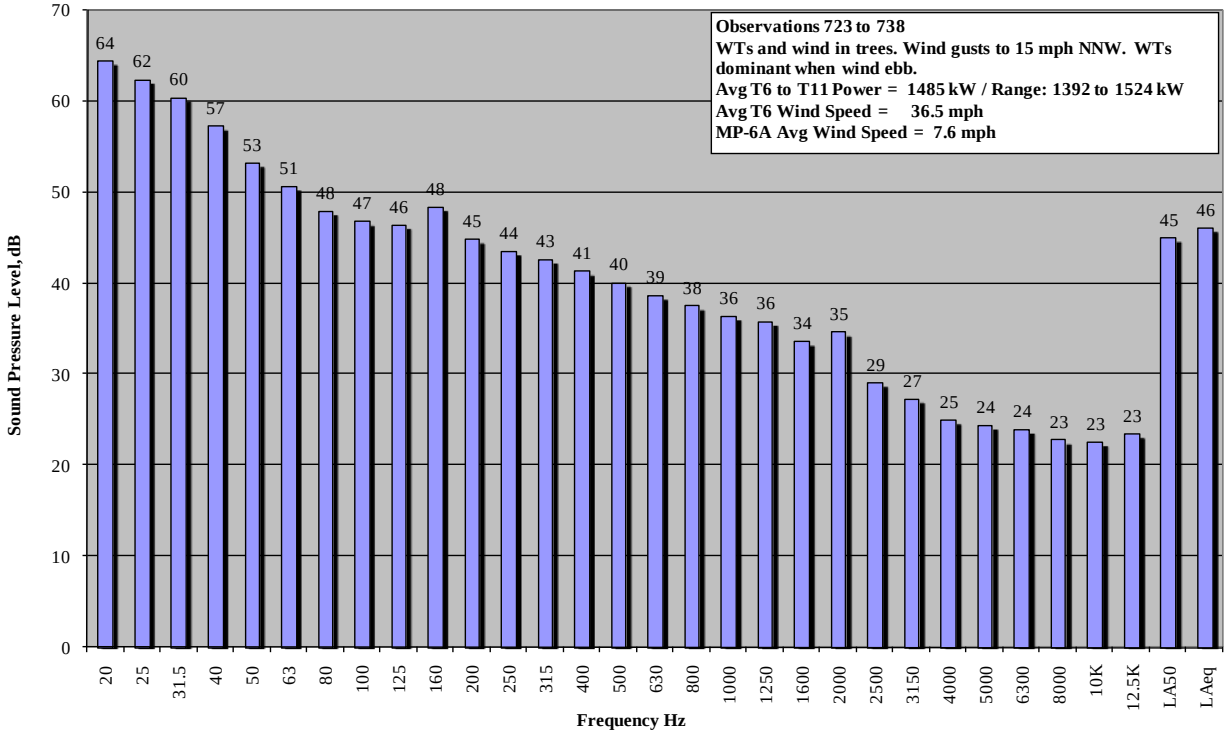
MP-5
(7" windscreen)
13-Jan-08 08:58 to 09:09



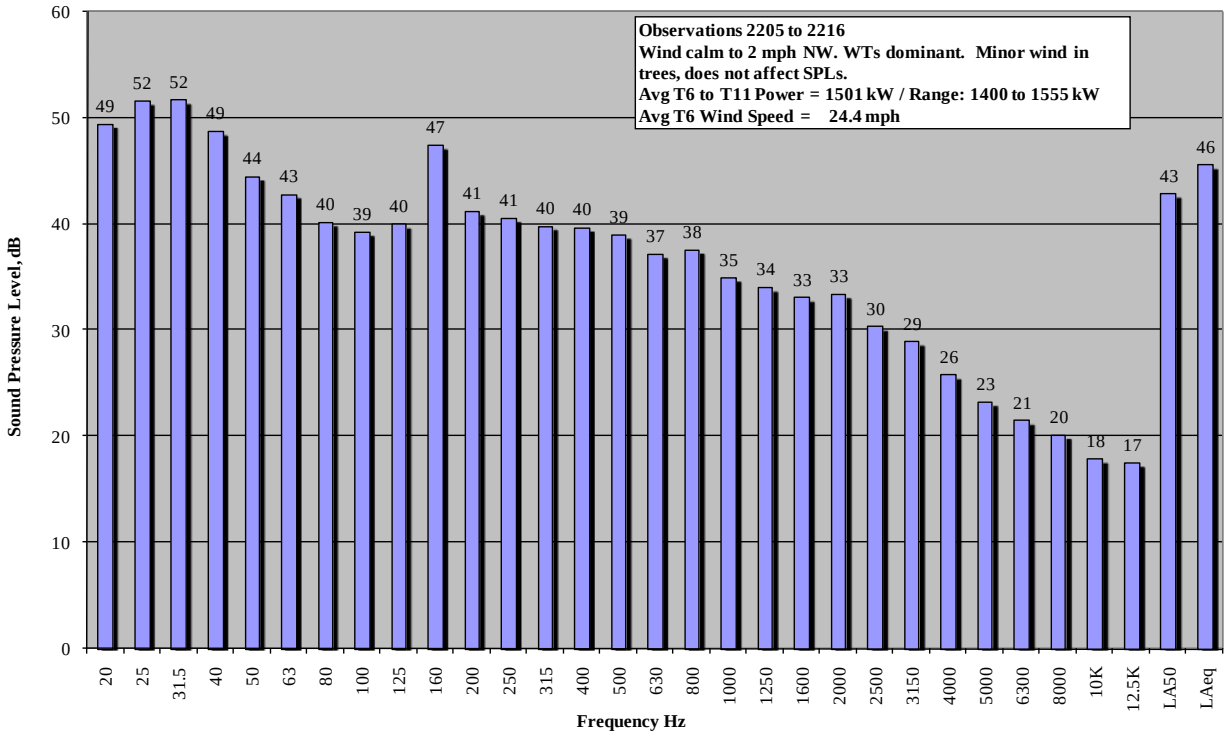
MP-6A
9-Jan-08 23:02 to 23:17



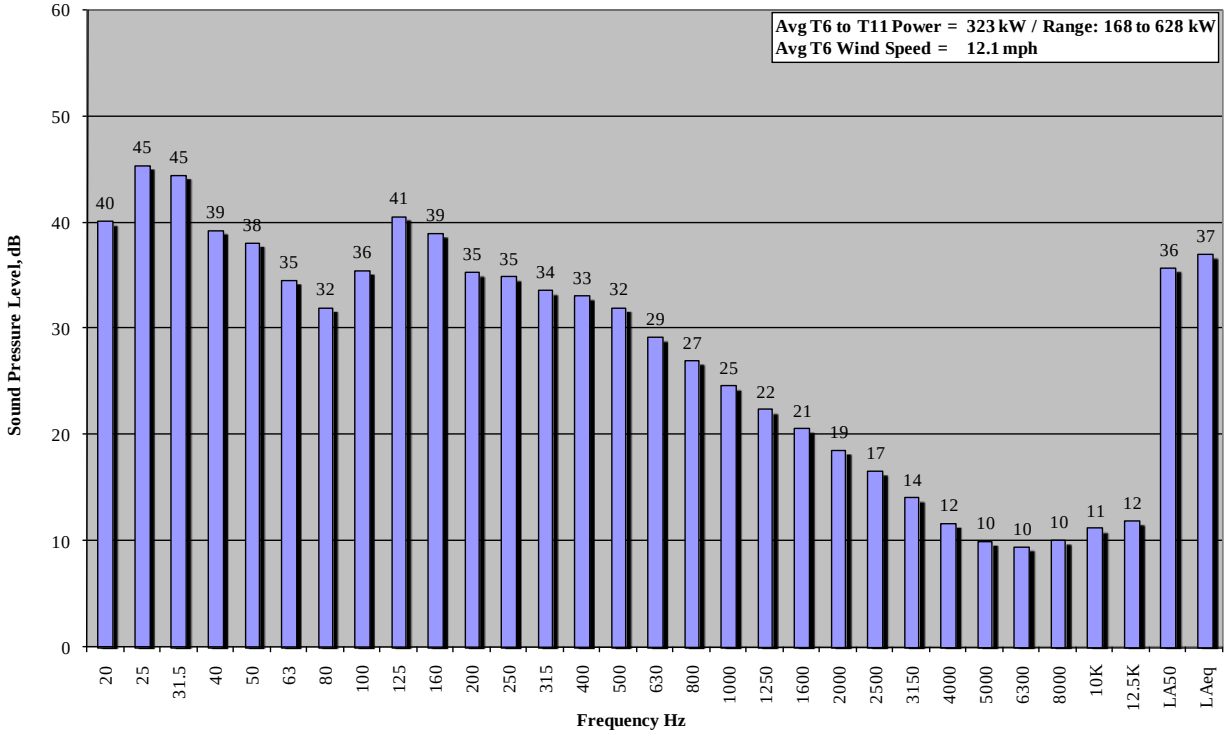
MP-6A
10-Jan-08 07:23 to 07:38



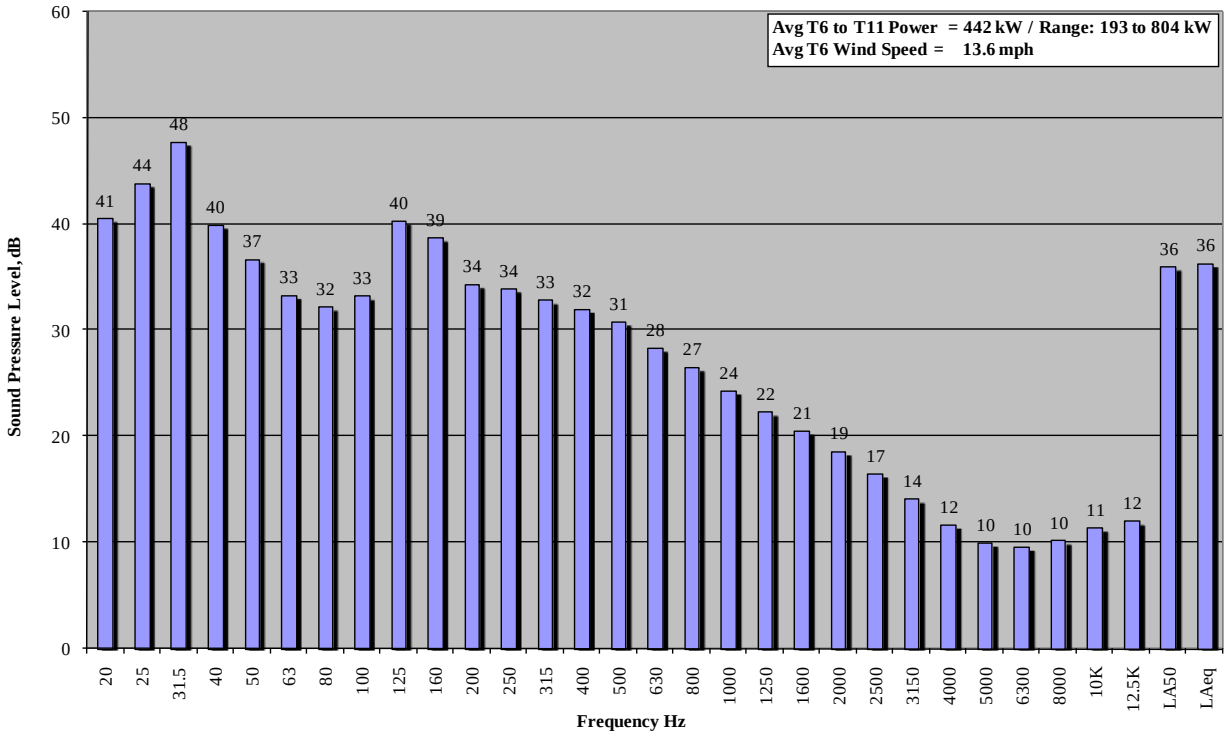
MP-6A
(7" windscreen)
10-Jan-08 22:05 to 22:16



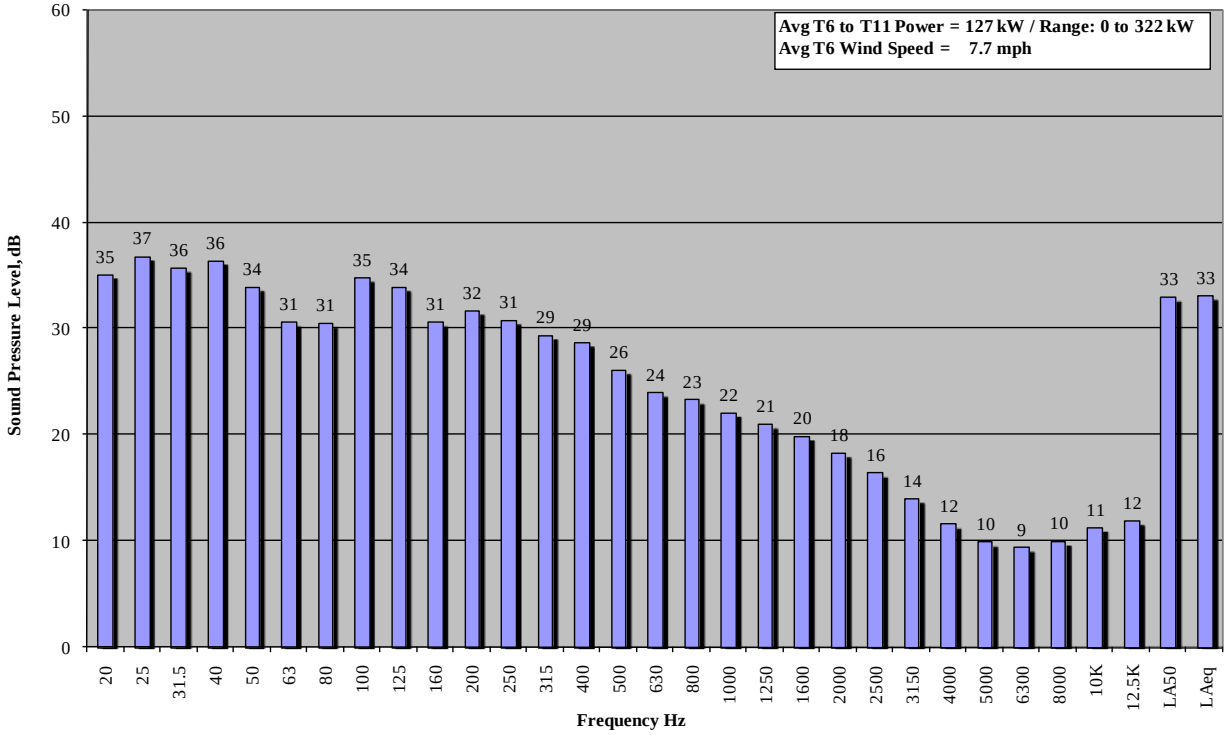
MP-6A
(7" windscreen)
11-Jan-08 02:00 to 03:00



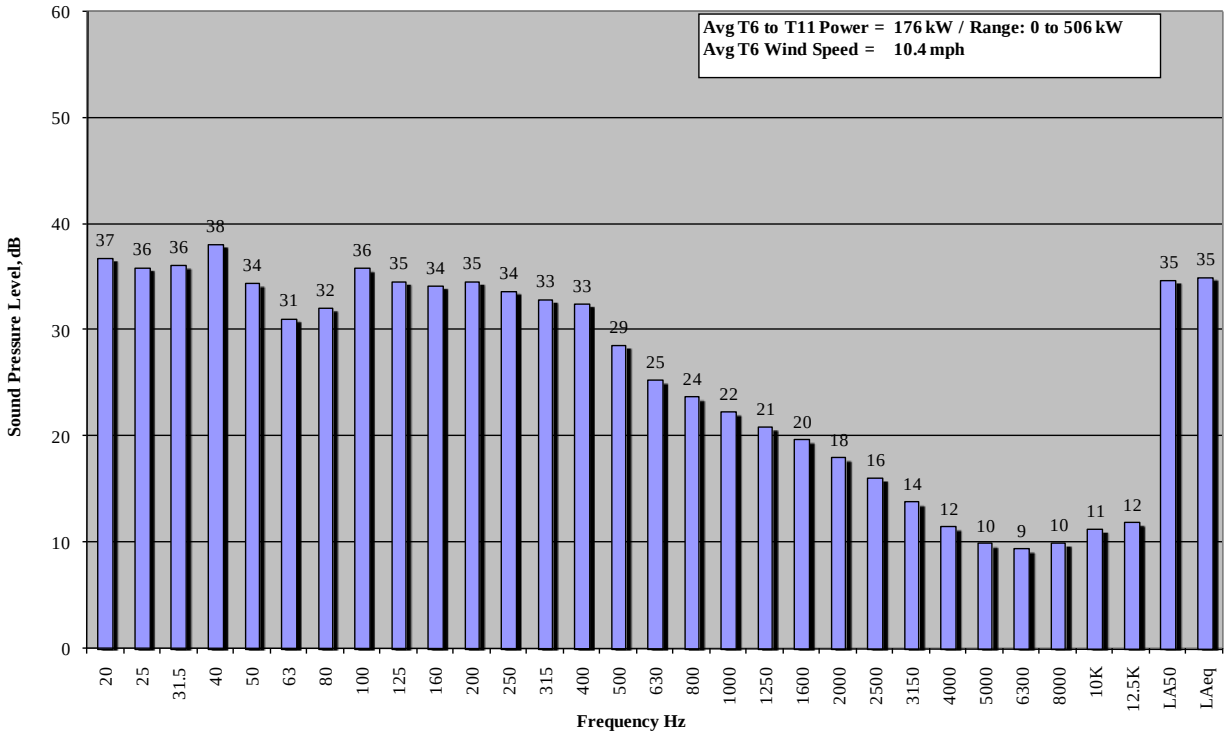
MP-6A
(7" windscreen)
11-Jan-08 03:00 to 04:00



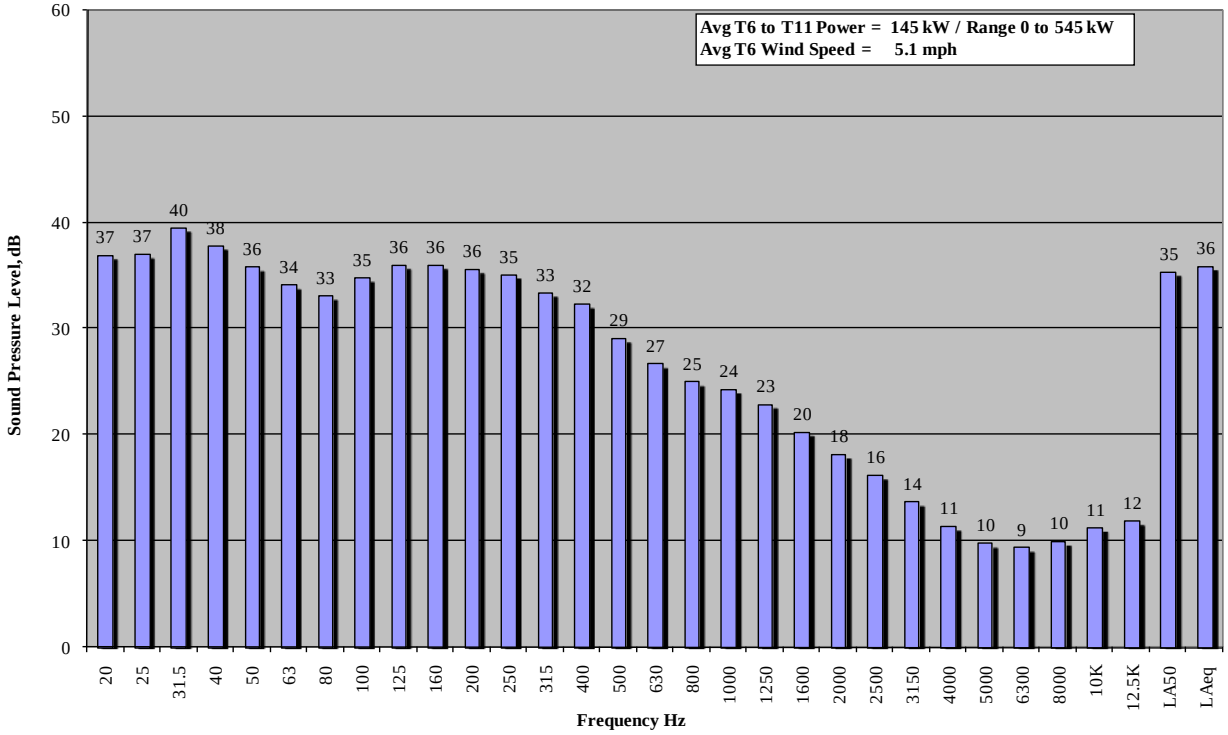
MP-6A
(7" windscreen)
11-Jan-08 04:00 to 05:00



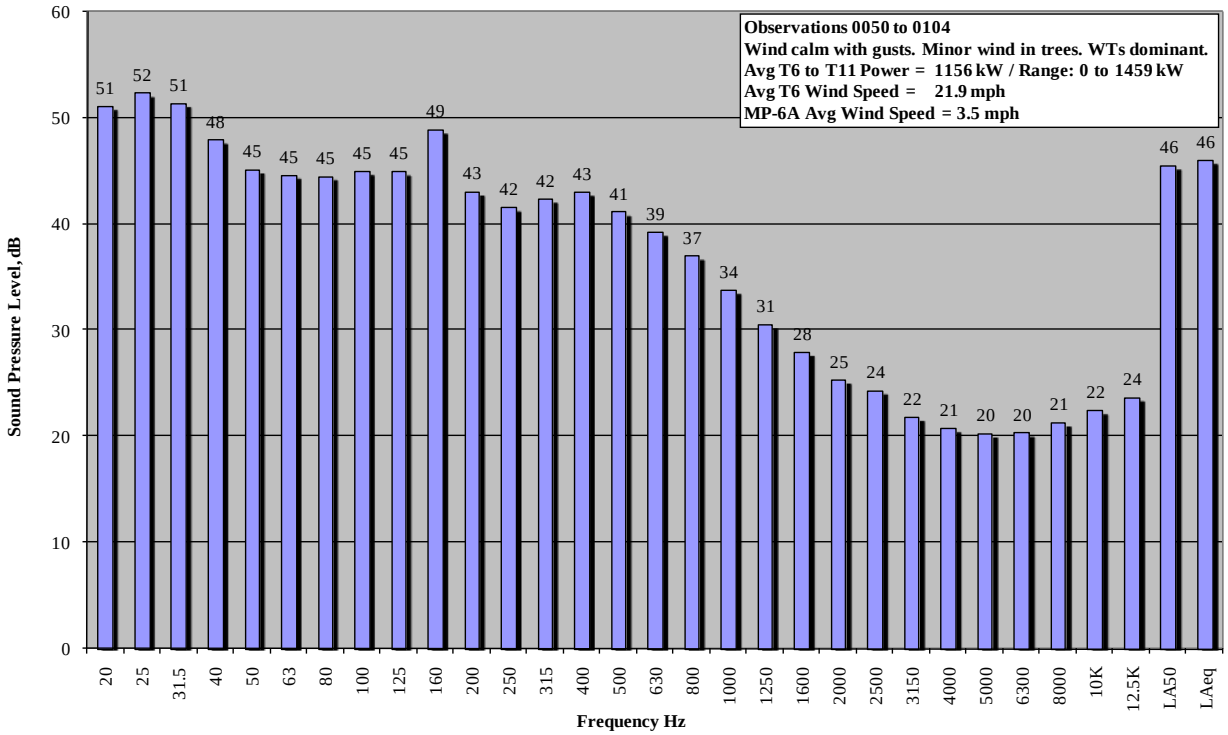
MP-6A
(7" windscreen)
11-Jan-08 05:00 to 06:00



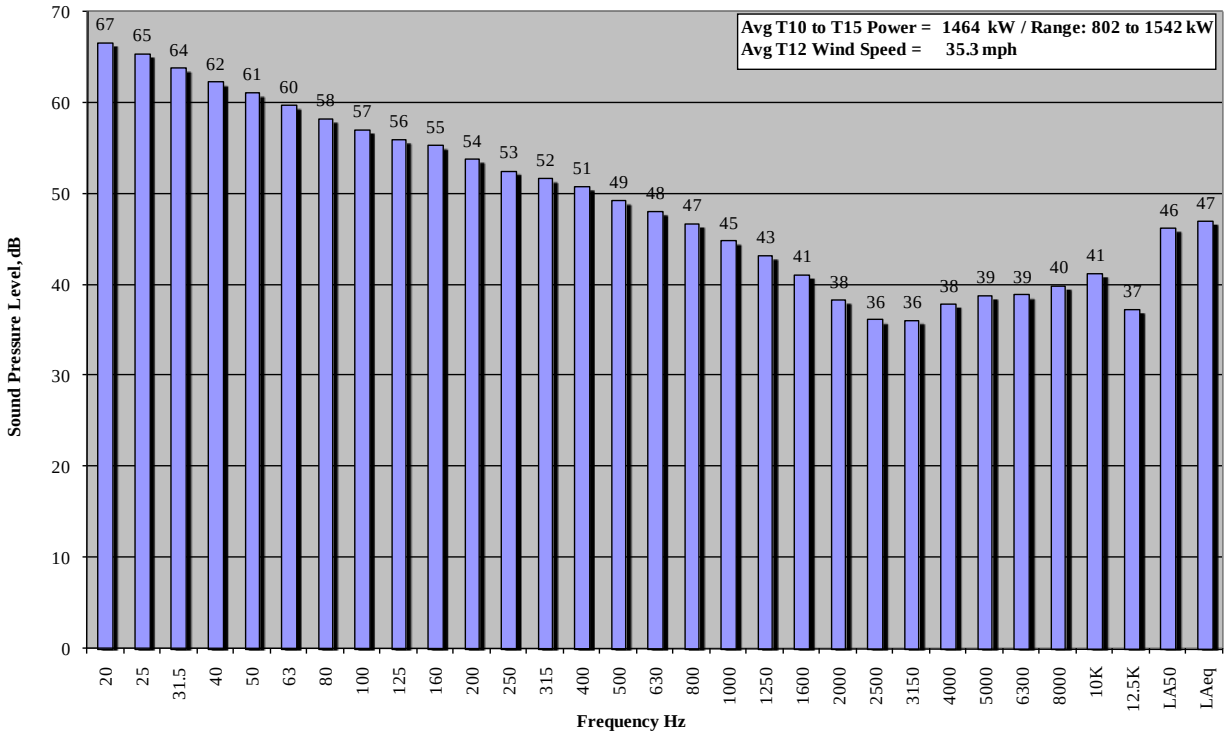
MP-6A
(7" windscreen)
11-Jan-08 06:00 to 07:00



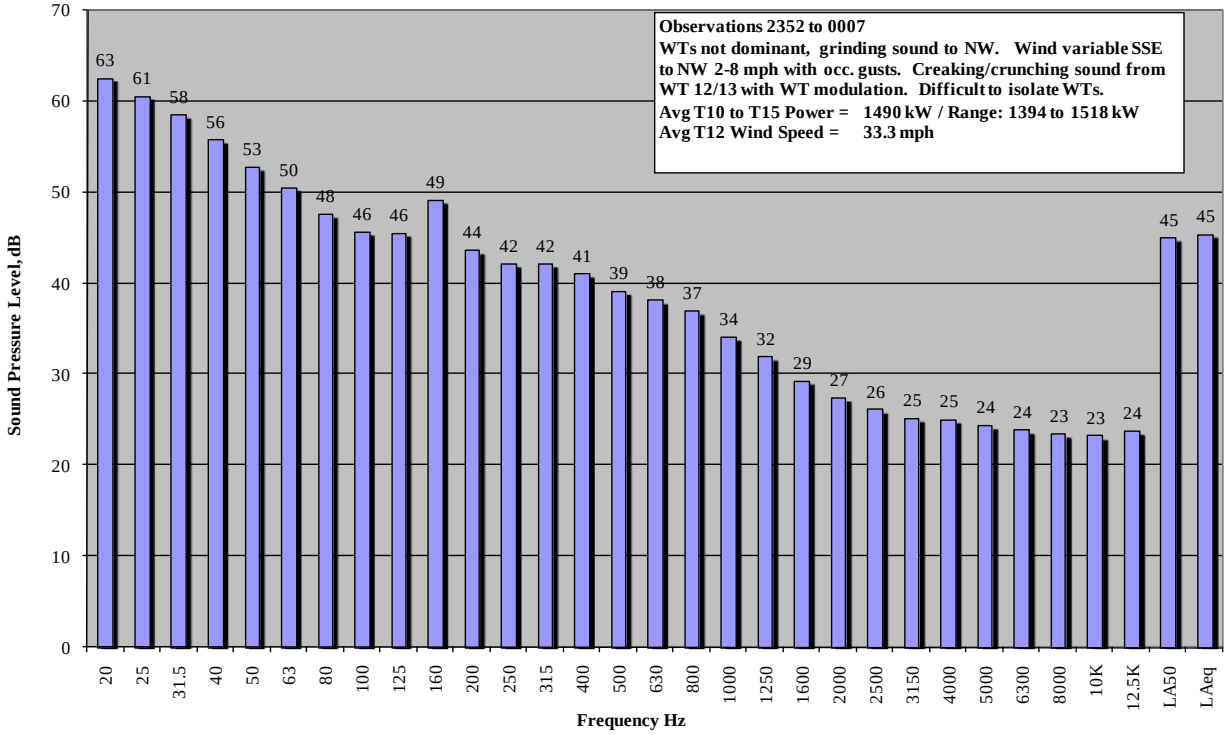
MP-6A
(7" windscreen)
13-Jan-08 00:50 to 01:04



