

Figure 7-8: Baseline Monitoring Graphical Results – Summer Location 1 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

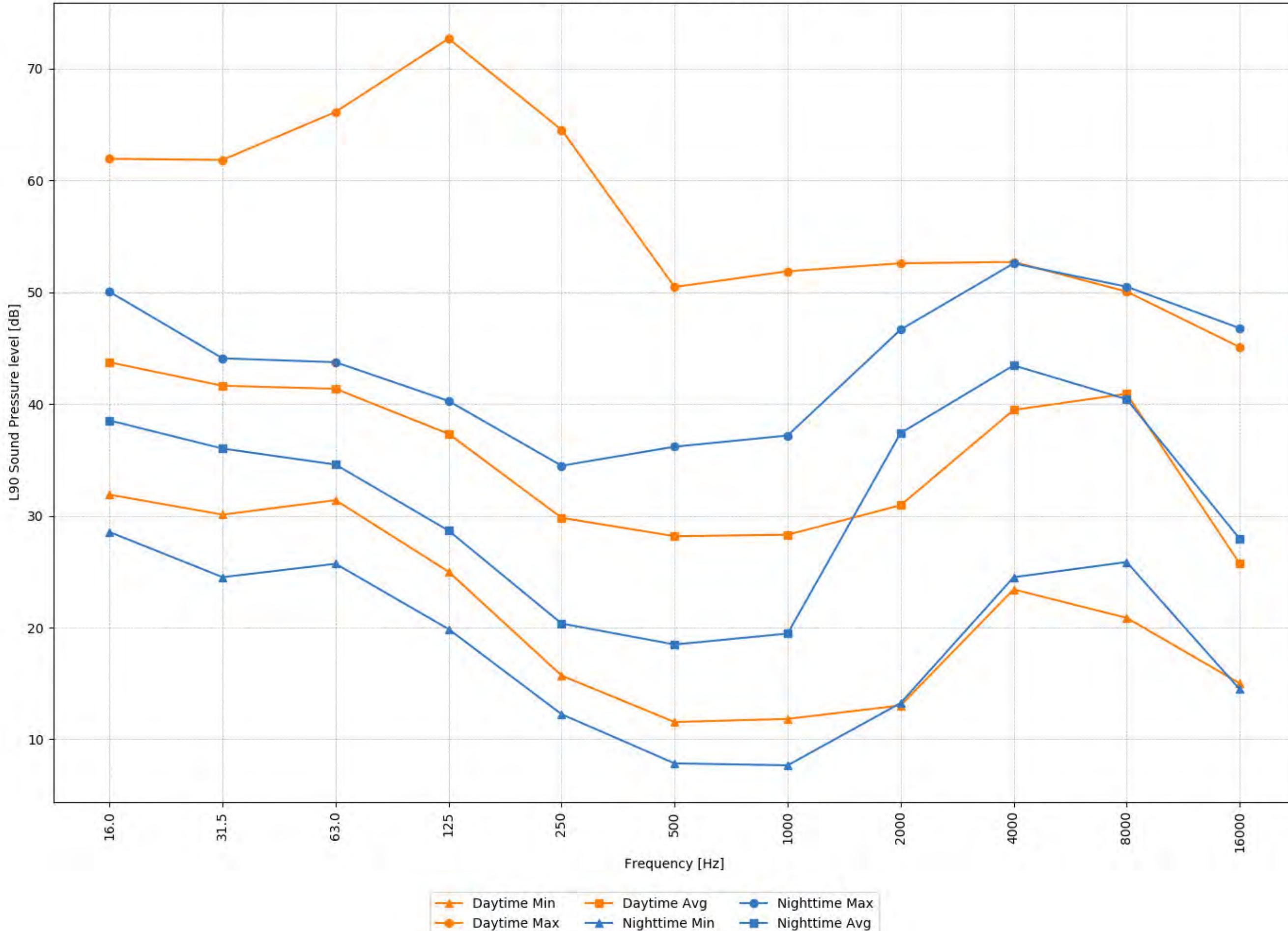


Figure 7-9: Baseline Monitoring Graphical Results - Winter Location 1 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

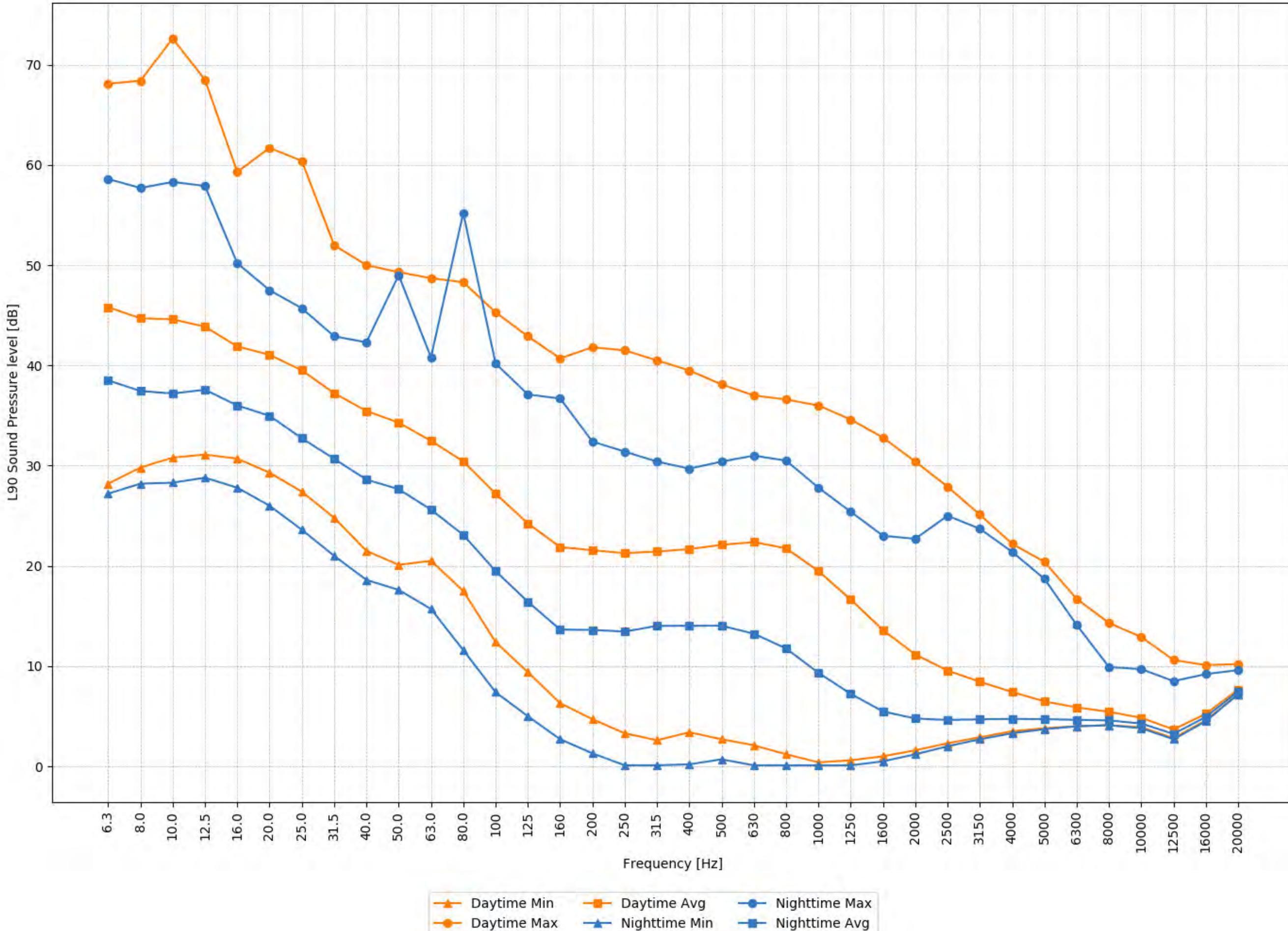


Figure 7-10: Baseline Monitoring Graphical Results – Summer Location 1 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

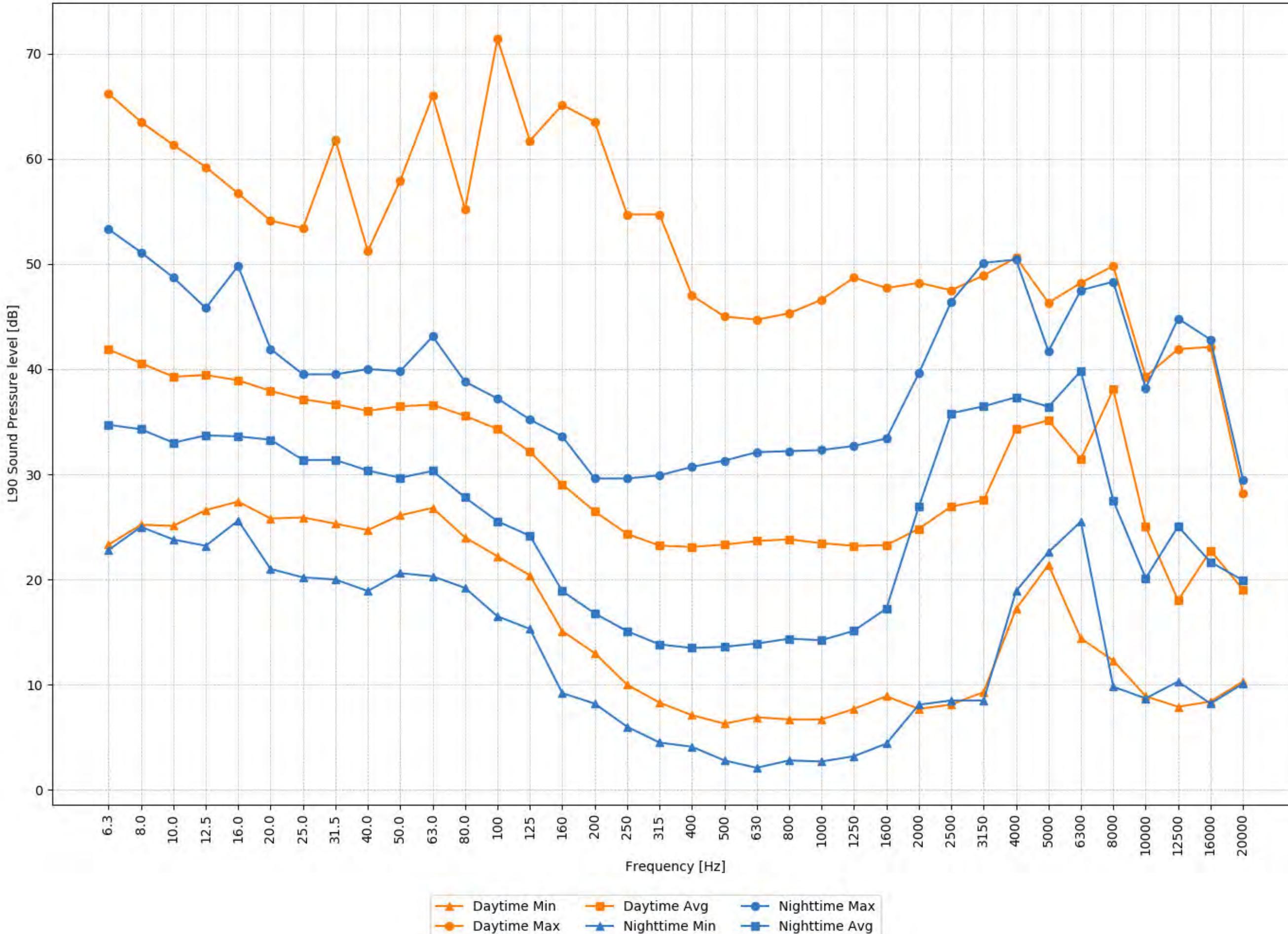


Figure 7-11: Baseline Monitoring Graphical Results - Location 2 (Winter)
10-Minute Ambient Sound Level Data

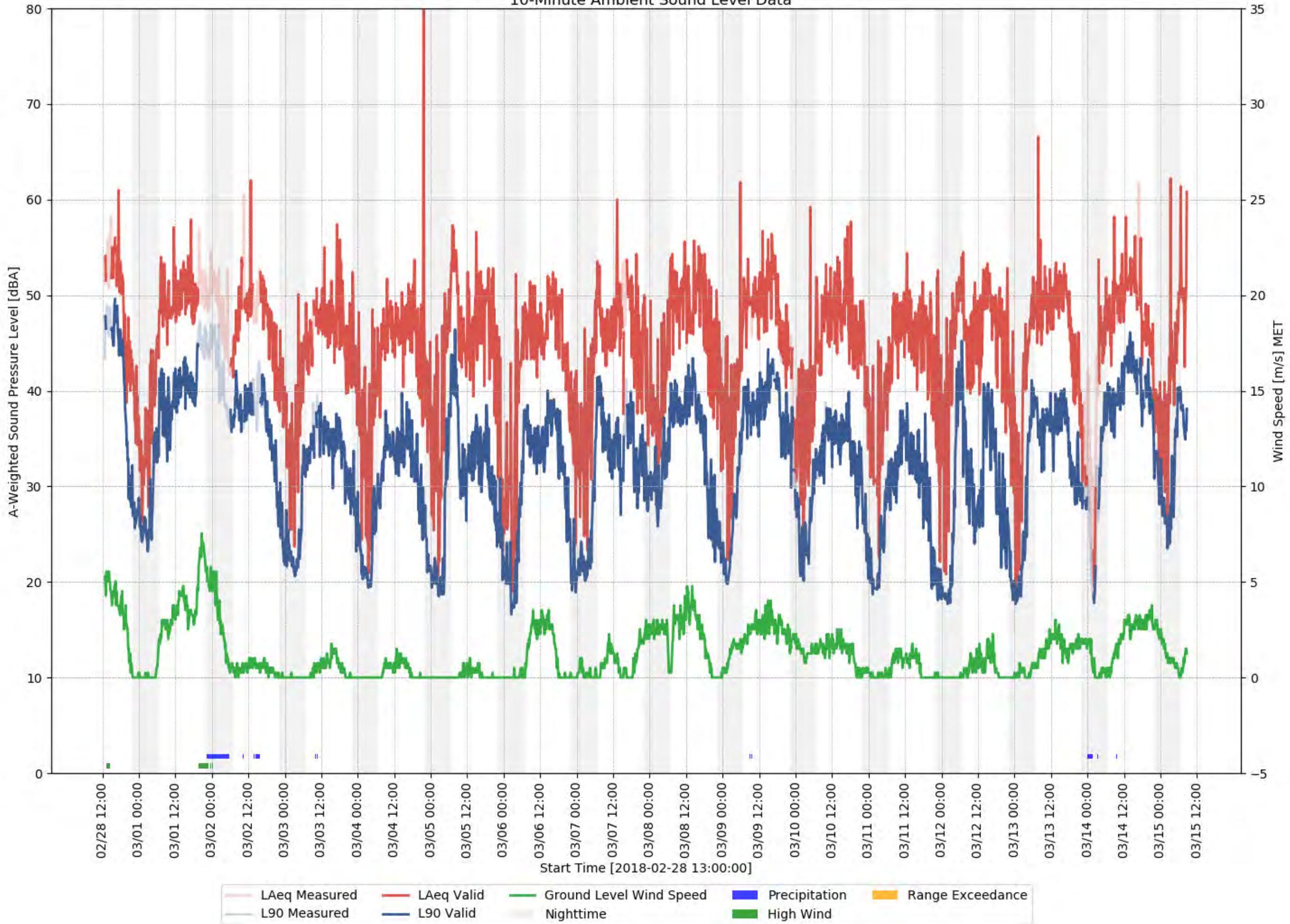


Figure 7-12: Baseline Monitoring Graphical Results - Location 2 (Summer)
10-Minute Ambient Sound Level Data

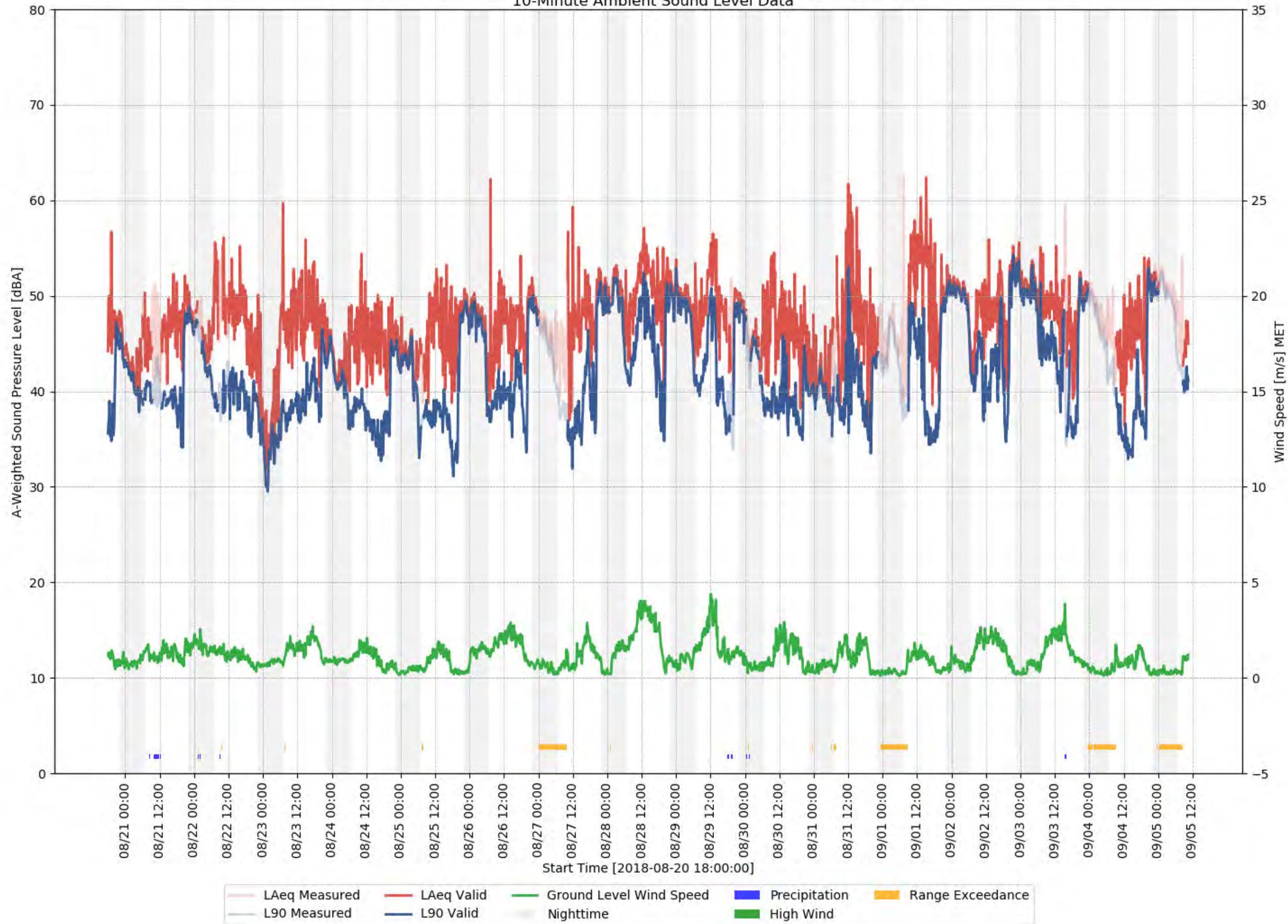


Figure 7-13: Baseline Monitoring Graphical Results - Location 2 - Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

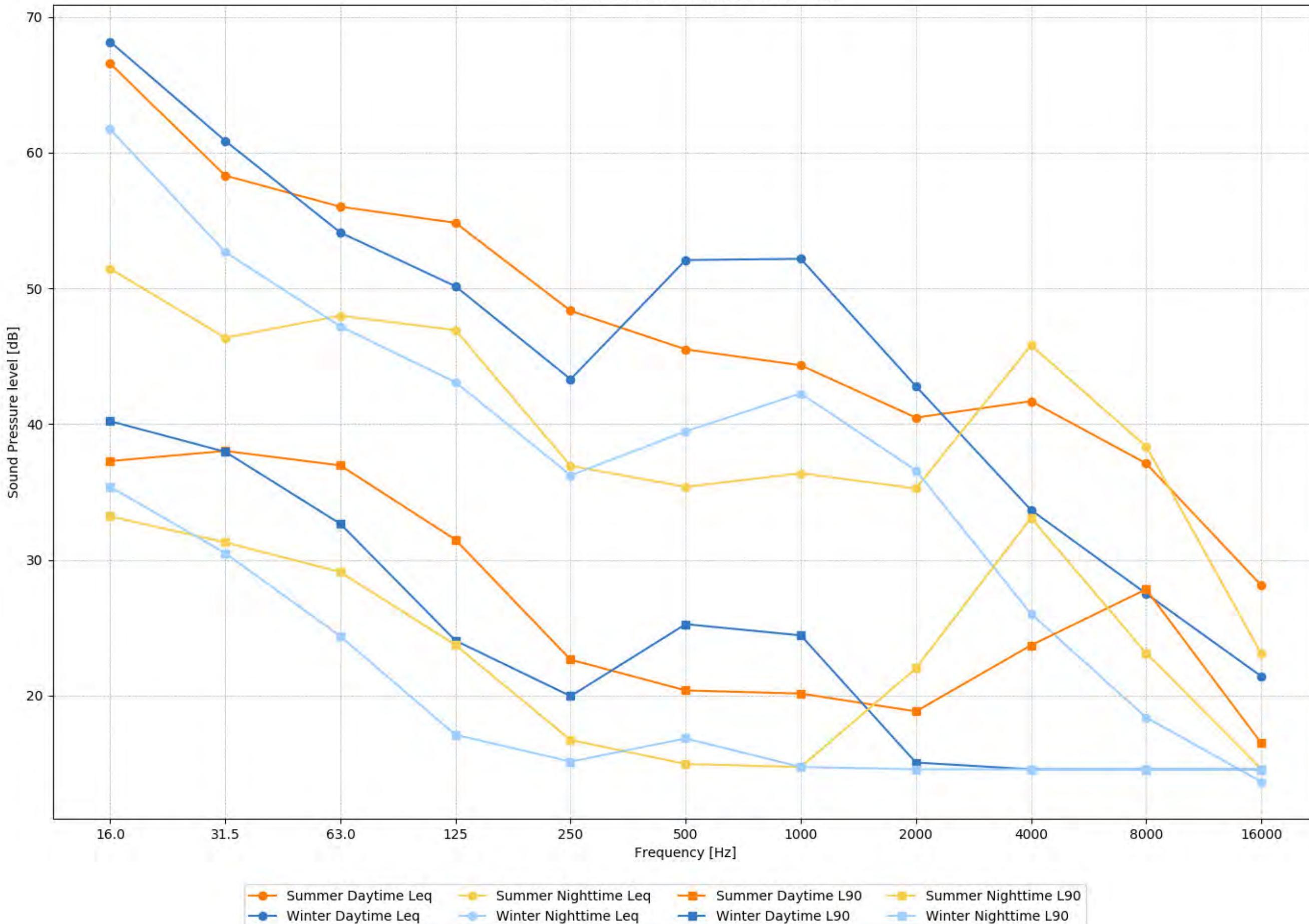


Figure 7-14: Baseline Monitoring Graphical Results - Location 2 - Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

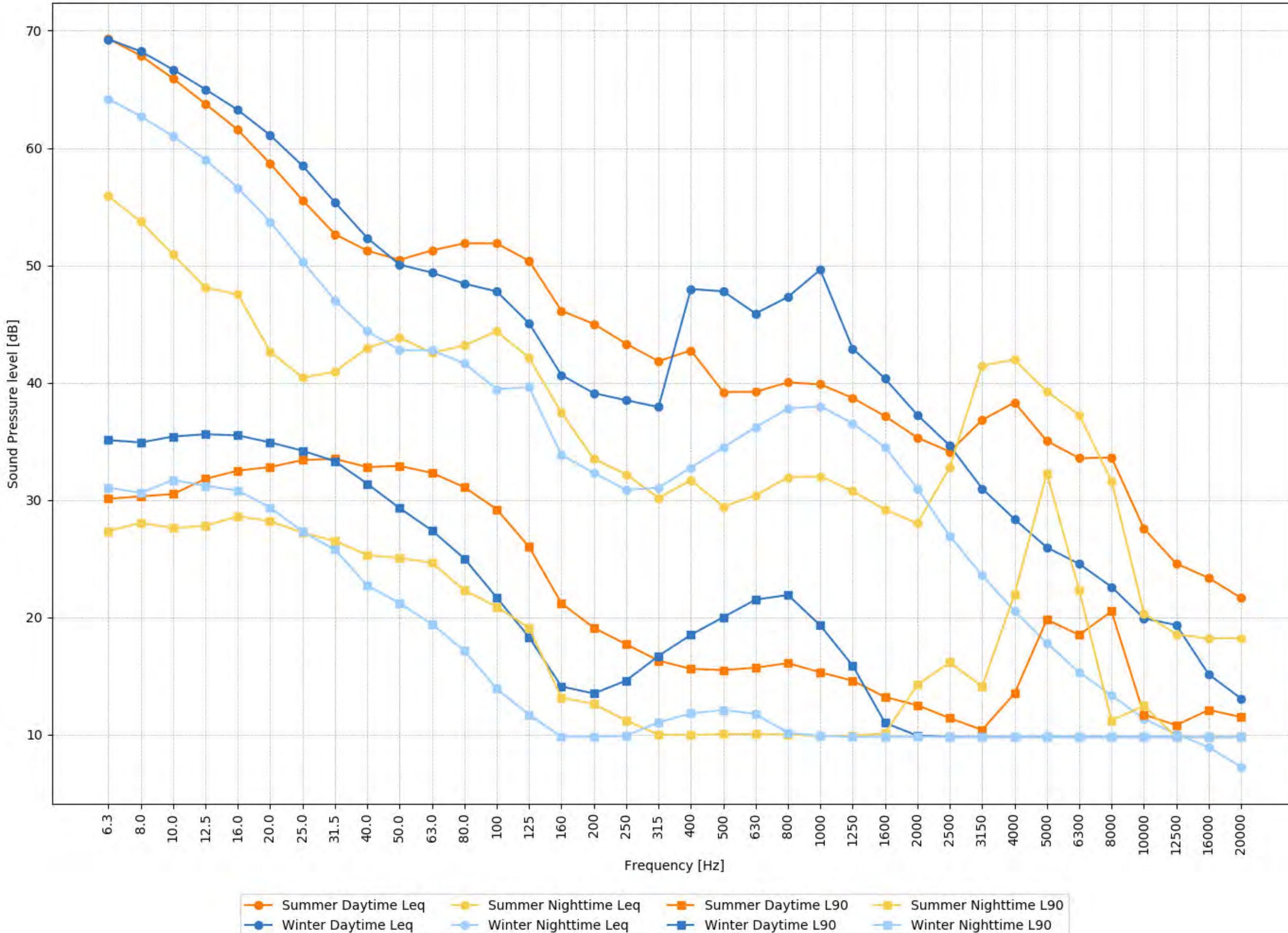


Figure 7-15: Baseline Monitoring Graphical Results – Winter Location 2 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

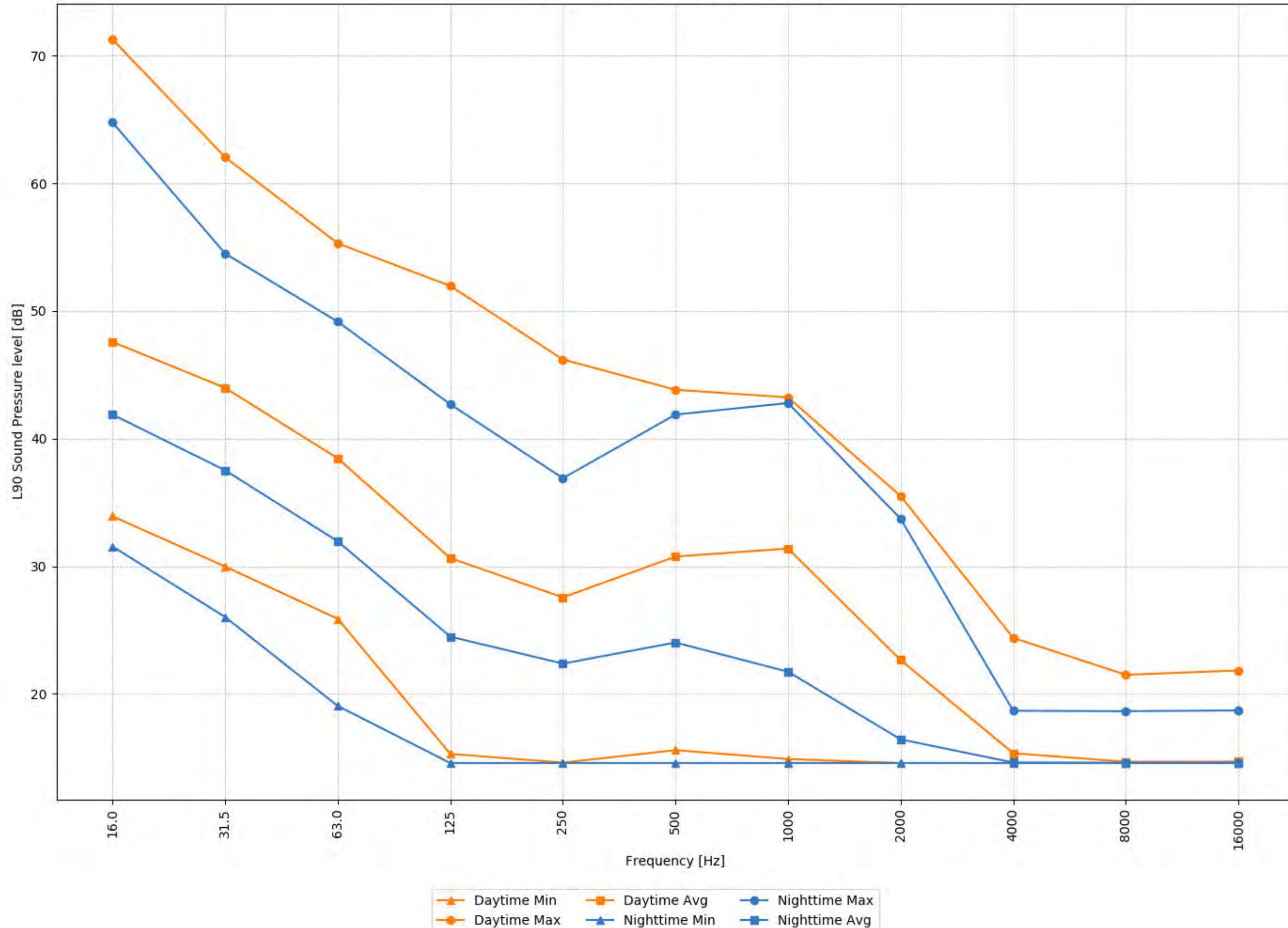


Figure 7-16: Baseline Monitoring Graphical Results – Summer Location 2 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

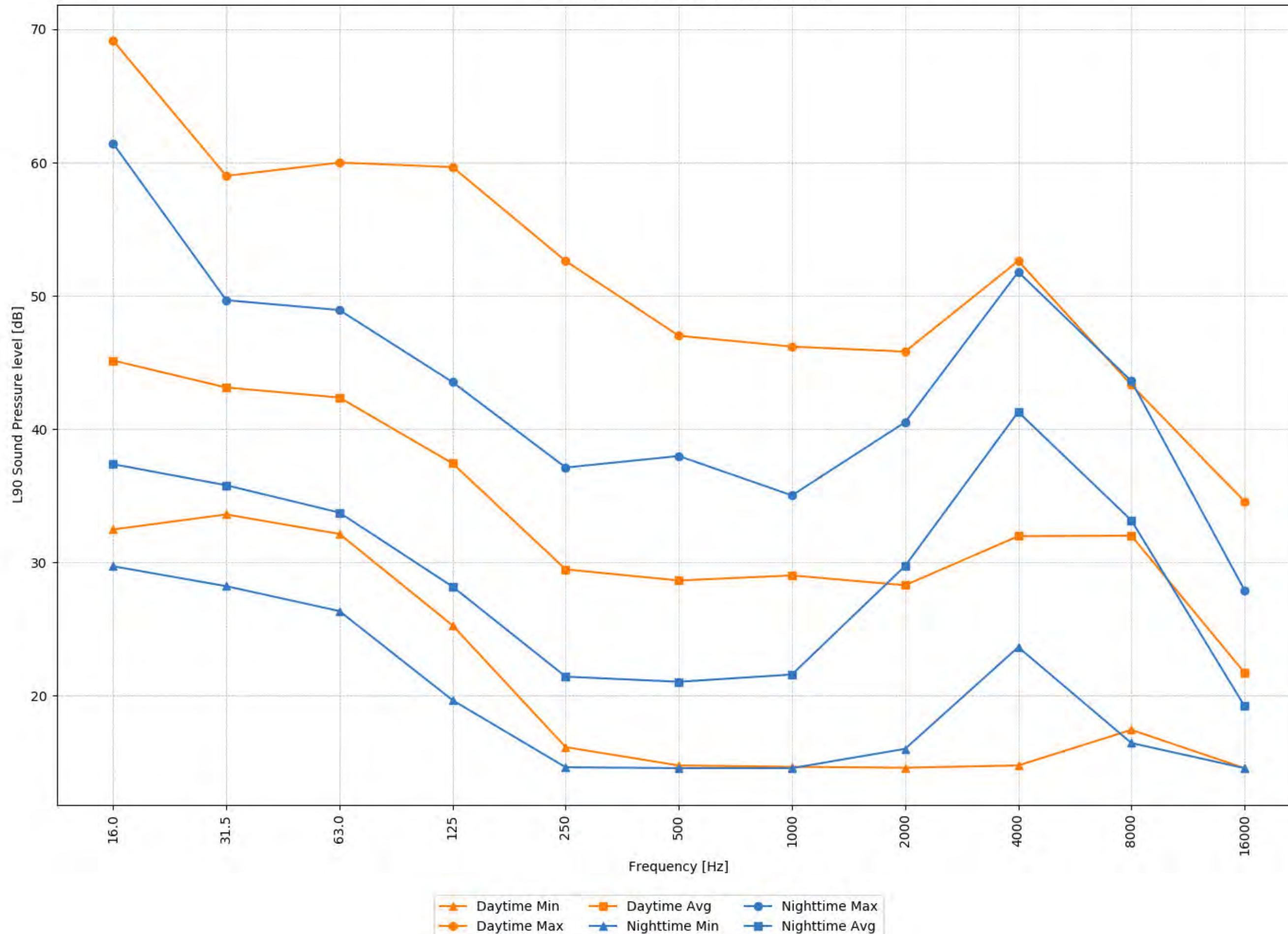


Figure 7-17: Baseline Monitoring Graphical Results – Winter Location 2 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

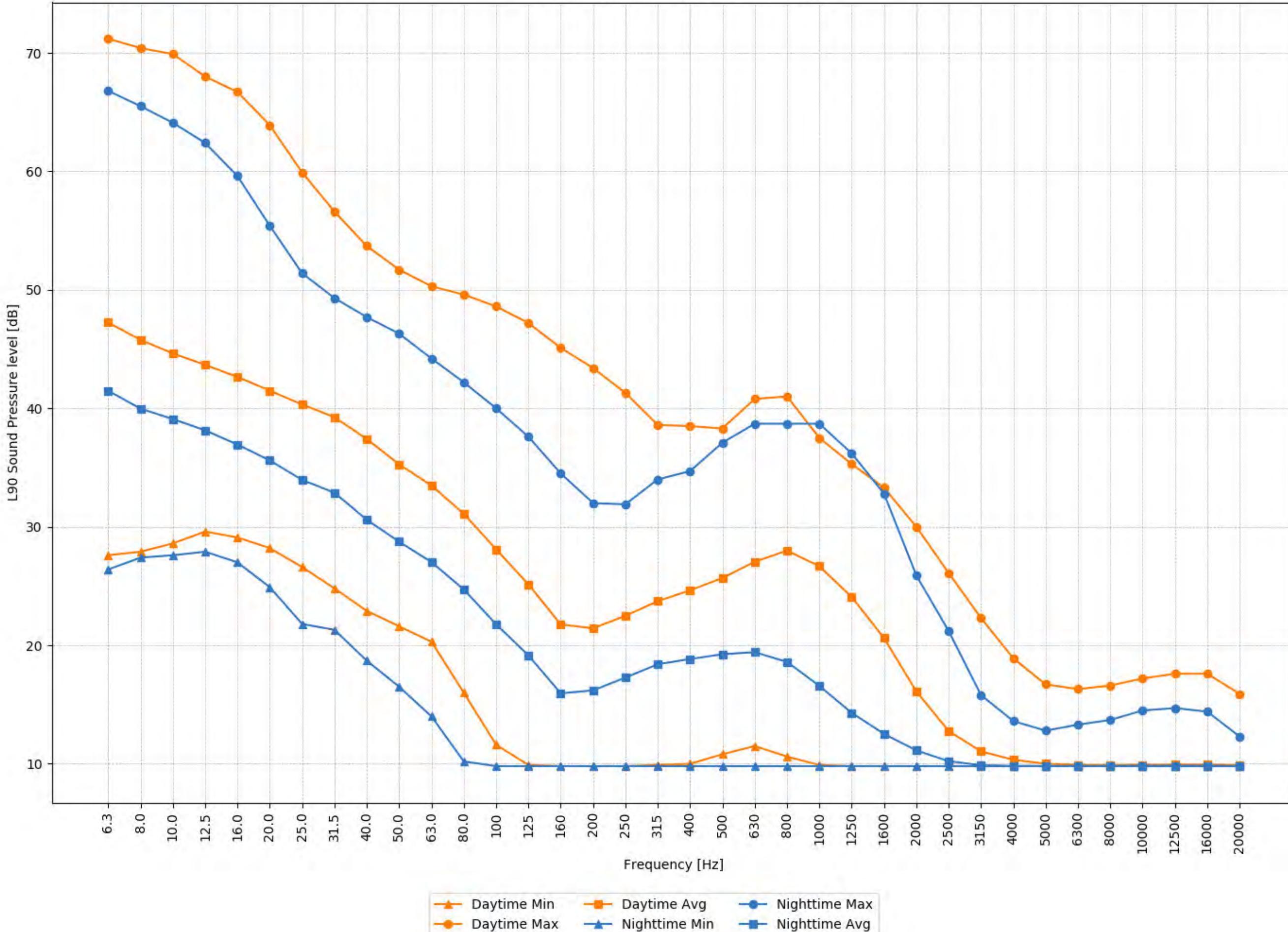


Figure 7-18: Baseline Monitoring Graphical Results – Summer Location 2 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

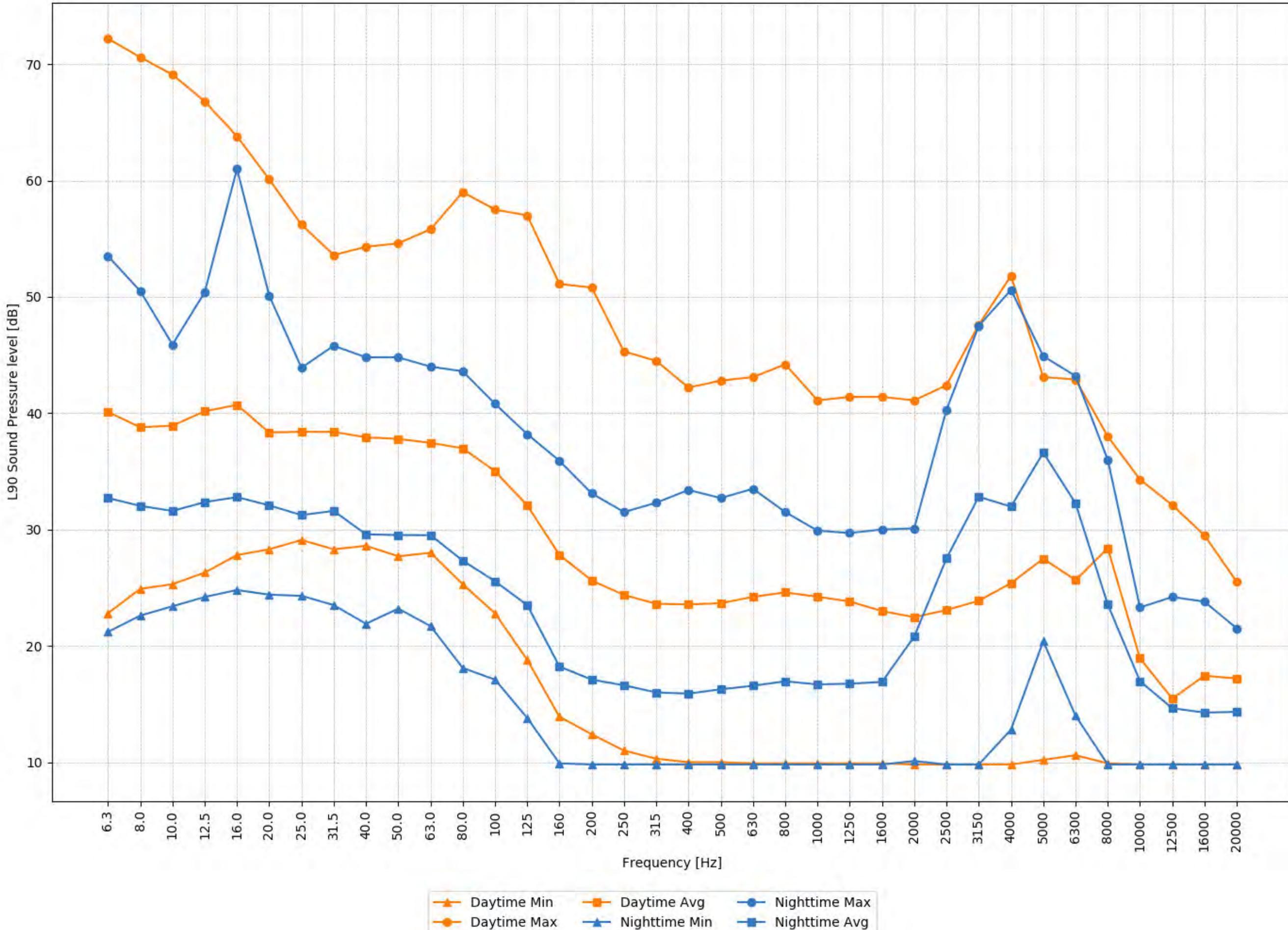


Figure 7-19: Baseline Monitoring Graphical Results - Location 3 (Winter)
10-Minute Ambient Sound Level Data

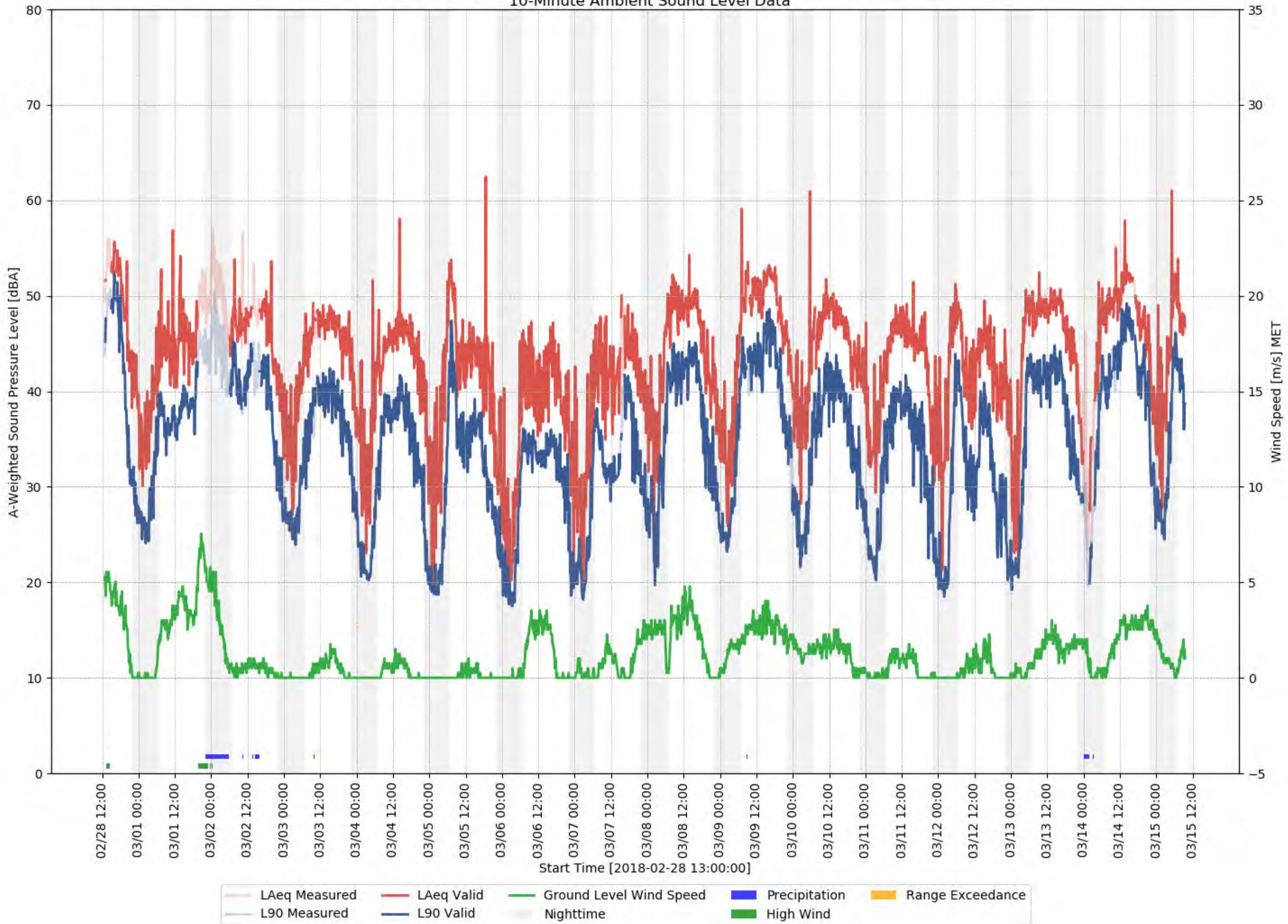


Figure 7-20: Baseline Monitoring Graphical Results - Location 3 (Summer)
10-Minute Ambient Sound Level Data

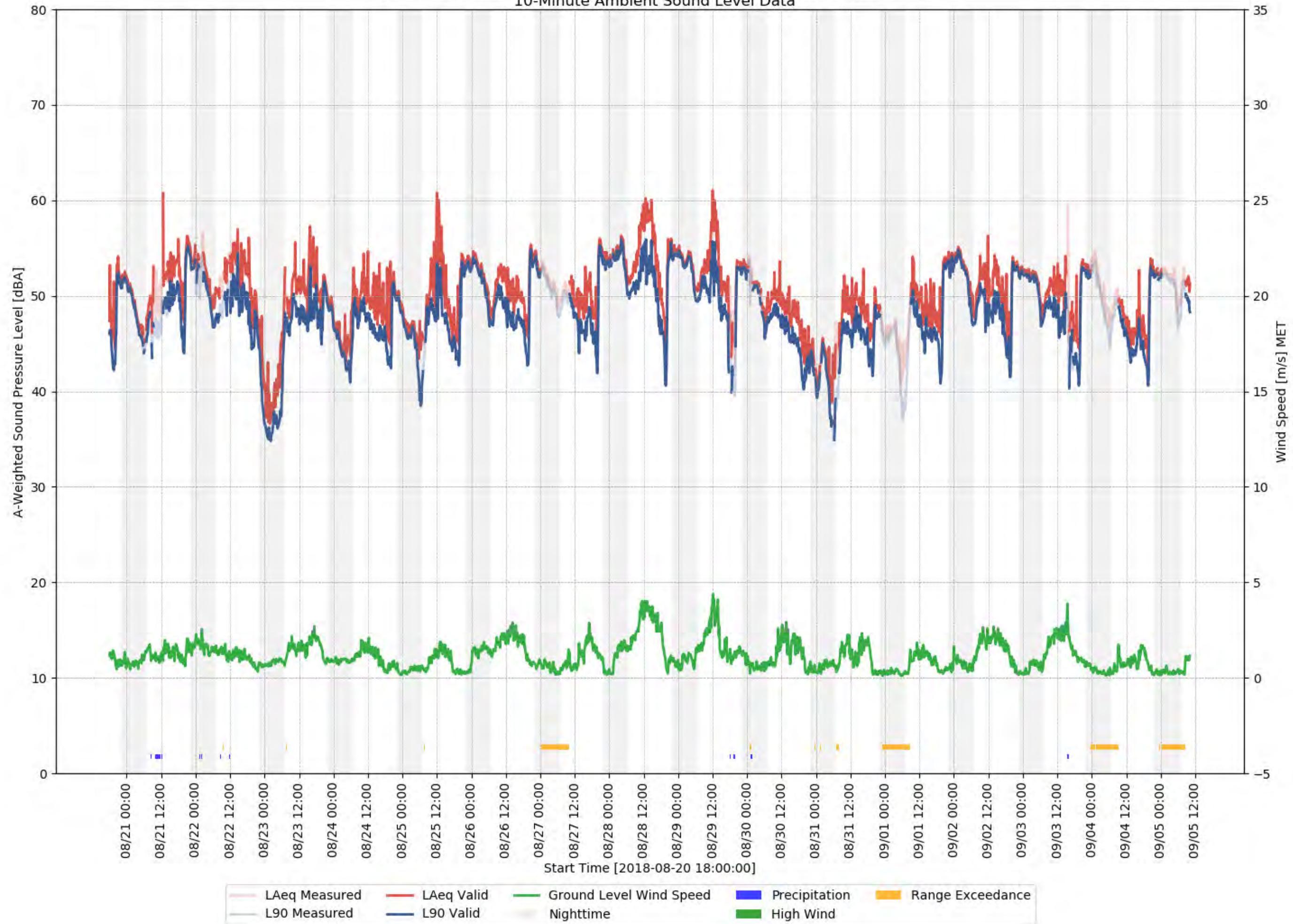


Figure 7-21: Baseline Monitoring Graphical Results - Location 3 - Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