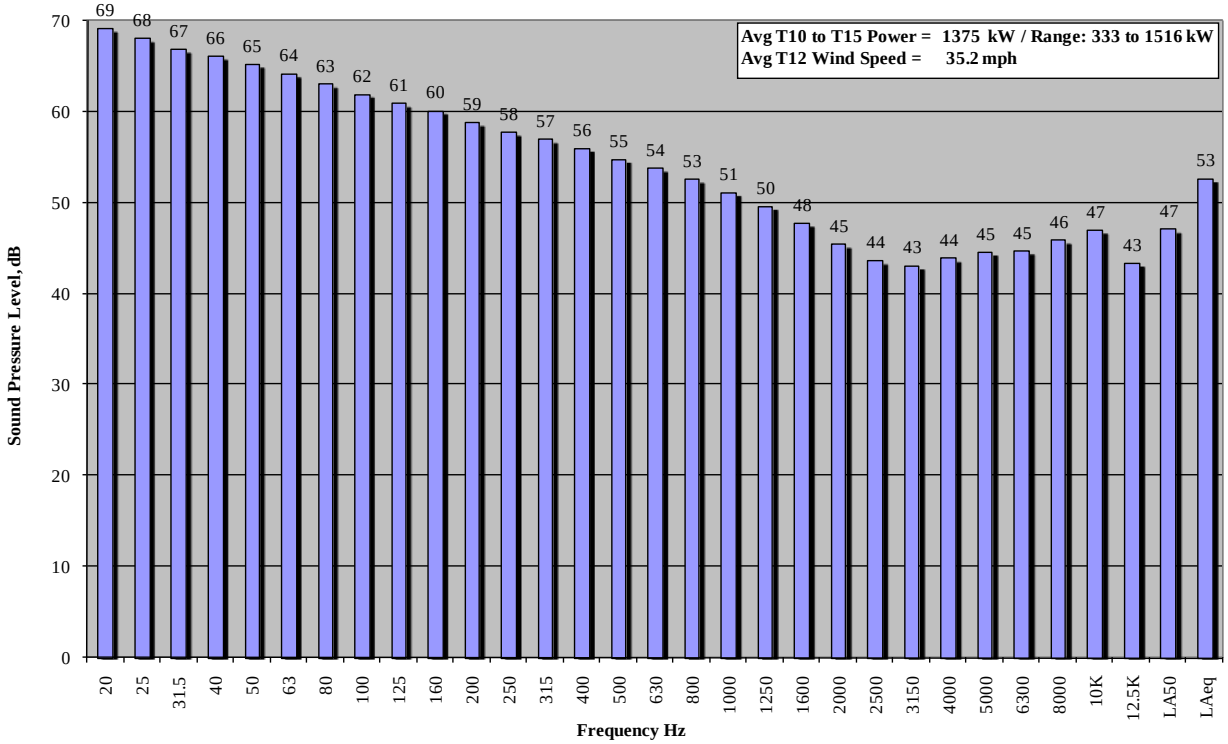
MP-7A
9-Jan-08 23:00 to 00:00



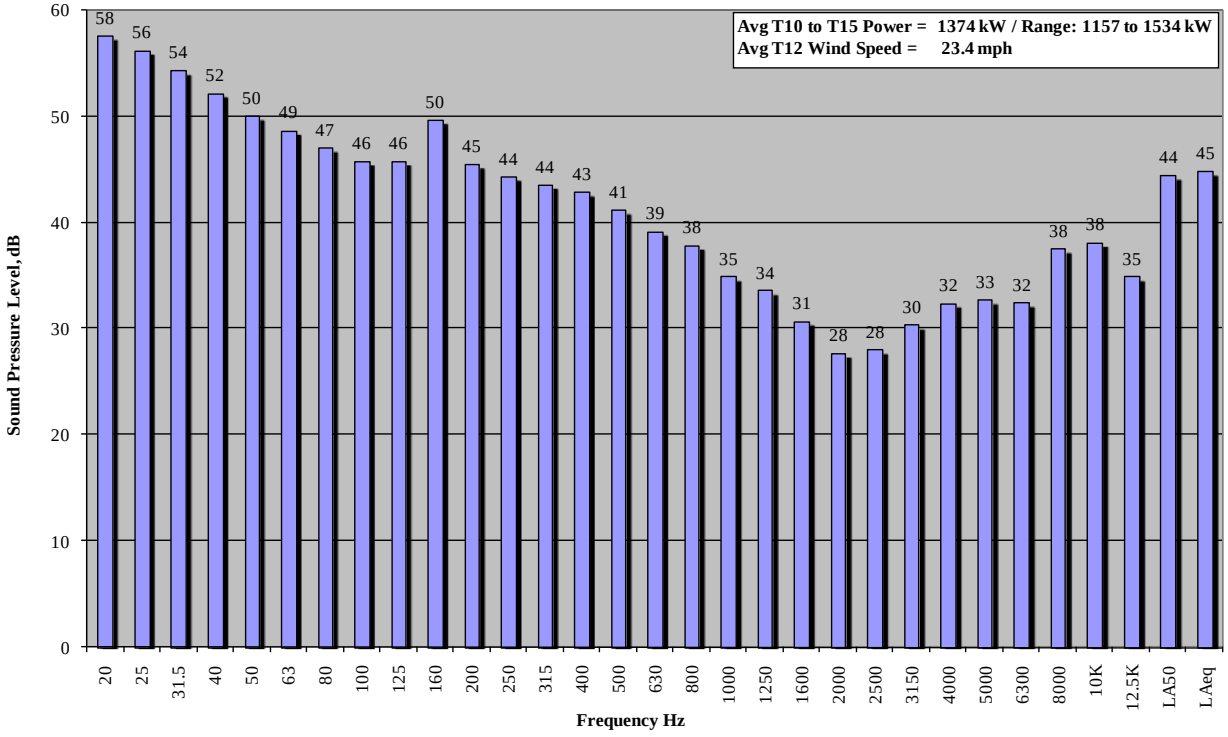
MP-7A
9-Jan-08 23:52 to 00:07



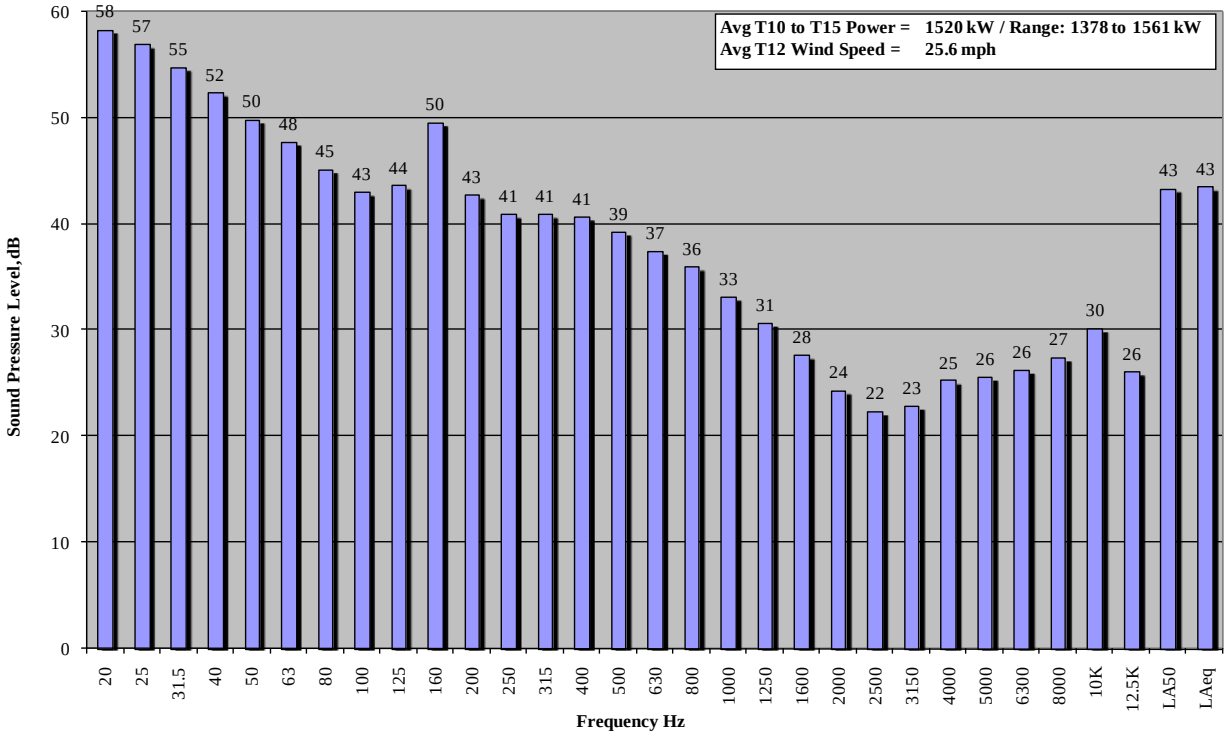
MP-7A
10-Jan-08 00:00 to 01:00



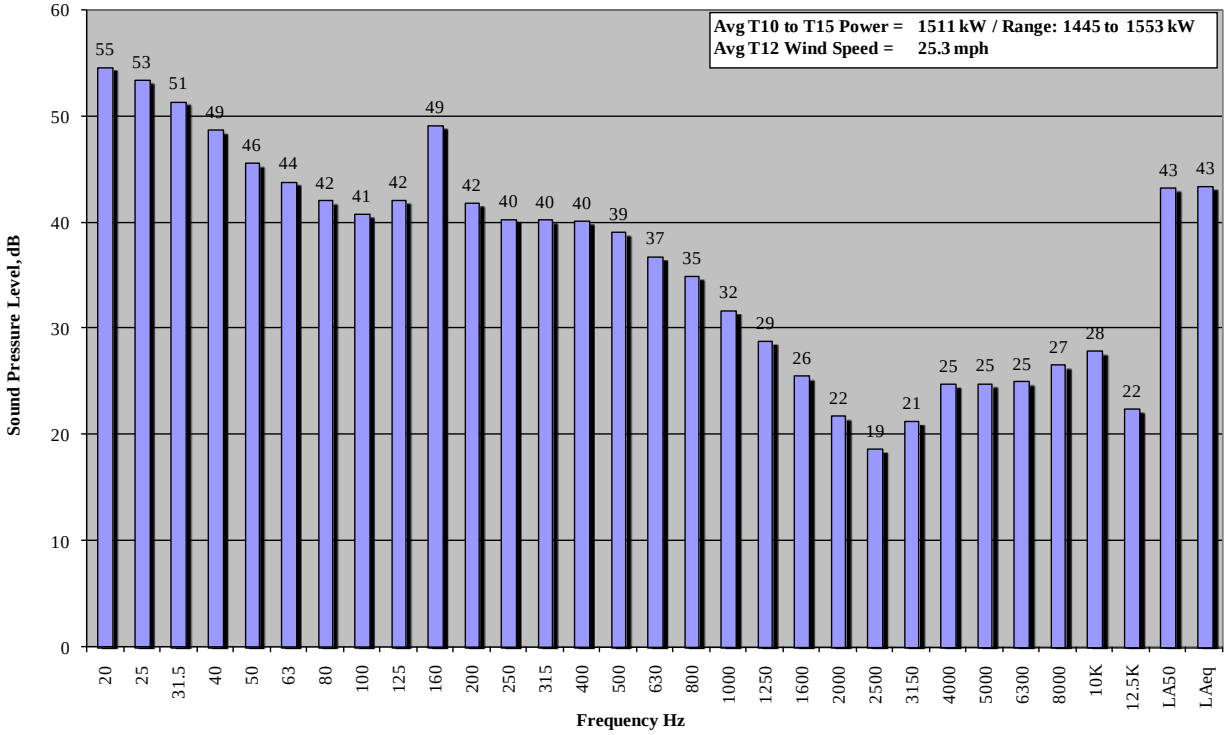
MP-7A
10-Jan-08 19:00 to 20:00



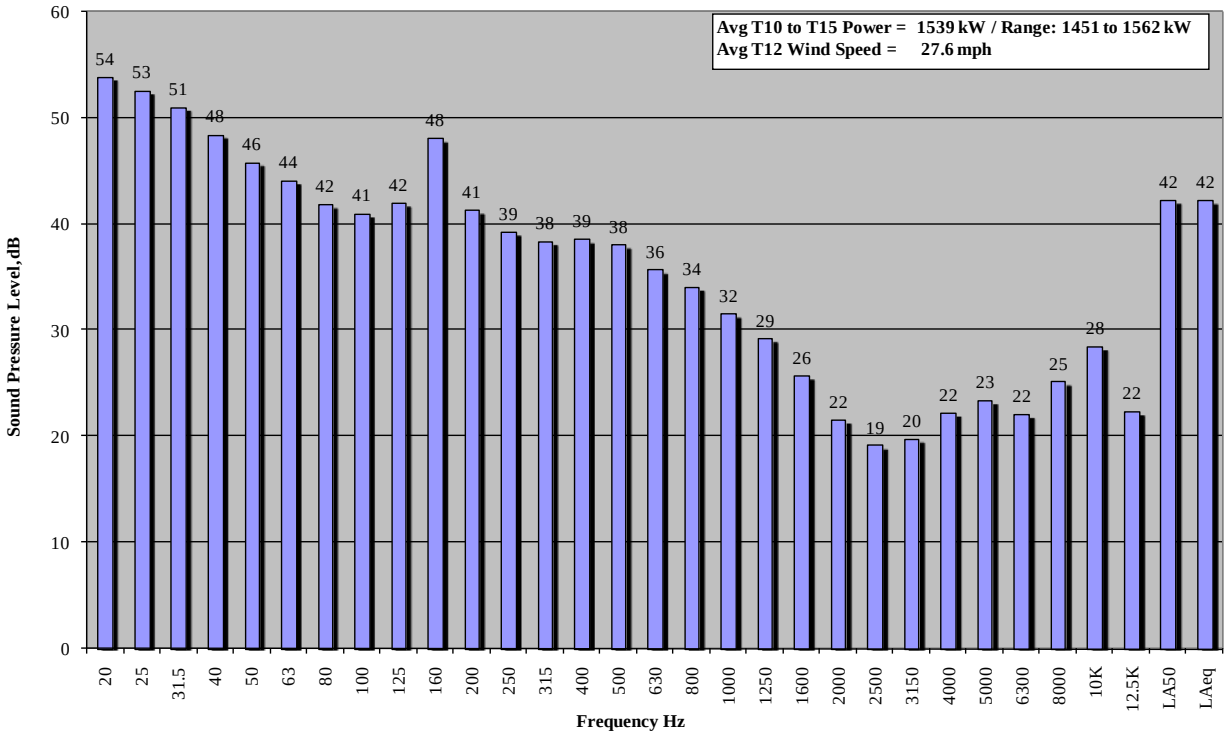
MP-7A
10-Jan-08 20:00 to 21:00



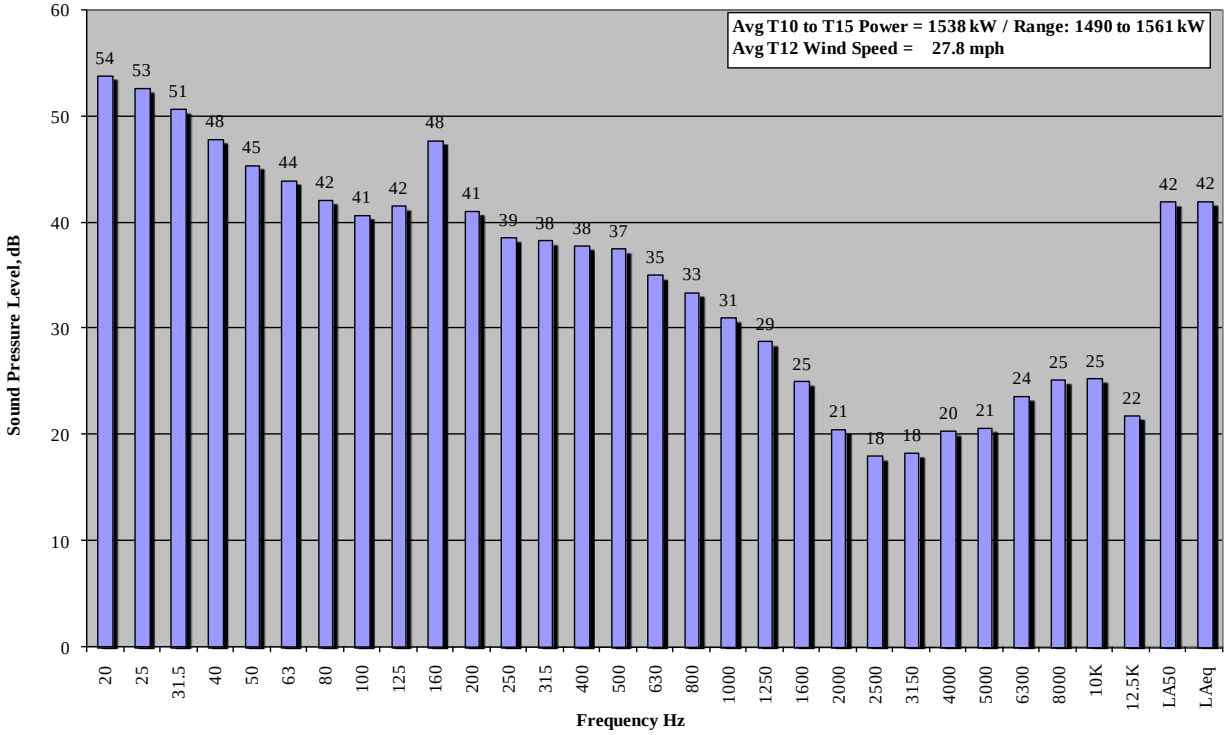
MP-7A
10-Jan-08 21:00 to 22:00



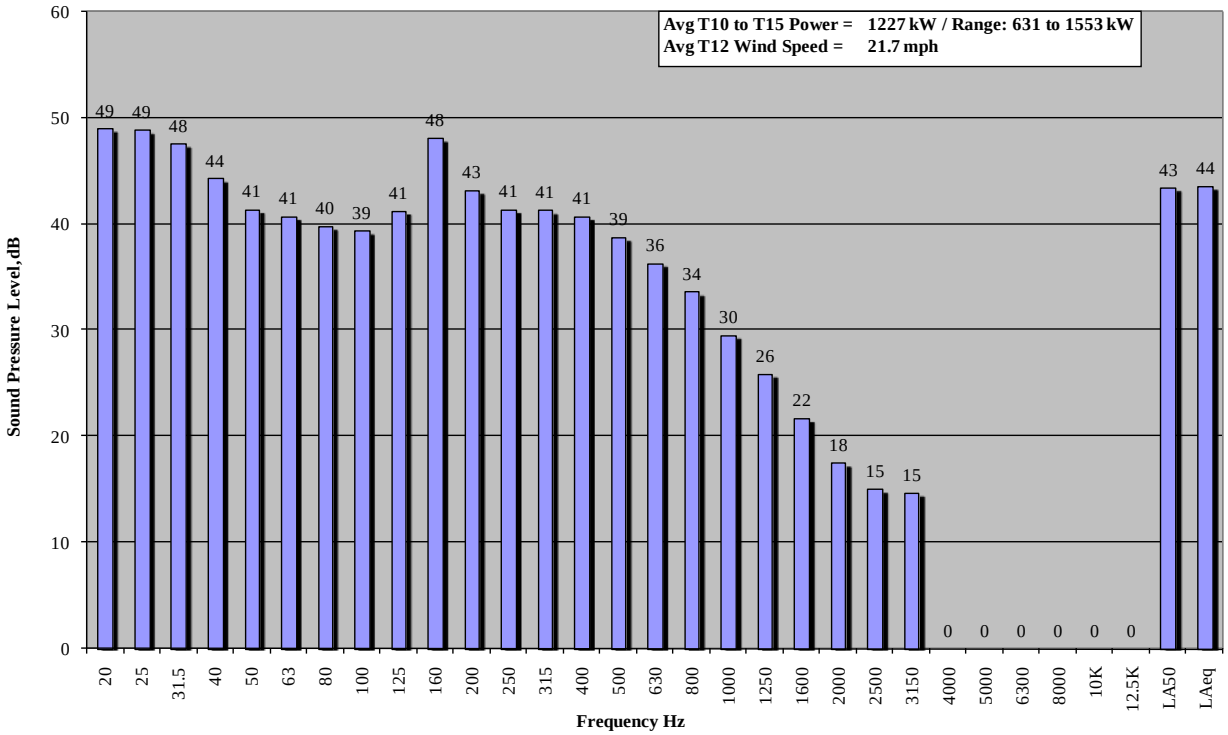
MP-7A
10-Jan-08 22:00 to 23:00



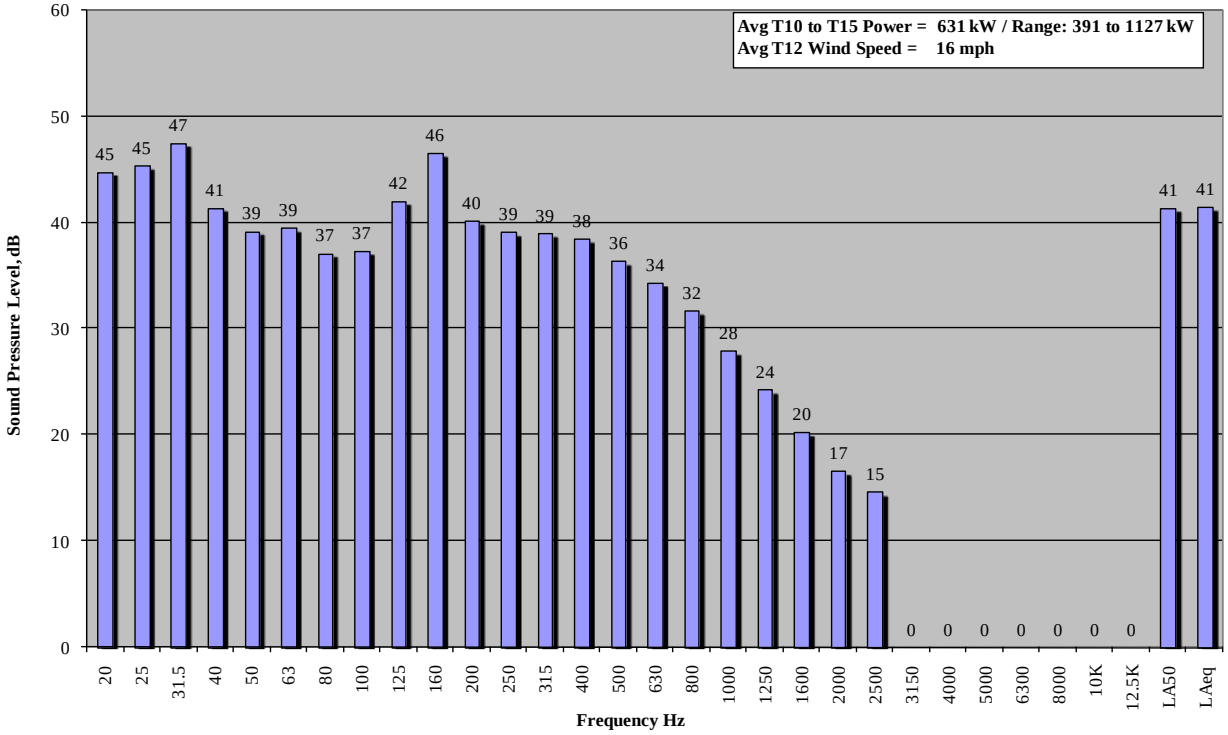
MP-7A
10-Jan-08 23:00 to 00:00



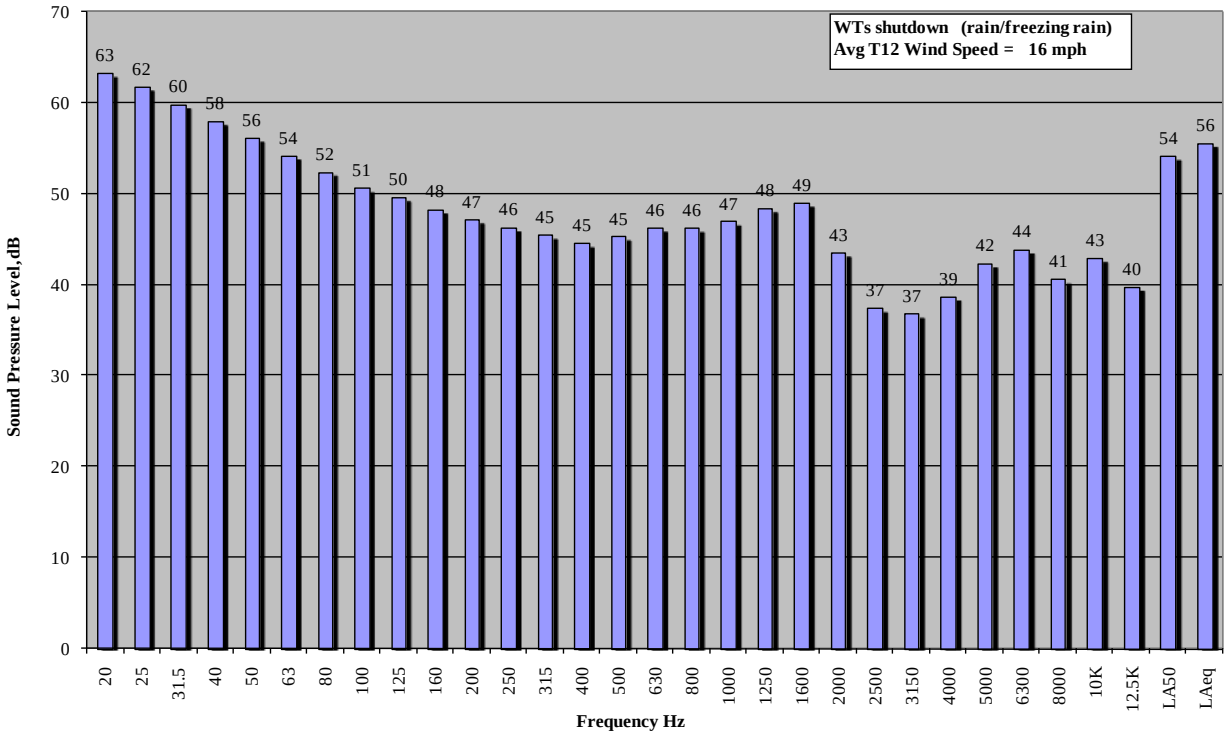
MP-7A
11-Jan-08 00:00 to 01:00



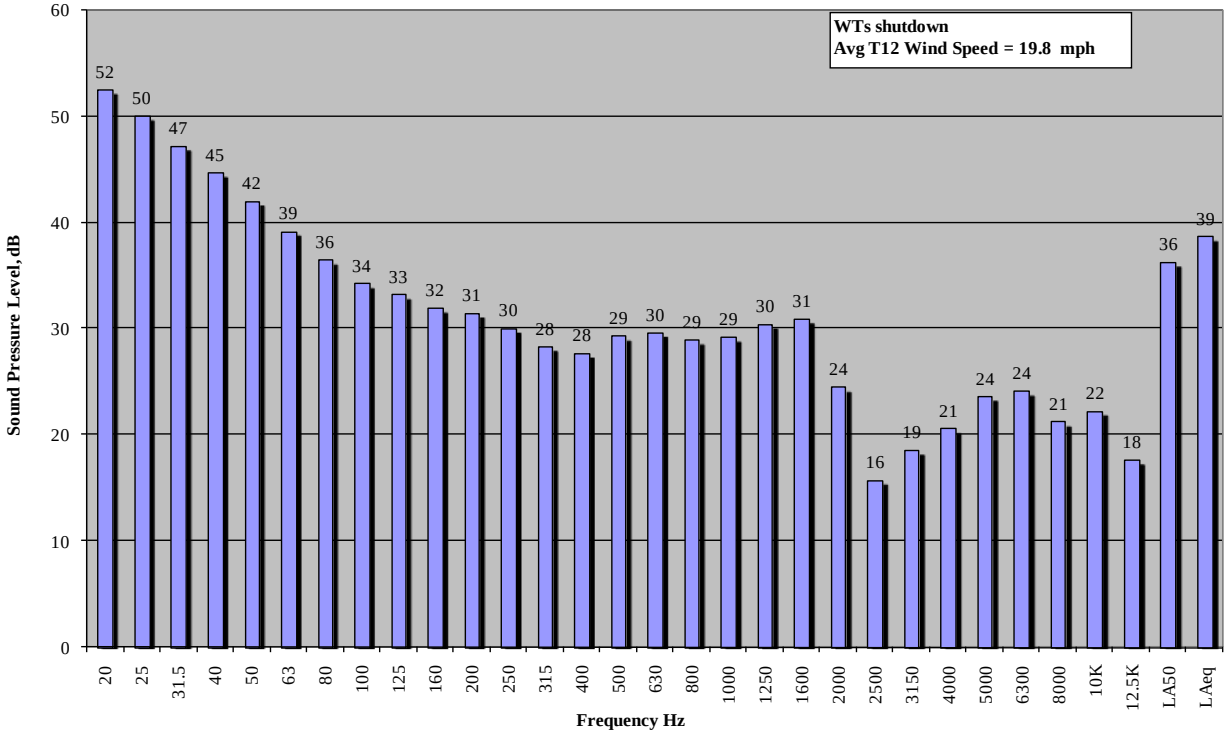
MP-7A
11-Jan-08 01:00 to 02:00



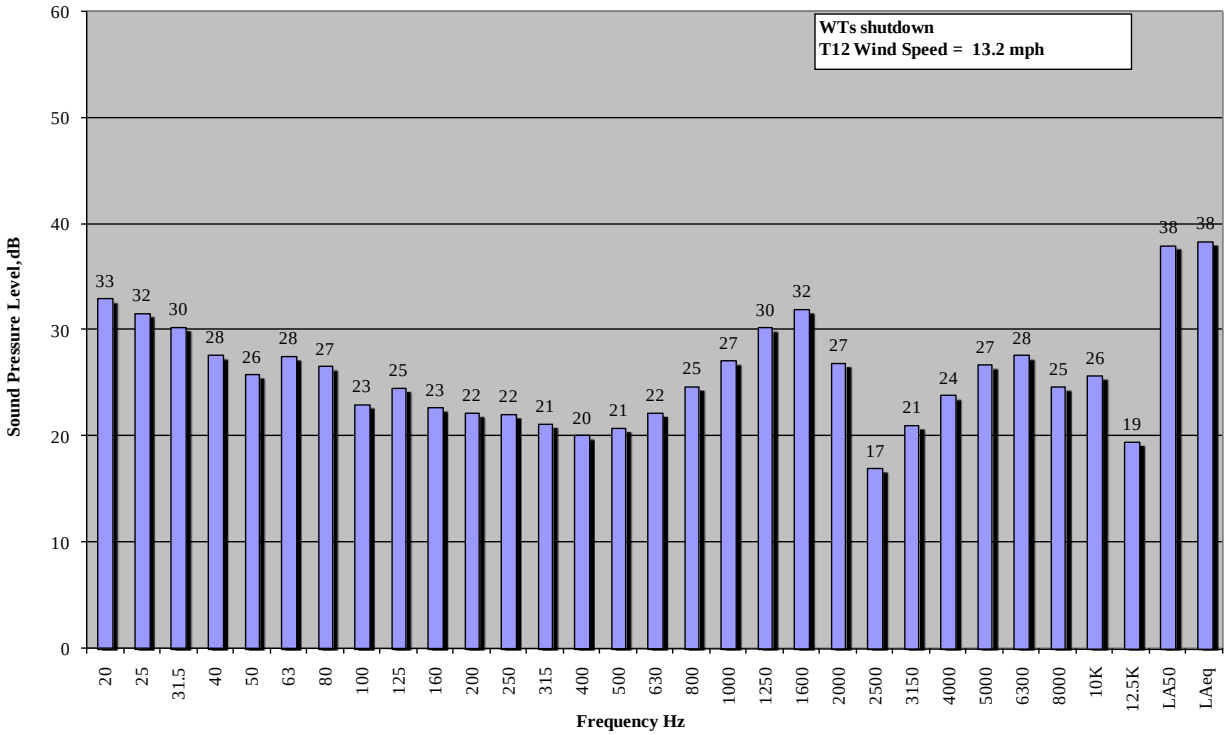
MP-7A
11-Jan-08 19:00 to 20:00



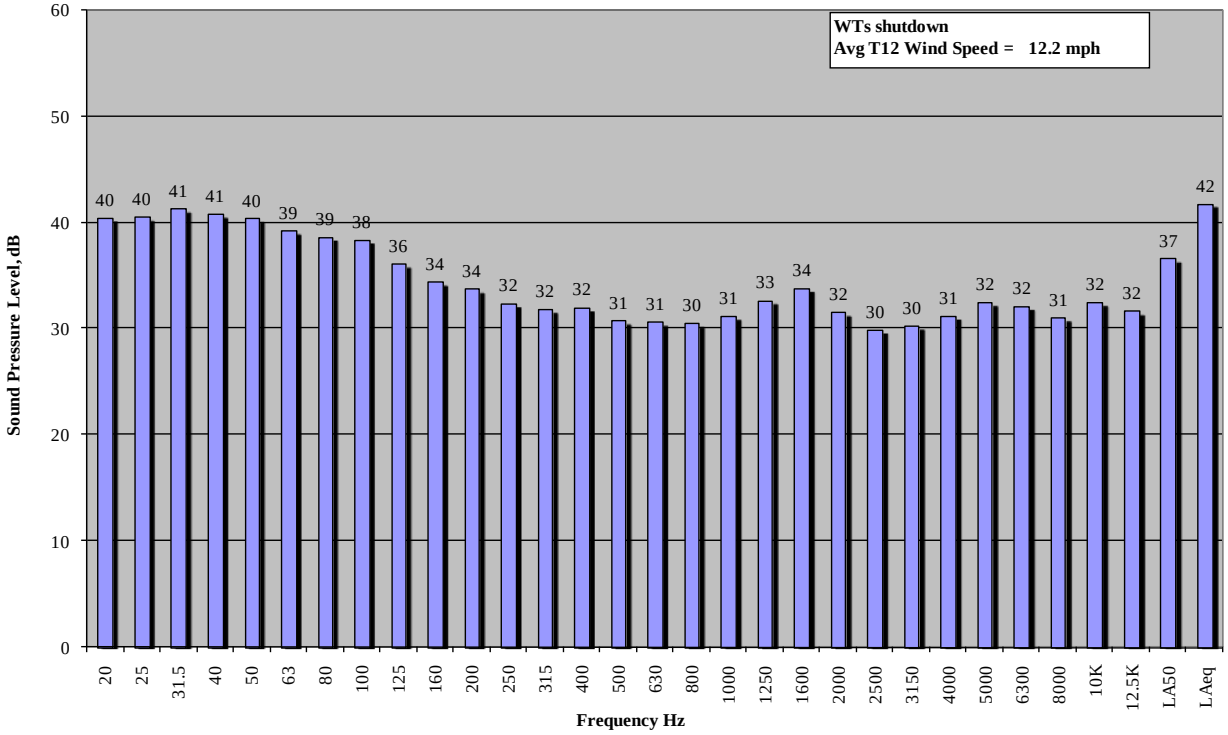
MP-7A
11-Jan-08 20:00 to 21:00



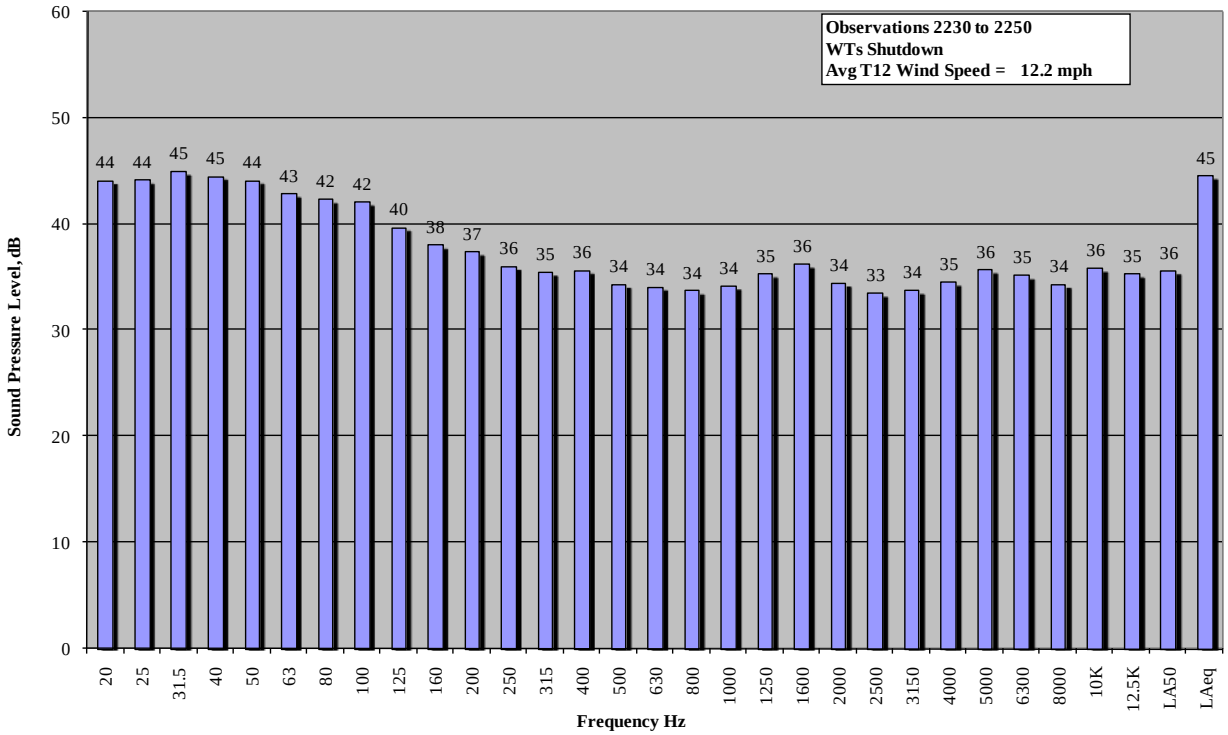
MP-7A
11-Jan-08 21:00 to 22:00



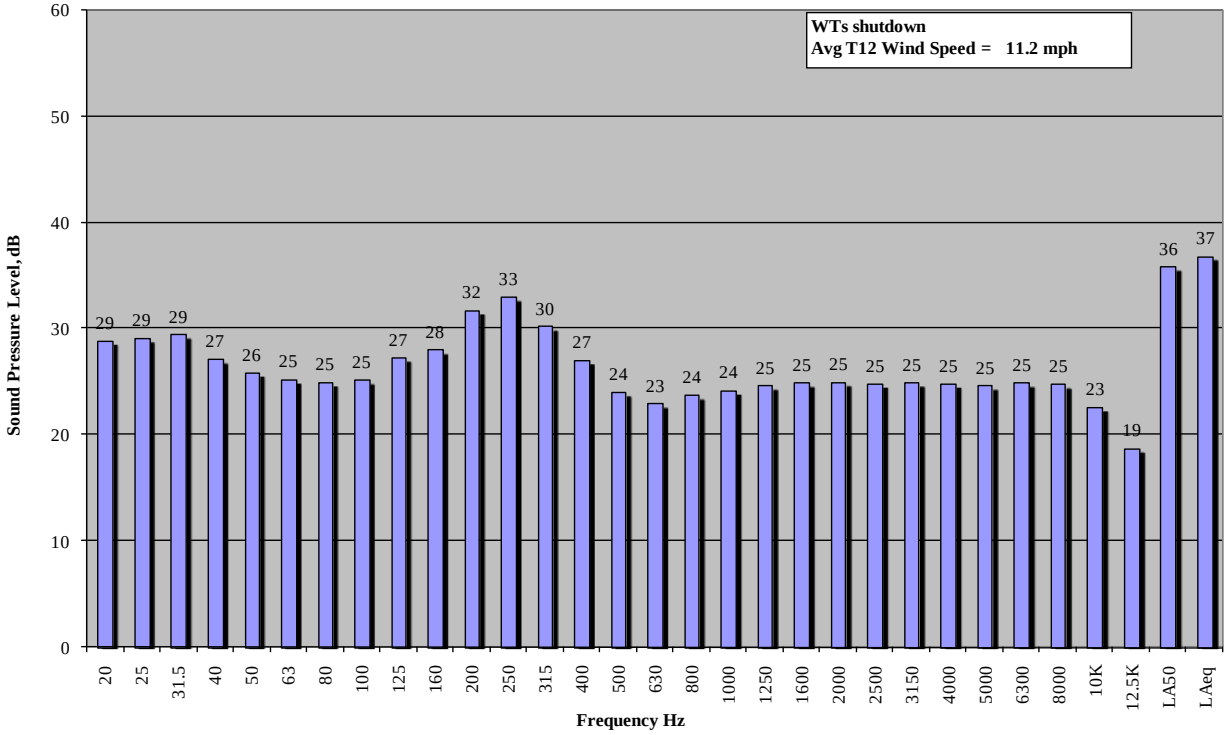
MP-7A
11-Jan-08 22:00 to 23:00



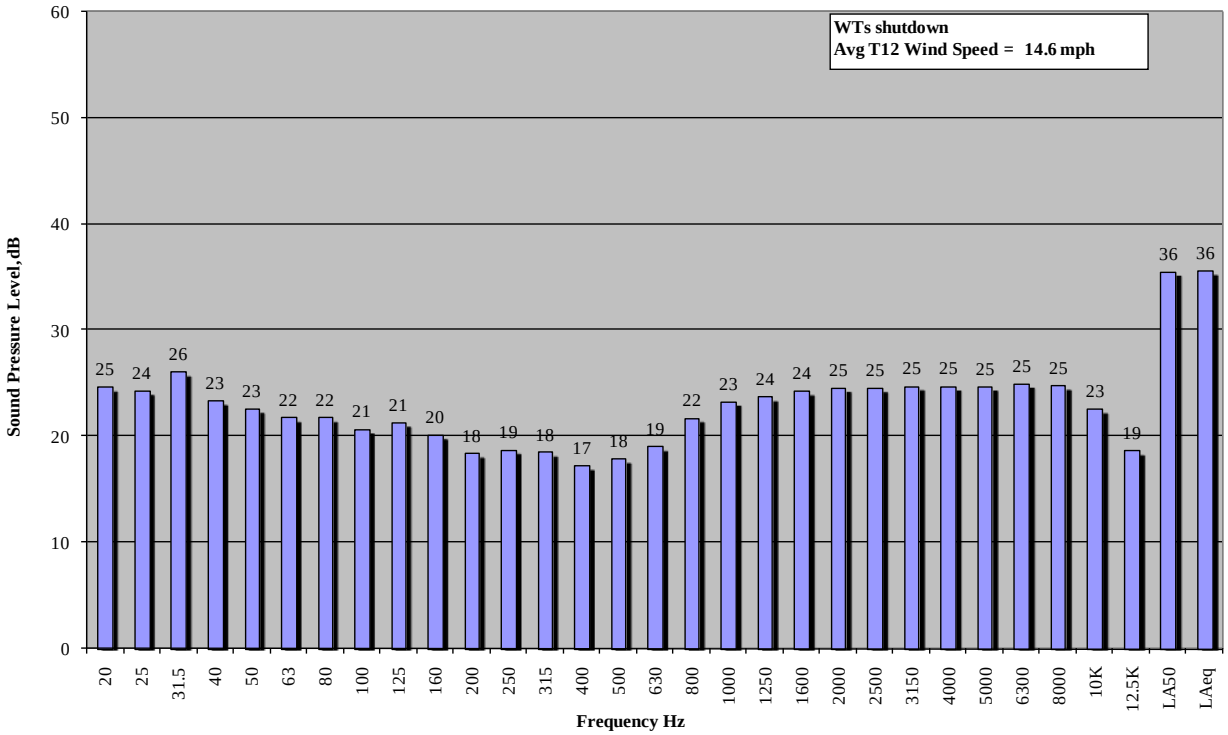
MP-7A
11-Jan-08 22:30 to 22:50



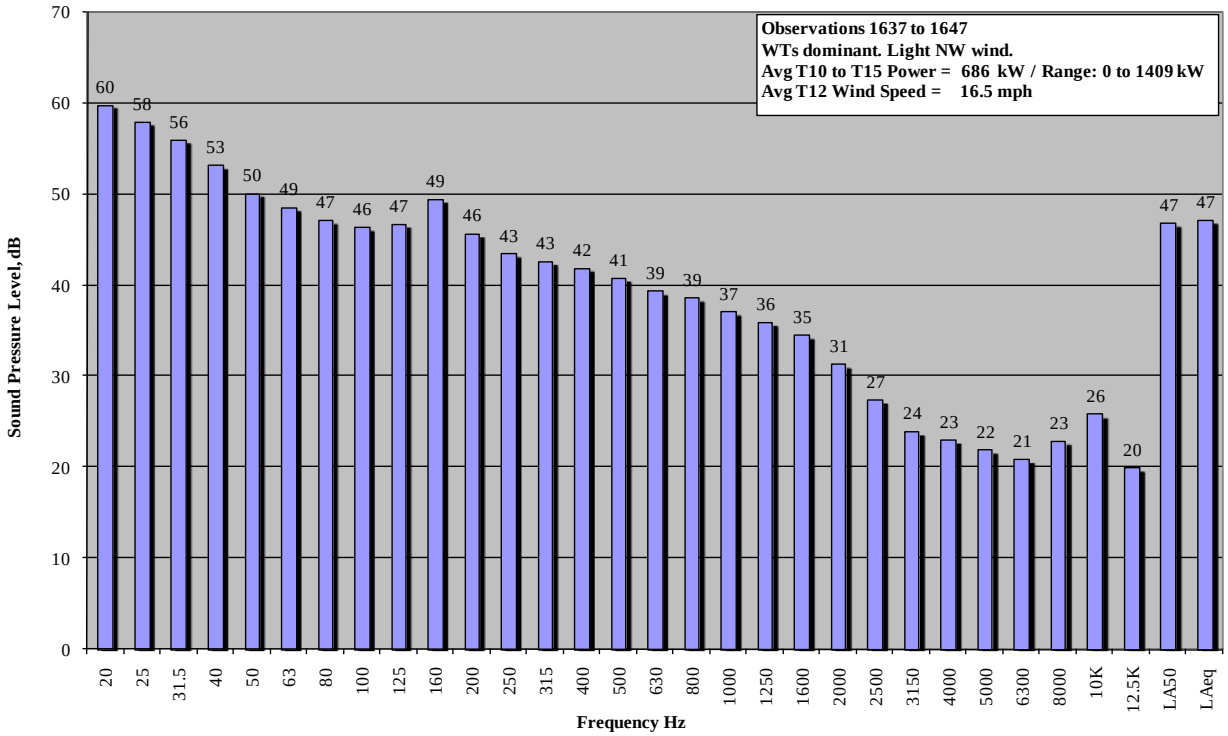
MP-7A
11-Jan-08 23:00 to 00:00



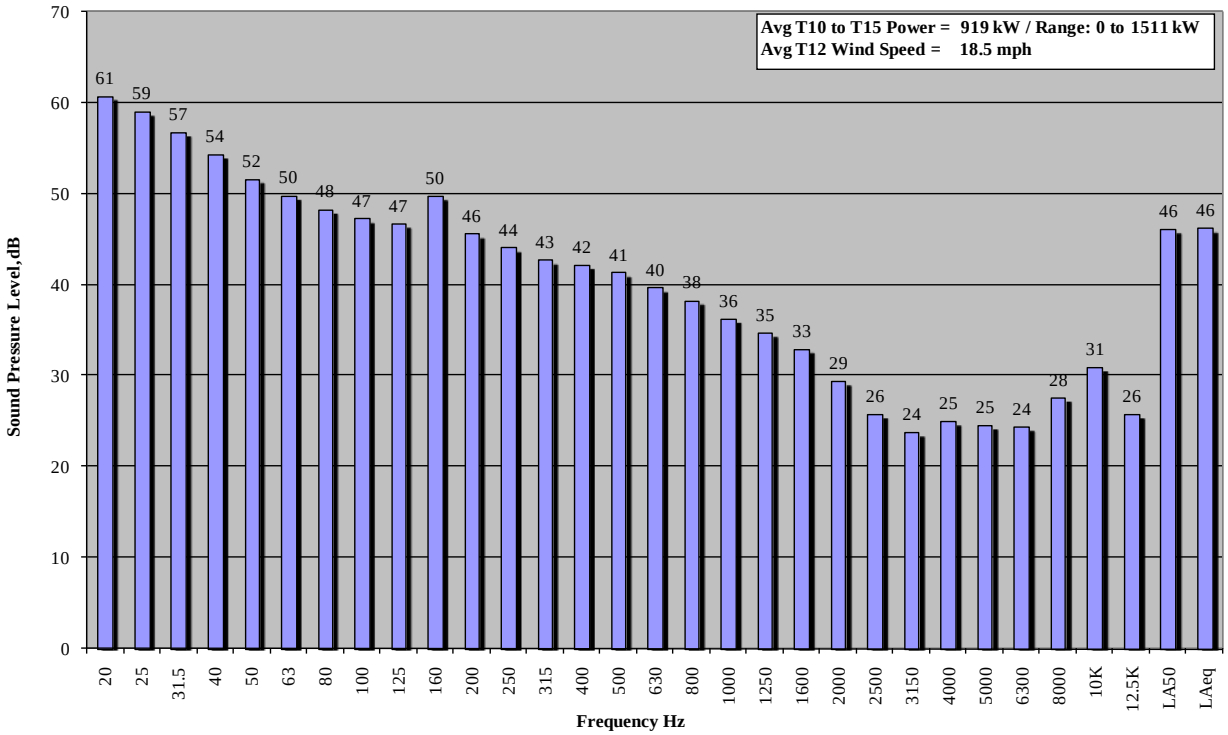
MP-7A
12-Jan-08 00:00 to 01:00



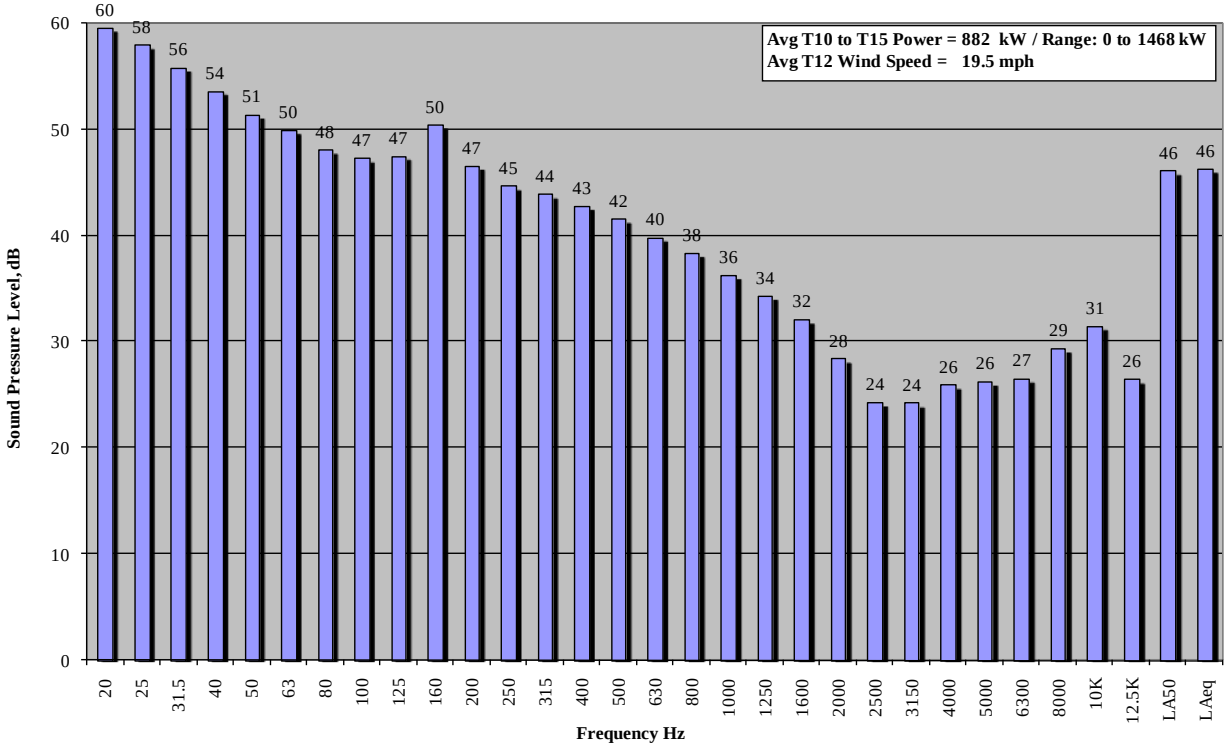
MP-7A
12-Jan-08 16:37 to 16:47



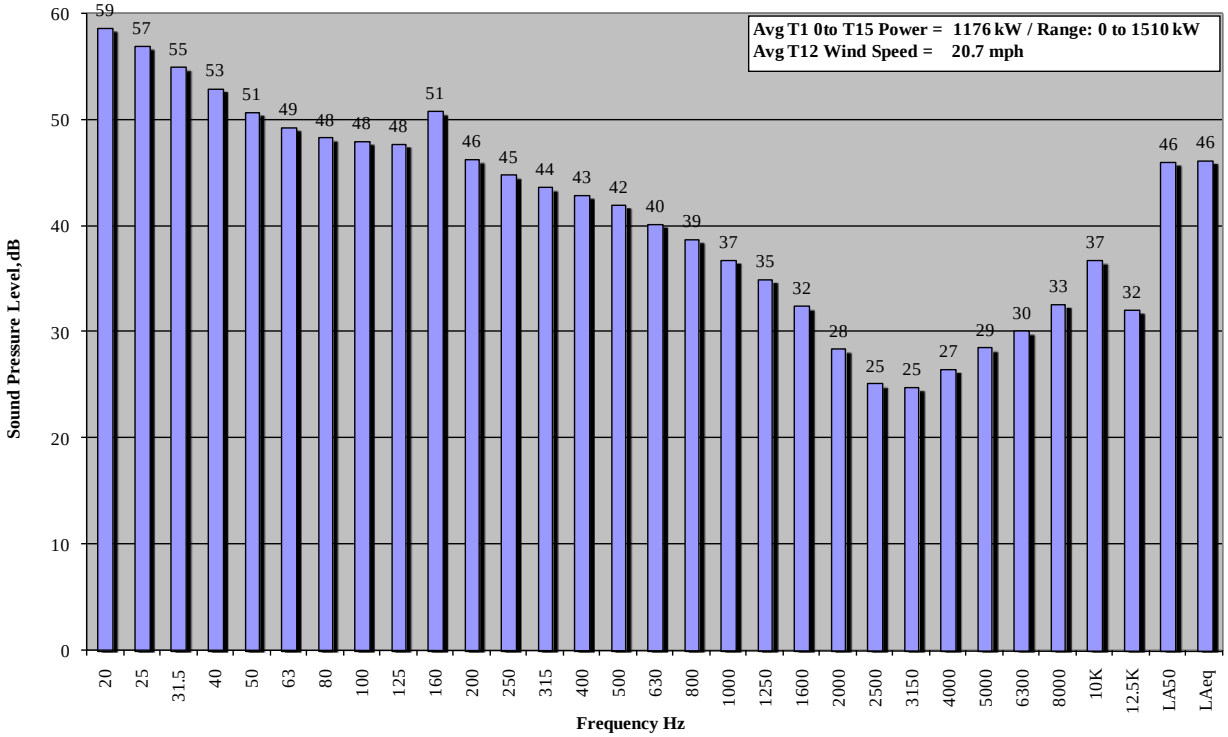
MP-7A
12-Jan-08 19:00 to 20:00



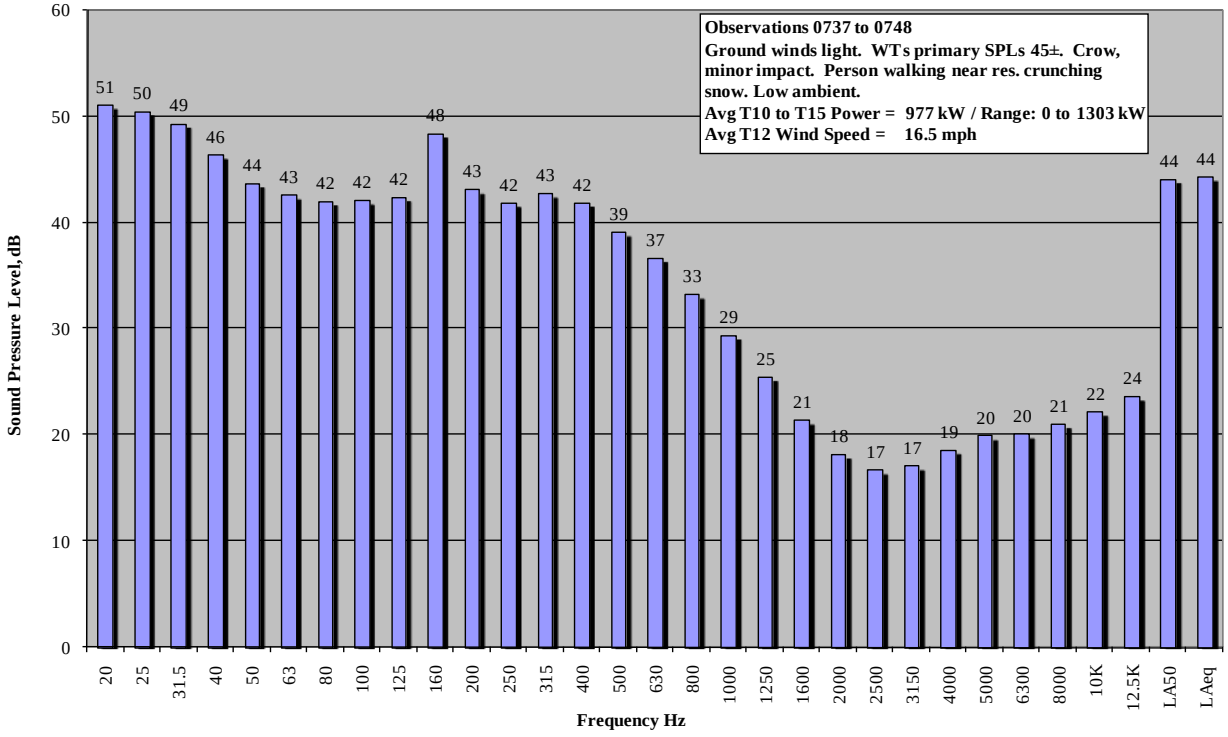
MP-7A
12-Jan-08 20:00 to 21:00

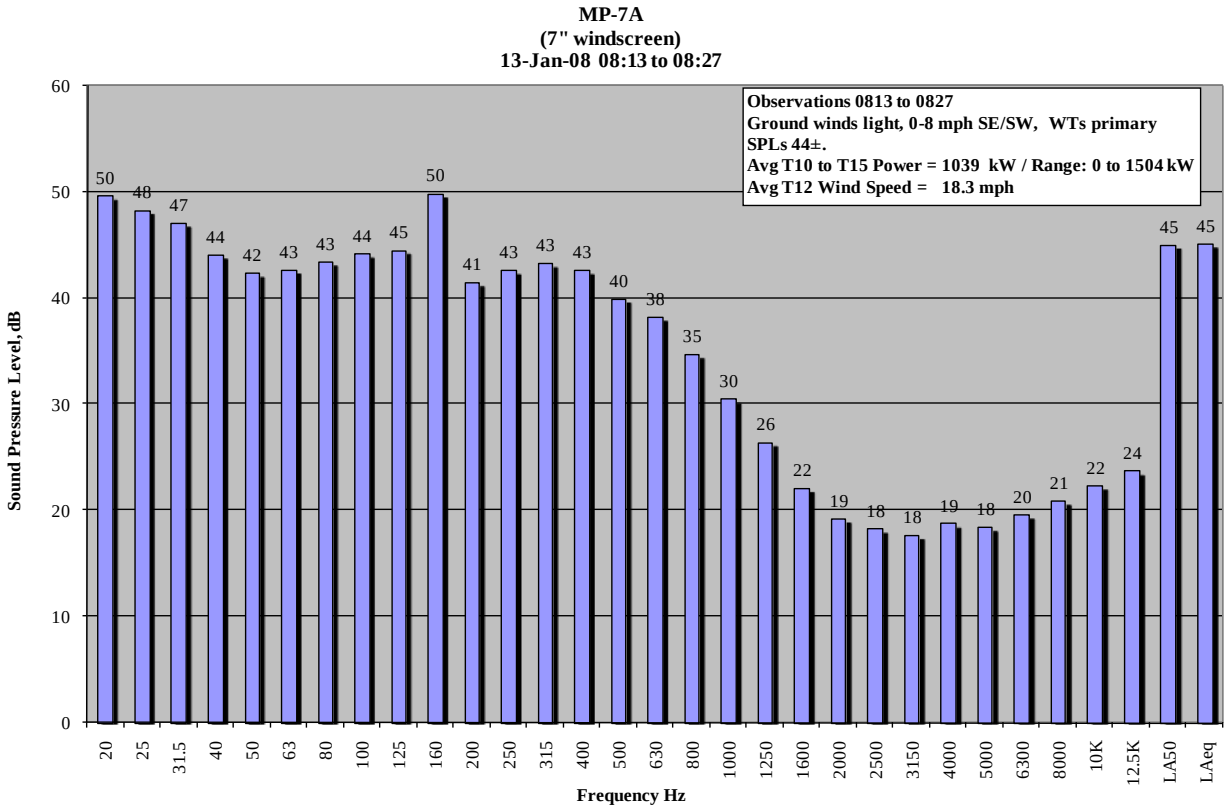


MP-7A
12-Jan-08 21:00 to 22:00

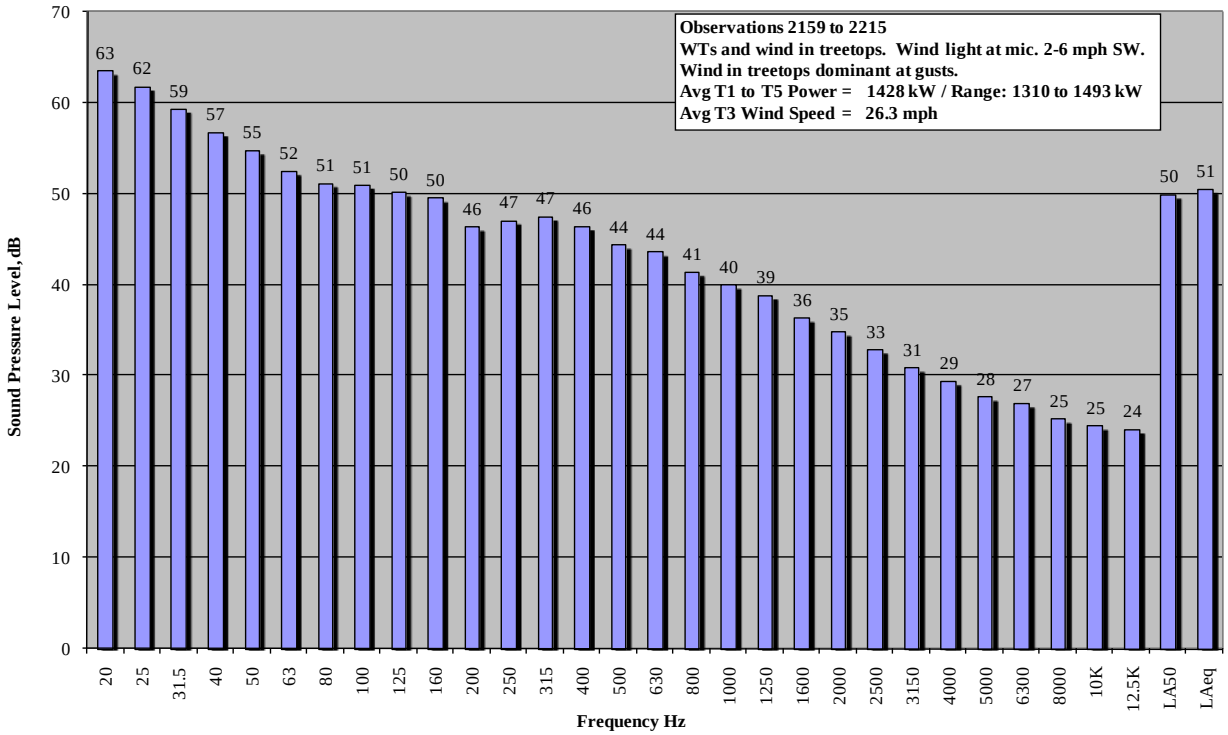


MP-7A
(7" windscreen)
13-Jan-08 07:34 to 07:48

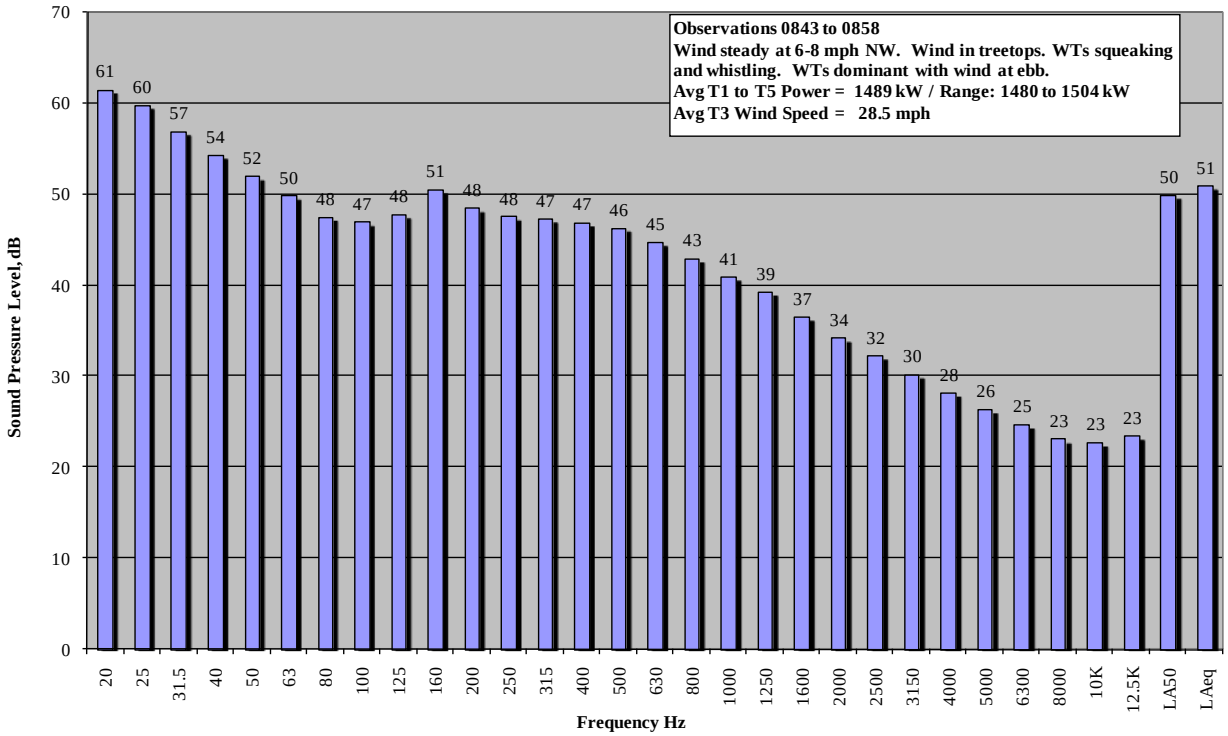


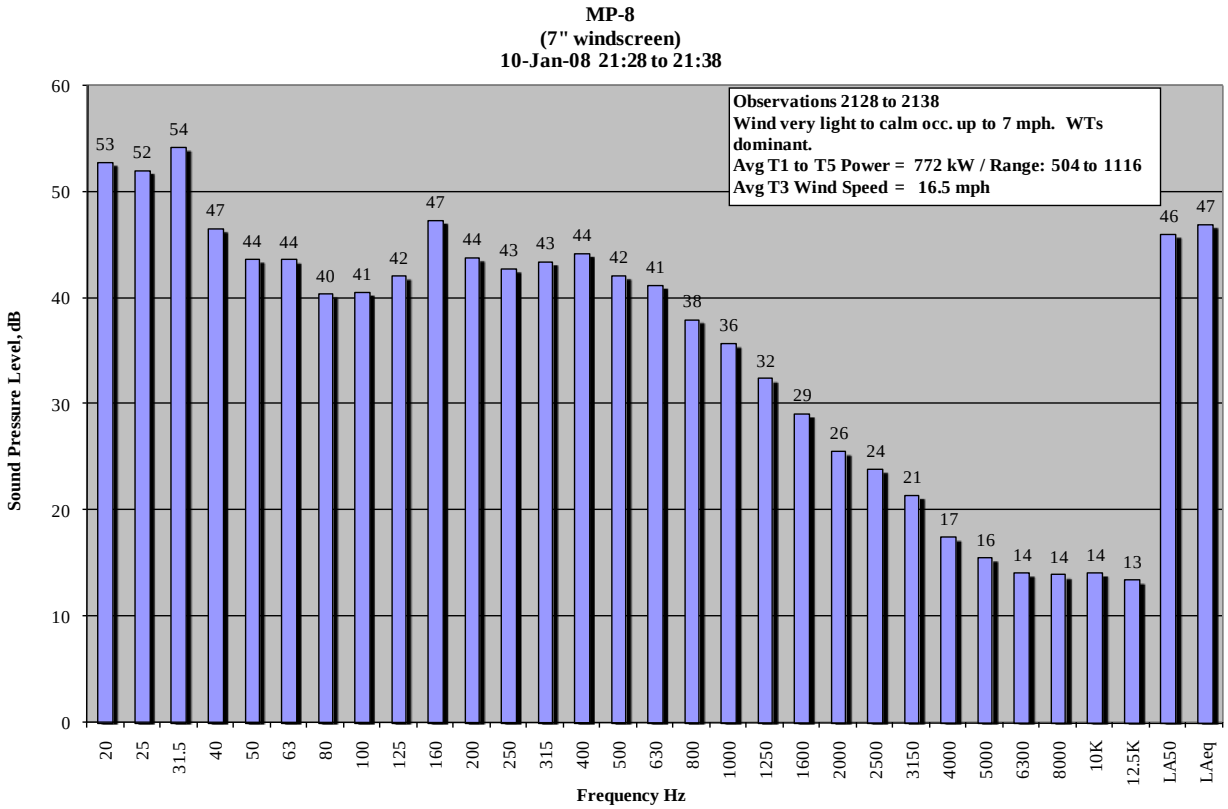

MP-7A
(7" windscreen)
13-Jan-08 08:13 to 08:27
Observations 0813 to 0827
Ground winds light, 0-8 mph SE/SW, WTs primary
SPLs 44±.
Avg T10 to T15 Power = 1039 kW / Range: 0 to 1504 kW
Avg T12 Wind Speed = 18.3 mph
Sound Pressure Level, dB
Frequency Hz
0
10
20
30
40
50
60
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
50 48 47 44 42 43 43 44 45 50 41 43 43 43 40 38 35 30 26 22 19 18 18 19 18 20 21 22 24 45 45

MP-8
9-Jan-08 21:59 to 22:15

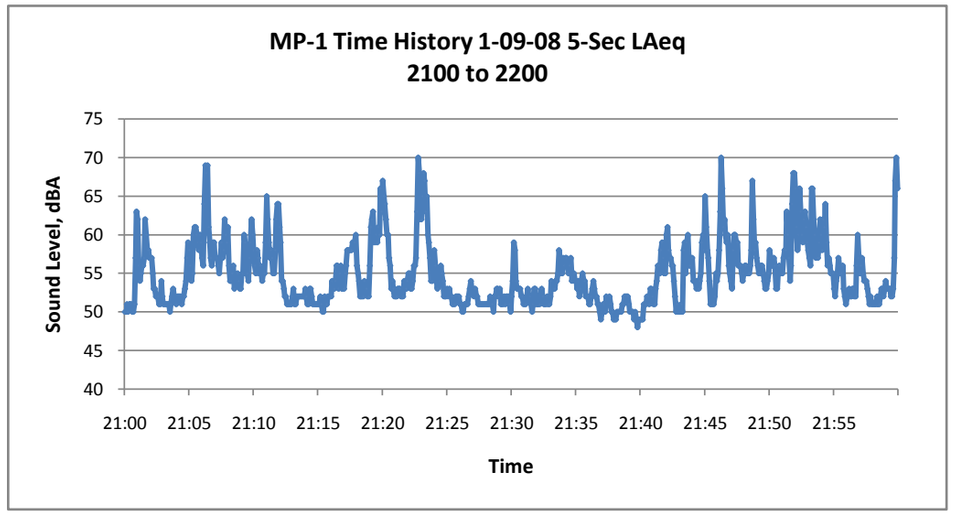