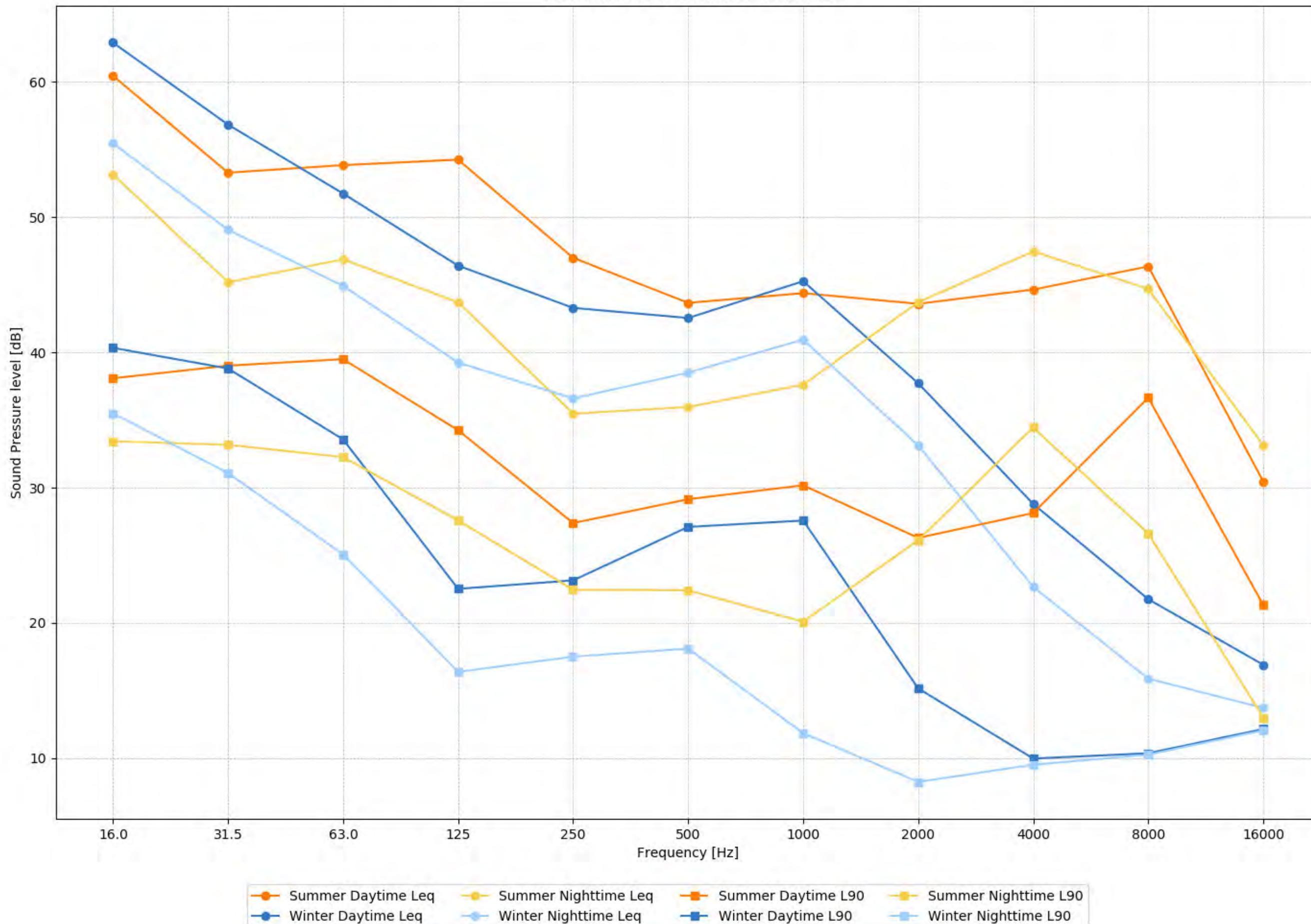


Figure 7-22: Baseline Monitoring Graphical Results - Location 3 - Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

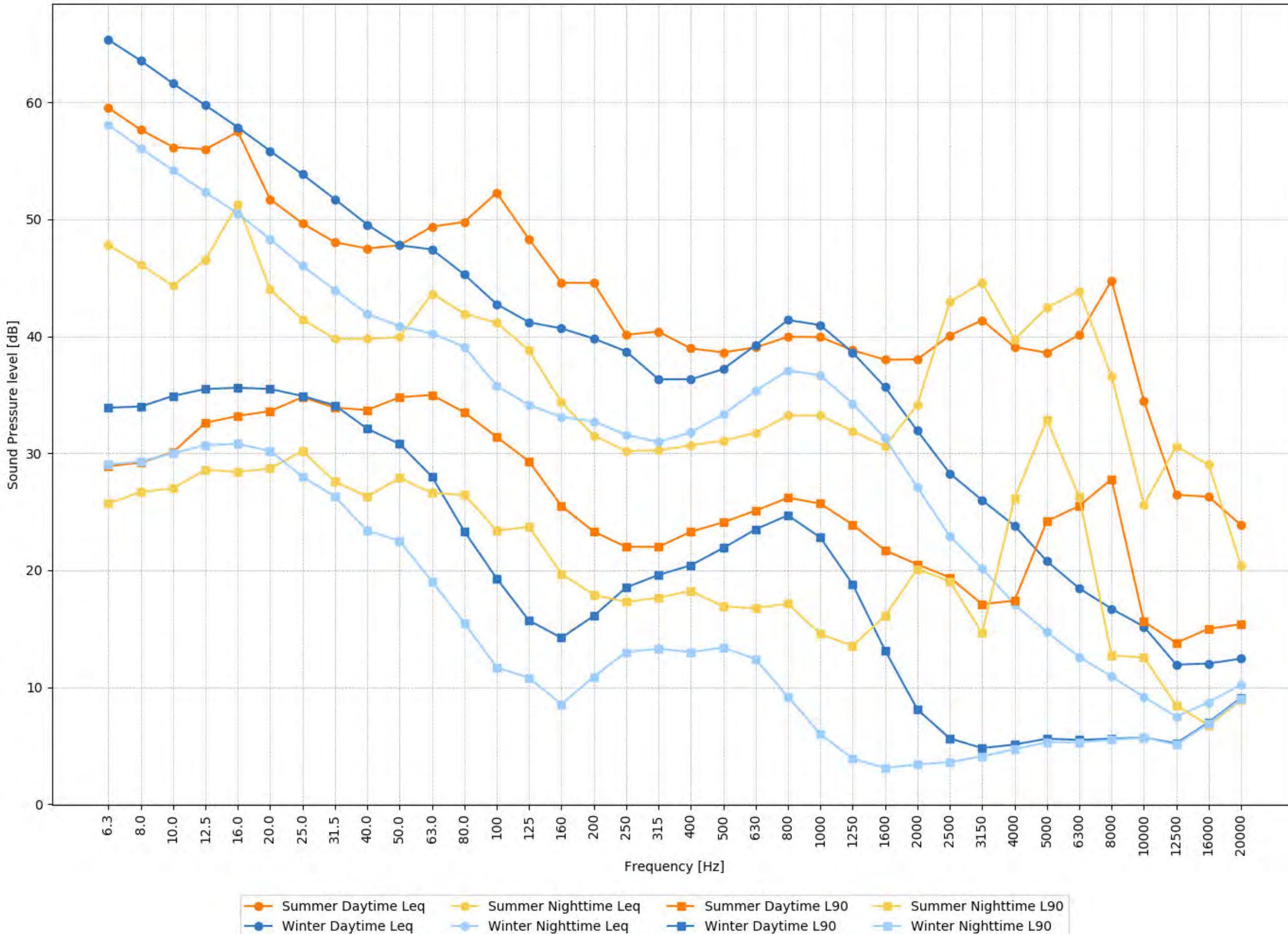


Figure 7-23: Baseline Monitoring Graphical Results - Winter Location 3 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

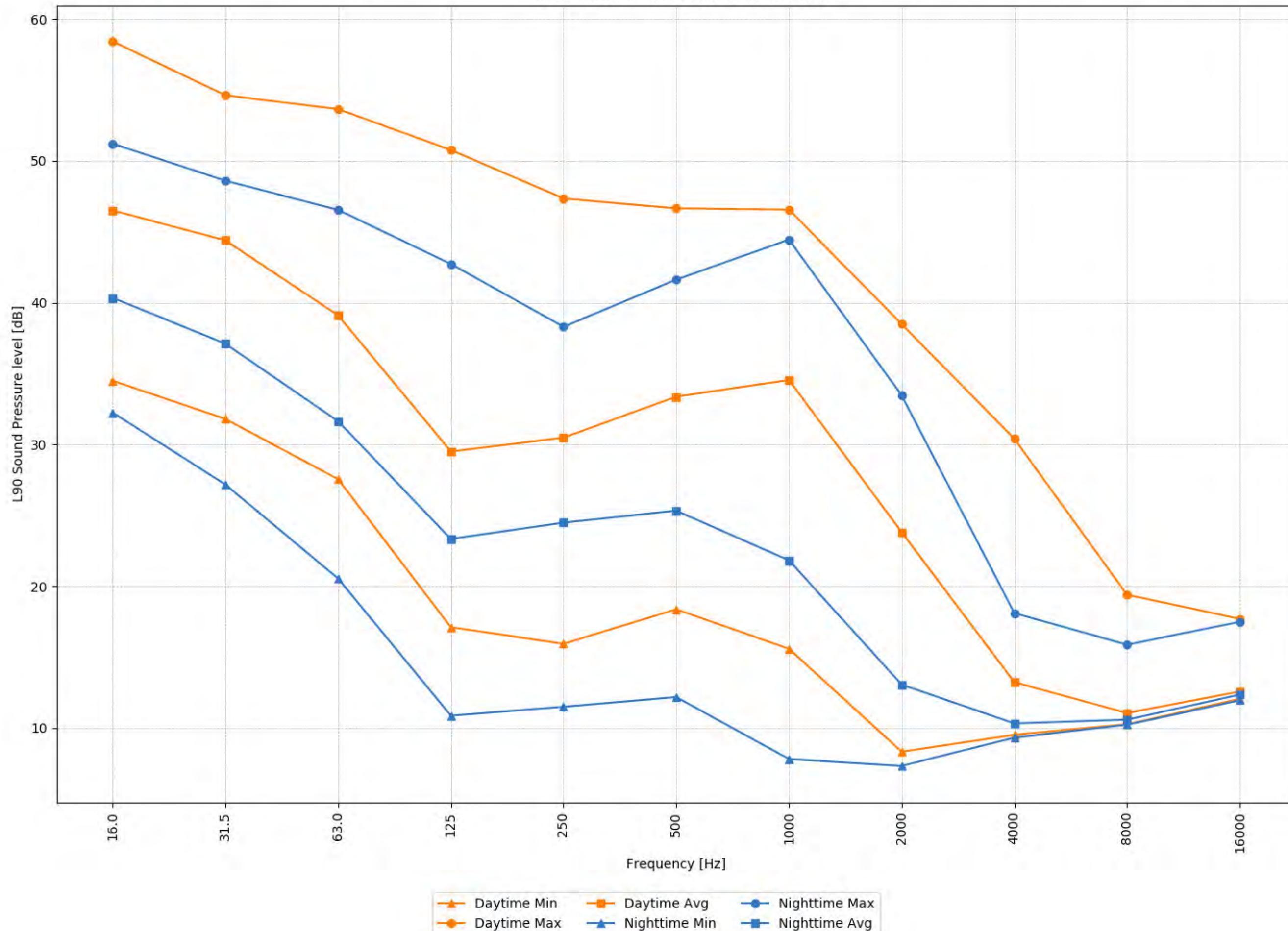


Figure 7-24: Baseline Monitoring Graphical Results – Summer Location 3 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

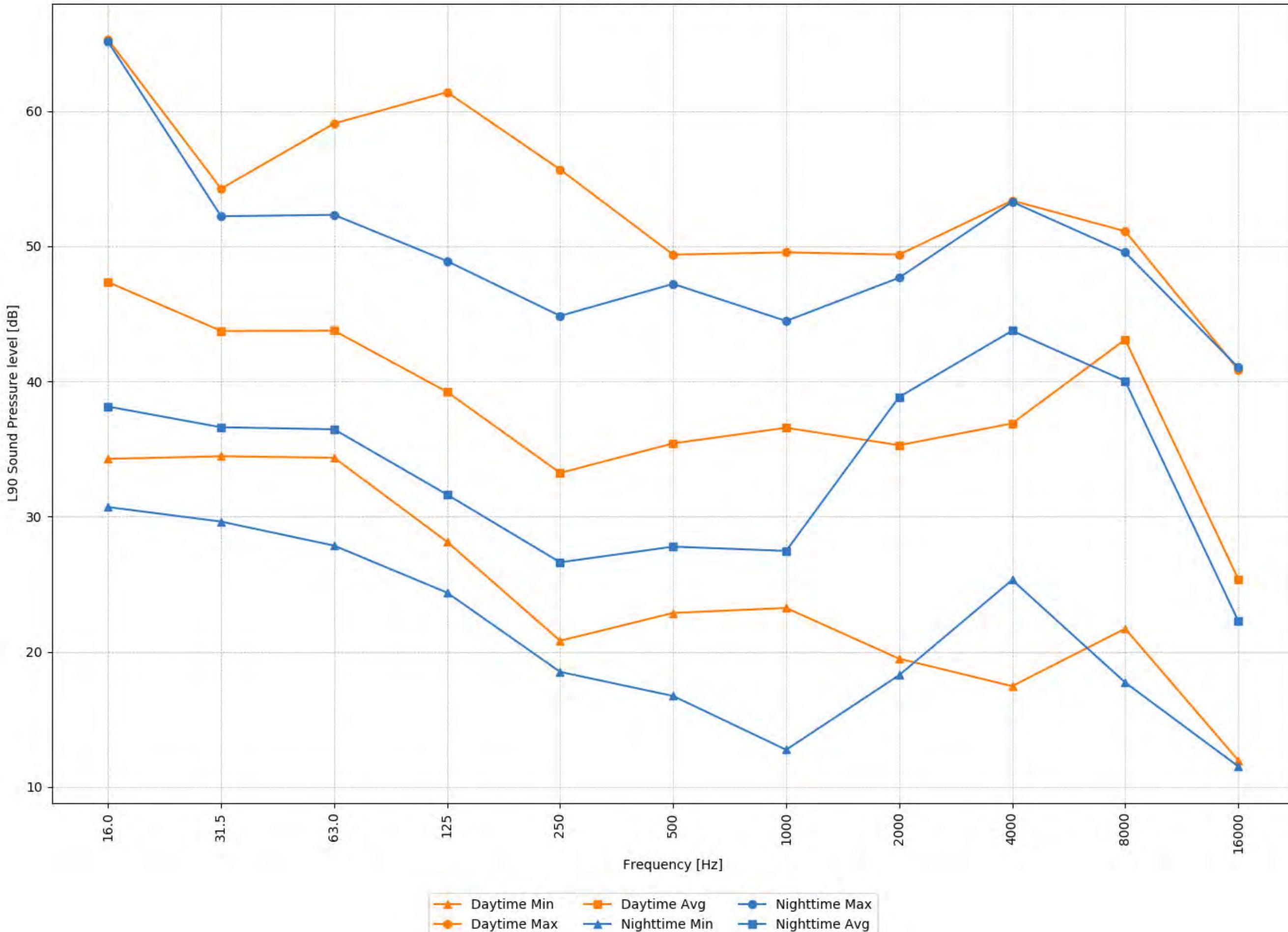


Figure 7-25: Baseline Monitoring Graphical Results – Winter Location 3 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

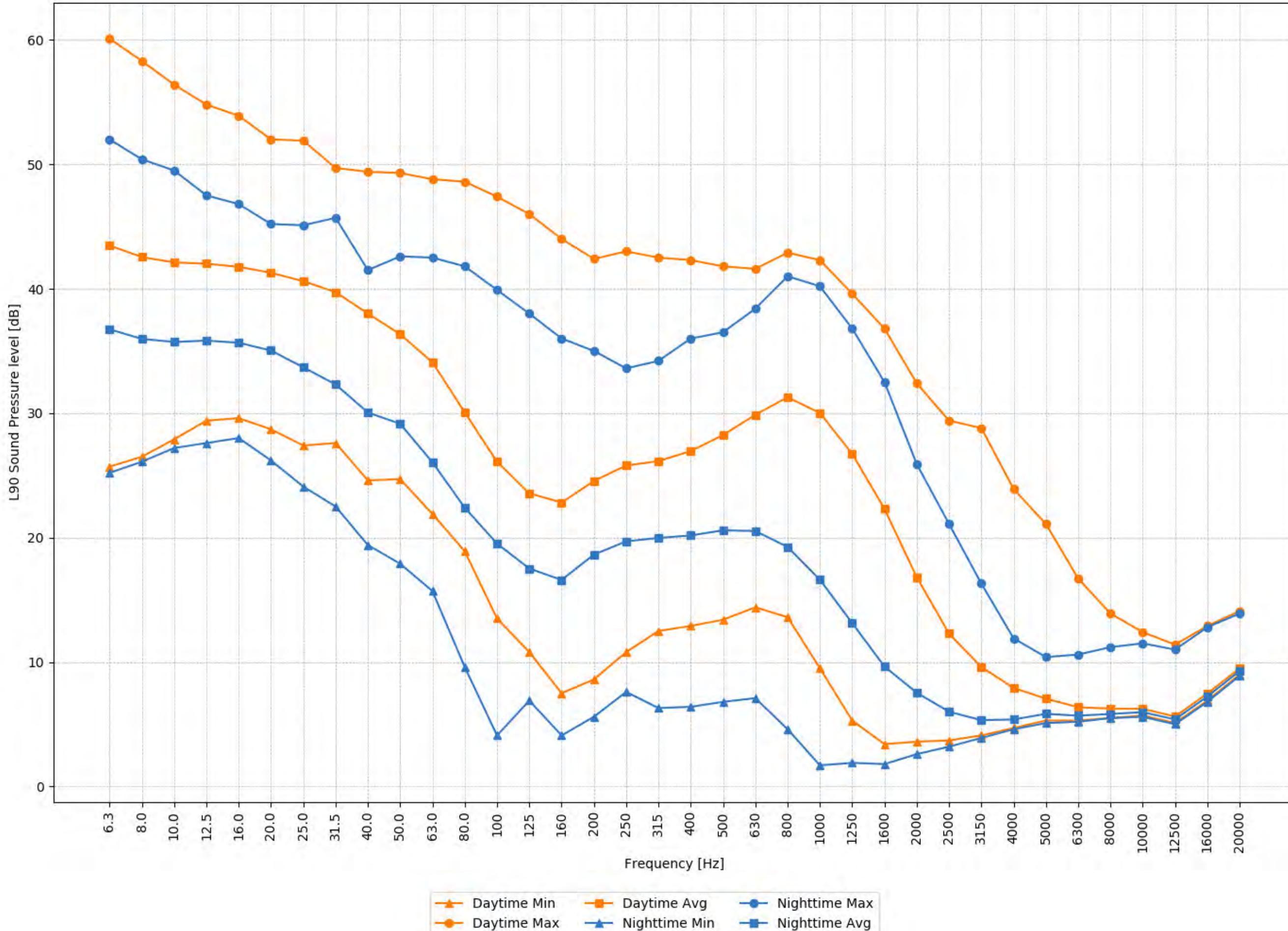


Figure 7-26: Baseline Monitoring Graphical Results – Summer Location 3 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

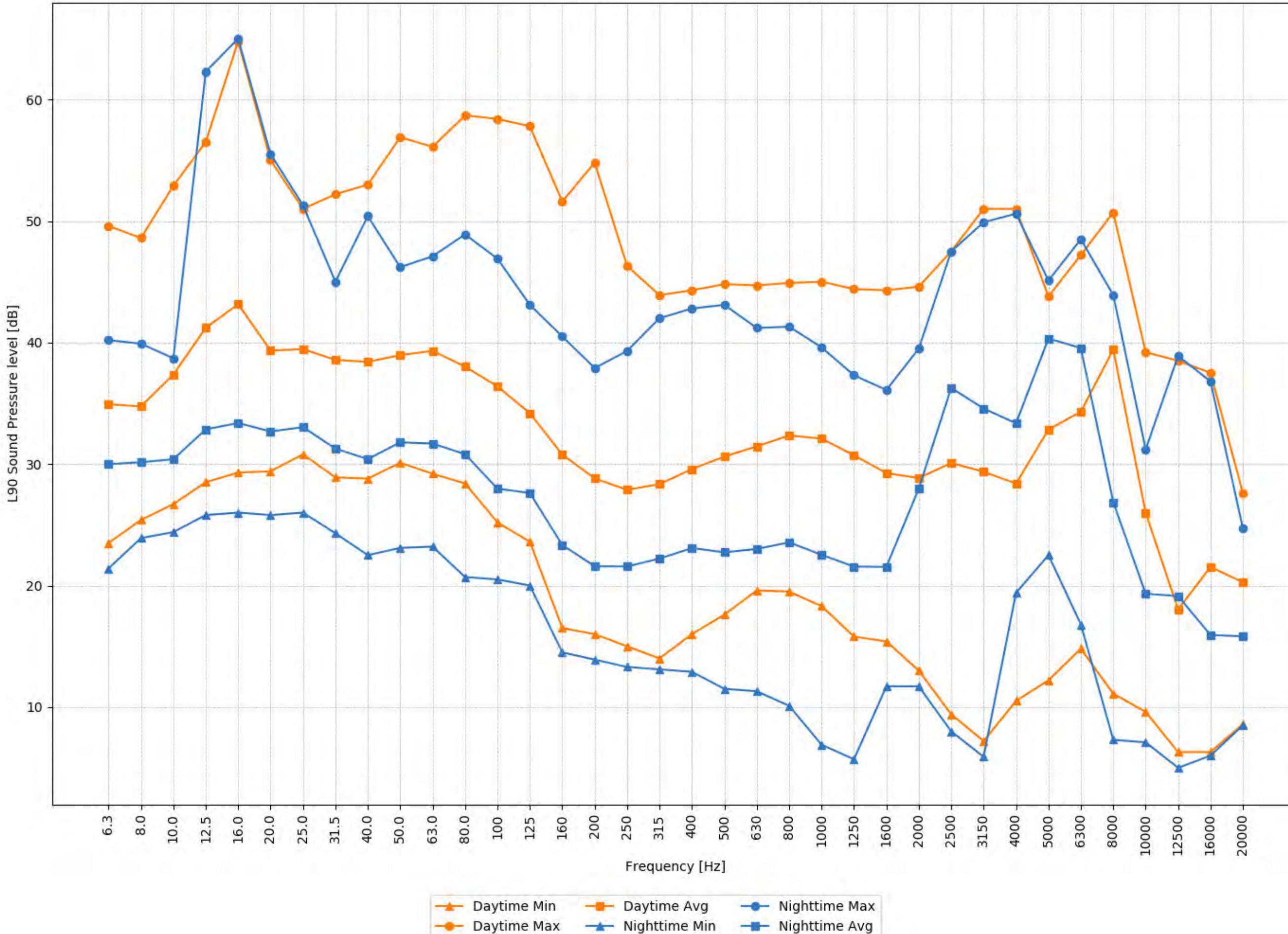


Figure 7-27: Baseline Monitoring Graphical Results - Location 4 (Winter)
10-Minute Ambient Sound Level Data

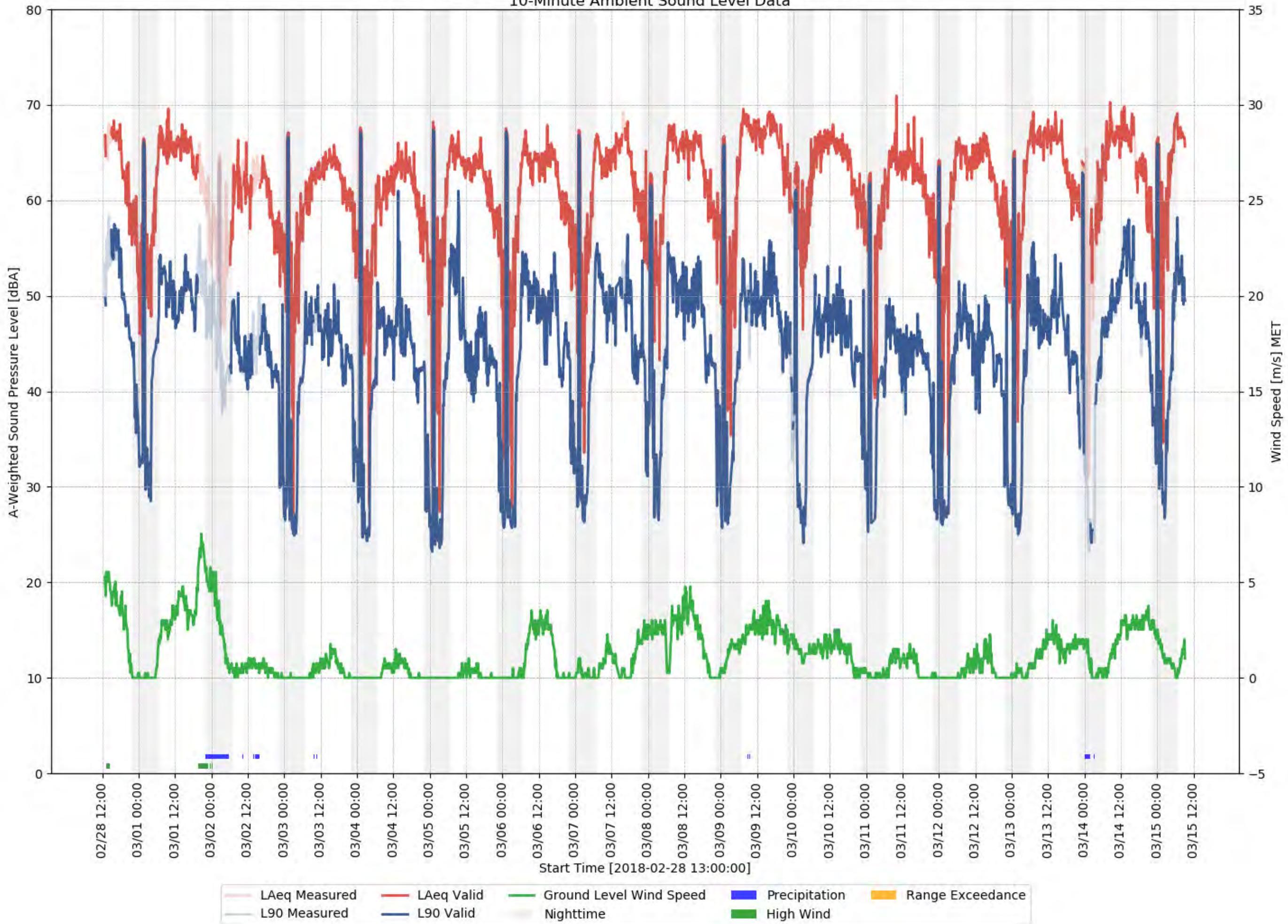


Figure 7-28: Baseline Monitoring Graphical Results - Location 4 (Summer)
10-Minute Ambient Sound Level Data

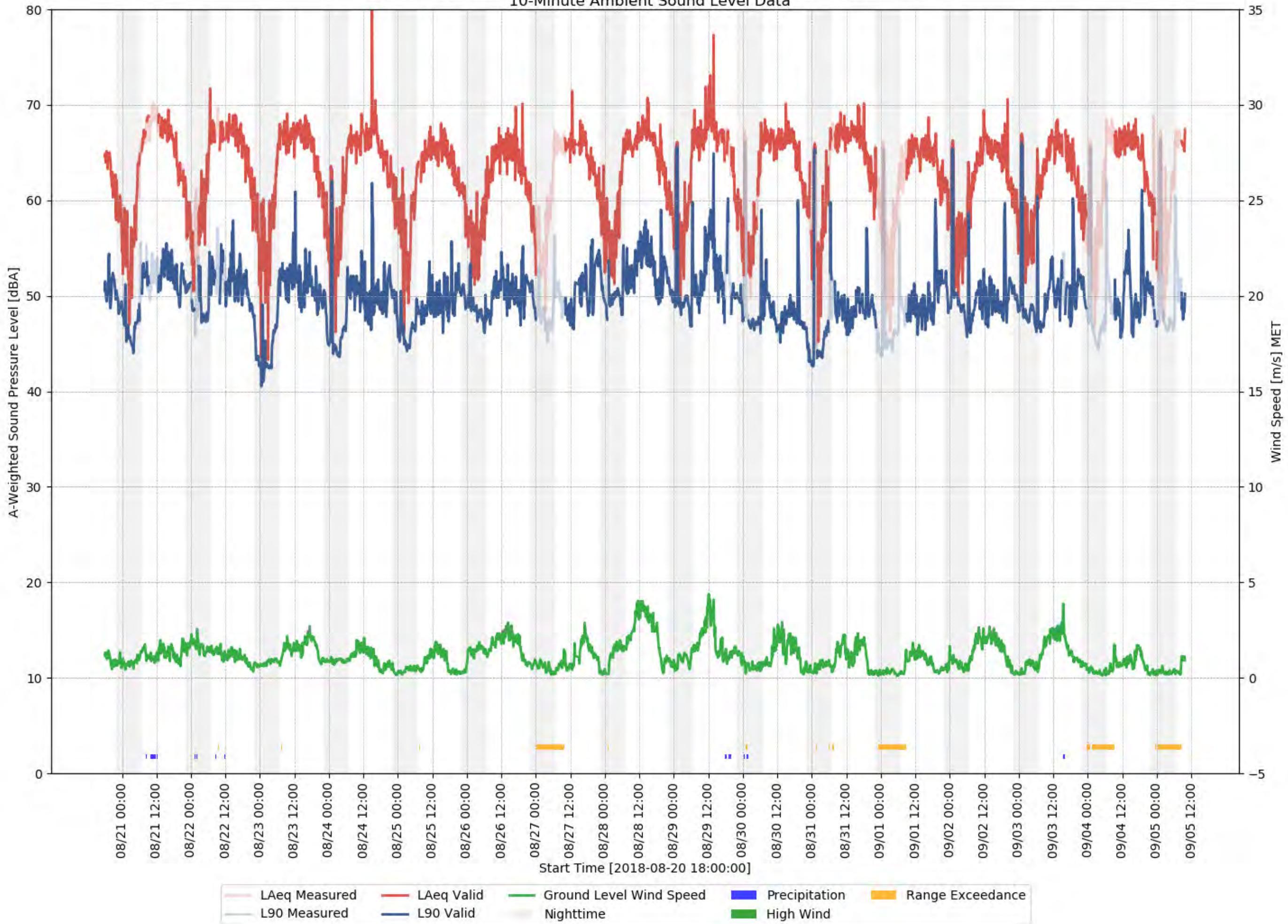


Figure 7-29: Baseline Monitoring Graphical Results - Location 4 - Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

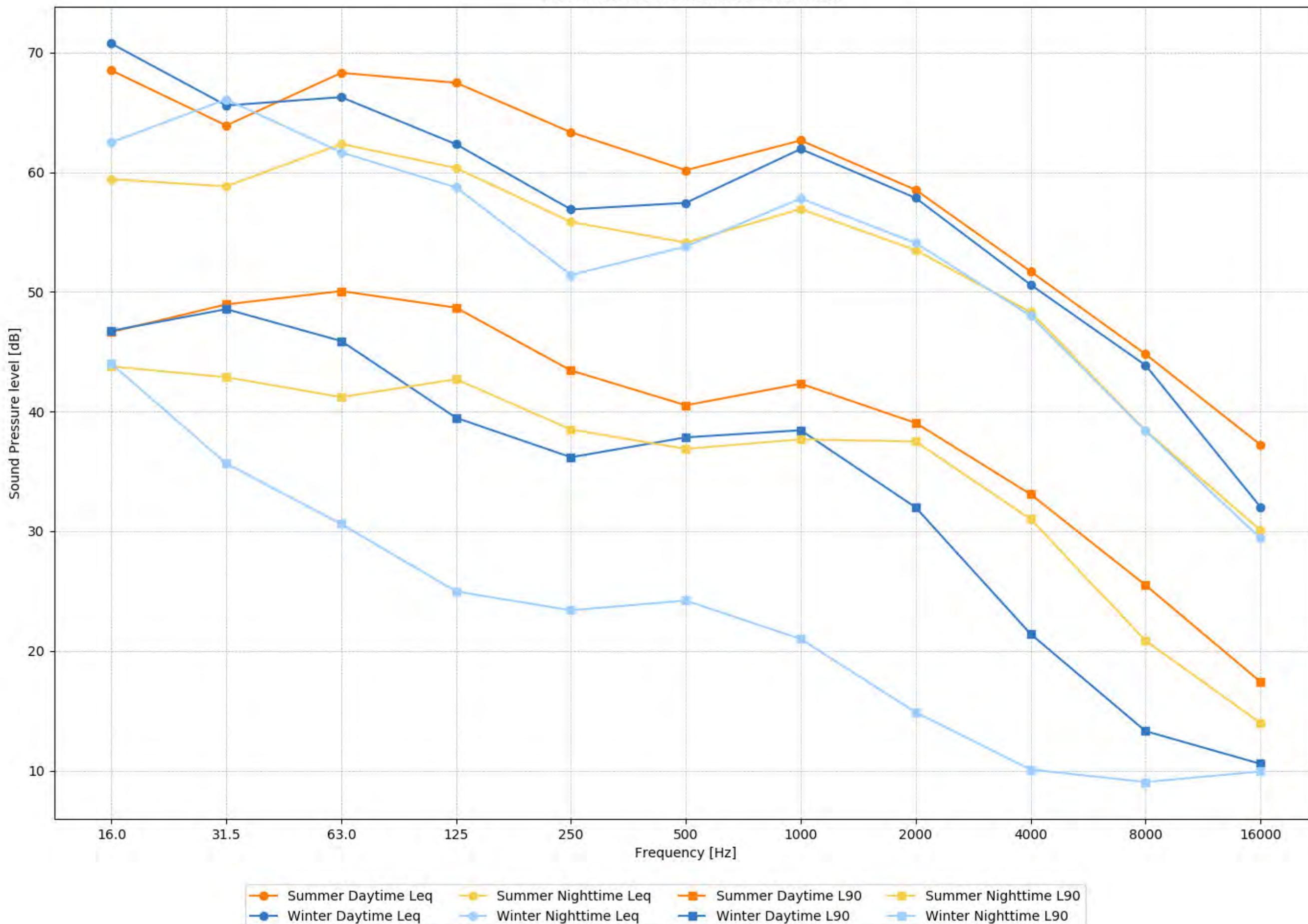


Figure 7-30: Baseline Monitoring Graphical Results - Location 4 - Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

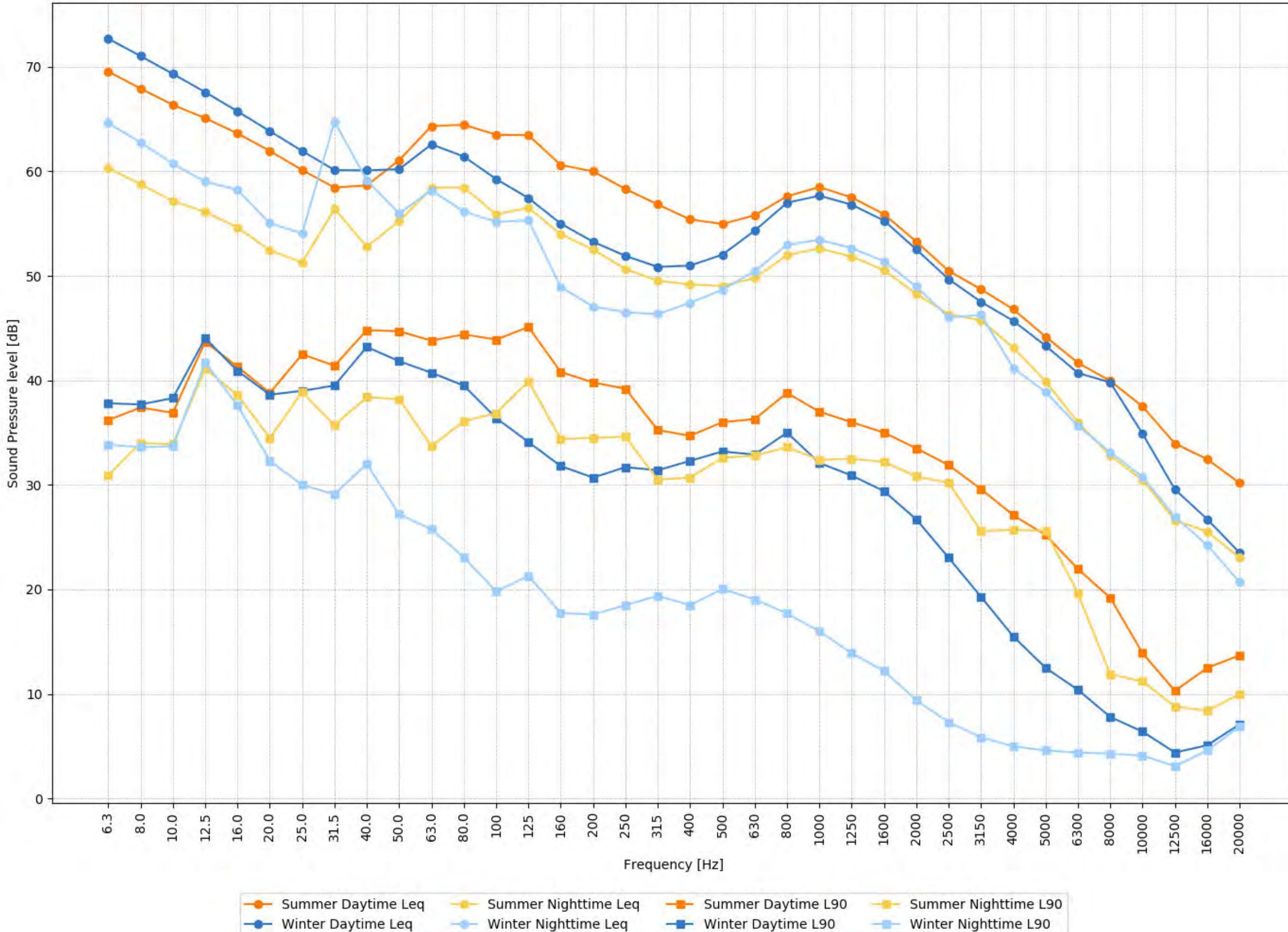


Figure 7-31: Baseline Monitoring Graphical Results – Winter Location 4 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

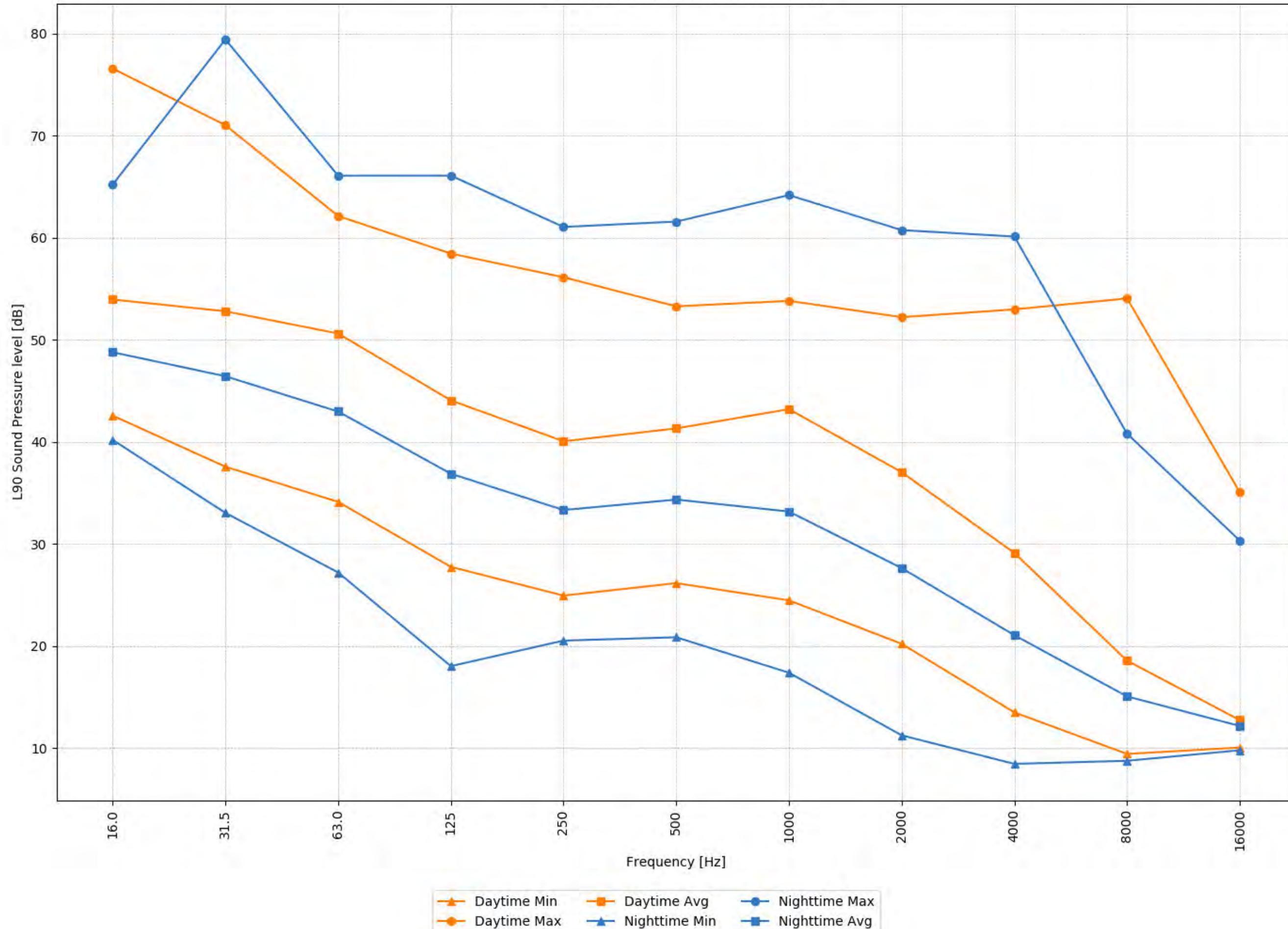


Figure 7-32: Baseline Monitoring Graphical Results – Summer Location 4 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

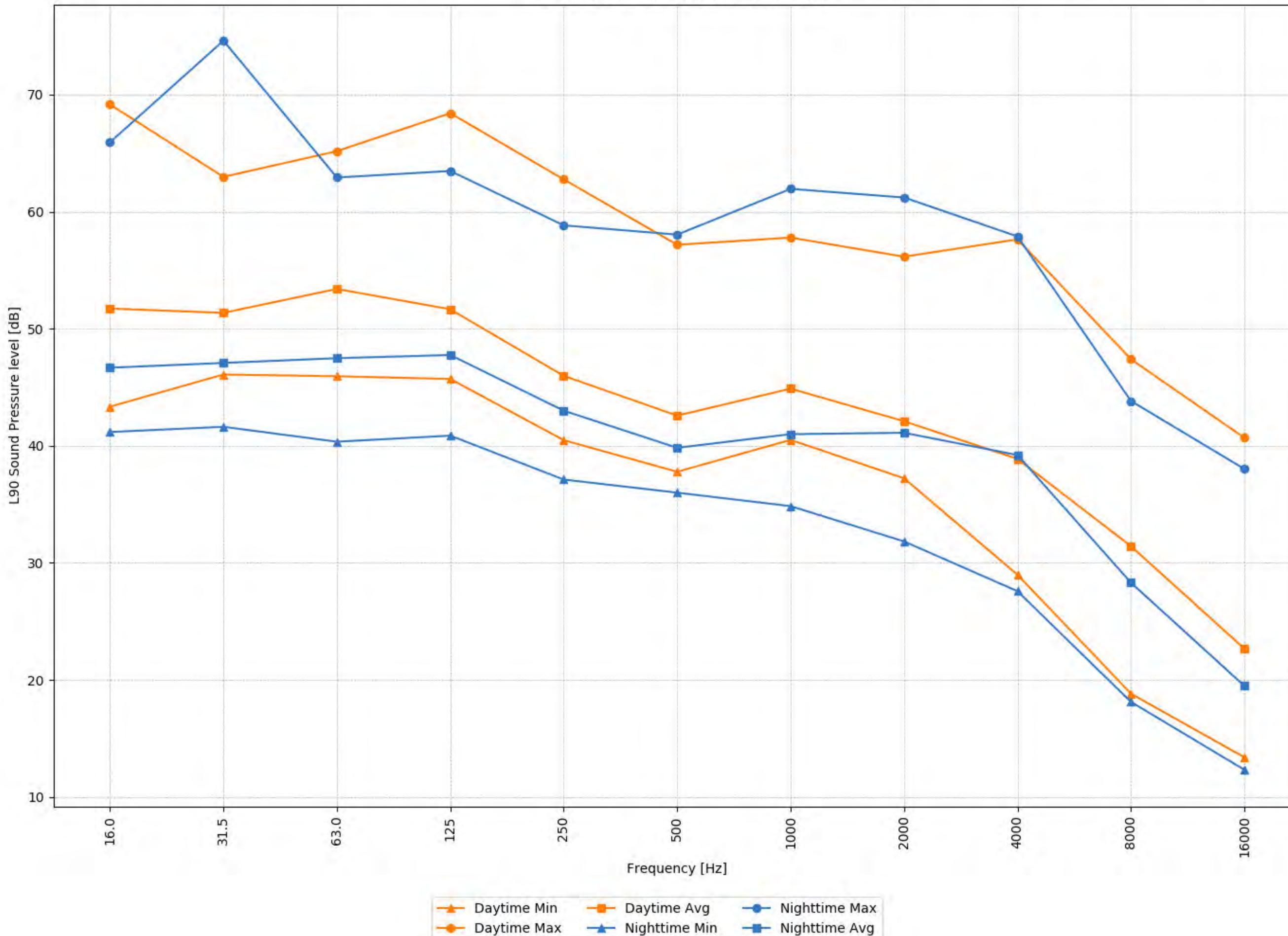


Figure 7-33: Baseline Monitoring Graphical Results – Winter Location 4 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

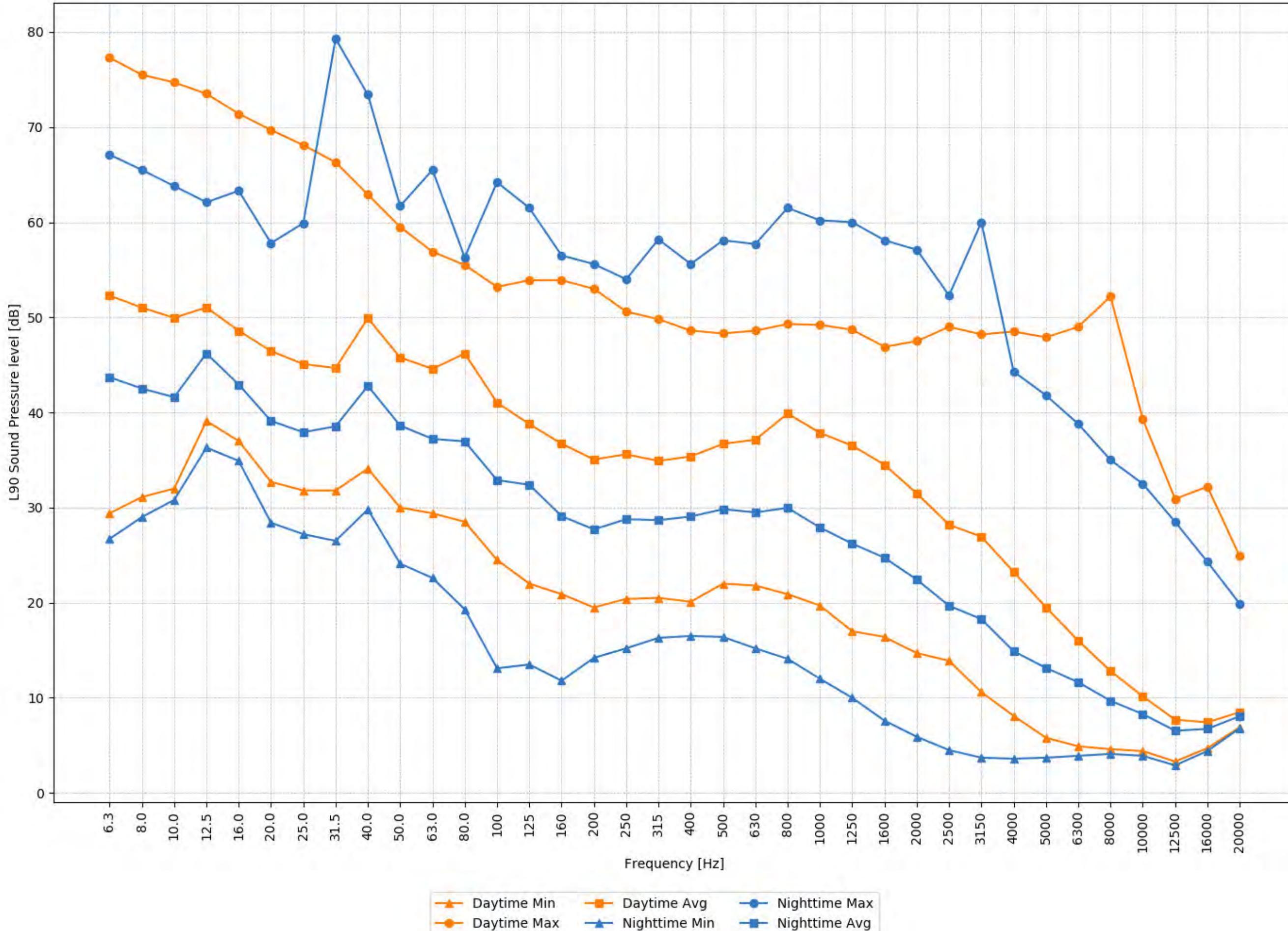


Figure 7-34: Baseline Monitoring Graphical Results – Summer Location 4 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

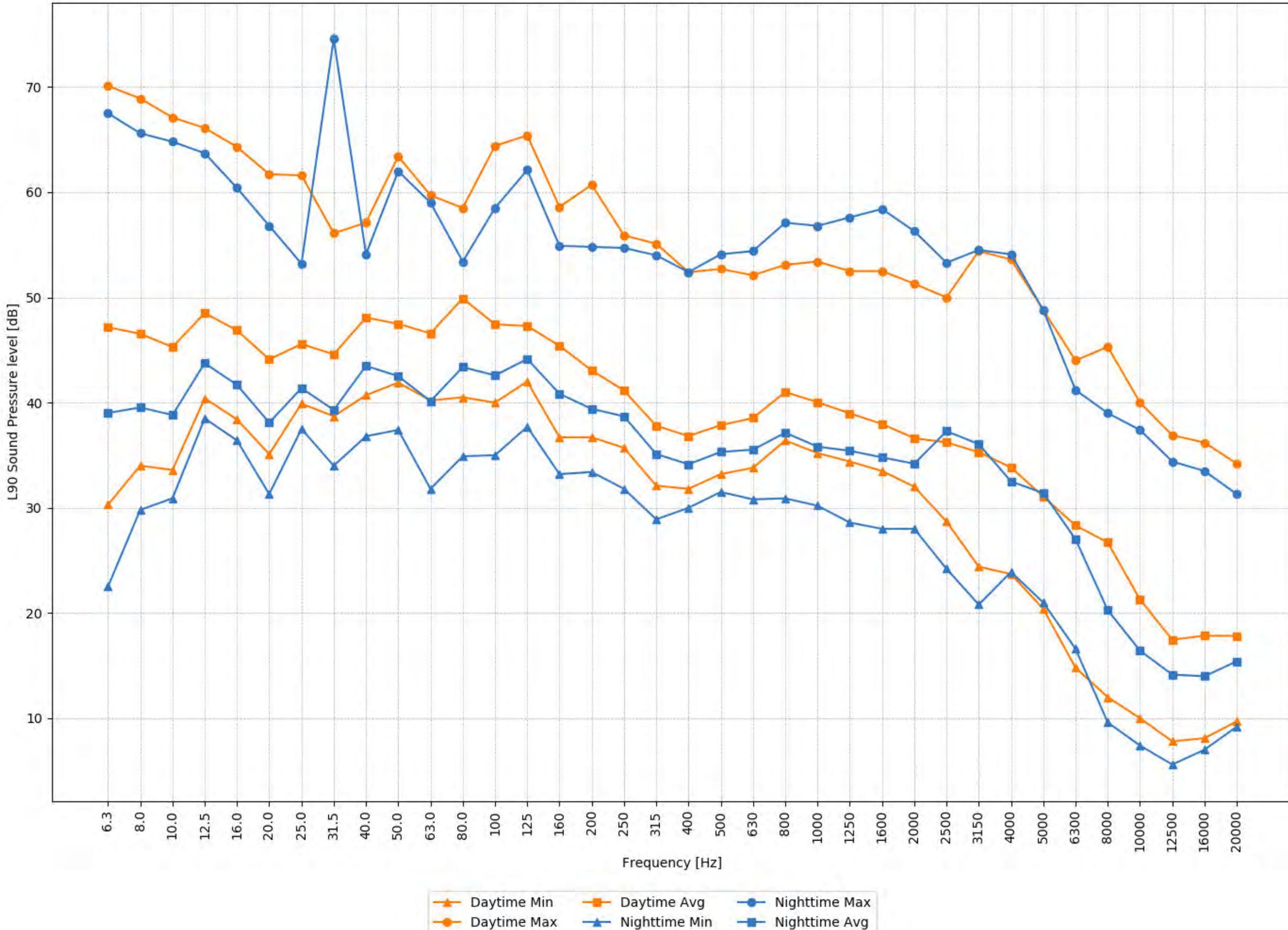


Figure 7-35: Baseline Monitoring Graphical Results - Location 5 (Winter)
10-Minute Ambient Sound Level Data