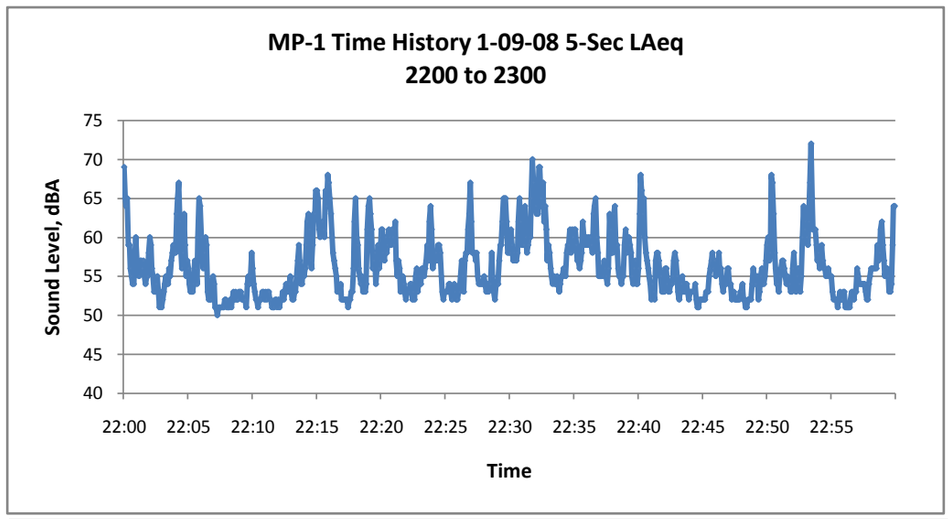
MP-8
10-Jan-08 08:43 to 08:58

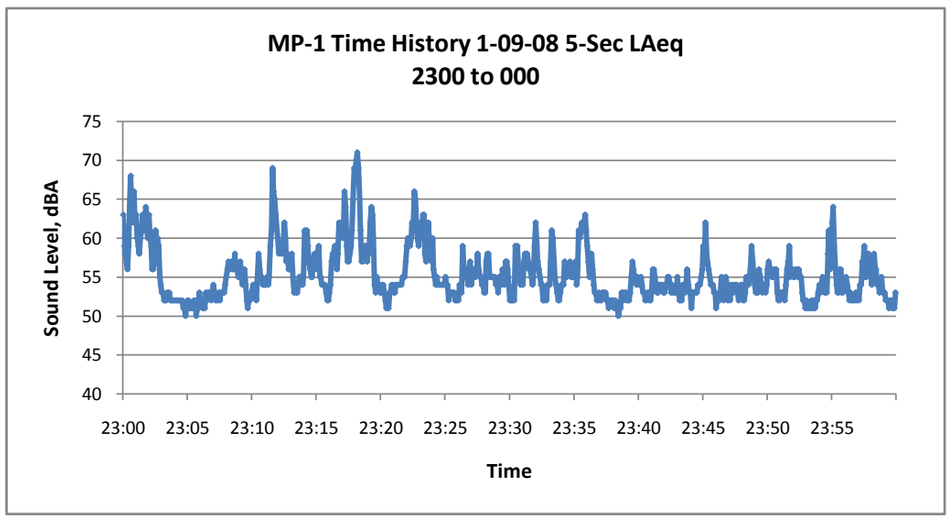


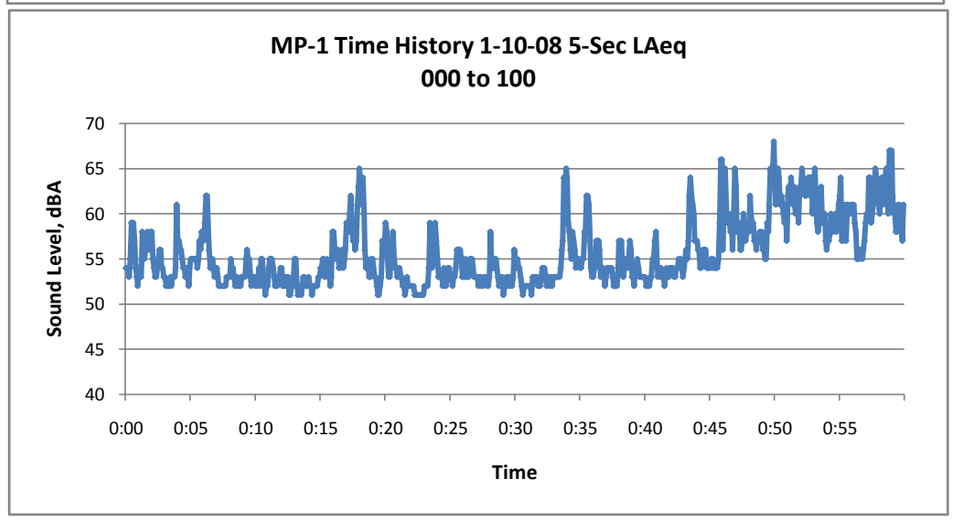

MP-8
(7" windscreen)
10-Jan-08 21:28 to 21:38
Observations 2128 to 2138
Wind very light to calm occ. up to 7 mph. WTs dominant.
Avg T1 to T5 Power = 772 kW / Range: 504 to 1116
Avg T3 Wind Speed = 16.5 mph
Sound Pressure Level, dB
Frequency Hz
0
10
20
30
40
50
60
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10K 12.5K LA50 LAeq
53 52 54 47 44 44 40 41 42 47 44 43 43 44 42 41 38 36 32 29 26 24 21 17 16 14 14 14 13 46 47

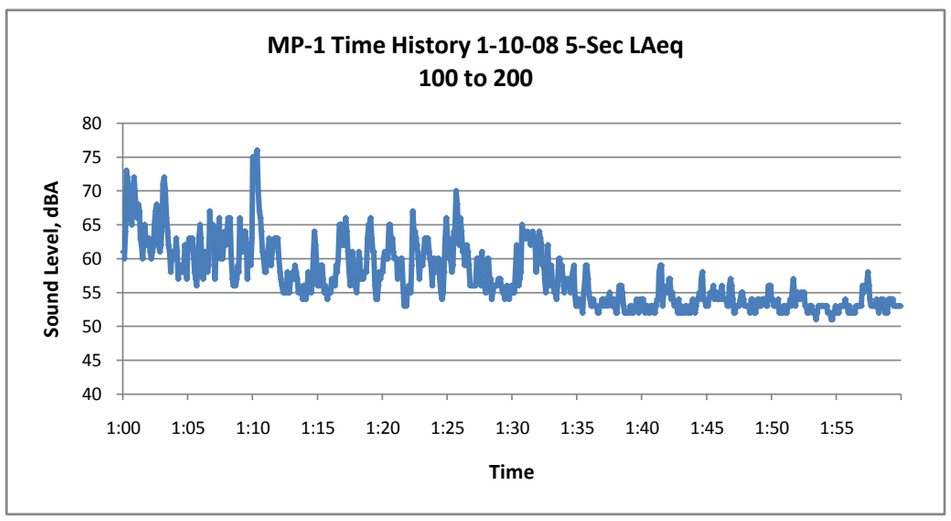
APPENDIX VI
TIME HISTORY PLOTS
JANUARY 9 TO 10, 2008

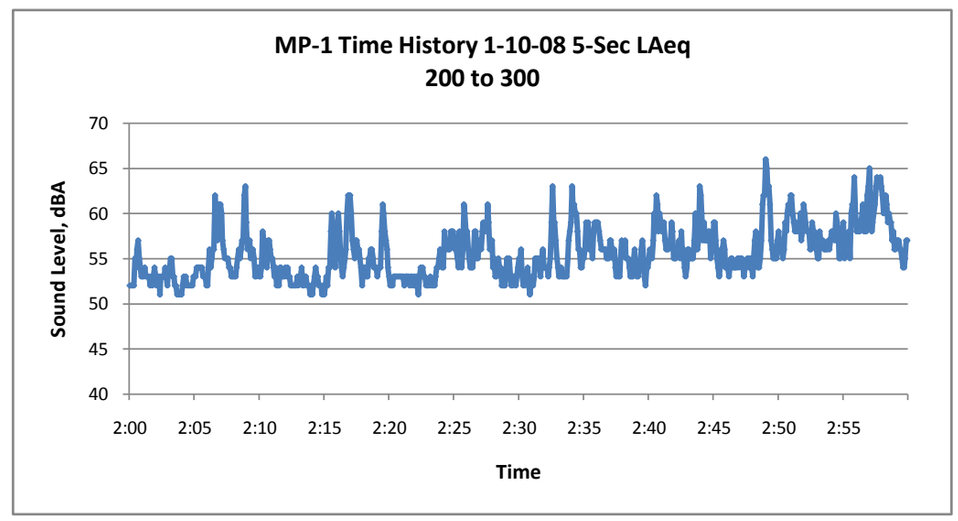

MP-1 Time History 1-09-08 5-Sec LAeq
2100 to 2200
Sound Level, dBA
75
70
65
60
55
50
45
40
21:00 21:05 21:10 21:15 21:20 21:25 21:30 21:35 21:40 21:45 21:50 21:55
Time

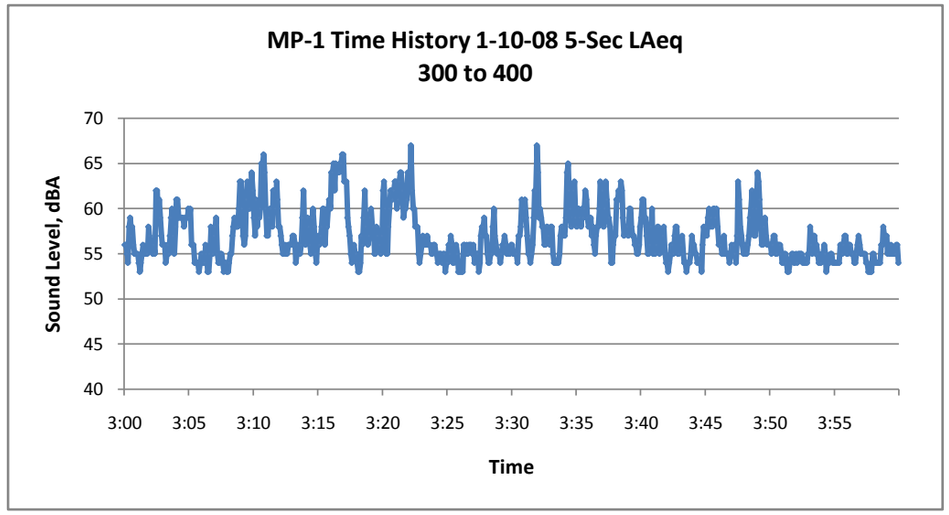

MP-1 Time History 1-09-08 5-Sec LAeq
2200 to 2300
Sound Level, dBA
75
70
65
60
55
50
45
40
22:00 22:05 22:10 22:15 22:20 22:25 22:30 22:35 22:40 22:45 22:50 22:55
Time

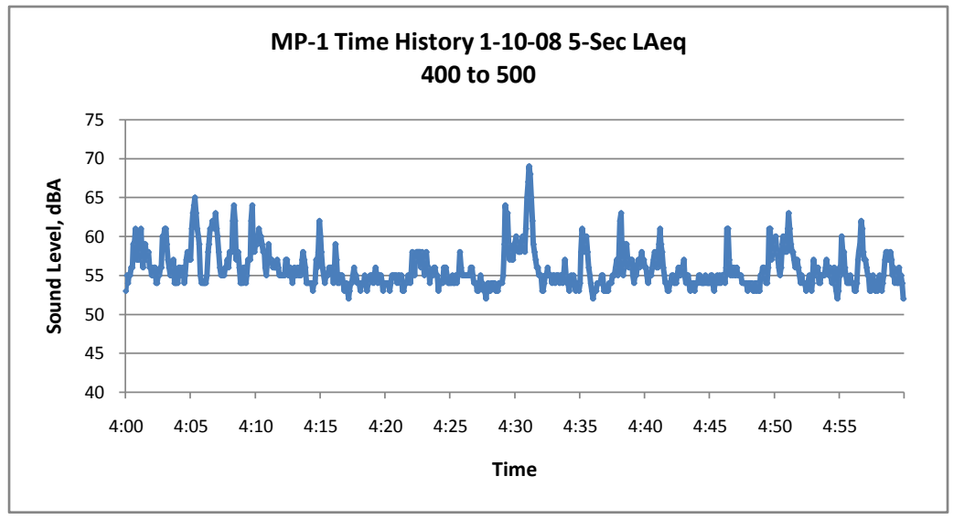

MP-1 Time History 1-09-08 5-Sec LAeq
2300 to 000
Sound Level, dBA
75
70
65
60
55
50
45
40
23:00 23:05 23:10 23:15 23:20 23:25 23:30 23:35 23:40 23:45 23:50 23:55
Time

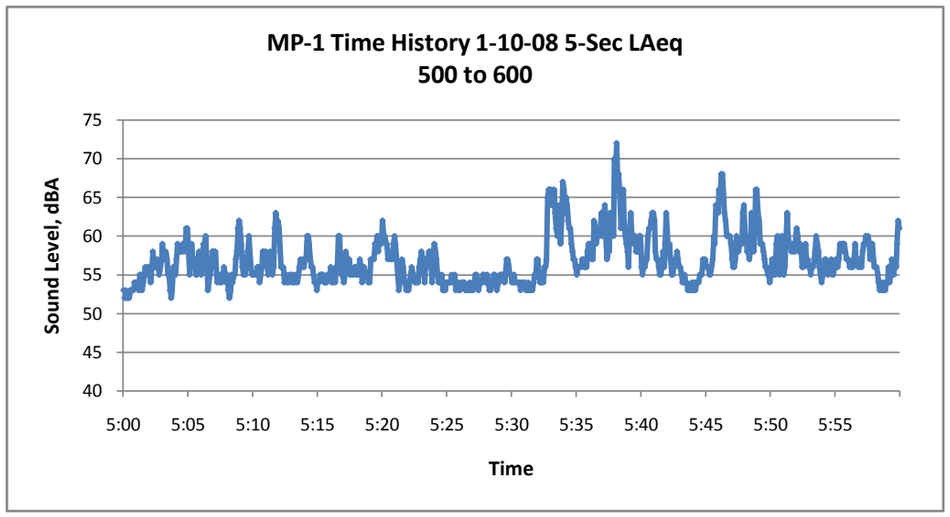

MP-1 Time History 1-10-08 5-Sec LAeq
000 to 100
Sound Level, dBA
70
65
60
55
50
45
40
0:00 0:05 0:10 0:15 0:20 0:25 0:30 0:35 0:40 0:45 0:50 0:55
Time

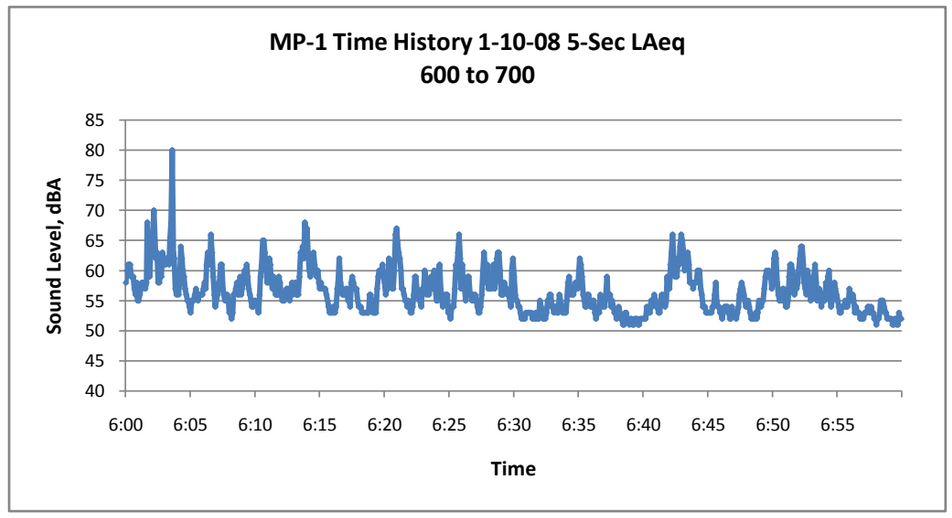

MP-1 Time History 1-10-08 5-Sec LAeq
100 to 200
Sound Level, dBA
80
75
70
65
60
55
50
45
40
1:00 1:05 1:10 1:15 1:20 1:25 1:30 1:35 1:40 1:45 1:50 1:55
Time

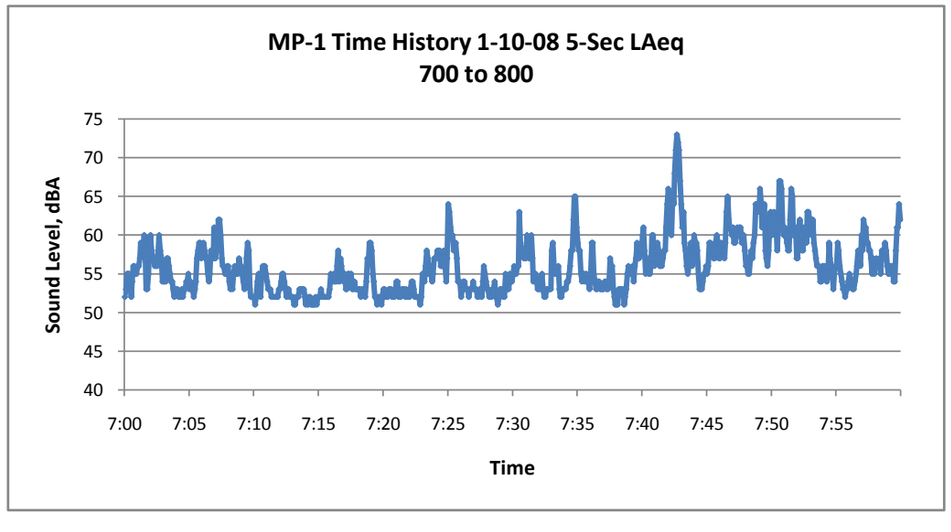

MP-1 Time History 1-10-08 5-Sec LAeq
200 to 300
Sound Level, dBA
70
65
60
55
50
45
40
2:00 2:05 2:10 2:15 2:20 2:25 2:30 2:35 2:40 2:45 2:50 2:55
Time

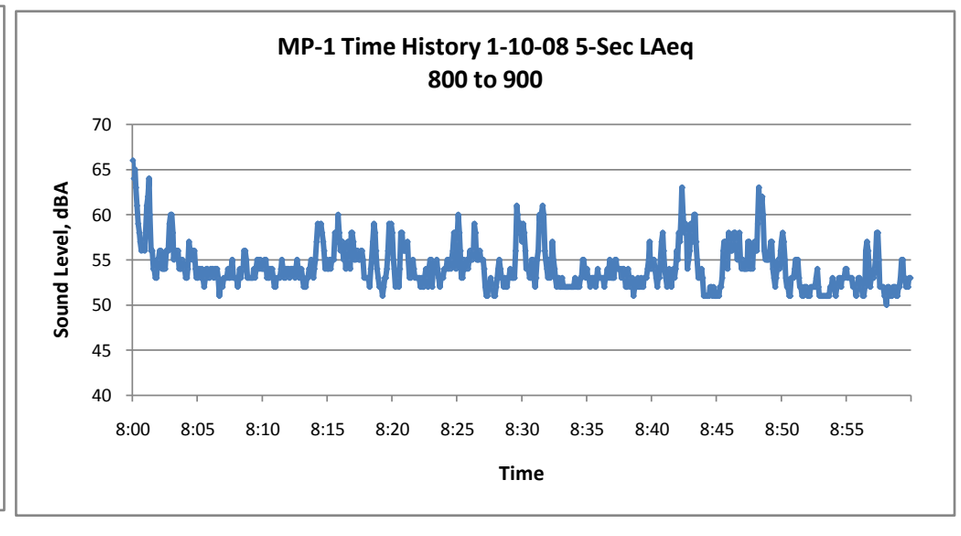

MP-1 Time History 1-10-08 5-Sec LAeq
300 to 400
Sound Level, dBA
70
65
60
55
50
45
40
3:00 3:05 3:10 3:15 3:20 3:25 3:30 3:35 3:40 3:45 3:50 3:55
Time

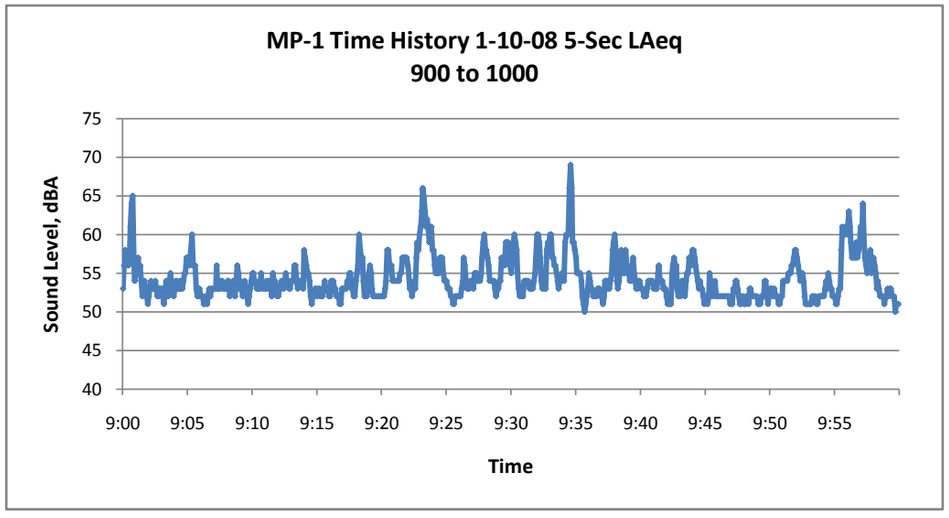

MP-1 Time History 1-10-08 5-Sec LAeq
400 to 500
Sound Level, dBA
75
70
65
60
55
50
45
40
4:00 4:05 4:10 4:15 4:20 4:25 4:30 4:35 4:40 4:45 4:50 4:55
Time

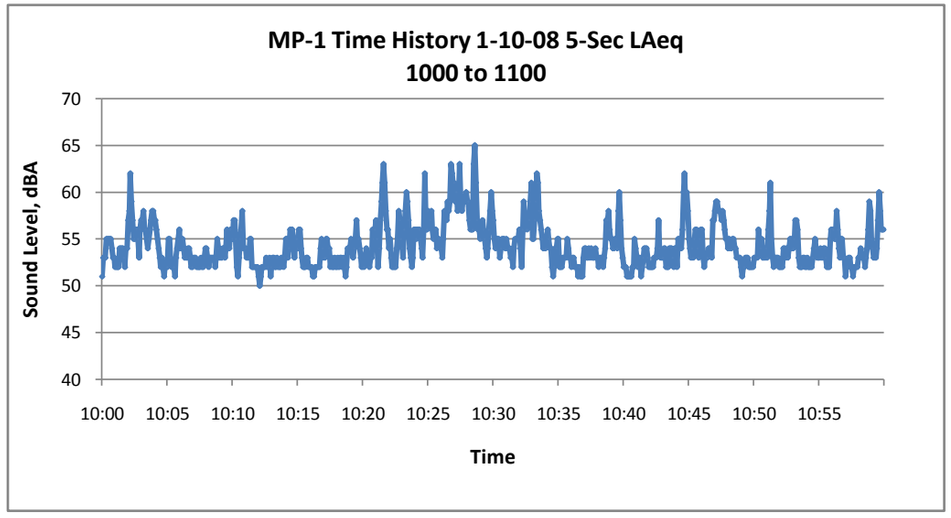

MP-1 Time History 1-10-08 5-Sec LAeq
500 to 600
Sound Level, dBA
75
70
65
60
55
50
45
40
5:00 5:05 5:10 5:15 5:20 5:25 5:30 5:35 5:40 5:45 5:50 5:55
Time

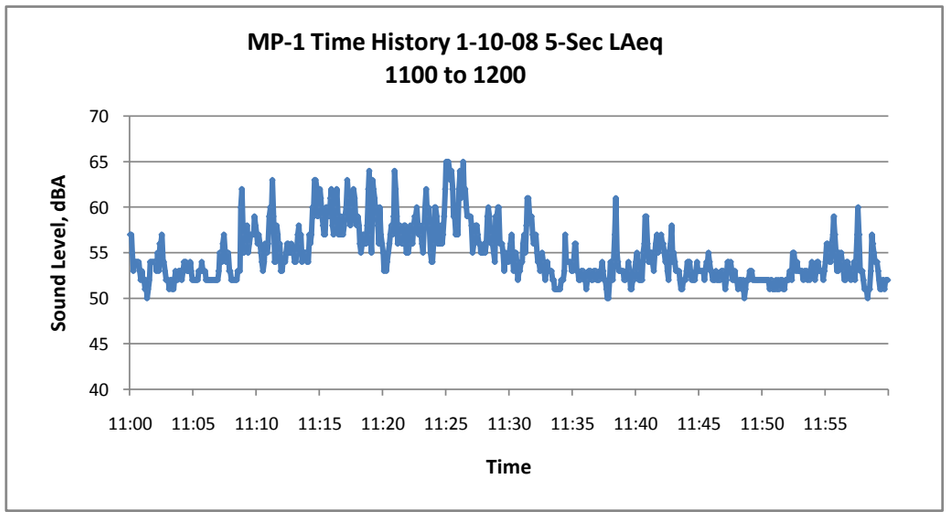

MP-1 Time History 1-10-08 5-Sec LAeq
600 to 700
Sound Level, dBA
85
80
75
70
65
60
55
50
45
40
6:00 6:05 6:10 6:15 6:20 6:25 6:30 6:35 6:40 6:45 6:50 6:55
Time


MP-1 Time History 1-10-08 5-Sec LAeq
700 to 800
Sound Level, dBA
75
70
65
60
55
50
45
40
7:00 7:05 7:10 7:15 7:20 7:25 7:30 7:35 7:40 7:45 7:50 7:55
Time


MP-1 Time History 1-10-08 5-Sec LAeq
800 to 900
Sound Level, dBA
70
65
60
55
50
45
40
8:00 8:05 8:10 8:15 8:20 8:25 8:30 8:35 8:40 8:45 8:50 8:55
Time


MP-1 Time History 1-10-08 5-Sec LAeq
900 to 1000
Sound Level, dBA
75
70
65
60
55
50
45
40
9:00
9:05
9:10
9:15
9:20
9:25
9:30
9:35
9:40
9:45
9:50
9:55
Time


MP-1 Time History 1-10-08 5-Sec LAeq
1000 to 1100
Sound Level, dBA
70
65
60
55
50
45
40
10:00
10:05
10:10
10:15
10:20
10:25
10:30
10:35
10:40
10:45
10:50
10:55
Time


MP-1 Time History 1-10-08 5-Sec LAeq
1100 to 1200
Sound Level, dBA
70
65
60
55
50
45
40
11:00
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11:45
11:50
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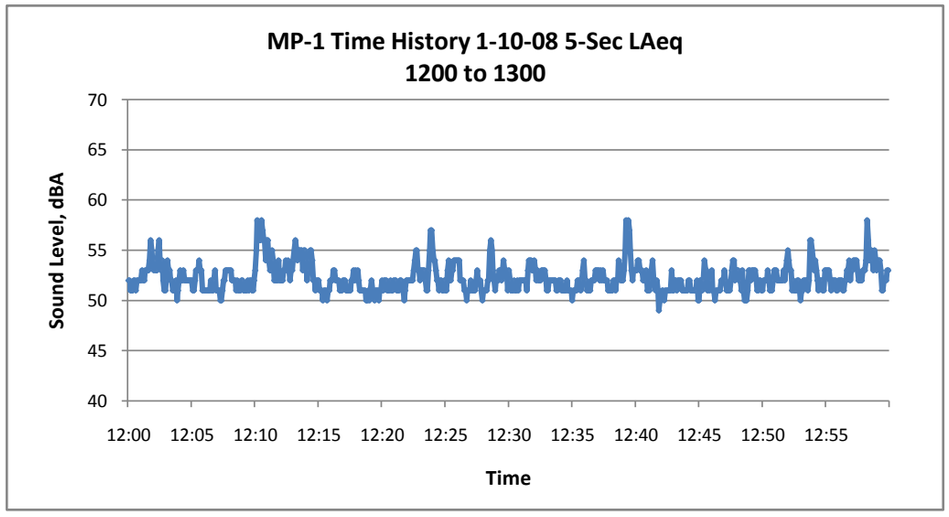
Time


MP-1 Time History 1-10-08 5-Sec LAeq
1200 to 1300
Sound Level, dBA
70
65
60
55
50
45
40
12:00
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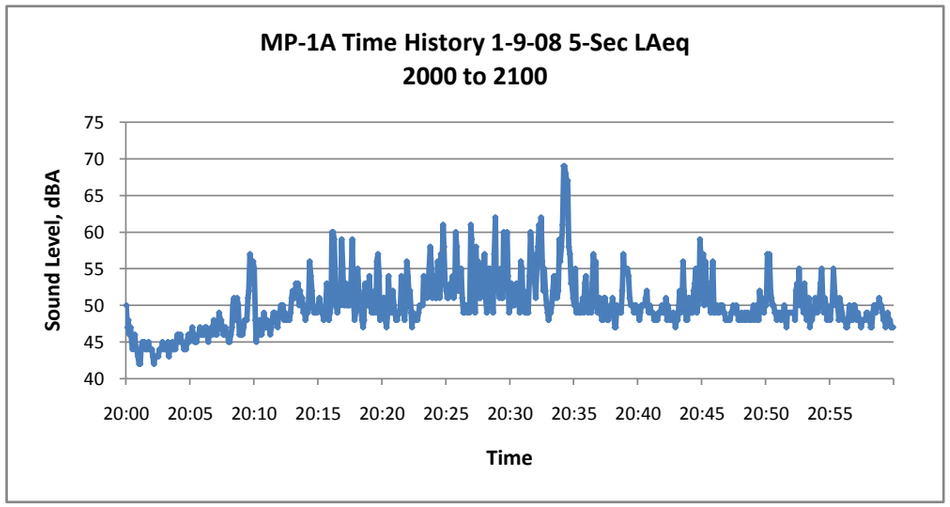
Time


MP-1A Time History 1-9-08 5-Sec LAeq
2000 to 2100
Sound Level, dBA
75
70
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45
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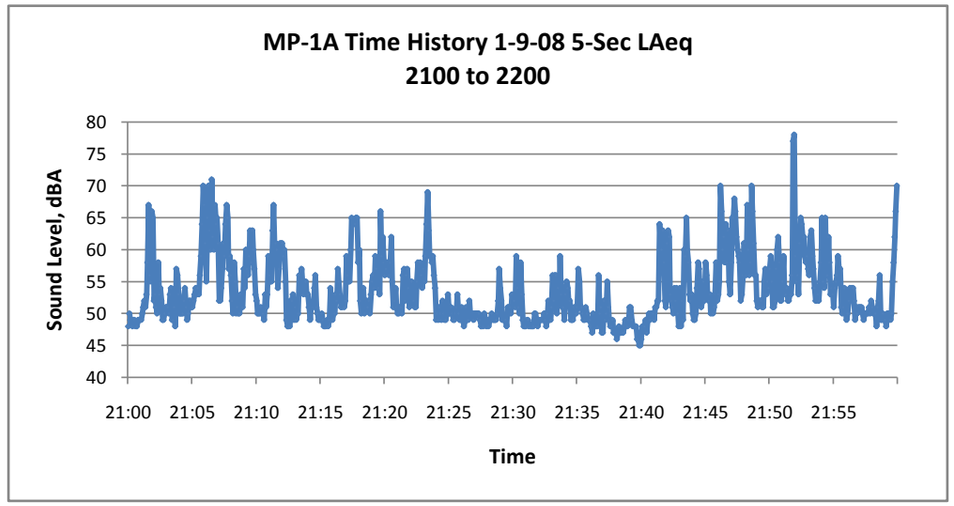
20:00 20:05 20:10 20:15 20:20 20:25 20:30 20:35 20:40 20:45 20:50 20:55
Time


MP-1A Time History 1-9-08 5-Sec LAeq
2100 to 2200
Sound Level, dBA
80
75
70
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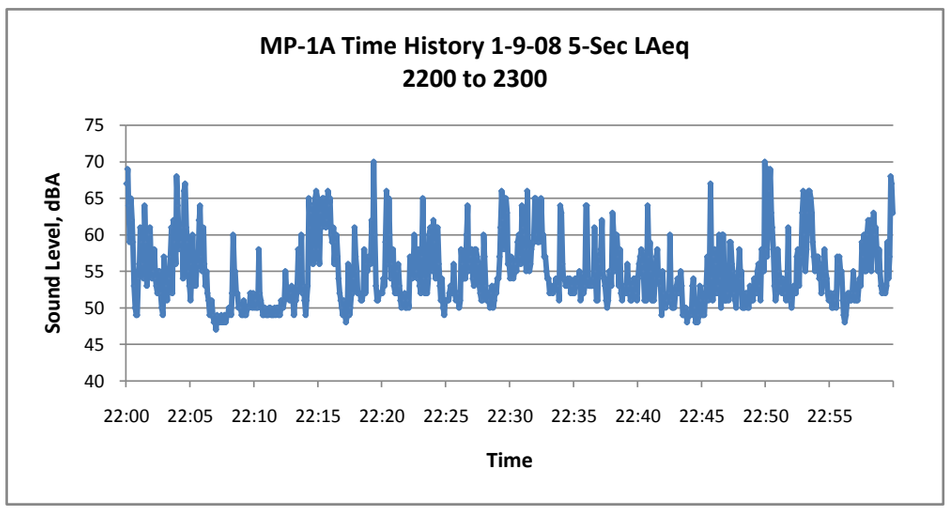
50
45
40
21:00 21:05 21:10 21:15 21:20 21:25 21:30 21:35 21:40 21:45 21:50 21:55
Time


MP-1A Time History 1-9-08 5-Sec LAeq
2200 to 2300
Sound Level, dBA
75
70
65
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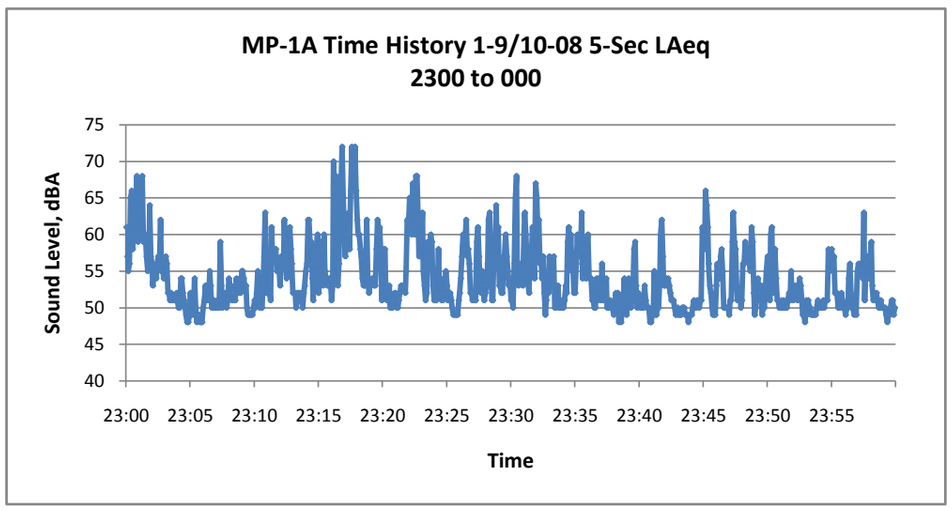
50
45
40
22:00 22:05 22:10 22:15 22:20 22:25 22:30 22:35 22:40 22:45 22:50 22:55
Time


MP-1A Time History 1-9/10-08 5-Sec LAeq
2300 to 000
Sound Level, dBA
75
70
65
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45
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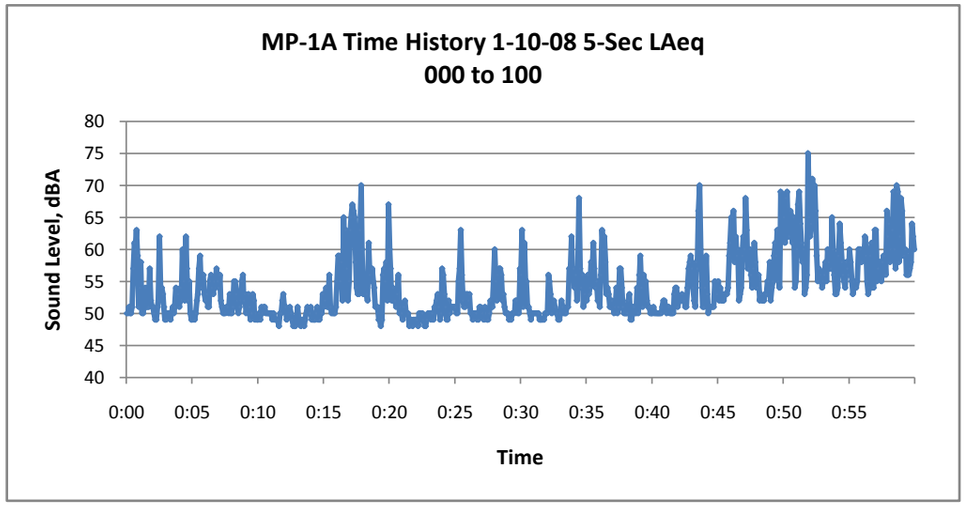
23:00 23:05 23:10 23:15 23:20 23:25 23:30 23:35 23:40 23:45 23:50 23:55
Time