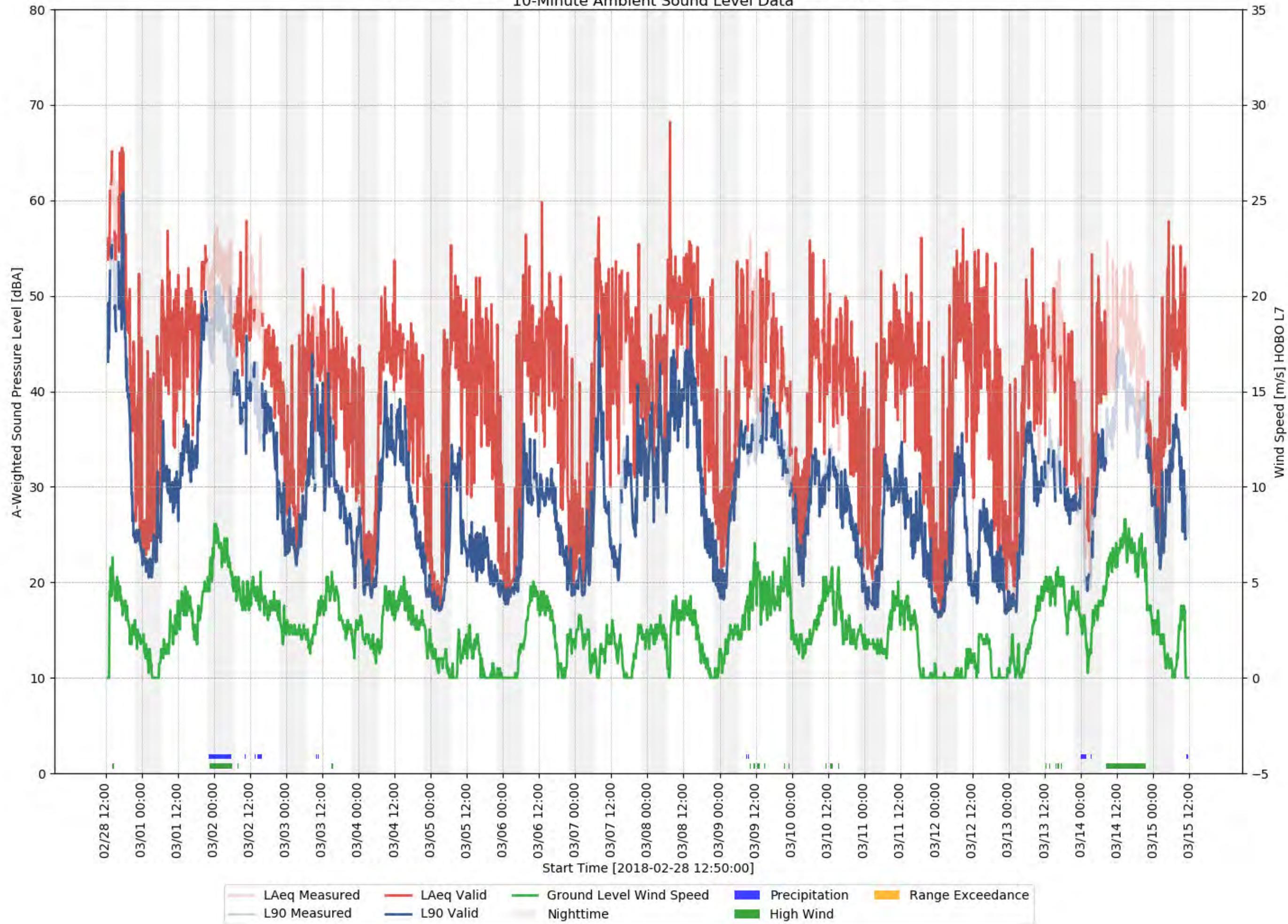


Figure 7-36: Baseline Monitoring Graphical Results - Location 5 (Summer)
10-Minute Ambient Sound Level Data

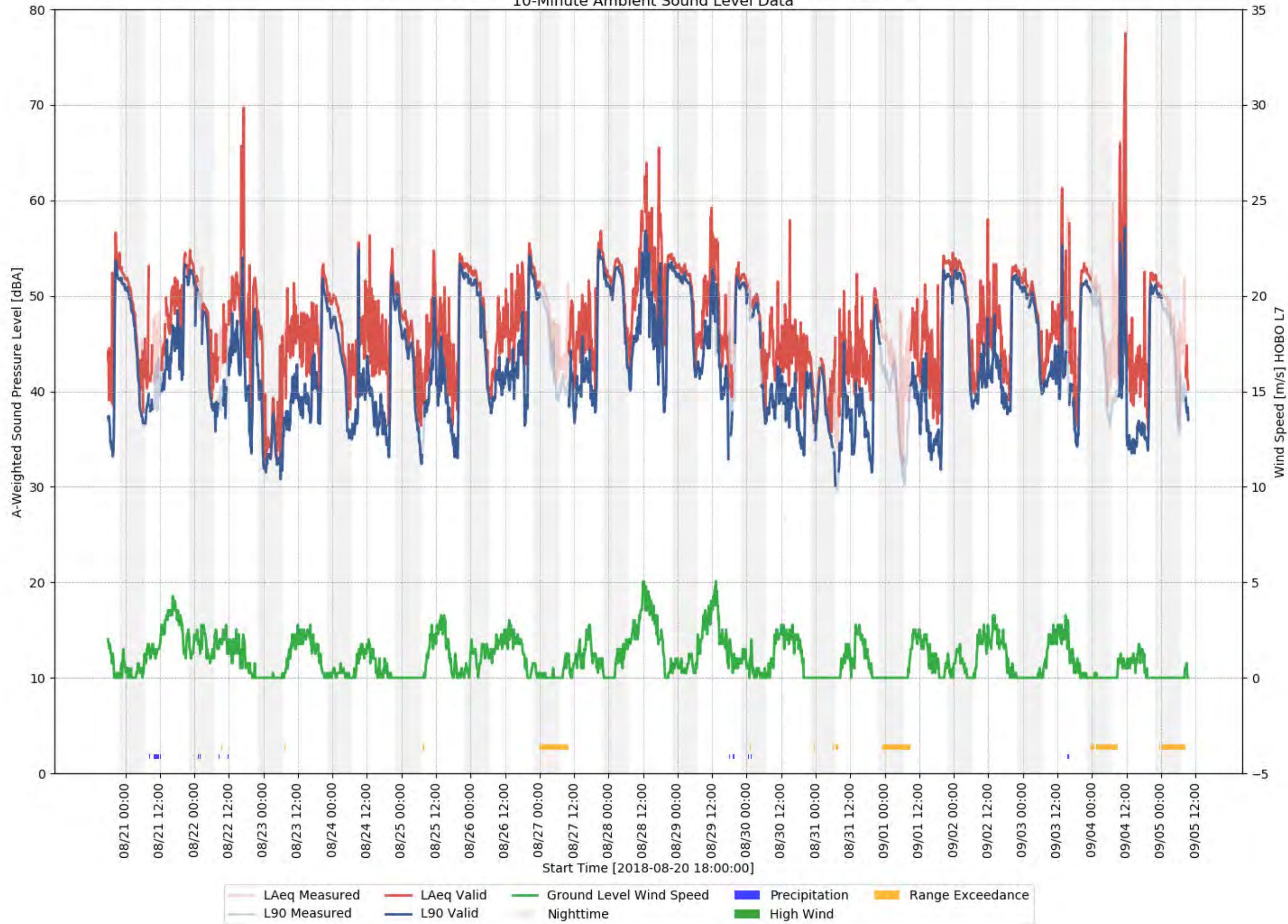


Figure 7-37: Baseline Monitoring Graphical Results - Location 5 - Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

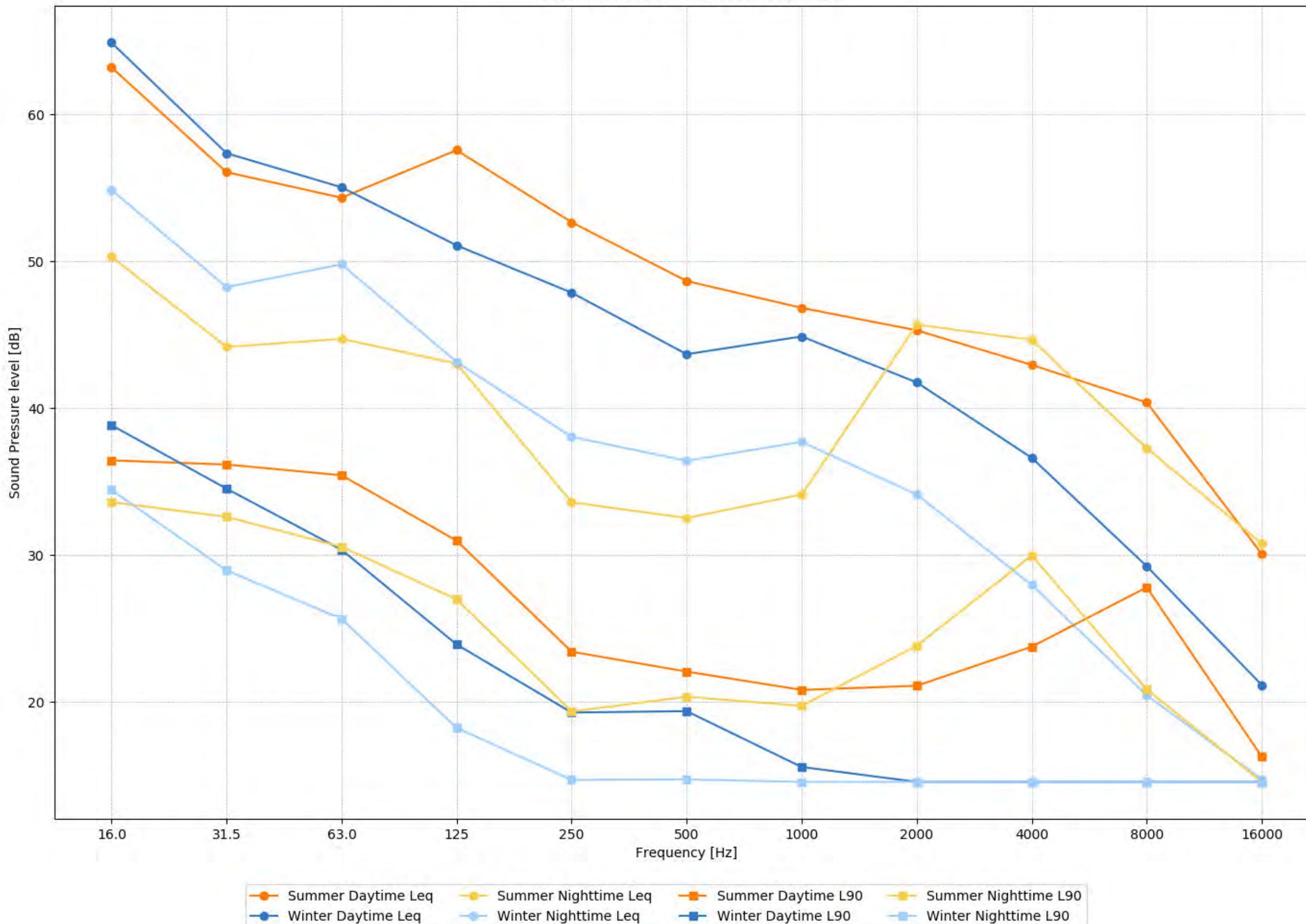


Figure 7-38: Baseline Monitoring Graphical Results - Location 5 - Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

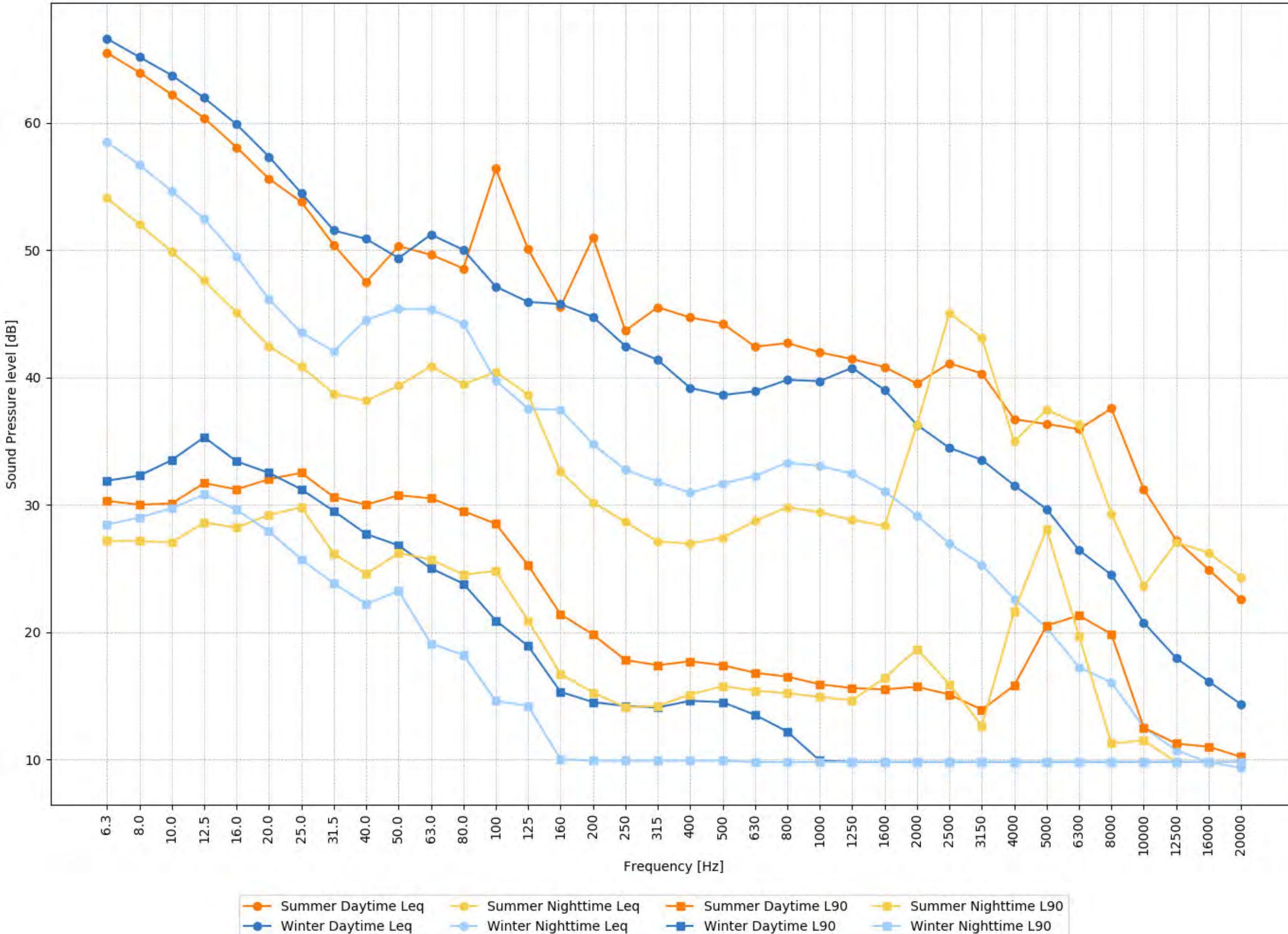


Figure 7-39: Baseline Monitoring Graphical Results – Winter Location 5 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

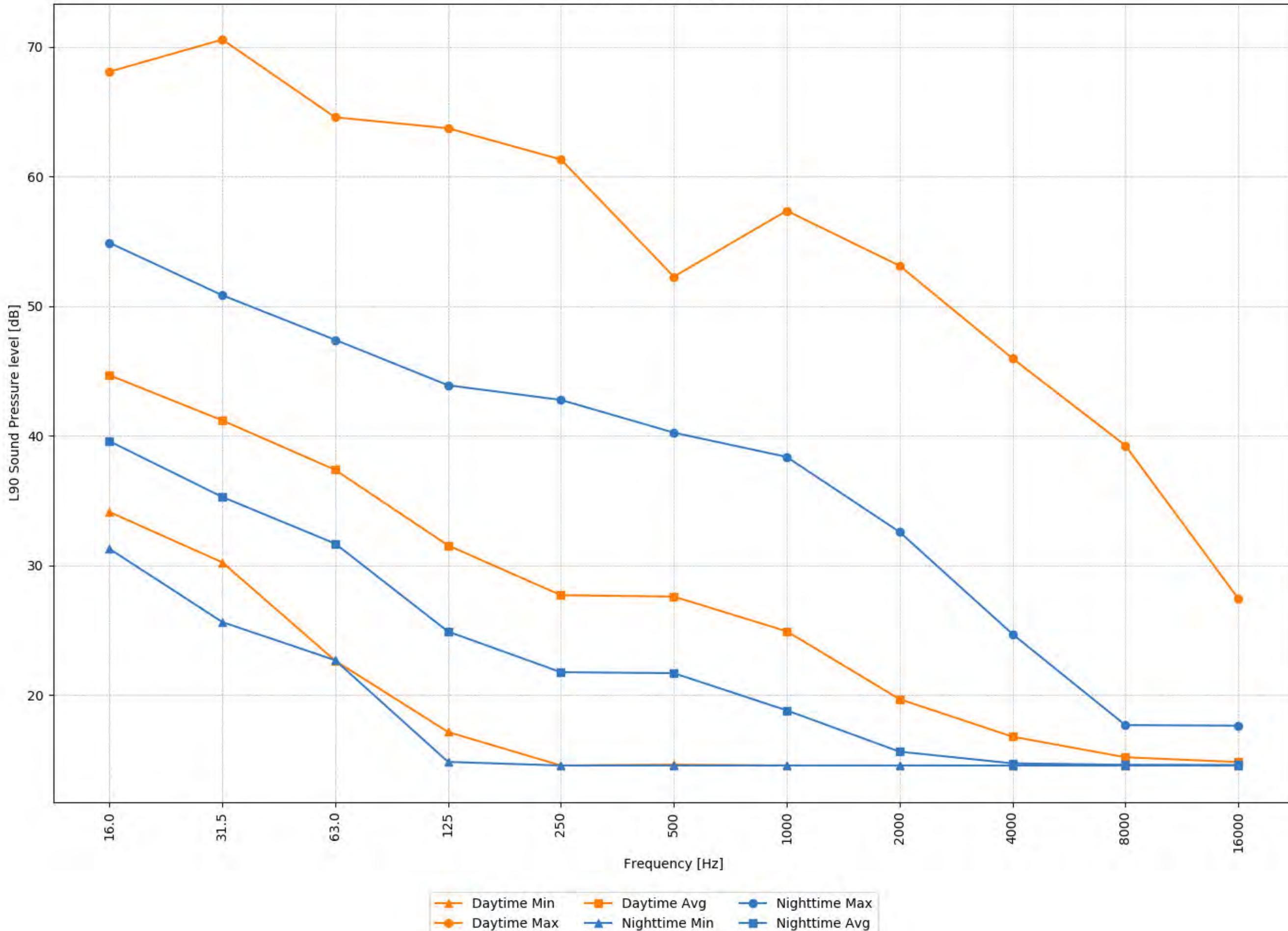


Figure 7-40: Baseline Monitoring Graphical Results – Summer Location 5 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

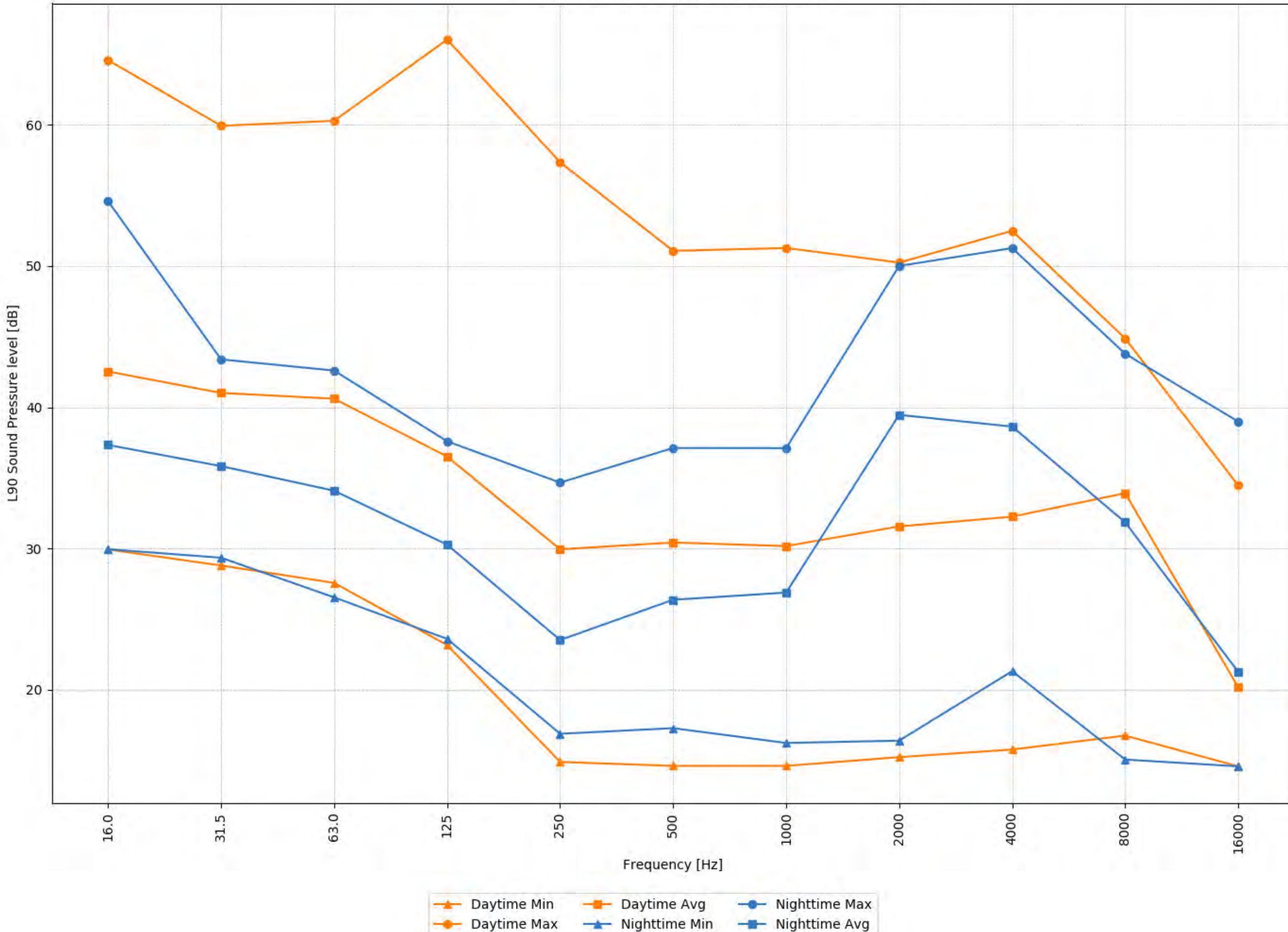


Figure 7-41: Baseline Monitoring Graphical Results – Winter Location 5 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

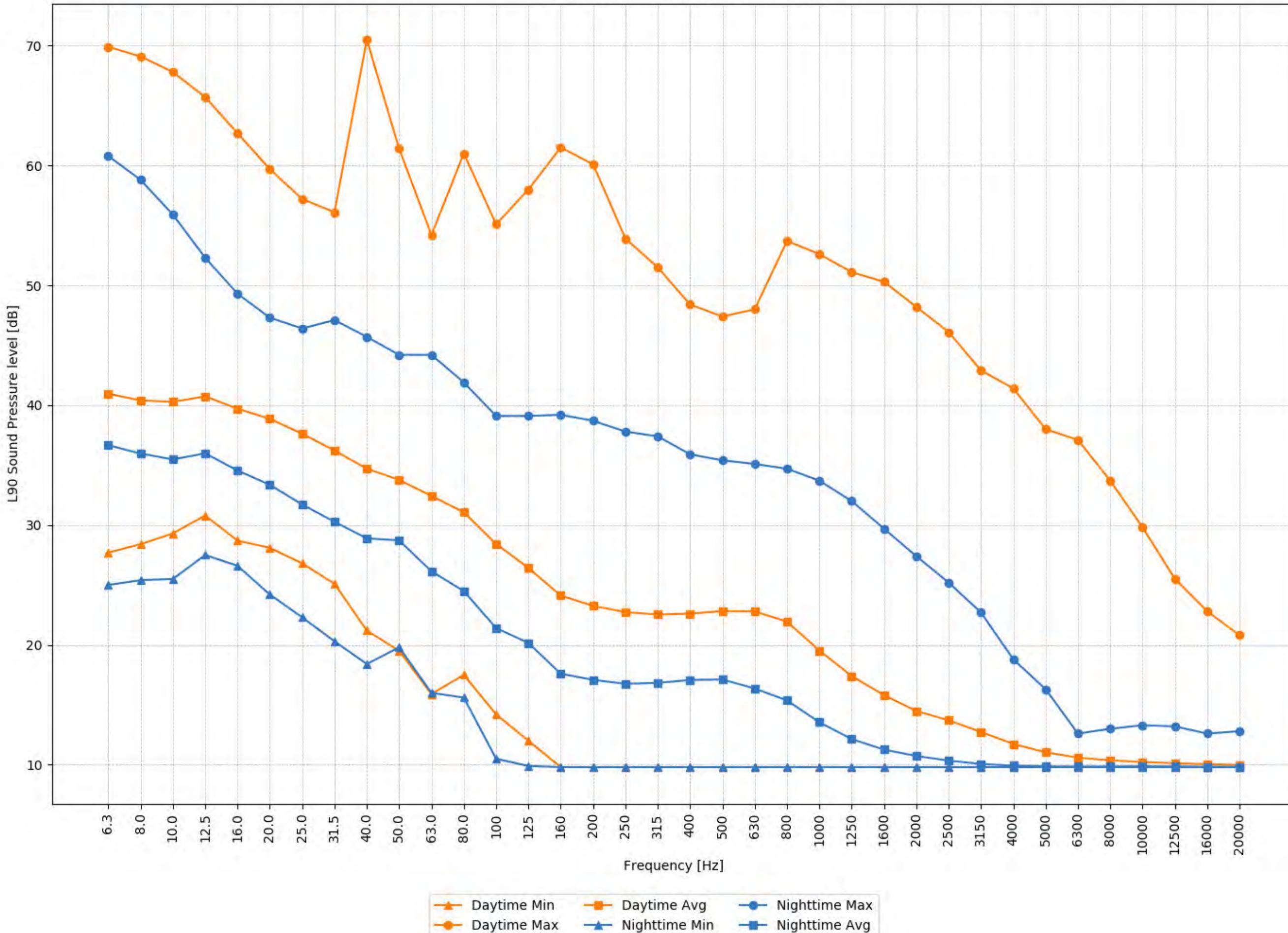


Figure 7-42: Baseline Monitoring Graphical Results – Summer Location 5 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

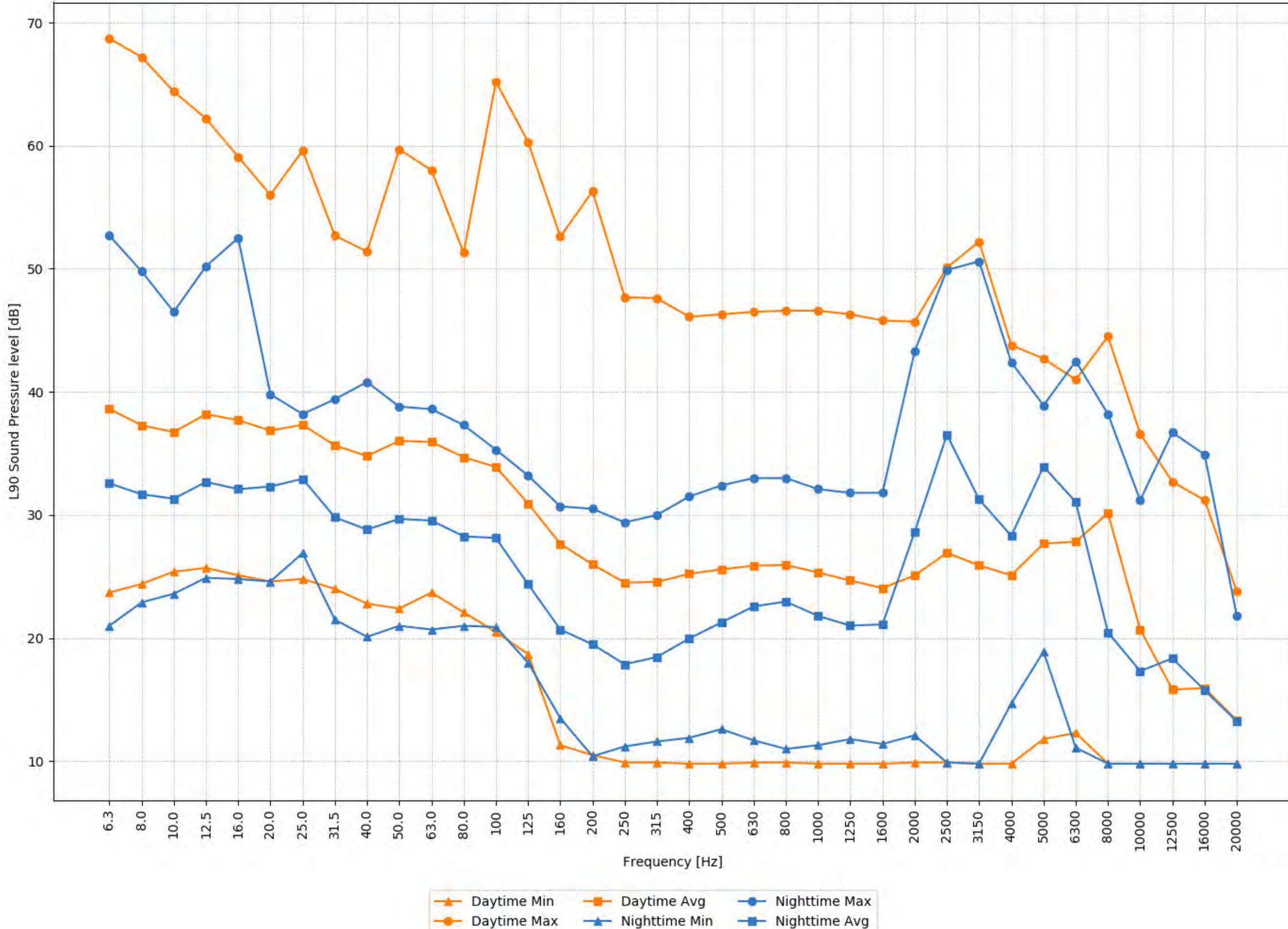


Figure 7-43: Baseline Monitoring Graphical Results - Location 6 (Winter)
10-Minute Ambient Sound Level Data

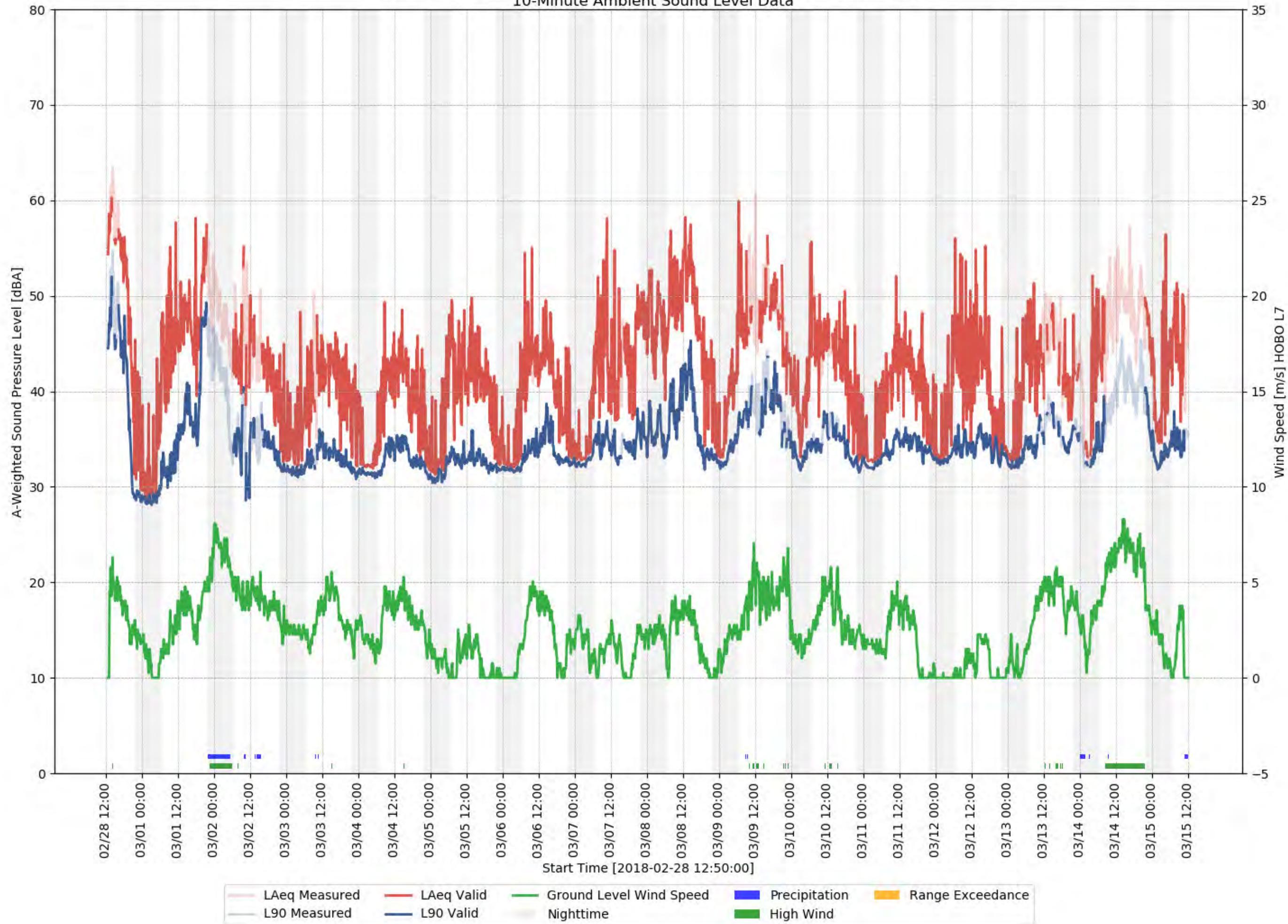


Figure 7-44: Baseline Monitoring Graphical Results - Location 6 (Summer)
10-Minute Ambient Sound Level Data

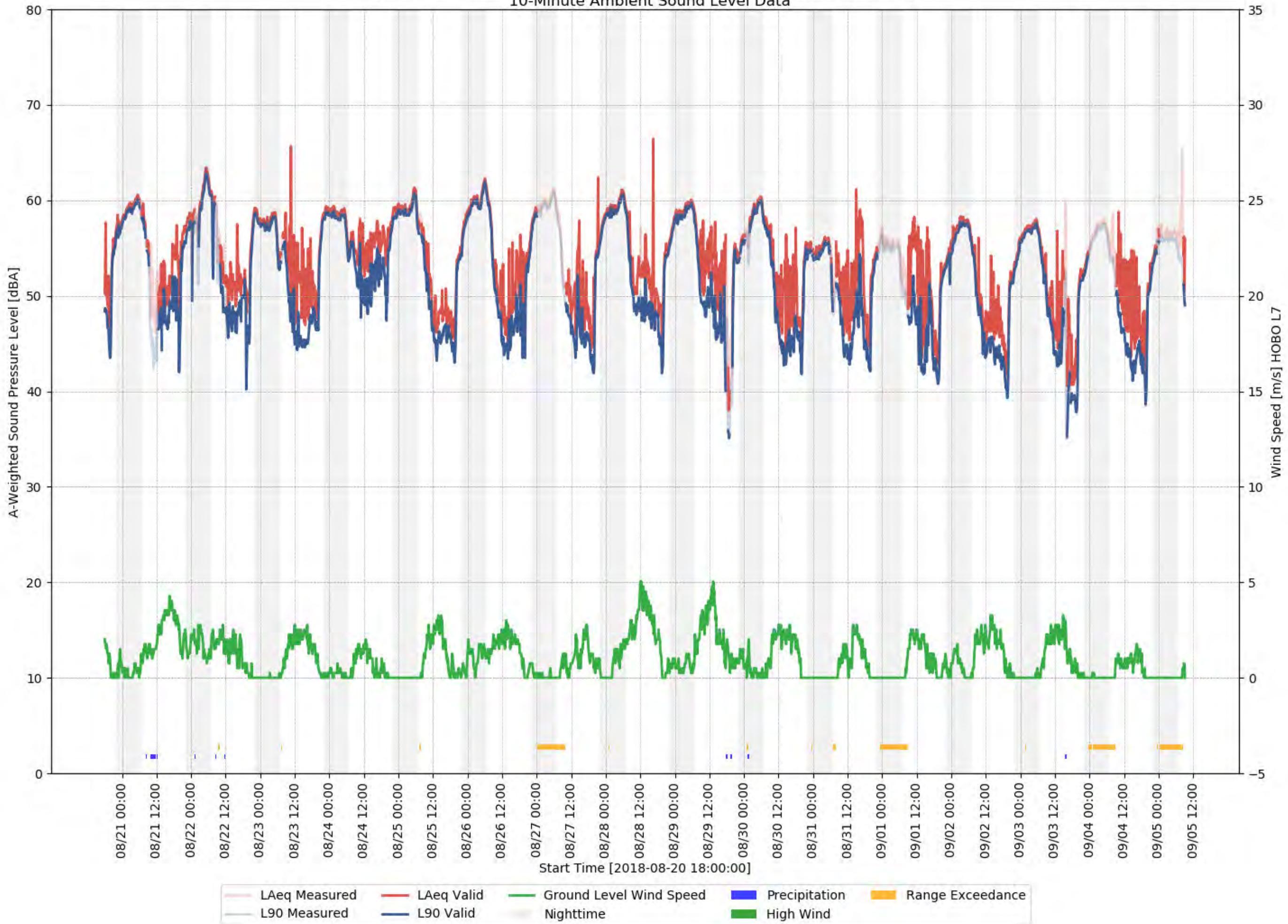


Figure 7-45: Baseline Monitoring Graphical Results - Location 6 - Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

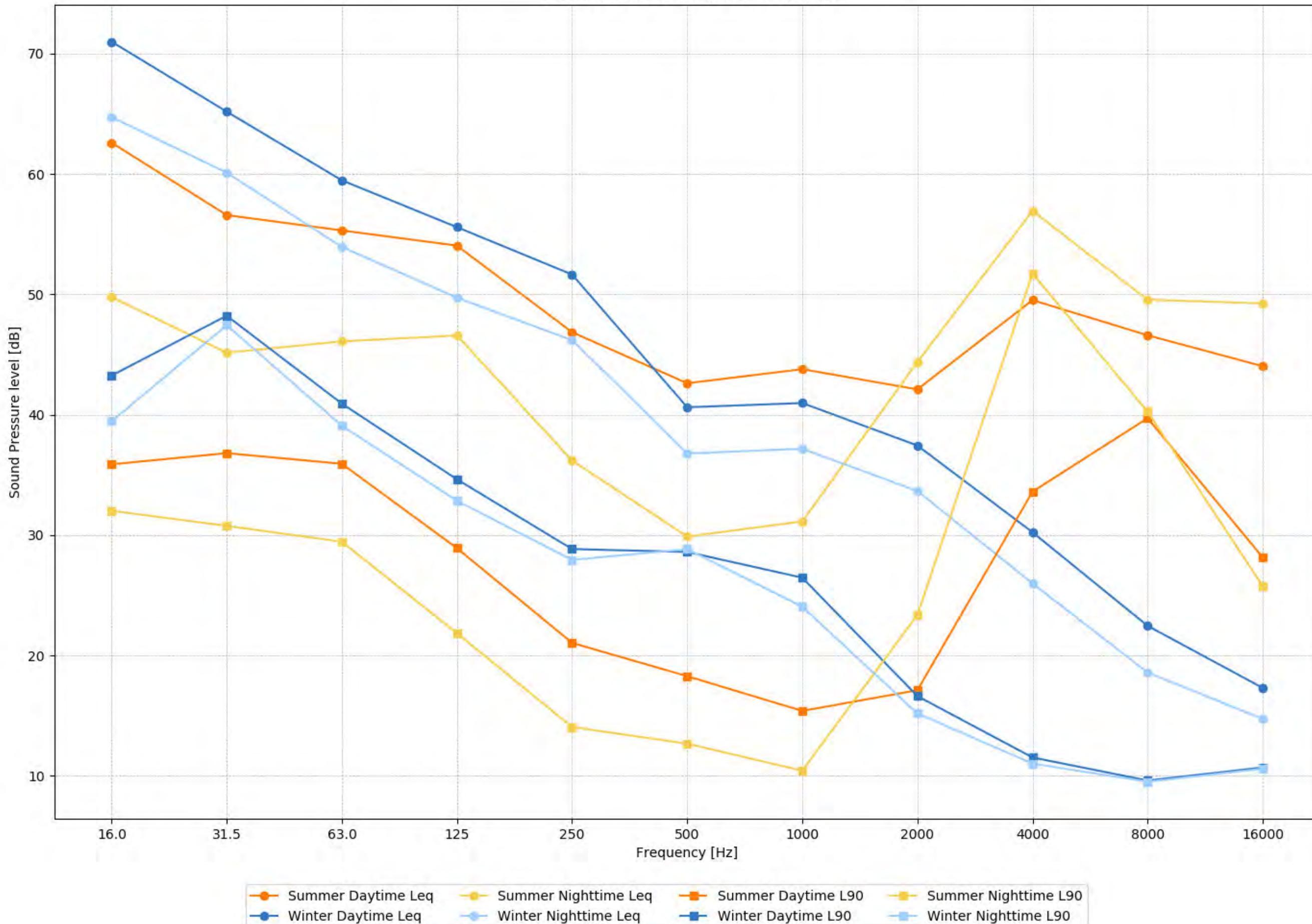


Figure 7-46: Baseline Monitoring Graphical Results - Location 6 - Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

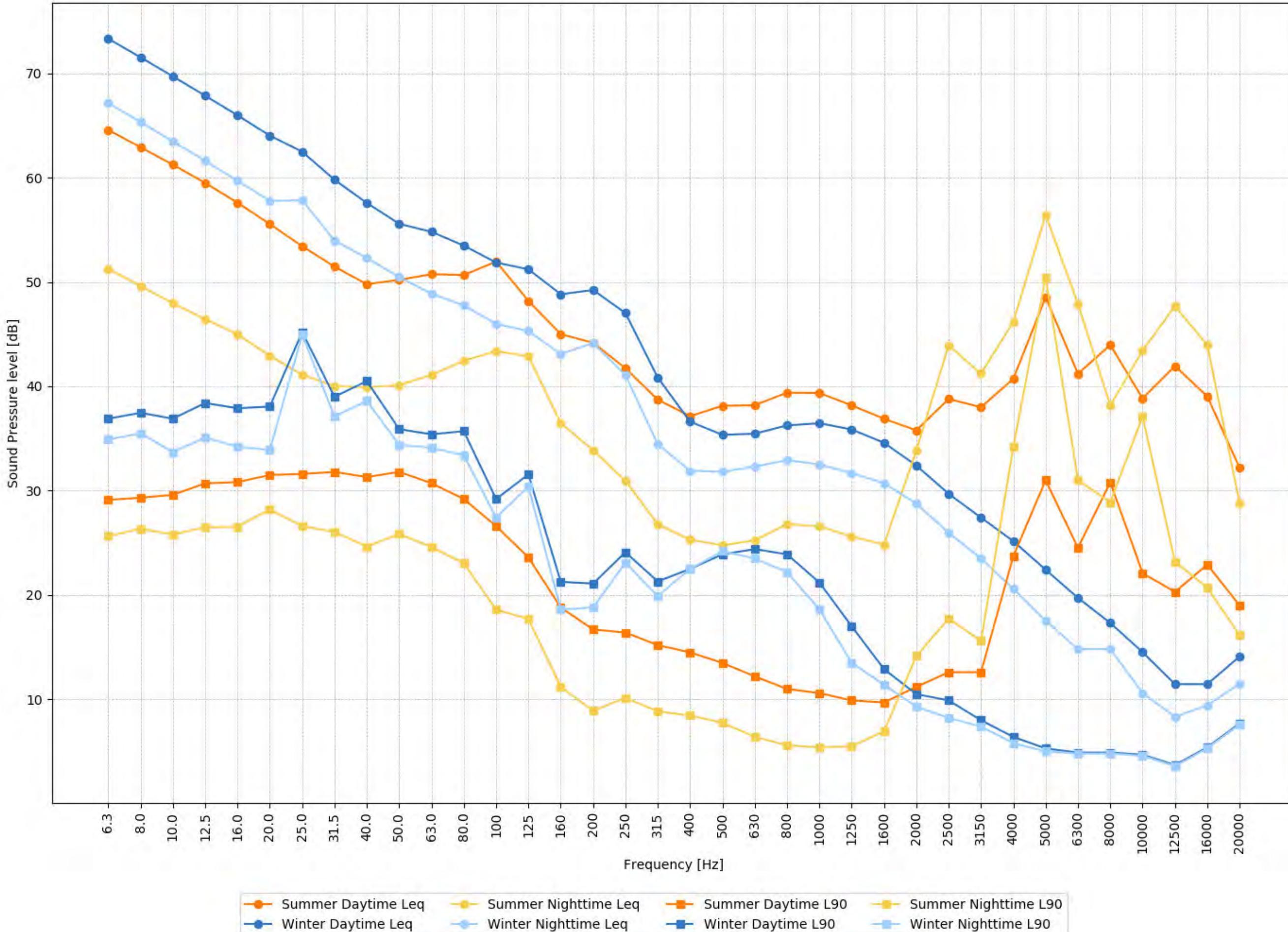


Figure 7-47: Baseline Monitoring Graphical Results - Winter Location 6 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

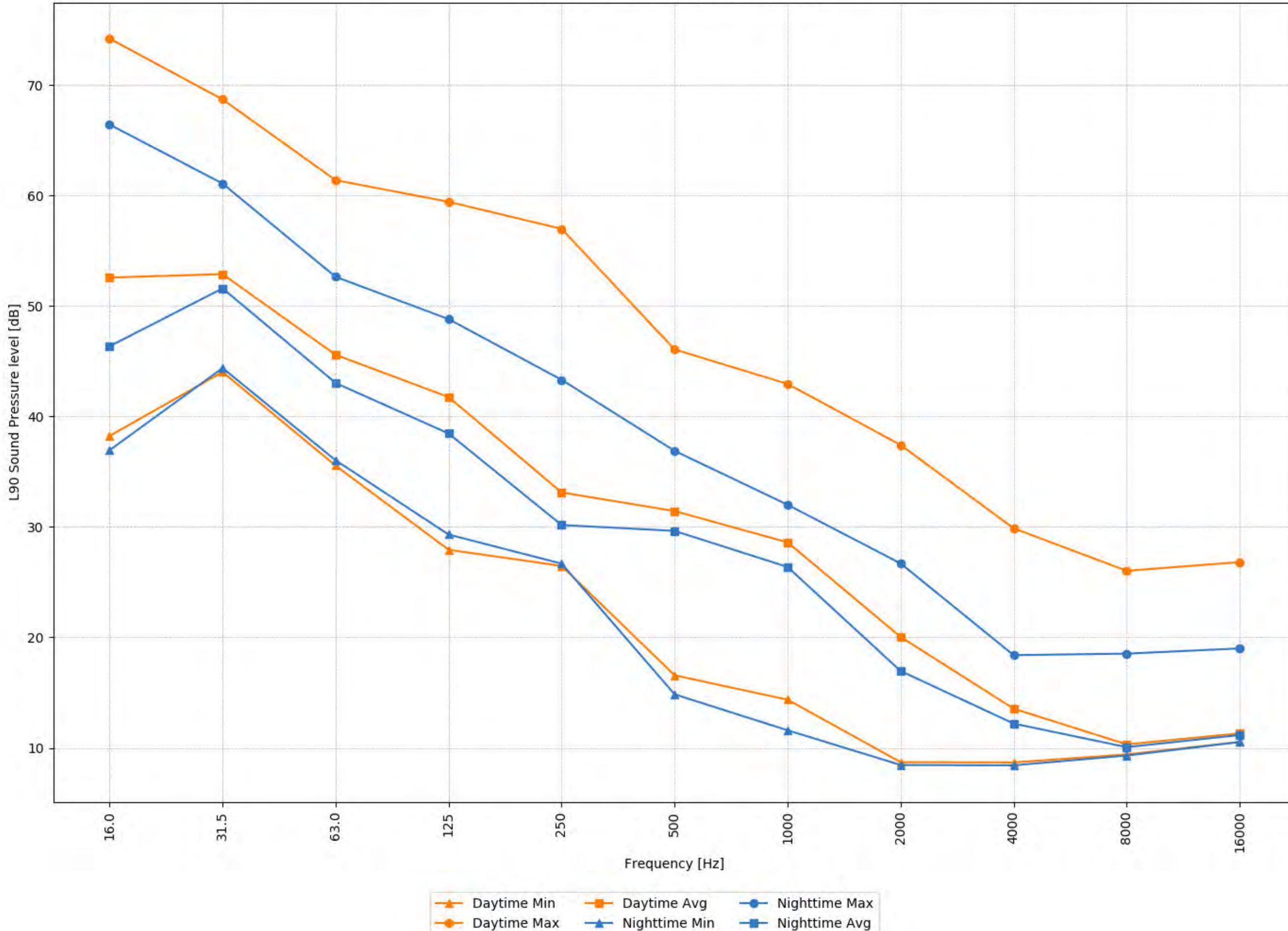


Figure 7-48: Baseline Monitoring Graphical Results – Summer Location 6 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

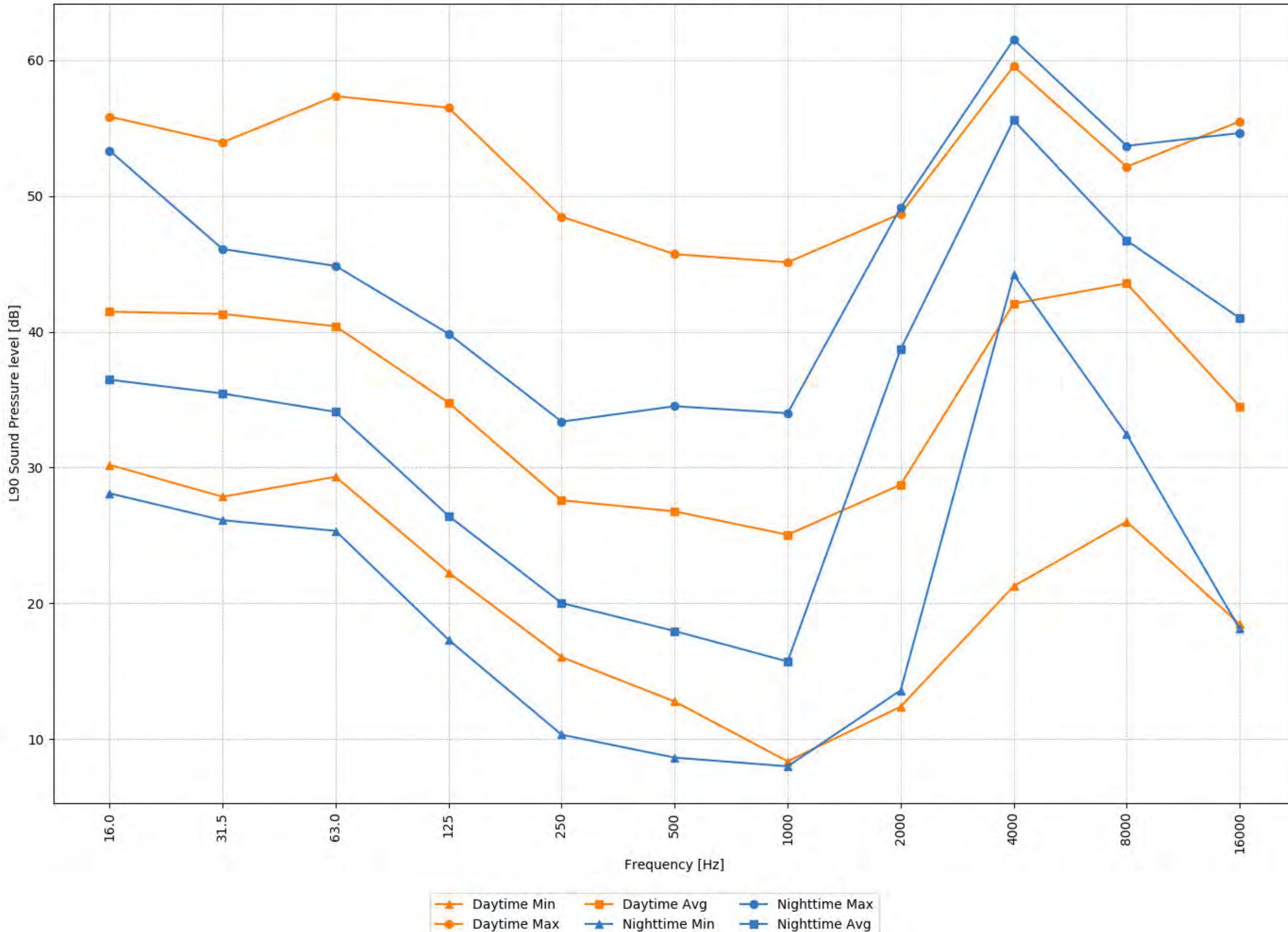


Figure 7-49: Baseline Monitoring Graphical Results – Winter Location 6 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