MP-1A Time History 1-10-08 5-Sec LAeq
000 to 100
Sound Level, dBA
80
75
70
65
60
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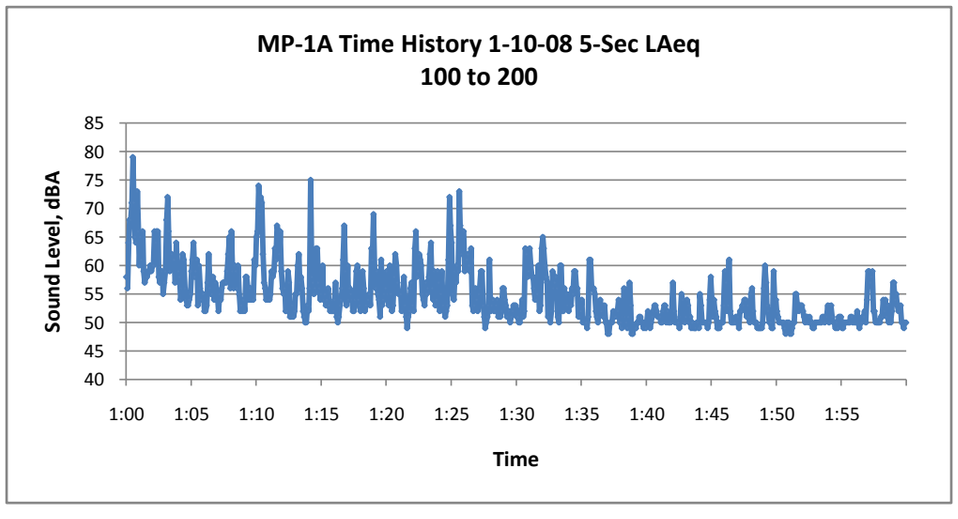
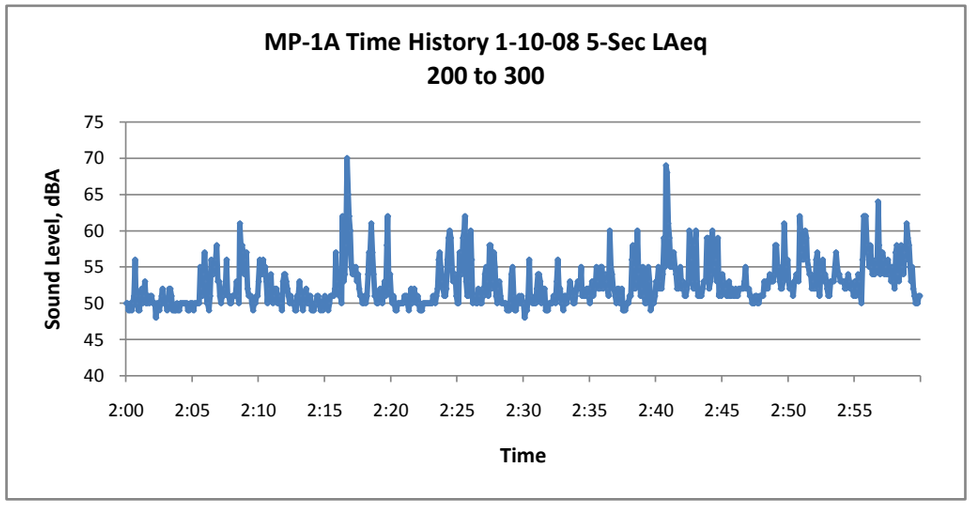
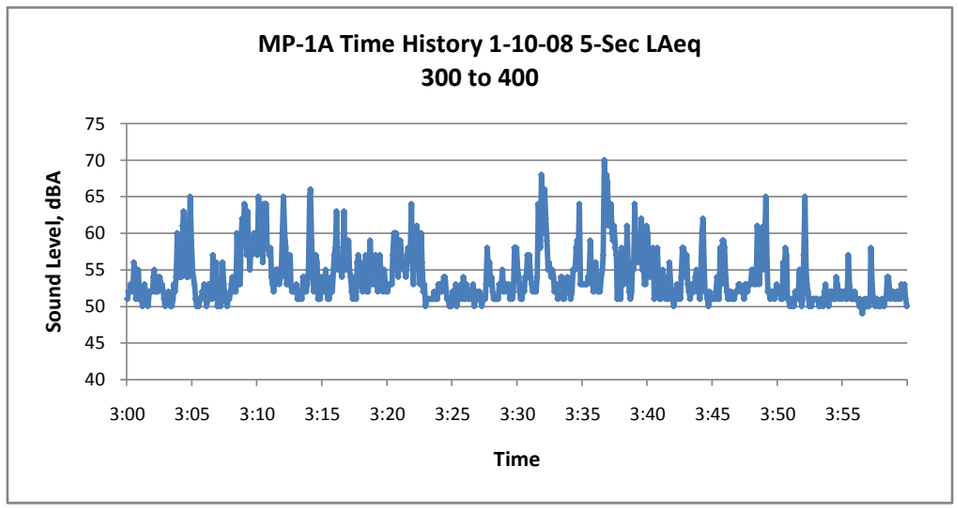
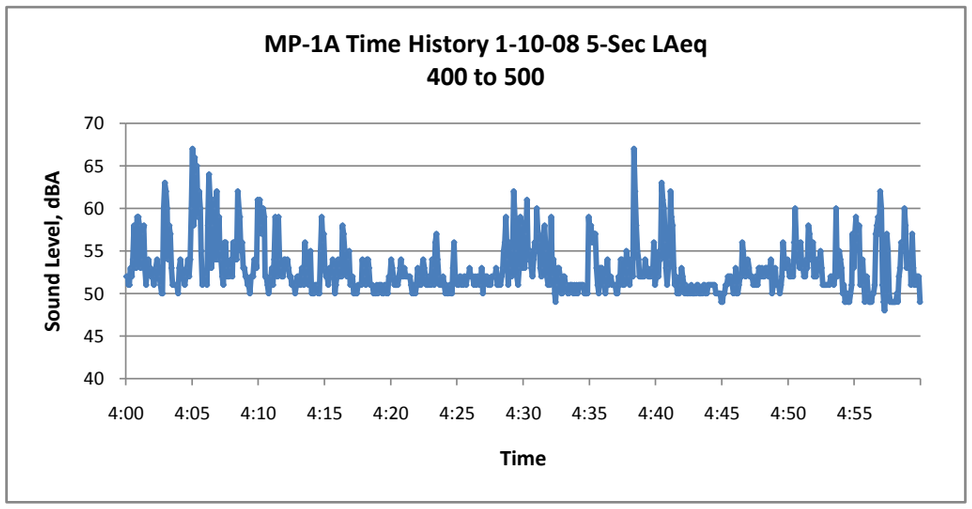
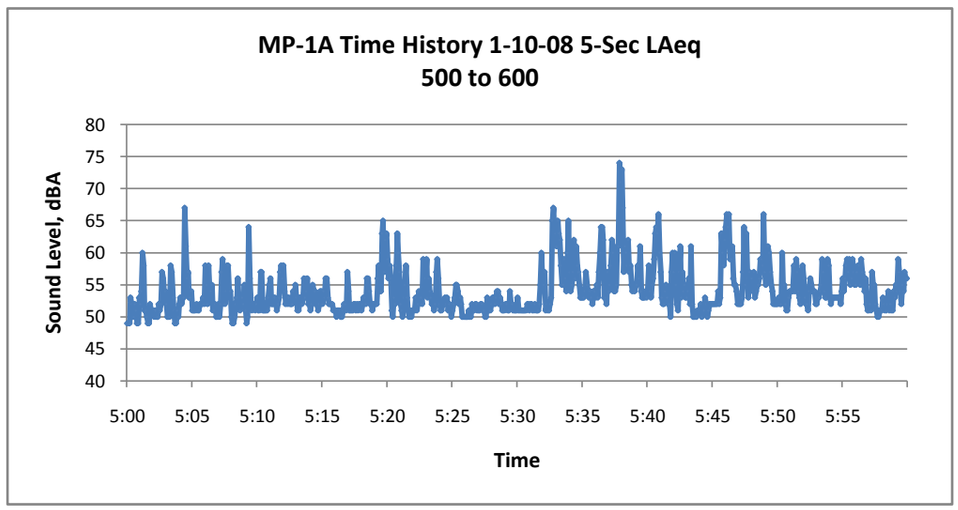
50
45
40
0:00 0:05 0:10 0:15 0:20 0:25 0:30 0:35 0:40 0:45 0:50 0:55
Time

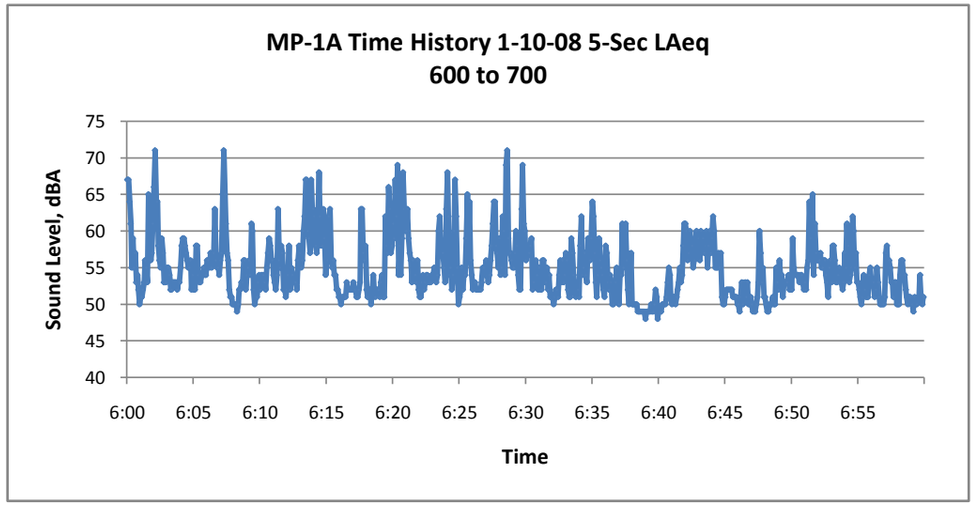

MP-1A Time History 1-10-08 5-Sec LAeq
100 to 200
Sound Level, dBA
85
80
75
70
65
60
55
50
45
40
1:00 1:05 1:10 1:15 1:20 1:25 1:30 1:35 1:40 1:45 1:50 1:55
Time

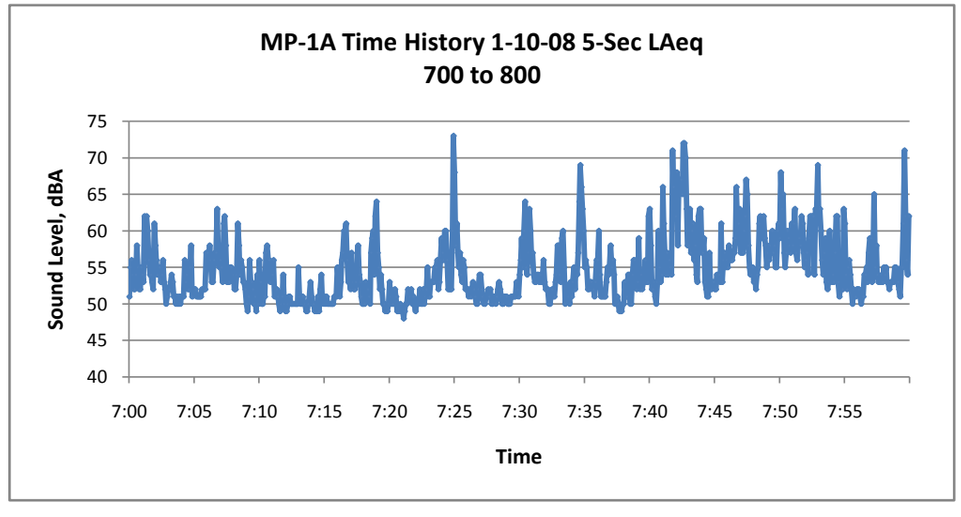

MP-1A Time History 1-10-08 5-Sec LAeq
200 to 300
Sound Level, dBA
75
70
65
60
55
50
45
40
2:00 2:05 2:10 2:15 2:20 2:25 2:30 2:35 2:40 2:45 2:50 2:55
Time

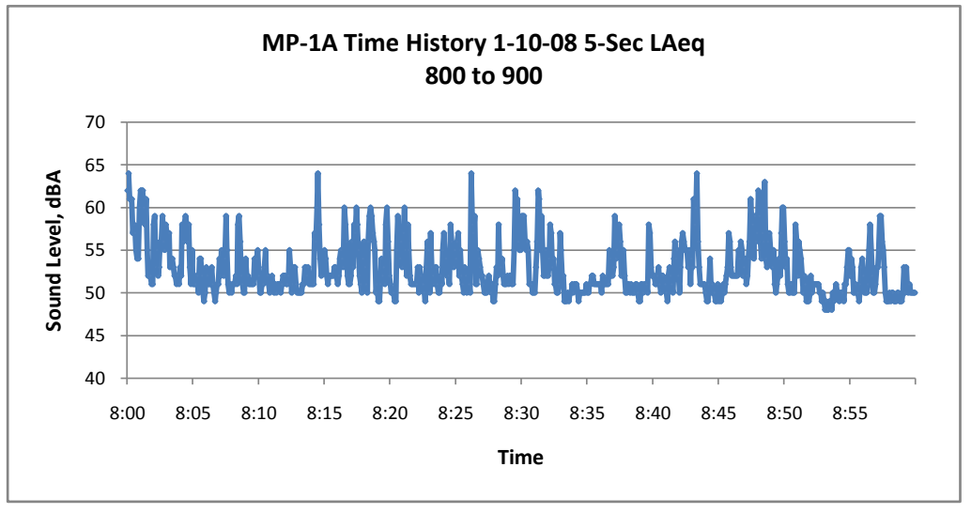

MP-1A Time History 1-10-08 5-Sec LAeq
300 to 400
Sound Level, dBA
75
70
65
60
55
50
45
40
3:00 3:05 3:10 3:15 3:20 3:25 3:30 3:35 3:40 3:45 3:50 3:55
Time


MP-1A Time History 1-10-08 5-Sec LAeq
400 to 500
Sound Level, dBA
70
65
60
55
50
45
40
4:00 4:05 4:10 4:15 4:20 4:25 4:30 4:35 4:40 4:45 4:50 4:55
Time


MP-1A Time History 1-10-08 5-Sec LAeq
500 to 600
Sound Level, dBA
80
75
70
65
60
55
50
45
40
5:00 5:05 5:10 5:15 5:20 5:25 5:30 5:35 5:40 5:45 5:50 5:55
Time


MP-1A Time History 1-10-08 5-Sec LAeq
600 to 700
Sound Level, dBA
75
70
65
60
55
50
45
40
6:00 6:05 6:10 6:15 6:20 6:25 6:30 6:35 6:40 6:45 6:50 6:55
Time


MP-1A Time History 1-10-08 5-Sec LAeq
700 to 800
Sound Level, dBA
75
70
65
60
55
50
45
40
7:00 7:05 7:10 7:15 7:20 7:25 7:30 7:35 7:40 7:45 7:50 7:55
Time


MP-1A Time History 1-10-08 5-Sec LAeq
800 to 900
Sound Level, dBA
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65
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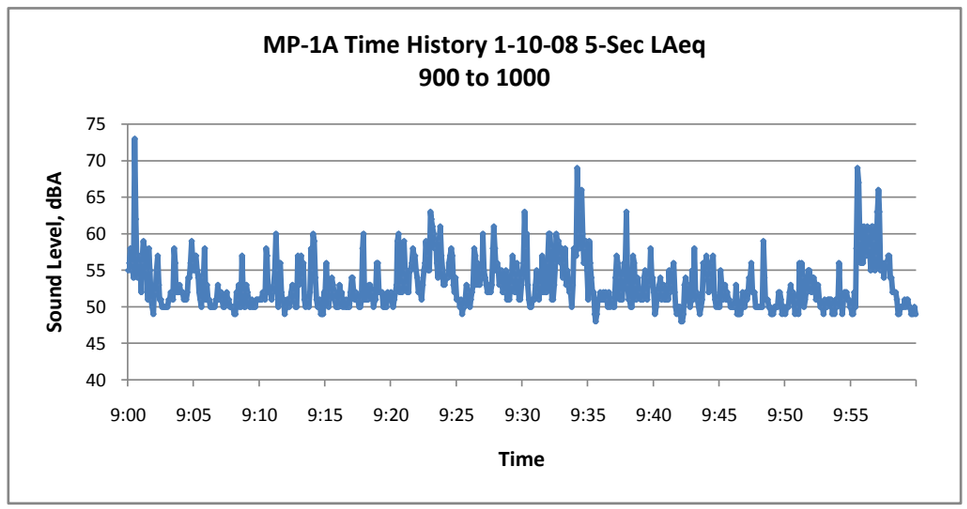
50
45
40
8:00 8:05 8:10 8:15 8:20 8:25 8:30 8:35 8:40 8:45 8:50 8:55
Time


MP-1A Time History 1-10-08 5-Sec LAeq
900 to 1000
Sound Level, dBA
75
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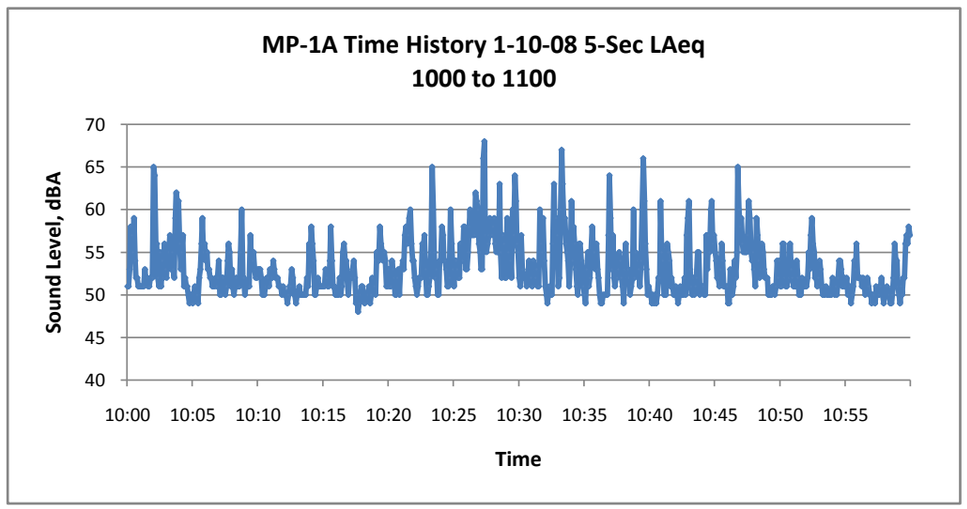
50
45
40
9:00 9:05 9:10 9:15 9:20 9:25 9:30 9:35 9:40 9:45 9:50 9:55
Time


MP-1A Time History 1-10-08 5-Sec LAeq
1000 to 1100
Sound Level, dBA
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60
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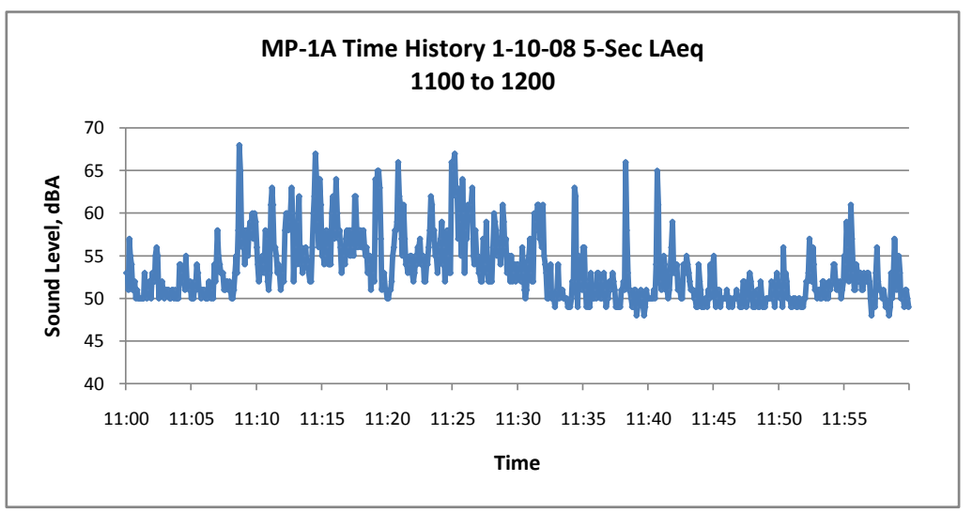
50
45
40
10:00 10:05 10:10 10:15 10:20 10:25 10:30 10:35 10:40 10:45 10:50 10:55
Time


MP-1A Time History 1-10-08 5-Sec LAeq
1100 to 1200
Sound Level, dBA
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60
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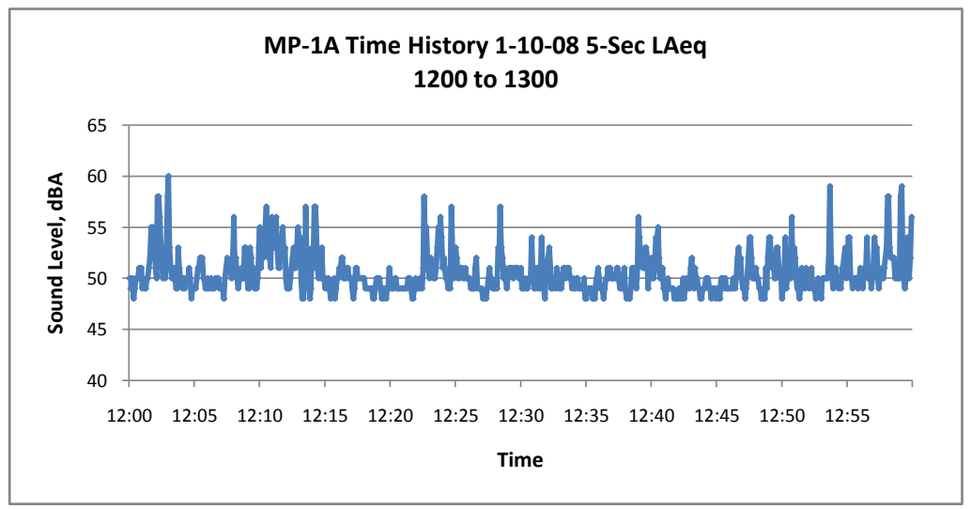
50
45
40
11:00 11:05 11:10 11:15 11:20 11:25 11:30 11:35 11:40 11:45 11:50 11:55
Time


MP-1A Time History 1-10-08 5-Sec LAeq
1200 to 1300
Sound Level, dBA
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60
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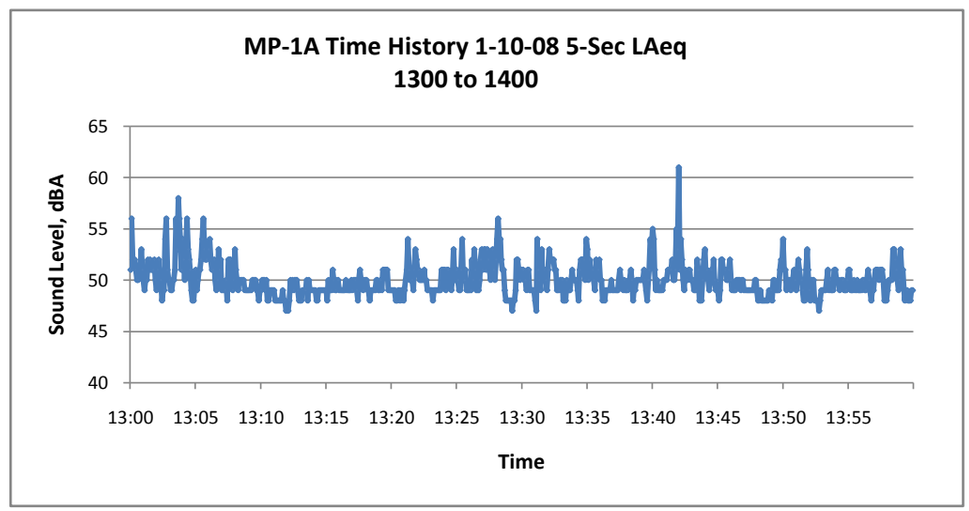
50
45
40
12:00 12:05 12:10 12:15 12:20 12:25 12:30 12:35 12:40 12:45 12:50 12:55
Time


MP-1A Time History 1-10-08 5-Sec LAeq
1300 to 1400
Sound Level, dBA
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60
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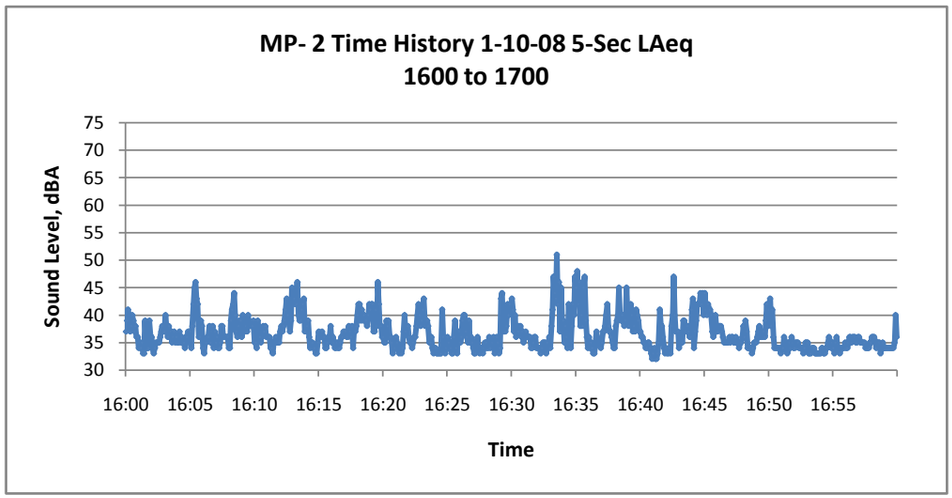
50
45
40
13:00 13:05 13:10 13:15 13:20 13:25 13:30 13:35 13:40 13:45 13:50 13:55
Time


MP- 2 Time History 1-10-08 5-Sec LAeq
1600 to 1700
Sound Level, dBA
75
70
65
60
55
50
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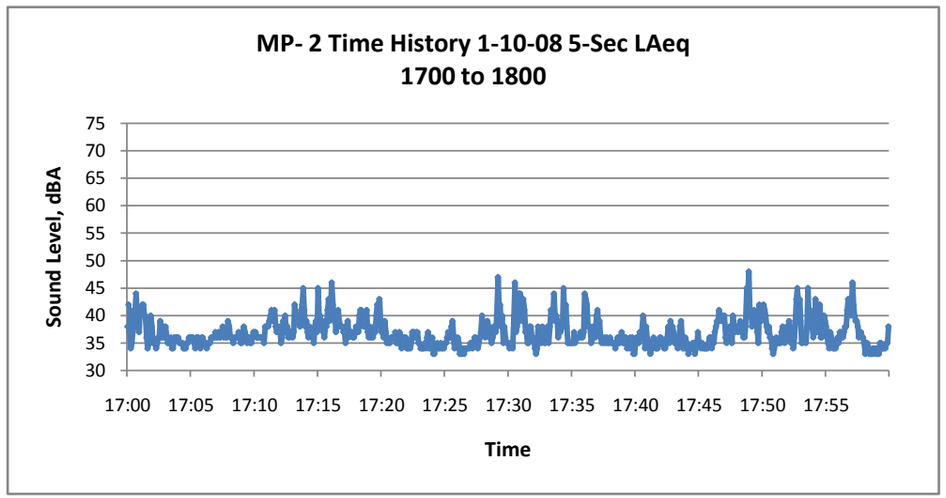
40
35
30
16:00 16:05 16:10 16:15 16:20 16:25 16:30 16:35 16:40 16:45 16:50 16:55
Time


MP- 2 Time History 1-10-08 5-Sec LAeq
1700 to 1800
Sound Level, dBA
75
70
65
60
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50
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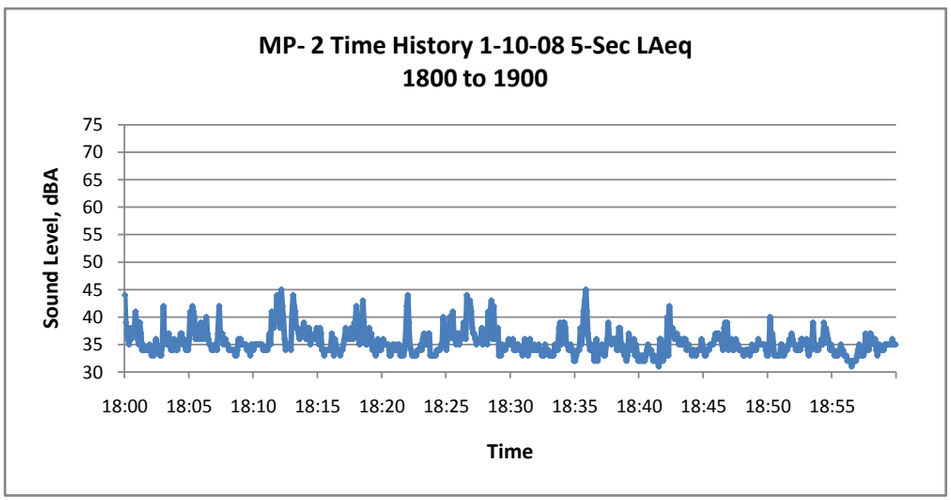
40
35
30
17:00 17:05 17:10 17:15 17:20 17:25 17:30 17:35 17:40 17:45 17:50 17:55
Time