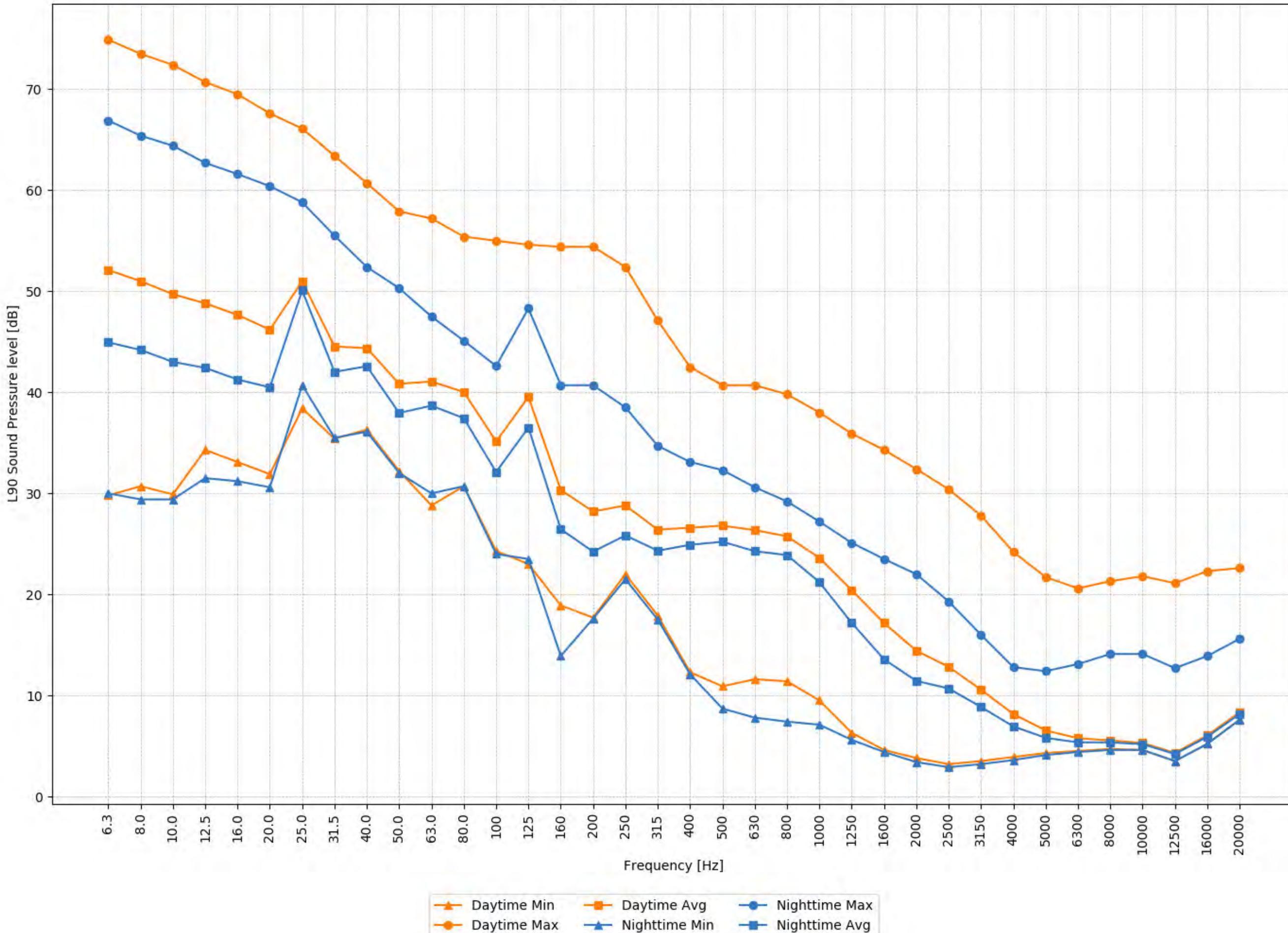


Figure 7-50: Baseline Monitoring Graphical Results – Summer Location 6 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

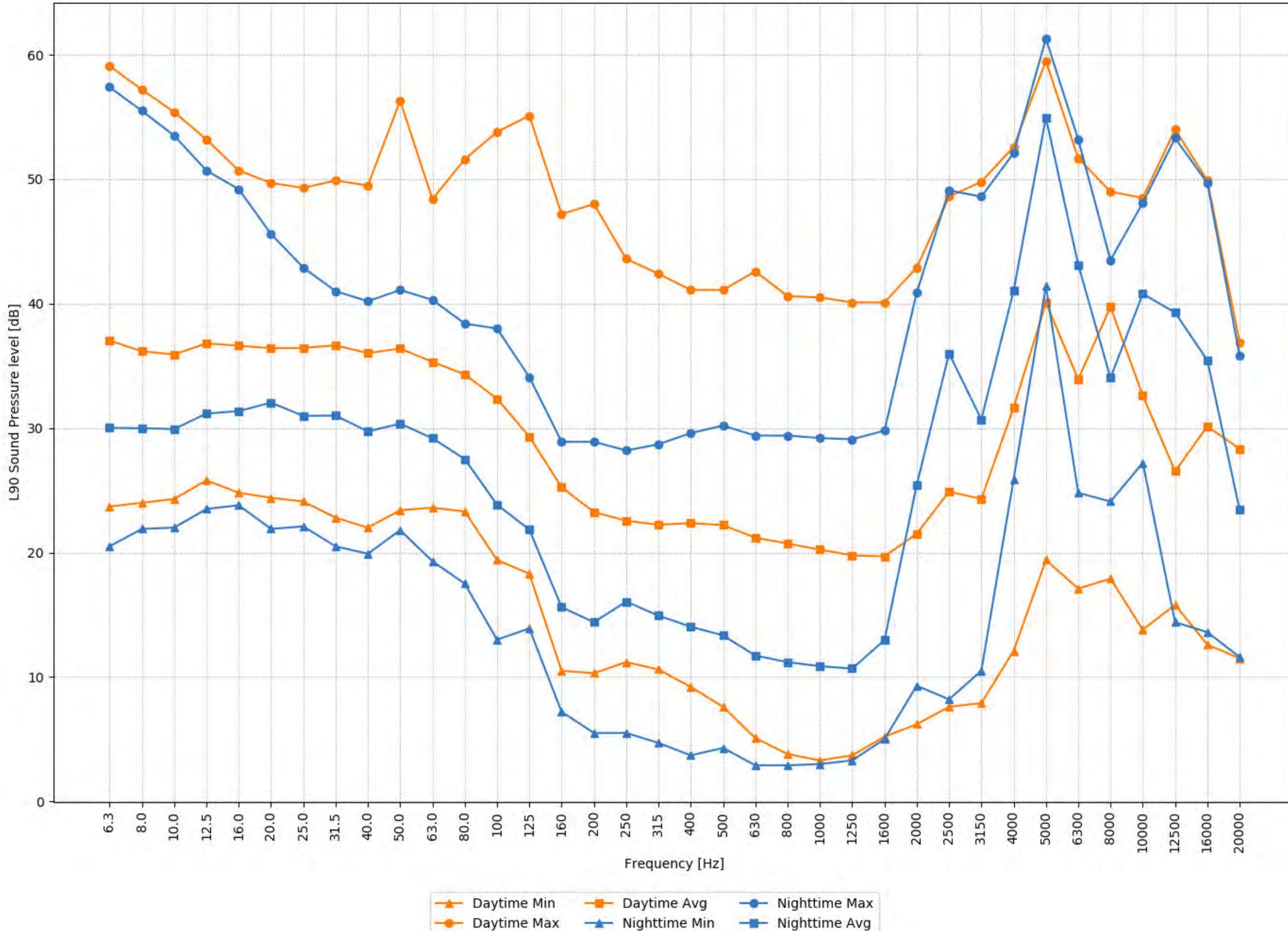


Figure 7-51: Baseline Monitoring Graphical Results - Location 7 (Winter)
10-Minute Ambient Sound Level Data

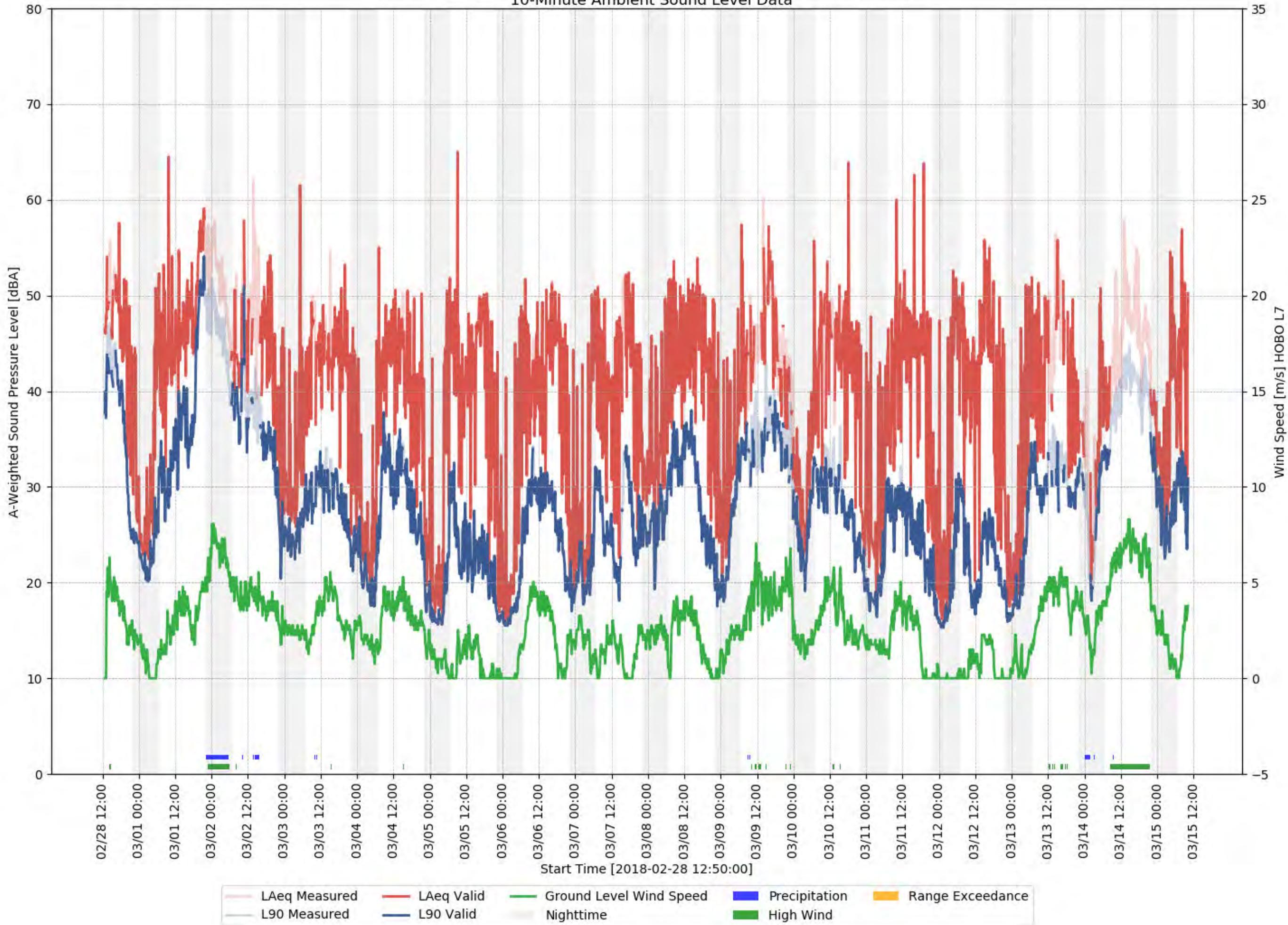


Figure 7-52: Baseline Monitoring Graphical Results - Location 7 (Summer)
10-Minute Ambient Sound Level Data

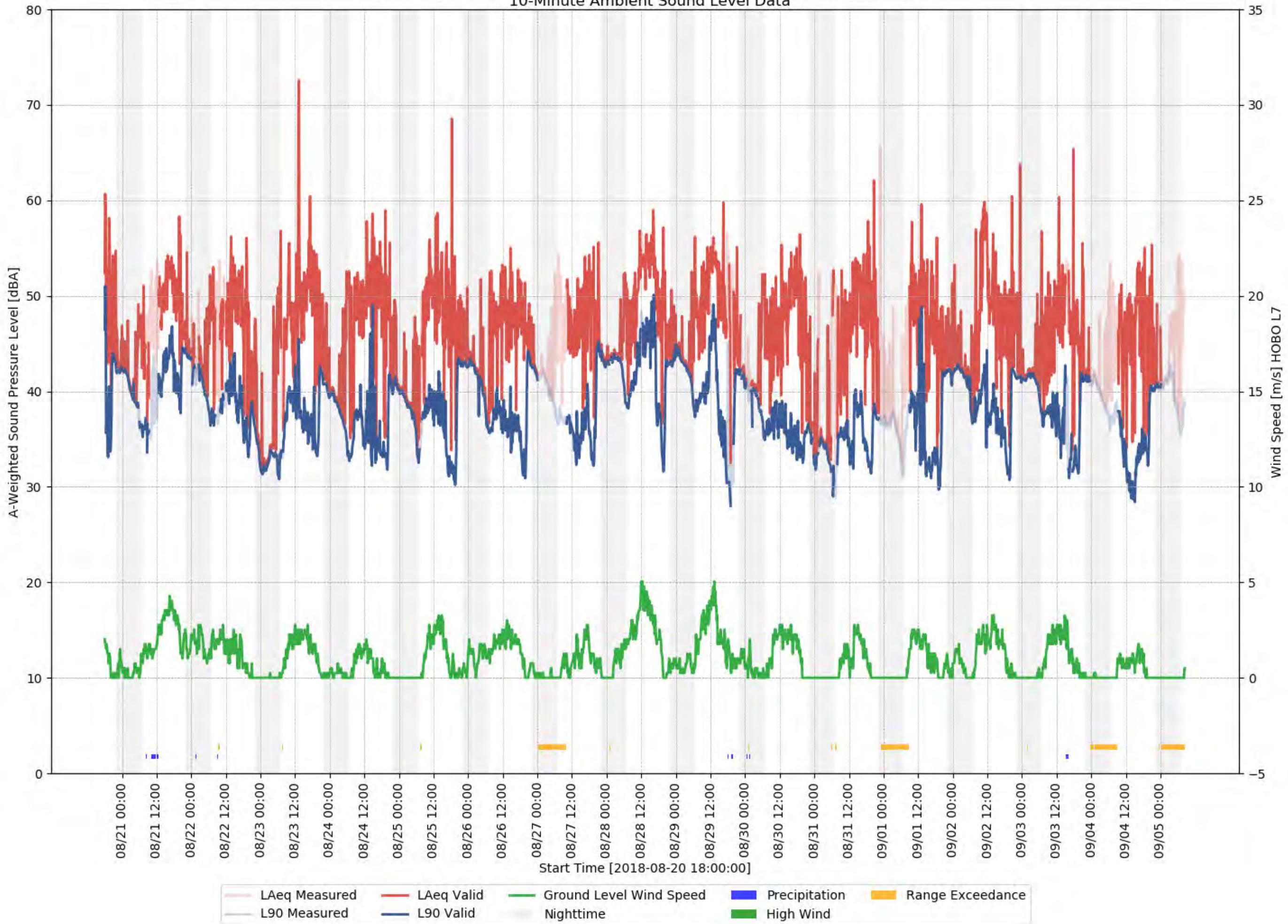


Figure 7-53: Baseline Monitoring Graphical Results - Location 7 - Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

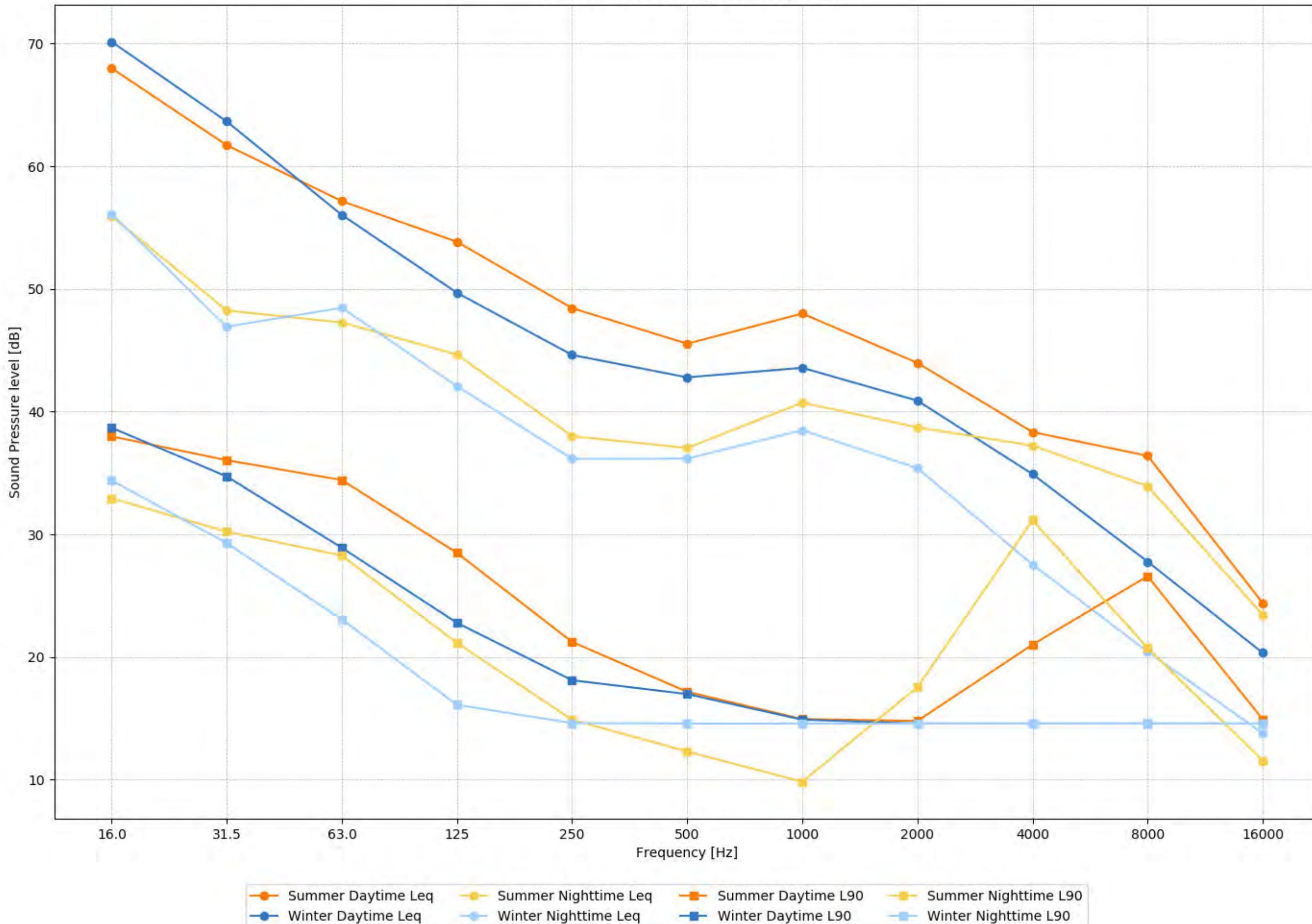


Figure 7-54: Baseline Monitoring Graphical Results - Location 7 - Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

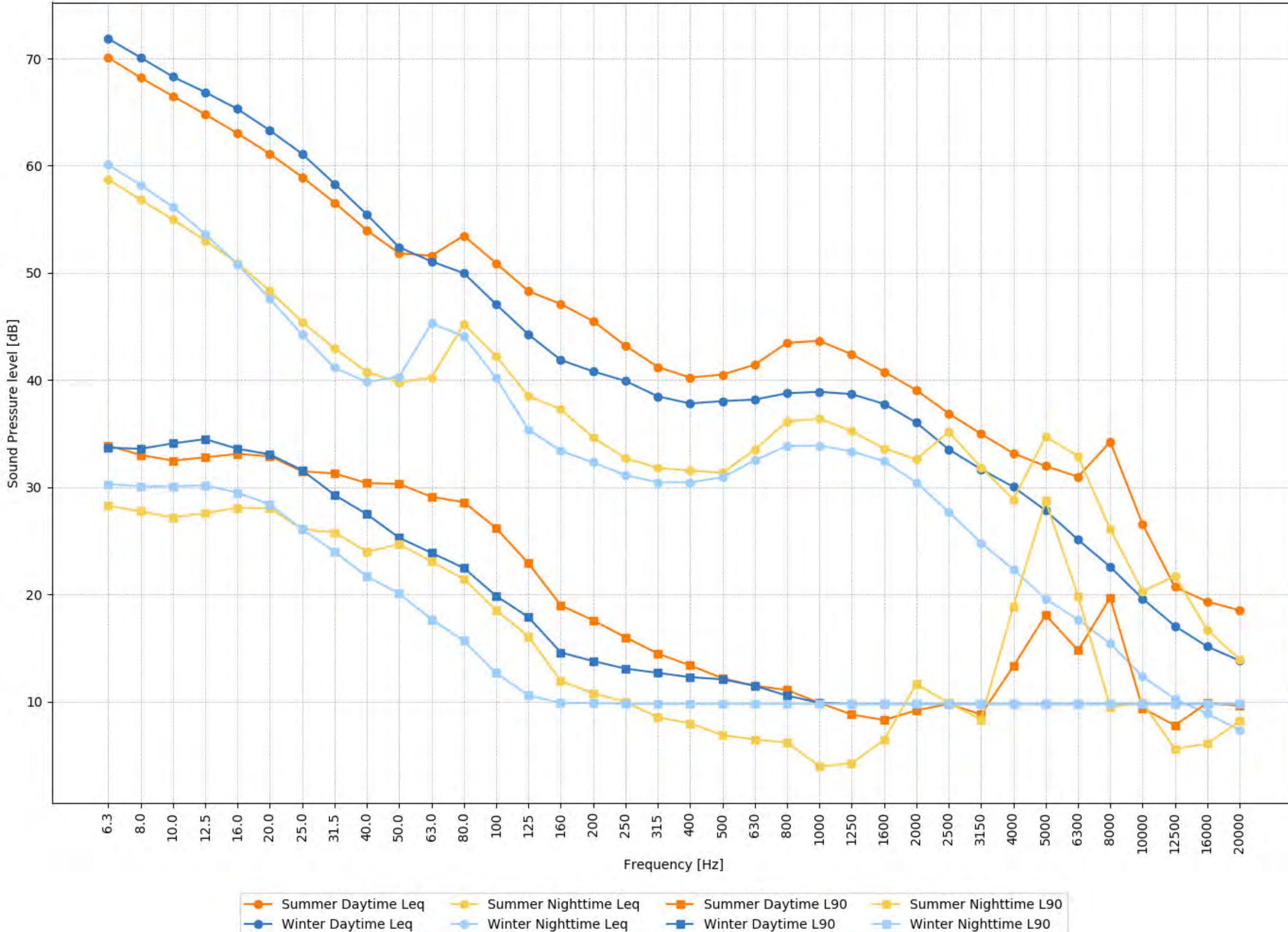


Figure 7-55: Baseline Monitoring Graphical Results - Winter Location 7 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