MP- 2 Time History 1-10-08 5-Sec LAeq
1800 to 1900
Sound Level, dBA
75
70
65
60
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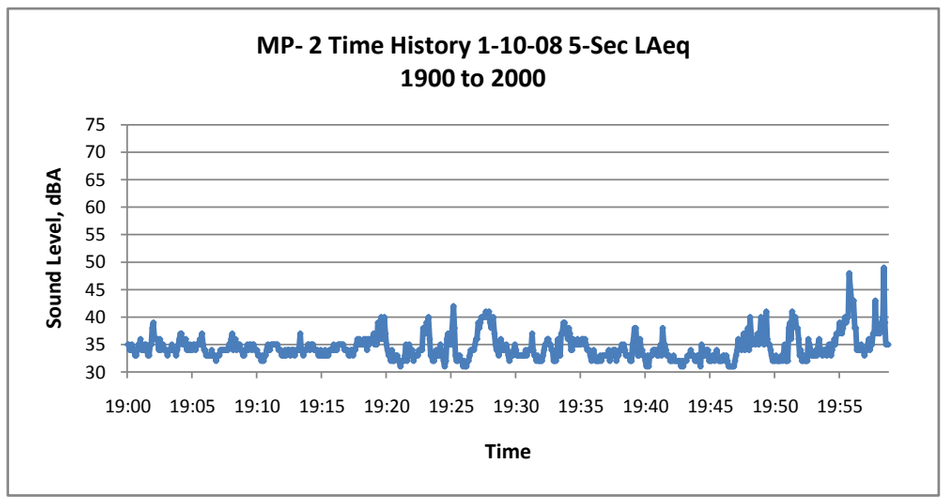
35
30
18:00 18:05 18:10 18:15 18:20 18:25 18:30 18:35 18:40 18:45 18:50 18:55
Time


MP- 2 Time History 1-10-08 5-Sec LAeq
1900 to 2000
Sound Level, dBA
75
70
65
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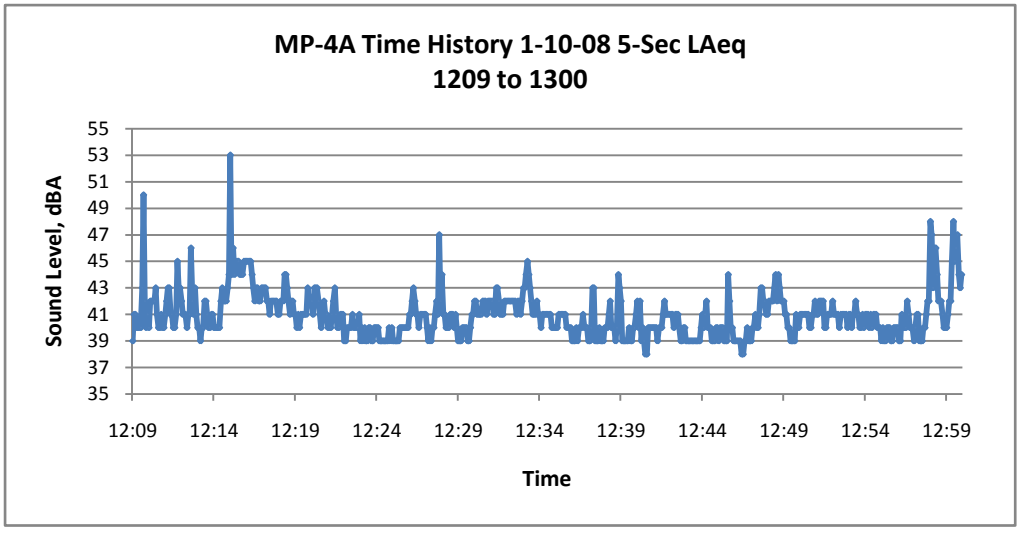
35
30
19:00 19:05 19:10 19:15 19:20 19:25 19:30 19:35 19:40 19:45 19:50 19:55
Time


MP-4A Time History 1-10-08 5-Sec LAeq
1209 to 1300
Sound Level, dBA
55
53
51
49
47
45
43
41
39
37
35
12:09
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12:19
12:24
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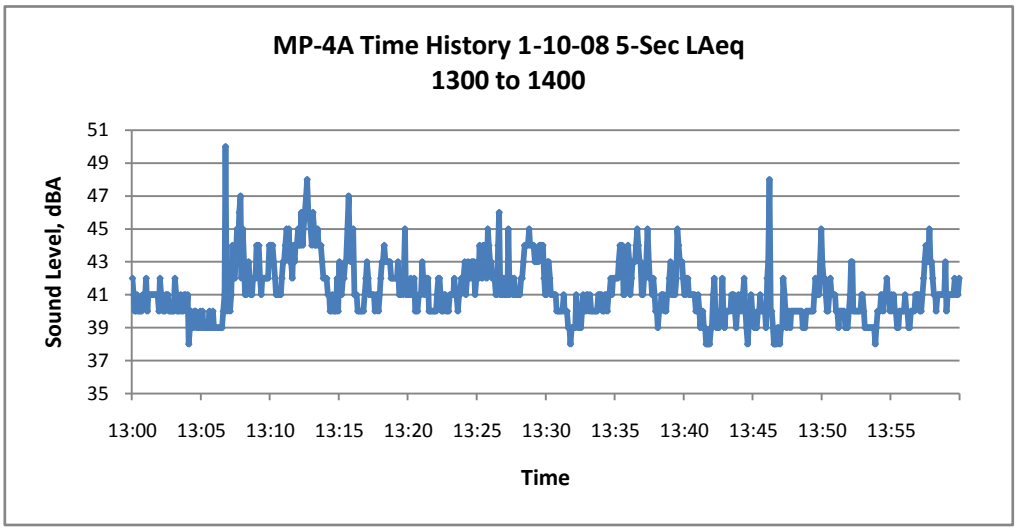
12:59
Time


MP-4A Time History 1-10-08 5-Sec LAeq
1300 to 1400
Sound Level, dBA
51
49
47
45
43
41
39
37
35
13:00
13:05
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13:15
13:20
13:25
13:30
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13:40
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13:50
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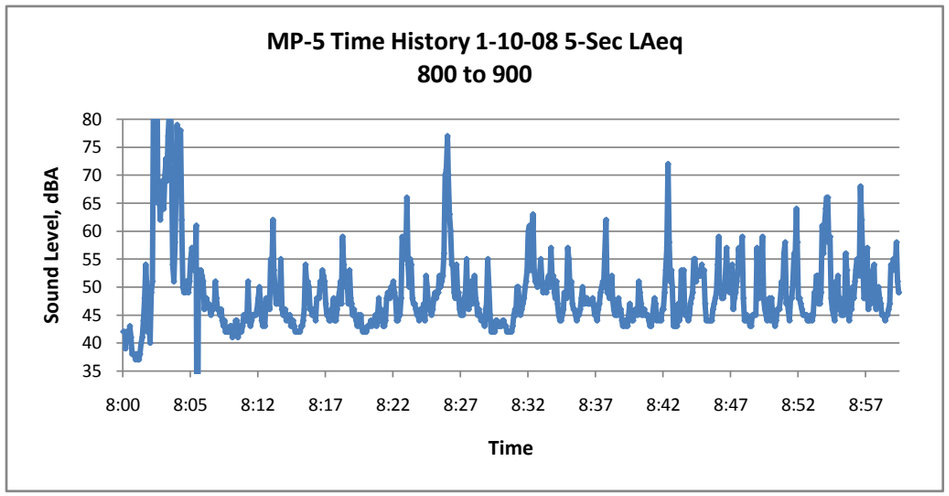
Time


MP-5 Time History 1-10-08 5-Sec LAeq
800 to 900
Sound Level, dBA
80
75
70
65
60
55
50
45
40
35
8:00
8:05
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8:17
8:22
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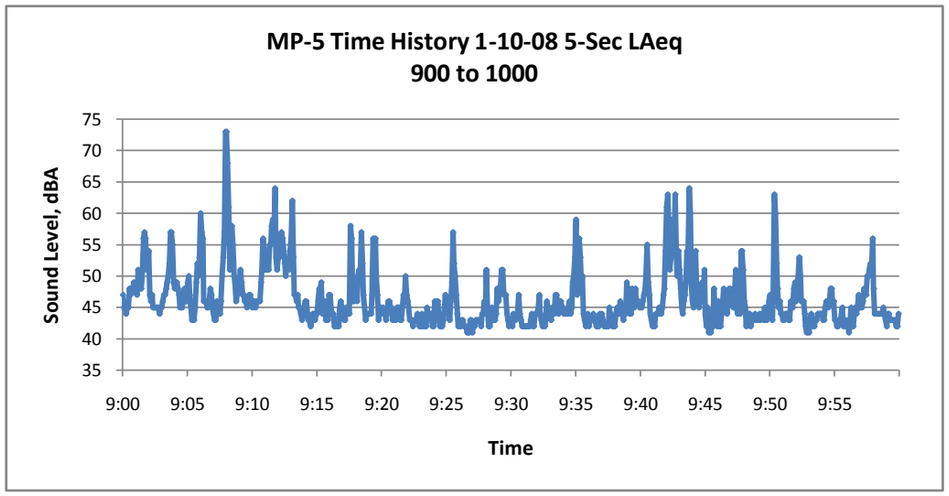
Time


MP-5 Time History 1-10-08 5-Sec LAeq
900 to 1000
Sound Level, dBA
75
70
65
60
55
50
45
40
35
9:00
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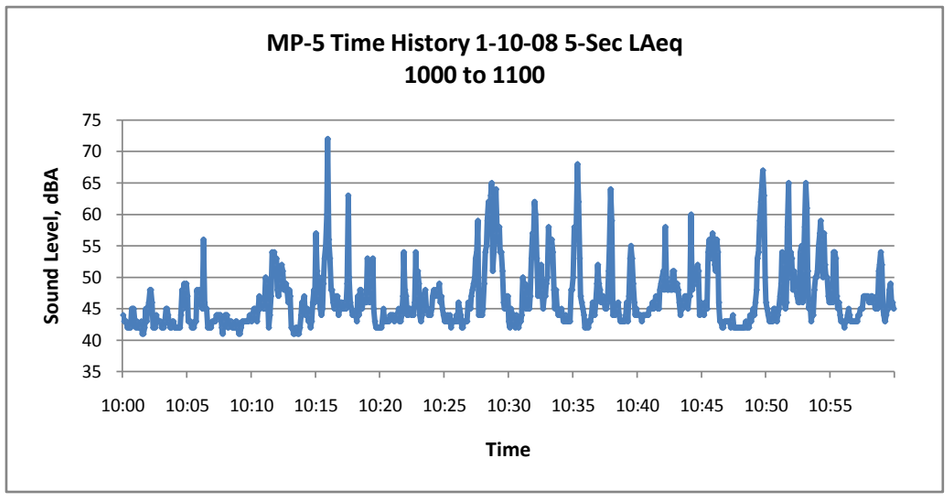
Time


MP-5 Time History 1-10-08 5-Sec LAeq
1000 to 1100
Sound Level, dBA
75
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55
50
45
40
35
10:00
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10:25
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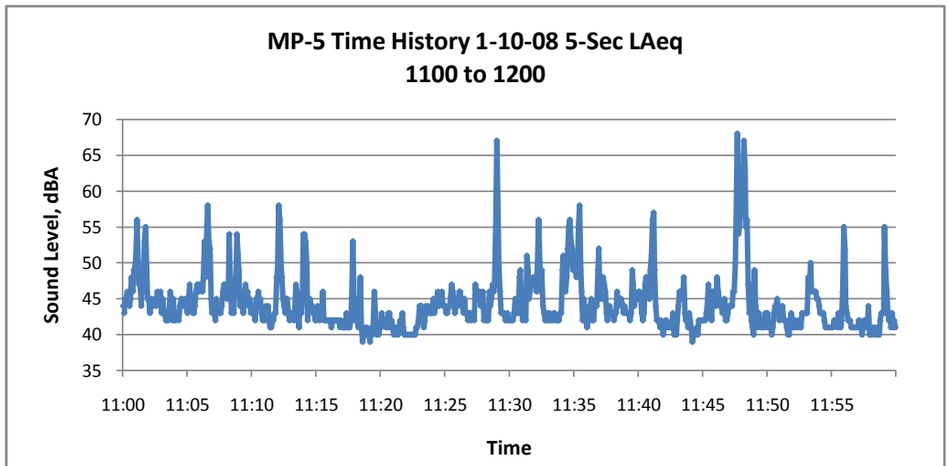
Time


MP-5 Time History 1-10-08 5-Sec LAeq
1100 to 1200
Sound Level, dBA
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50
45
40
35
11:00
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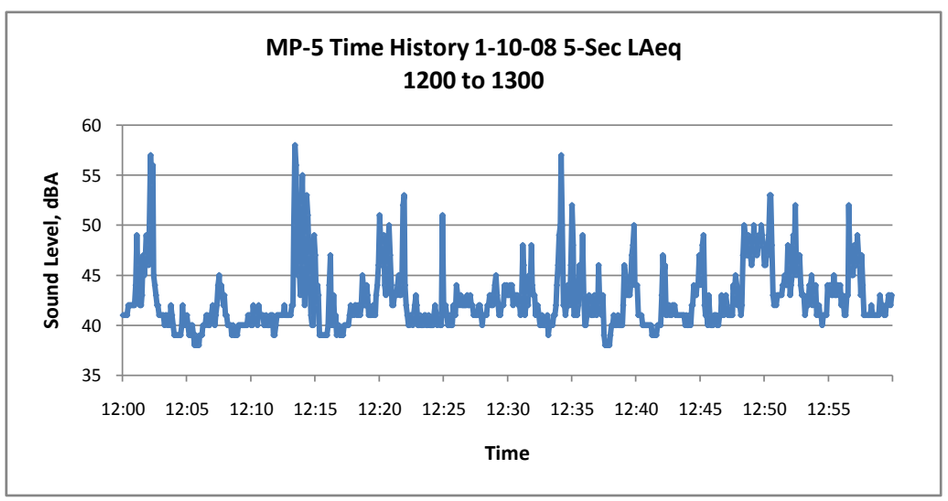
Time


MP-5 Time History 1-10-08 5-Sec LAeq
1200 to 1300
Sound Level, dBA
60
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45
40
35
12:00
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12:15
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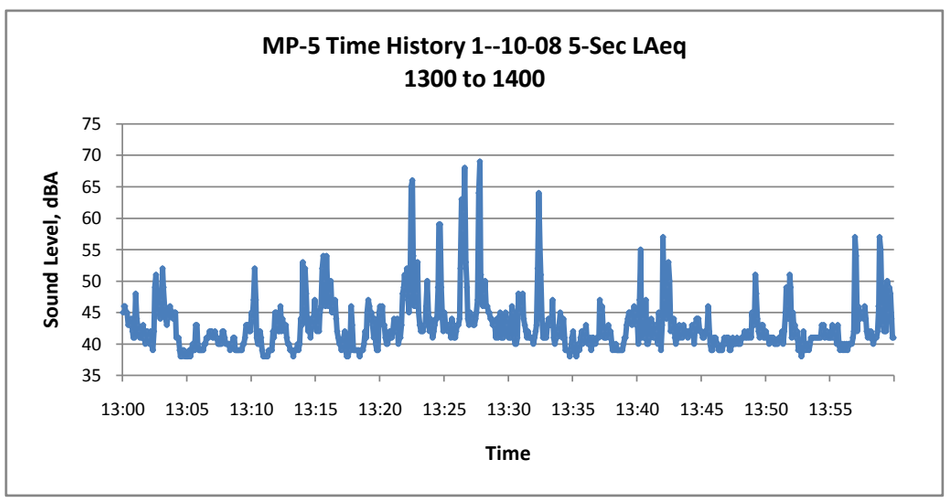
Time


MP-5 Time History 1--10-08 5-Sec LAeq
1300 to 1400
Sound Level, dBA
75
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60
55
50
45
40
35
13:00
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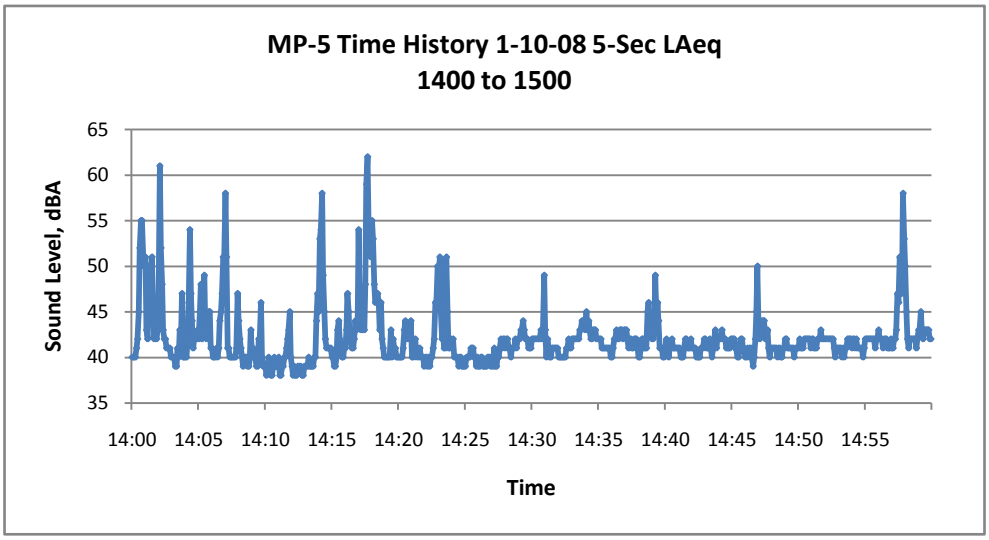
Time


MP-5 Time History 1-10-08 5-Sec LAeq
1400 to 1500
Sound Level, dBA
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50
45
40
35
14:00
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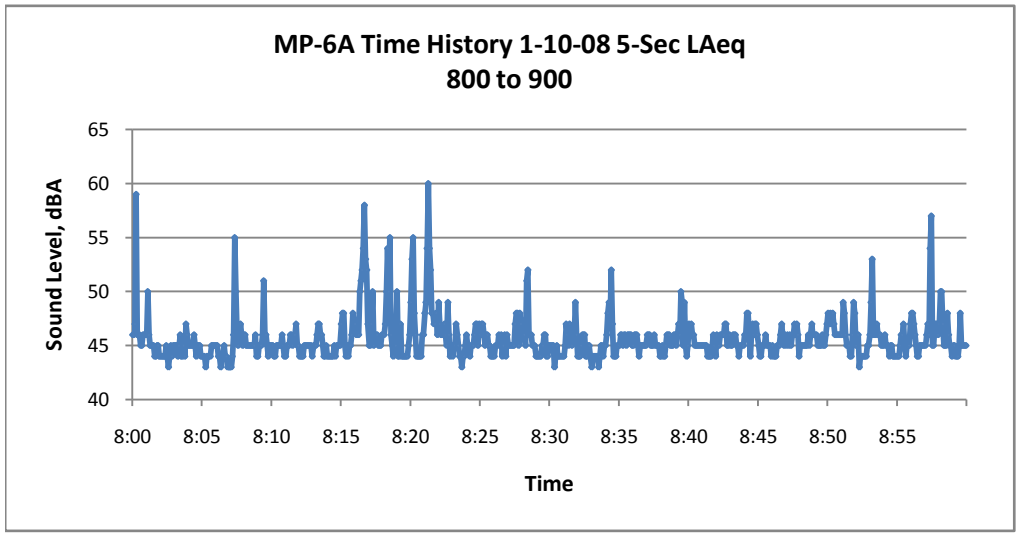
14:55
Time


MP-6A Time History 1-10-08 5-Sec LAeq
800 to 900
Sound Level, dBA
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50
45
40
8:00
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8:50
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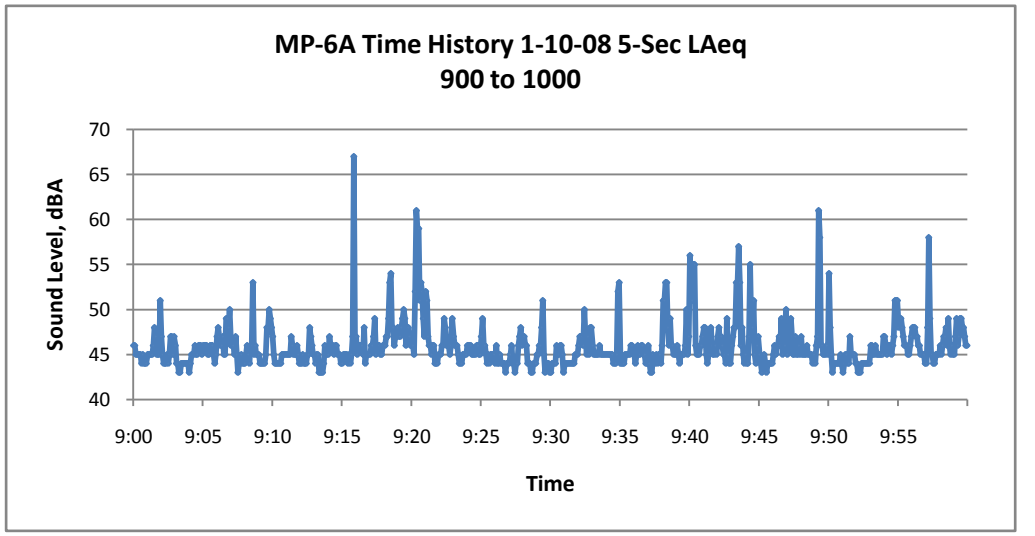
Time


MP-6A Time History 1-10-08 5-Sec LAeq
900 to 1000
Sound Level, dBA
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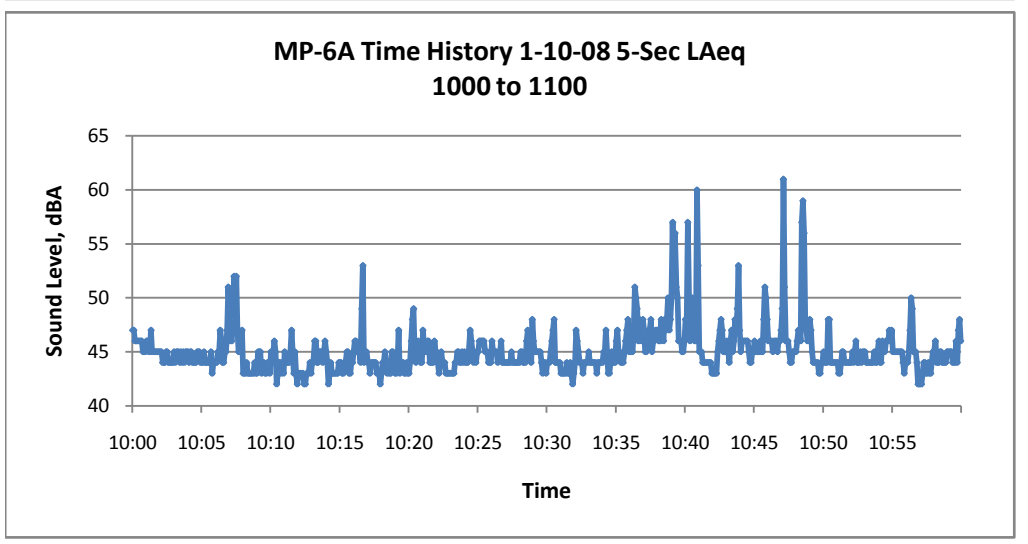
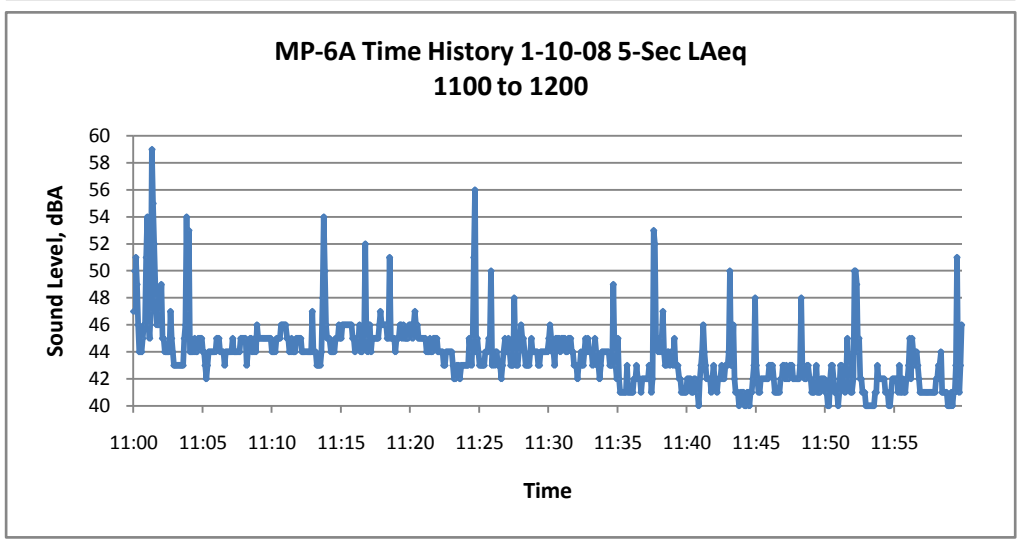
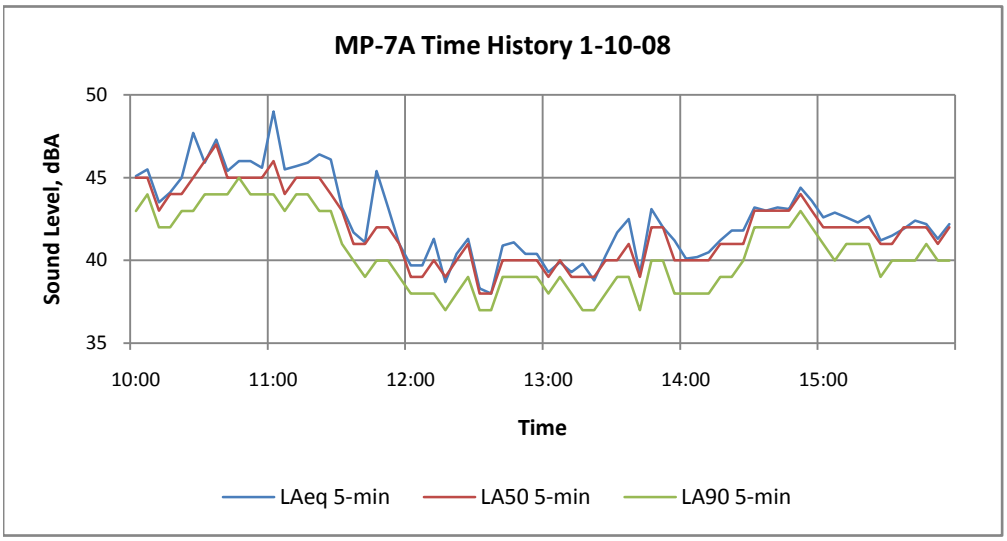
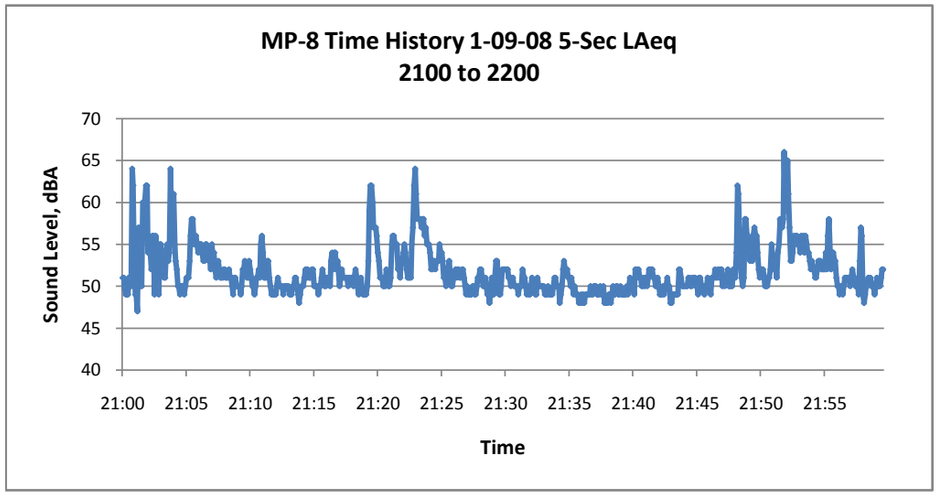
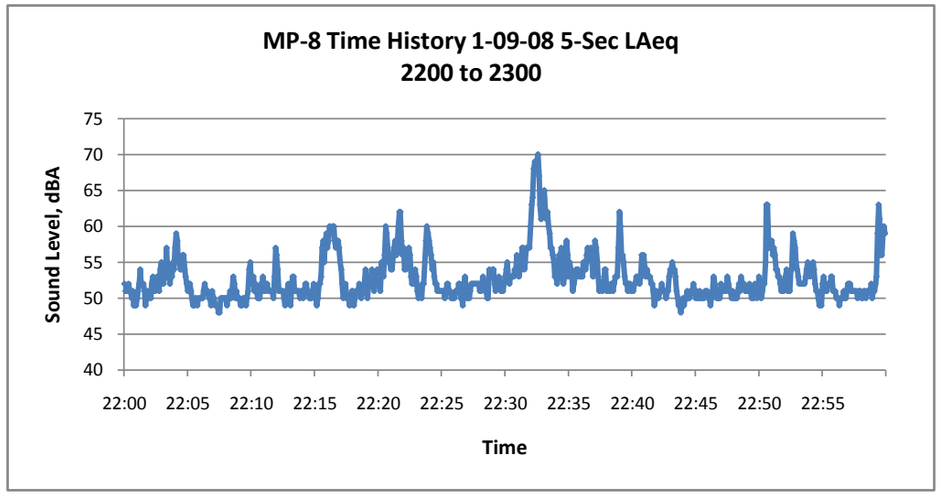
45
40
9:00
9:05
9:10
9:15
9:20
9:25
9:30
9:35
9:40
9:45
9:50
9:55
Time

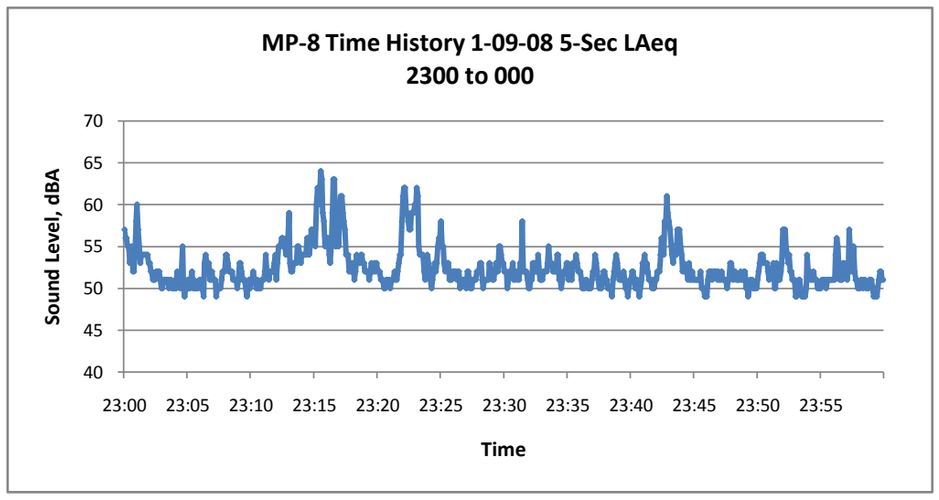

MP-6A Time History 1-10-08 5-Sec LAeq
1000 to 1100
Sound Level, dBA
65
60
55
50
45
40
10:00
10:05
10:10
10:15
10:20
10:25
10:30
10:35
10:40
10:45
10:50
10:55
Time

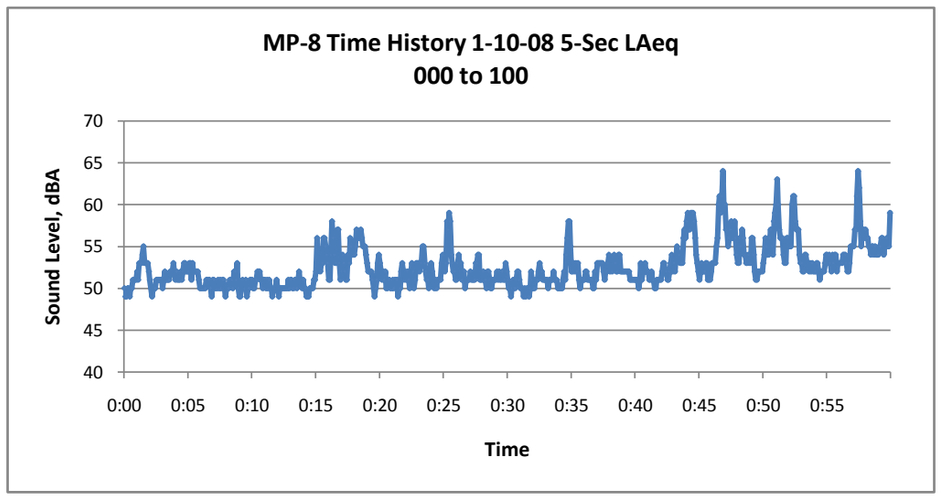

MP-6A Time History 1-10-08 5-Sec LAeq
1100 to 1200
Sound Level, dBA
60
58
56
54
52
50
48
46
44
42
40
11:00
11:05
11:10
11:15
11:20
11:25
11:30
11:35
11:40
11:45
11:50
11:55
Time

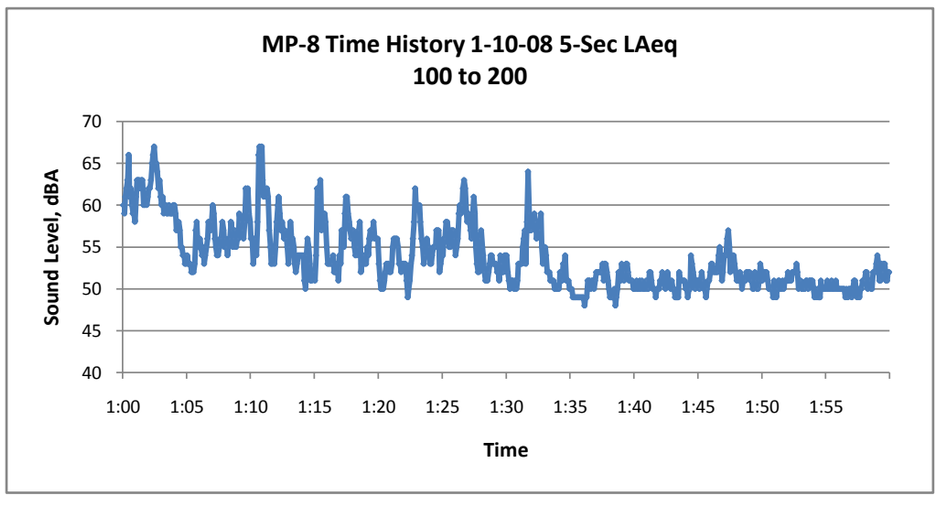

MP-7A Time History 1-10-08
Sound Level, dBA
50
45
40
35
10:00
11:00
12:00
13:00
14:00
15:00
Time
LAeq 5-min
LA50 5-min
LA90 5-min

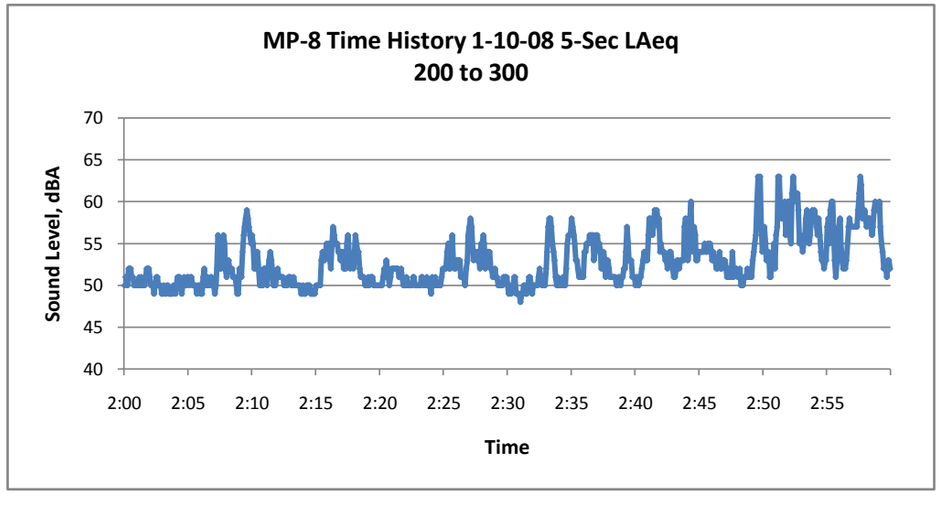

MP-8 Time History 1-09-08 5-Sec LAeq
2100 to 2200
Sound Level, dBA
70
65
60
55
50
45
40
21:00 21:05 21:10 21:15 21:20 21:25 21:30 21:35 21:40 21:45 21:50 21:55
Time

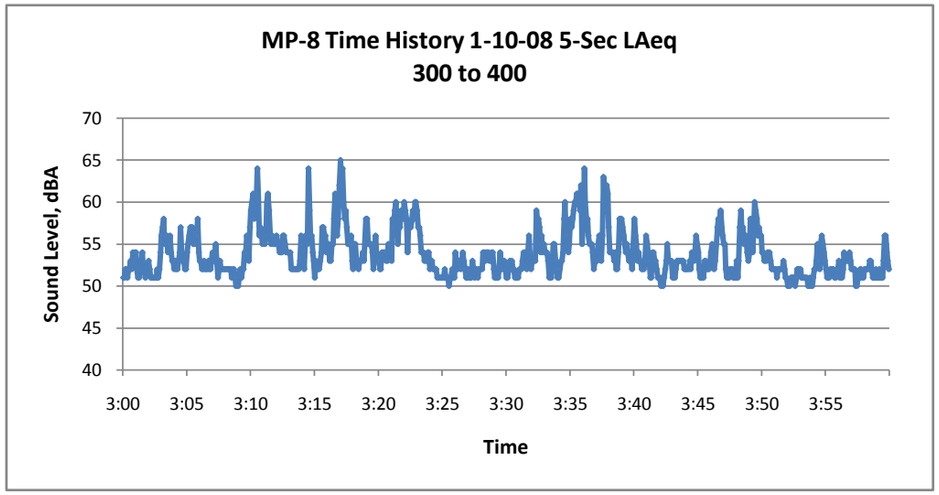

MP-8 Time History 1-09-08 5-Sec LAeq
2200 to 2300
Sound Level, dBA
75
70
65
60
55
50
45
40
22:00 22:05 22:10 22:15 22:20 22:25 22:30 22:35 22:40 22:45 22:50 22:55
Time

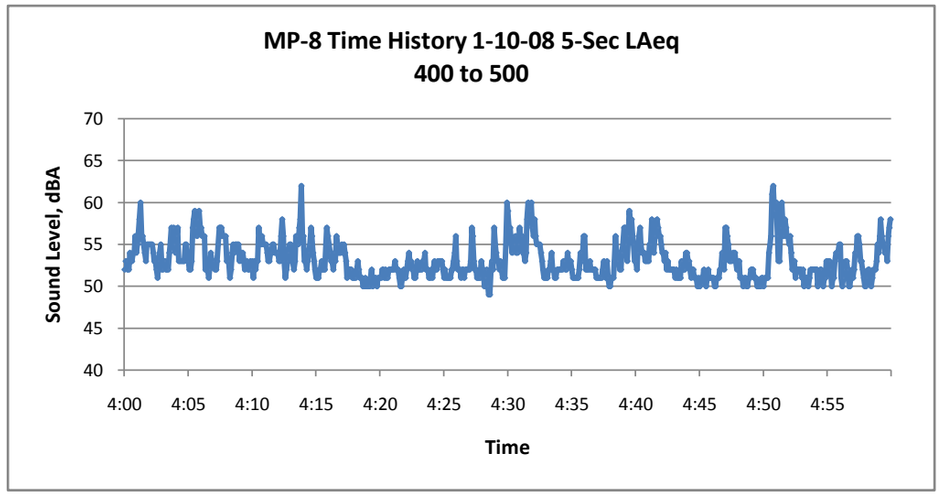

MP-8 Time History 1-09-08 5-Sec LAeq
2300 to 000
Sound Level, dBA
70
65
60
55
50
45
40
23:00 23:05 23:10 23:15 23:20 23:25 23:30 23:35 23:40 23:45 23:50 23:55
Time

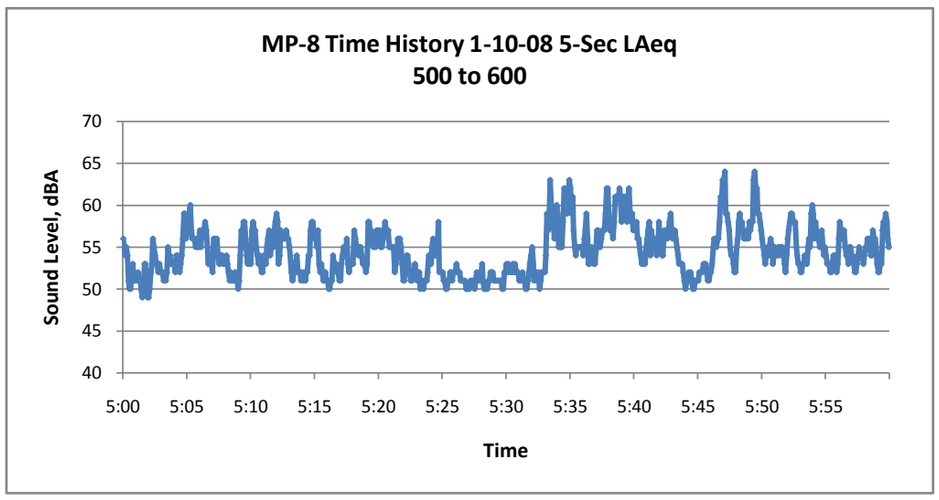

MP-8 Time History 1-10-08 5-Sec LAeq
000 to 100
Sound Level, dBA
70
65
60
55
50
45
40
0:00 0:05 0:10 0:15 0:20 0:25 0:30 0:35 0:40 0:45 0:50 0:55
Time

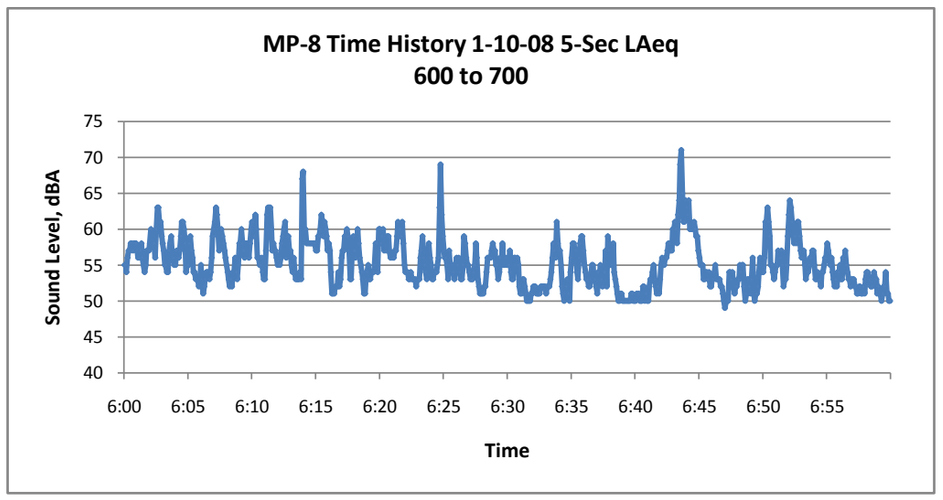

MP-8 Time History 1-10-08 5-Sec LAeq
100 to 200
Sound Level, dBA
70
65
60
55
50
45
40
1:00 1:05 1:10 1:15 1:20 1:25 1:30 1:35 1:40 1:45 1:50 1:55
Time

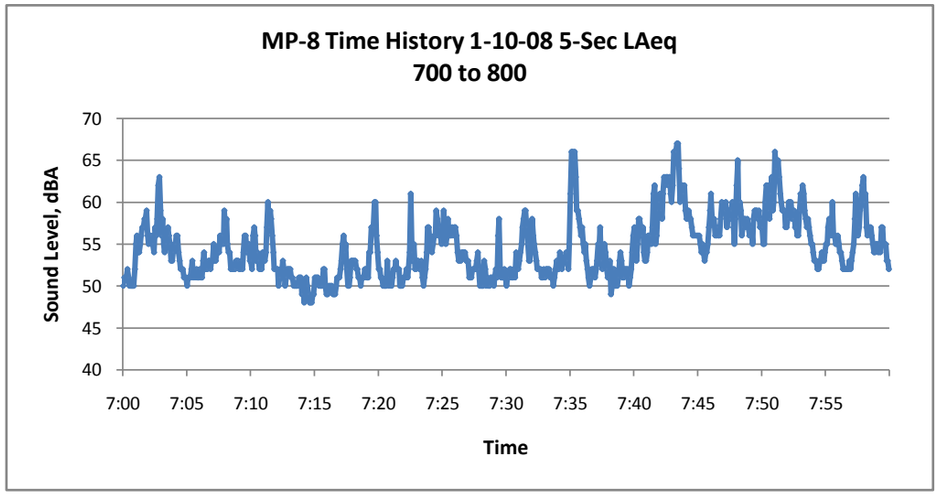

MP-8 Time History 1-10-08 5-Sec LAeq
200 to 300
Sound Level, dBA
70
65
60
55
50
45
40
2:00 2:05 2:10 2:15 2:20 2:25 2:30 2:35 2:40 2:45 2:50 2:55
Time

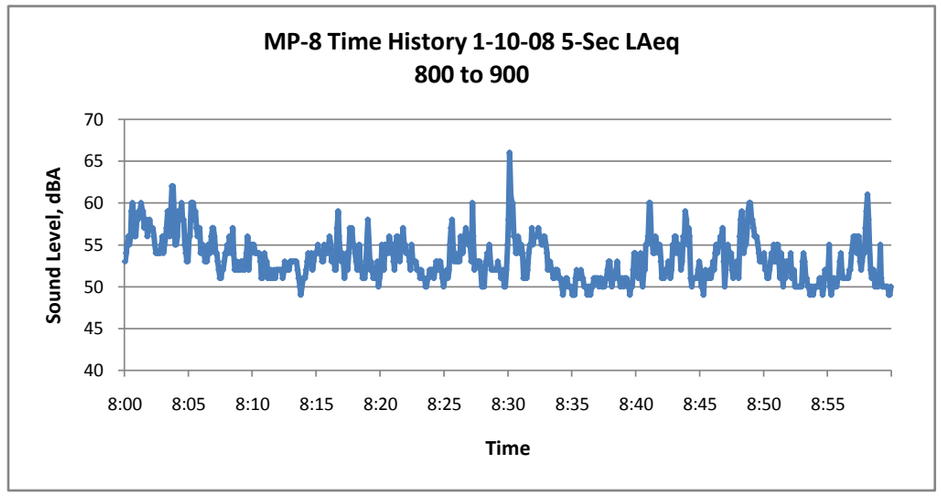

MP-8 Time History 1-10-08 5-Sec LAeq
300 to 400
Sound Level, dBA
70
65
60
55
50
45
40
3:00 3:05 3:10 3:15 3:20 3:25 3:30 3:35 3:40 3:45 3:50 3:55
Time

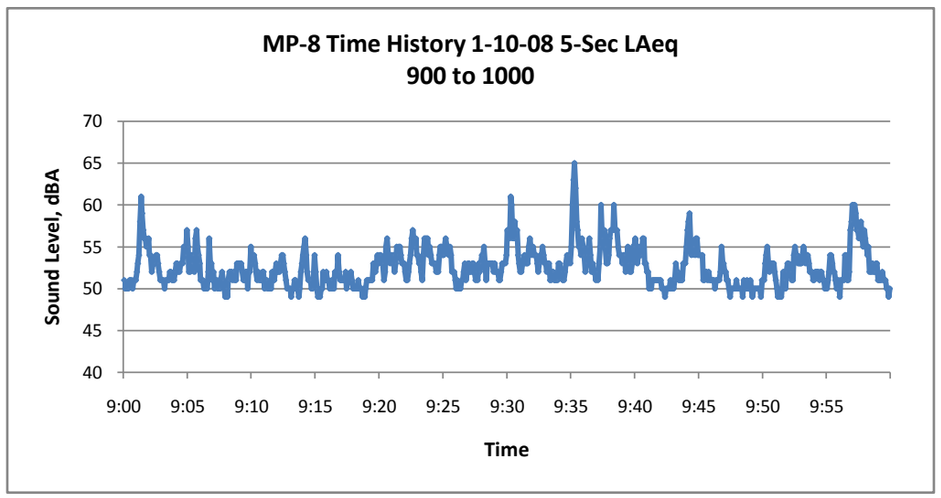

MP-8 Time History 1-10-08 5-Sec LAeq
400 to 500
Sound Level, dBA
70
65
60
55
50
45
40
4:00 4:05 4:10 4:15 4:20 4:25 4:30 4:35 4:40 4:45 4:50 4:55
Time

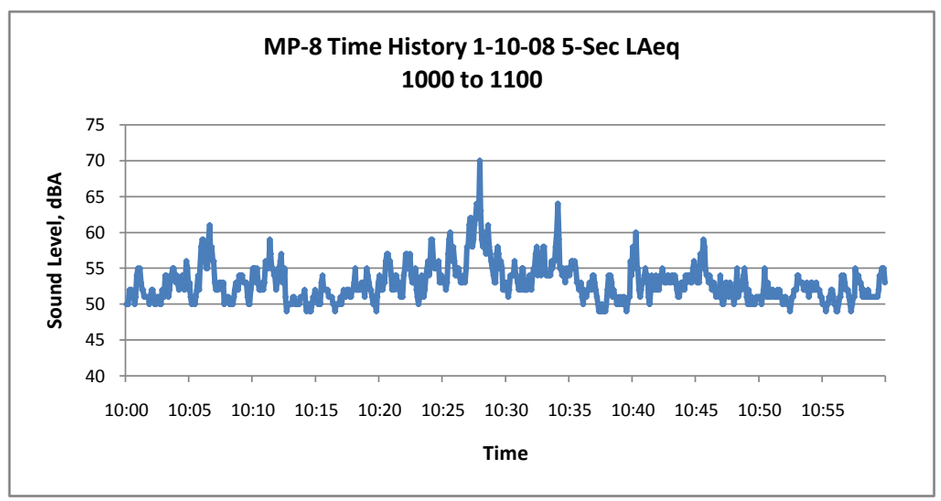

MP-8 Time History 1-10-08 5-Sec LAeq
500 to 600
Sound Level, dBA
70
65
60
55
50
45
40
5:00 5:05 5:10 5:15 5:20 5:25 5:30 5:35 5:40 5:45 5:50 5:55
Time


MP-8 Time History 1-10-08 5-Sec LAeq
600 to 700
Sound Level, dBA
75
70
65
60
55
50
45
40
6:00 6:05 6:10 6:15 6:20 6:25 6:30 6:35 6:40 6:45 6:50 6:55
Time


MP-8 Time History 1-10-08 5-Sec LAeq
700 to 800
Sound Level, dBA
70
65
60
55
50
45
40
7:00 7:05 7:10 7:15 7:20 7:25 7:30 7:35 7:40 7:45 7:50 7:55
Time


MP-8 Time History 1-10-08 5-Sec LAeq
800 to 900
Sound Level, dBA
70
65
60
55
50
45
40
8:00 8:05 8:10 8:15 8:20 8:25 8:30 8:35 8:40 8:45 8:50 8:55
Time


MP-8 Time History 1-10-08 5-Sec LAeq
900 to 1000
Sound Level, dBA
70
65
60
55
50
45
40
9:00
9:05
9:10
9:15
9:20
9:25
9:30
9:35
9:40
9:45
9:50
9:55
Time


MP-8 Time History 1-10-08 5-Sec LAeq
1000 to 1100
Sound Level, dBA
75
70
65
60
55
50
45
40
10:00
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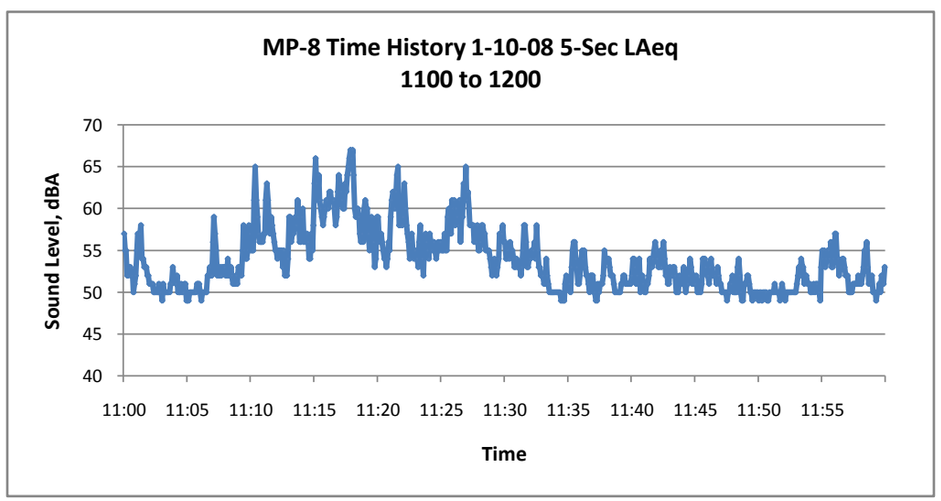
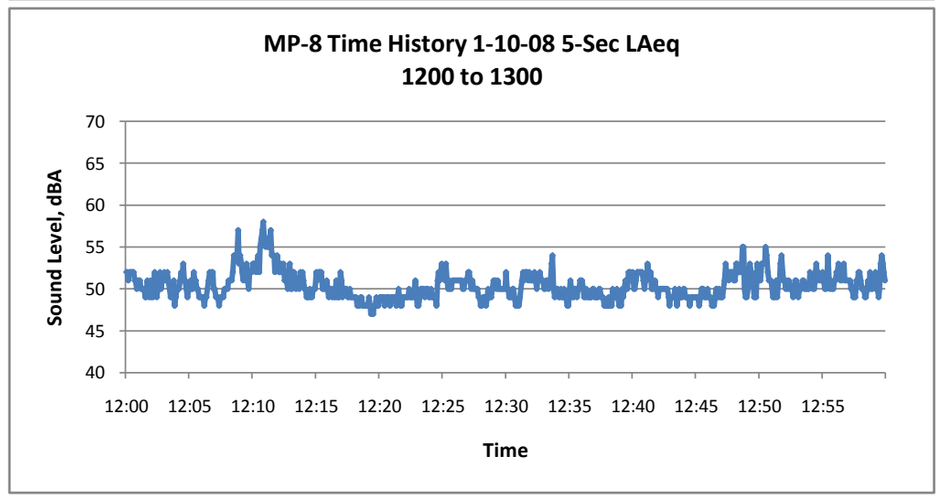
10:35
10:40
10:45
10:50
10:55
Time


MP-8 Time History 1-10-08 5-Sec LAeq
1100 to 1200
Sound Level, dBA
70
65
60
55
50
45
40
11:00
11:05
11:10
11:15
11:20
11:25
11:30
11:35
11:40
11:45
11:50
11:55
Time


MP-8 Time History 1-10-08 5-Sec LAeq
1200 to 1300
Sound Level, dBA
70
65
60
55
50
45
40
12:00
12:05
12:10
12:15
12:20
12:25
12:30
12:35
12:40
12:45
12:50
12:55
Time