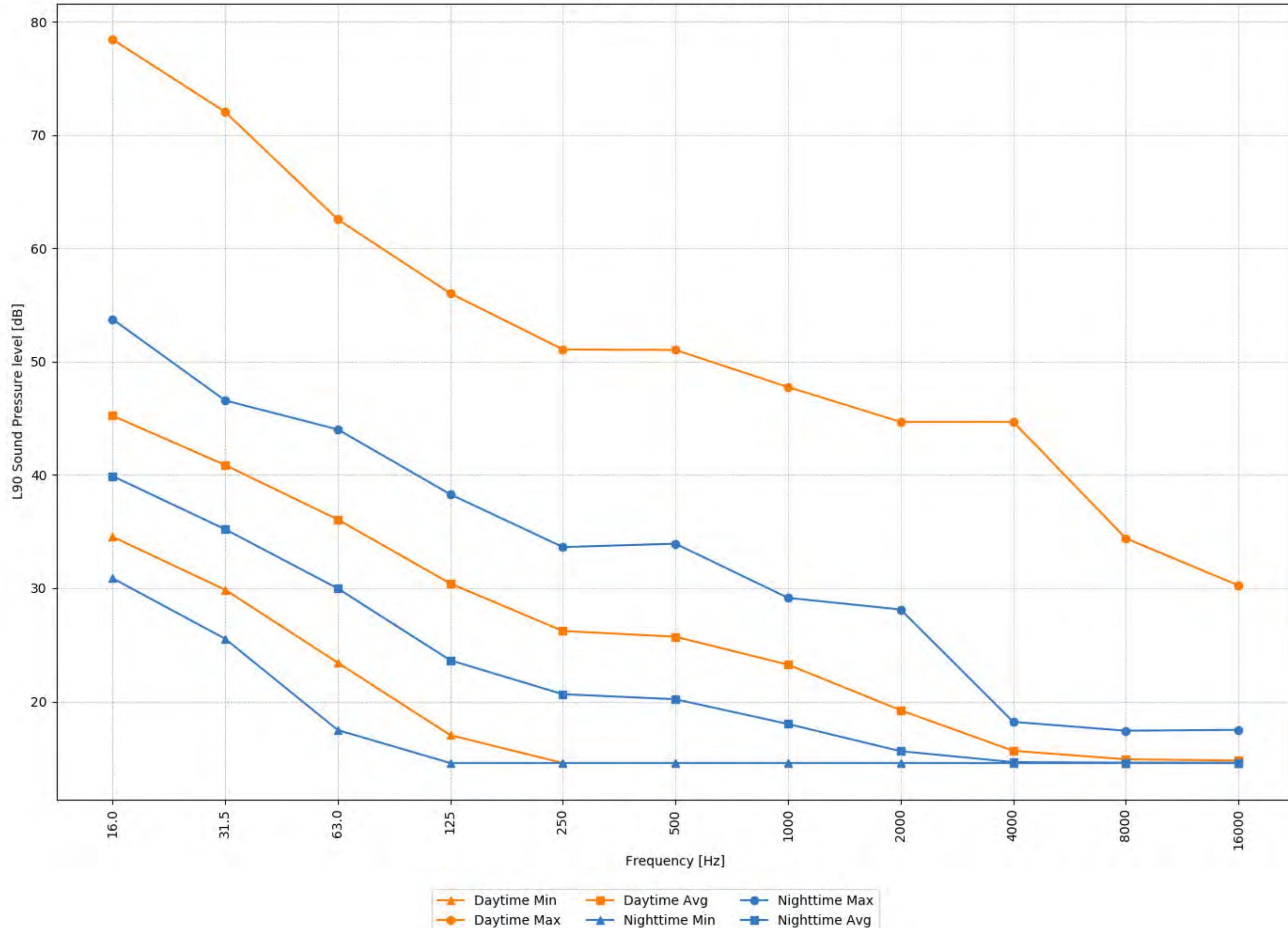


Figure 7-56: Baseline Monitoring Graphical Results - Summer Location 7 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

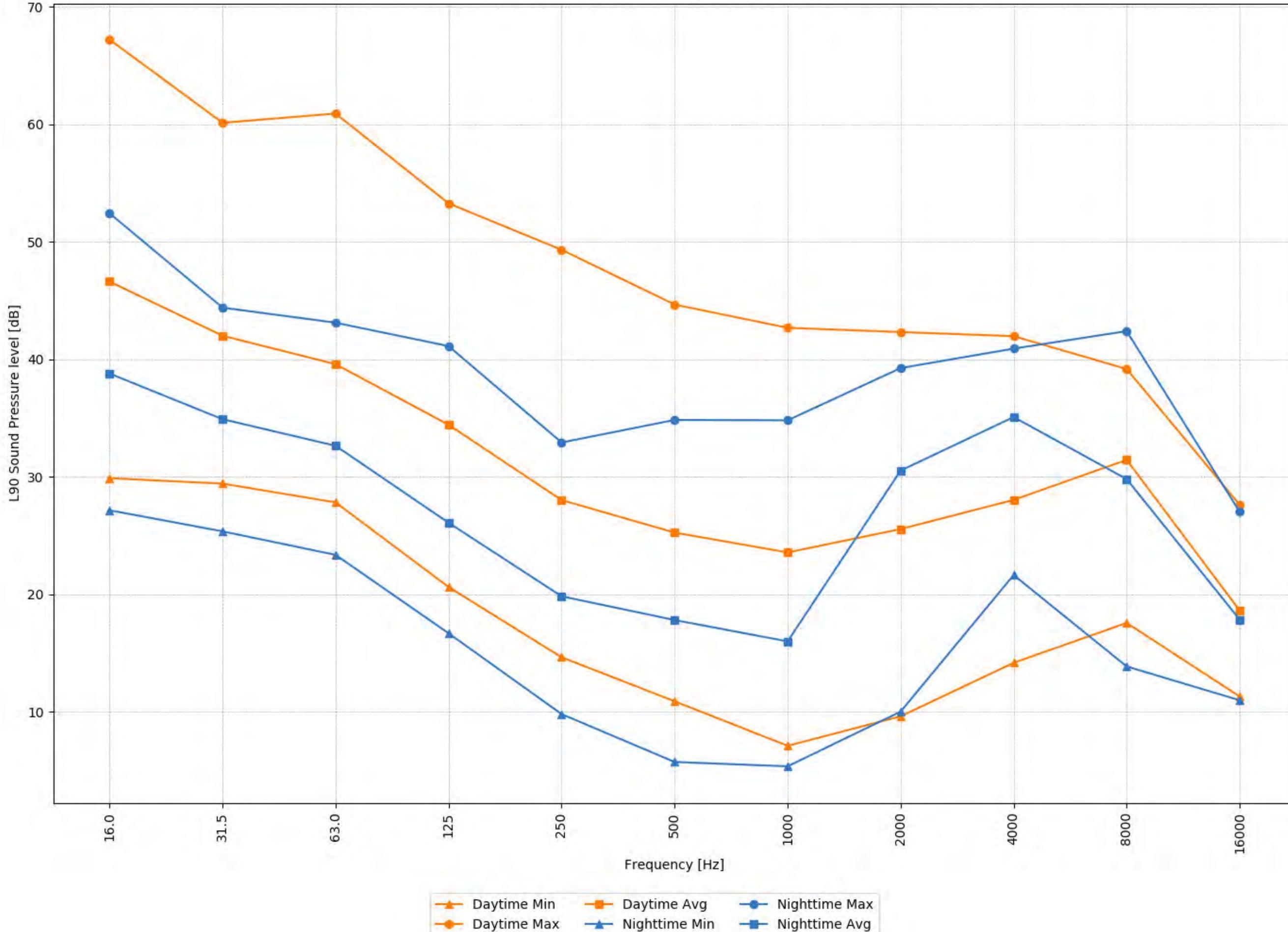


Figure 7-57: Baseline Monitoring Graphical Results – Winter Location 7 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

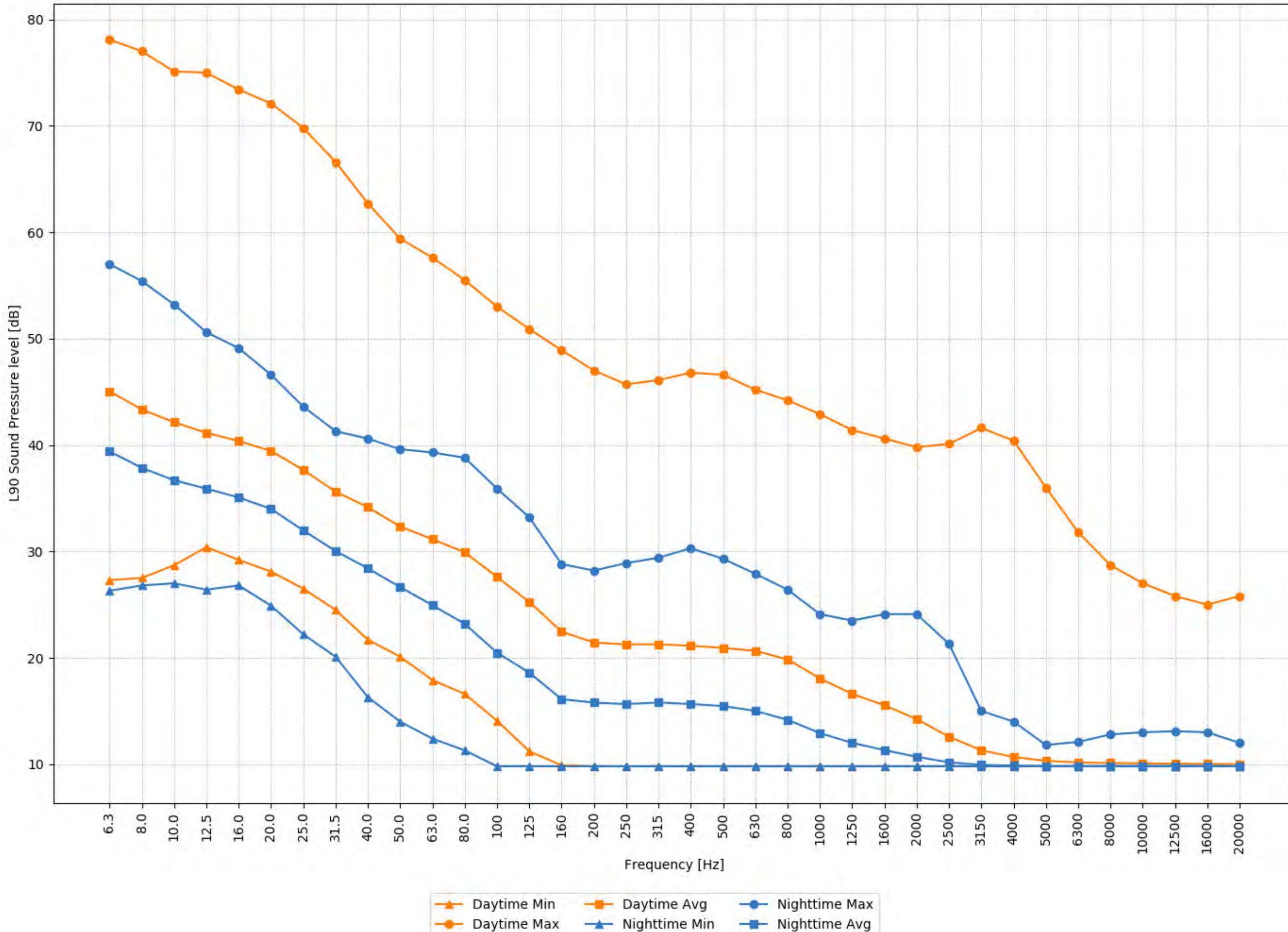


Figure 7-58: Baseline Monitoring Graphical Results – Summer Location 7 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

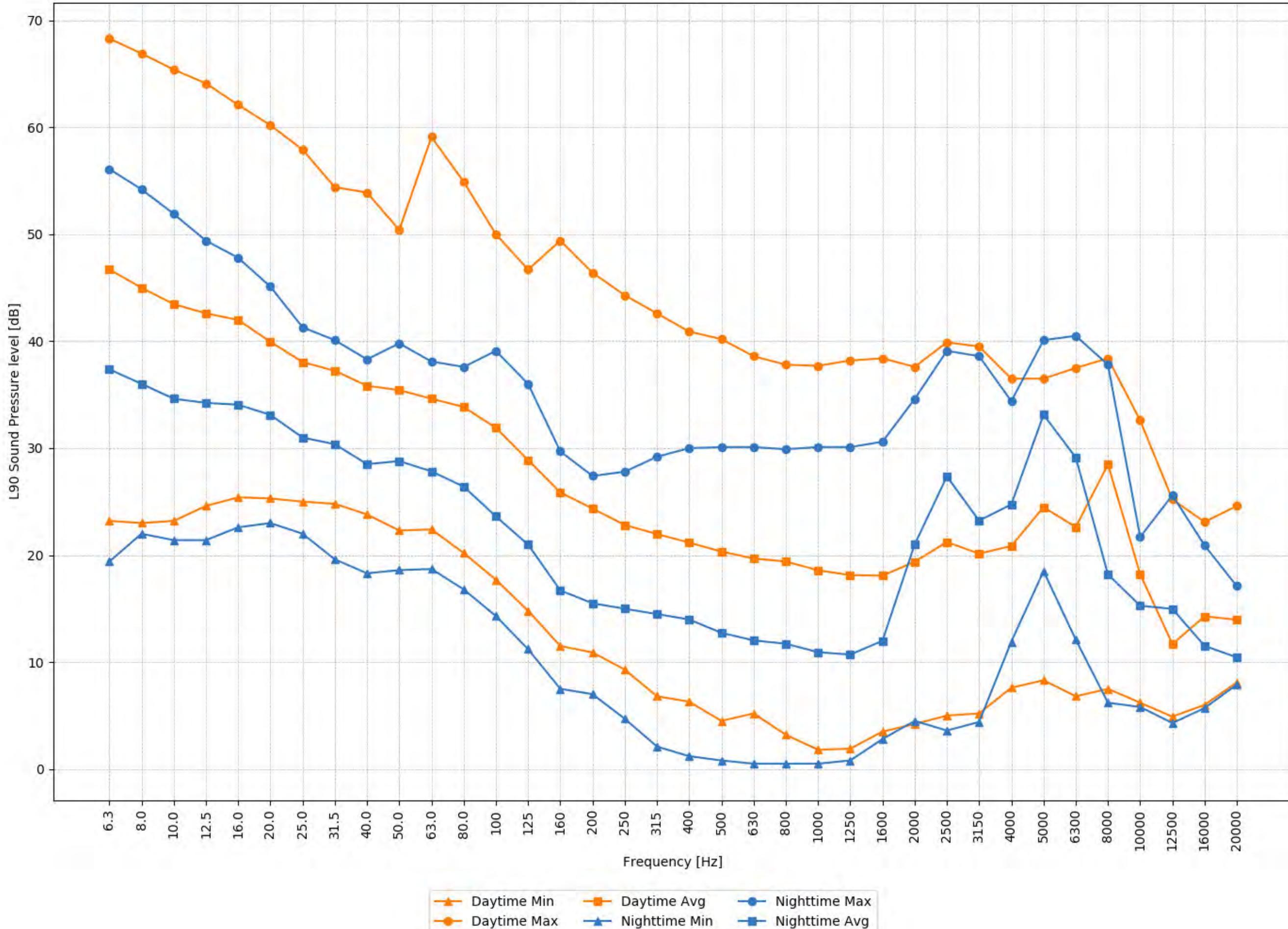


Figure 7-59: Baseline Monitoring Graphical Results - Location 8 (Winter)
10-Minute Ambient Sound Level Data

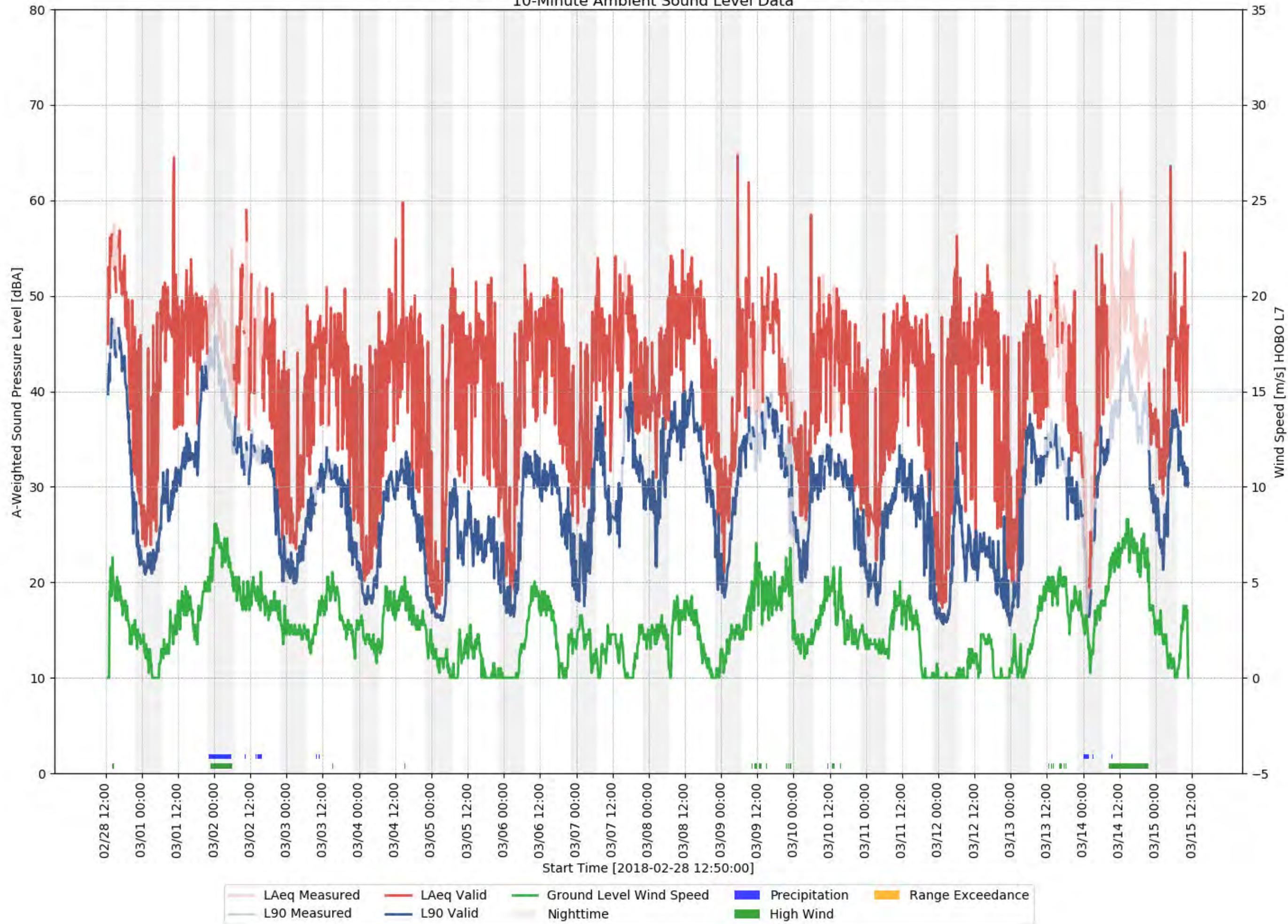


Figure 7-60: Baseline Monitoring Graphical Results - Location 8 (Summer)
10-Minute Ambient Sound Level Data

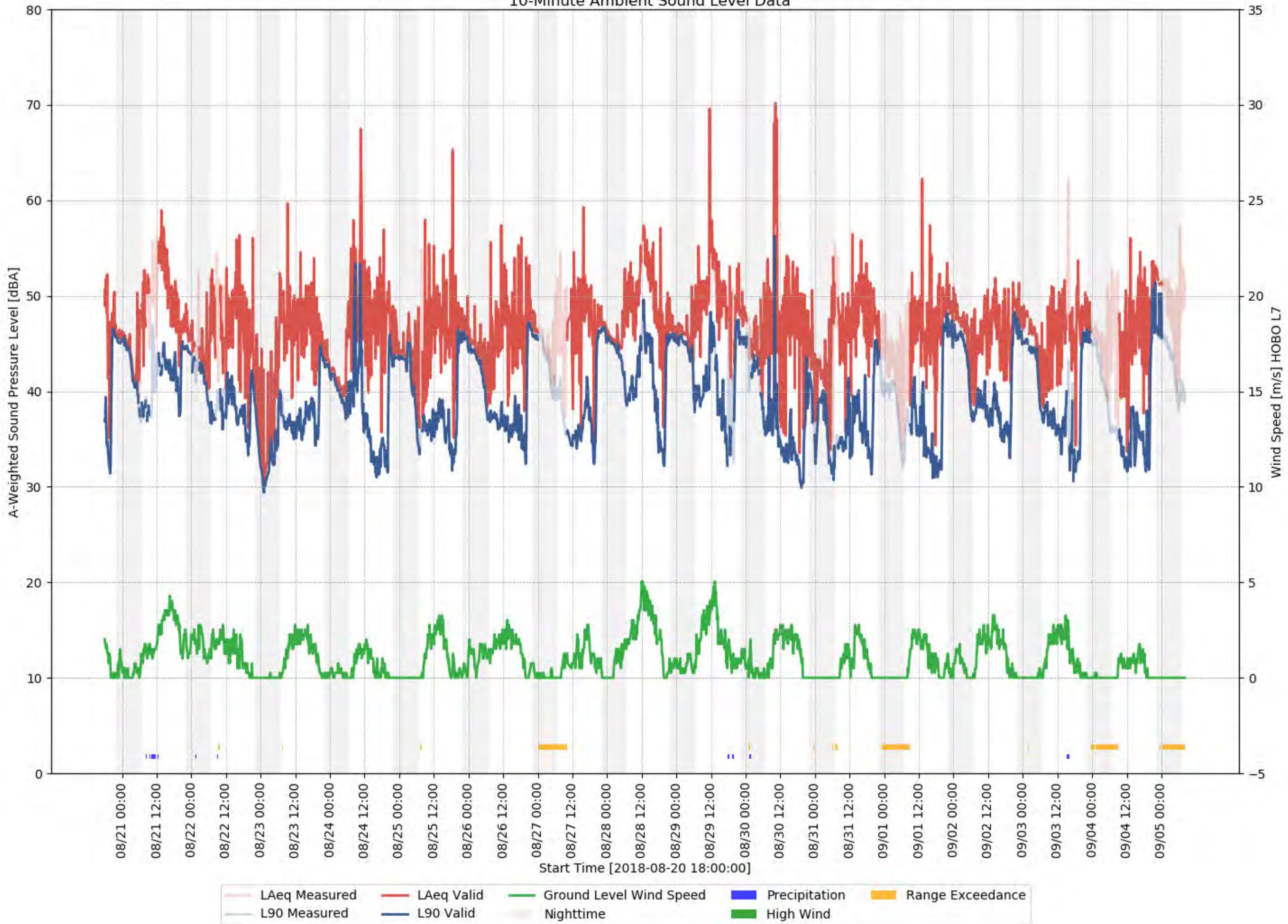


Figure 7-61: Baseline Monitoring Graphical Results - Location 8 - Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

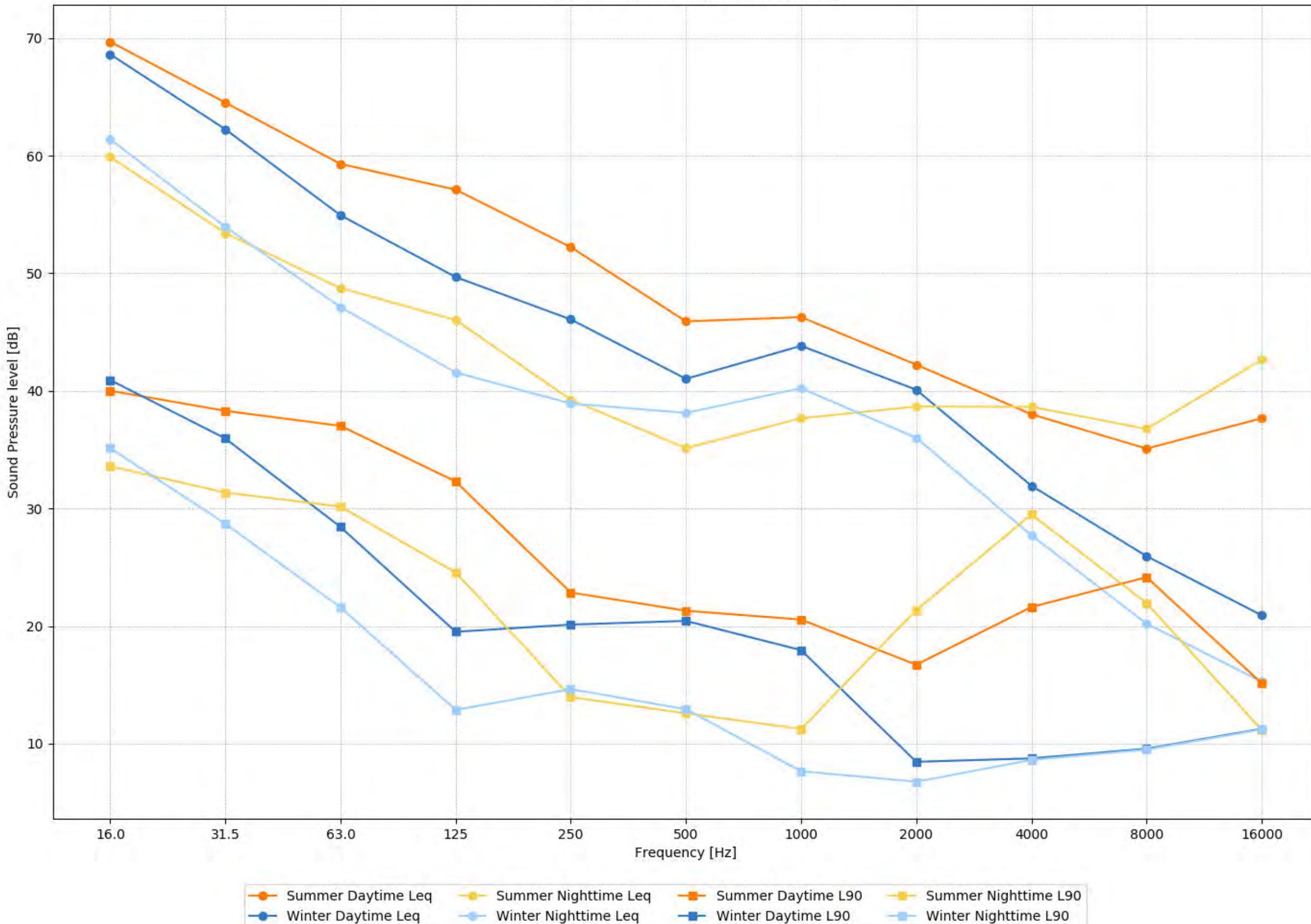


Figure 7-62: Baseline Monitoring Graphical Results - Location 8 - Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data



Figure 7-63: Baseline Monitoring Graphical Results – Winter Location 8 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

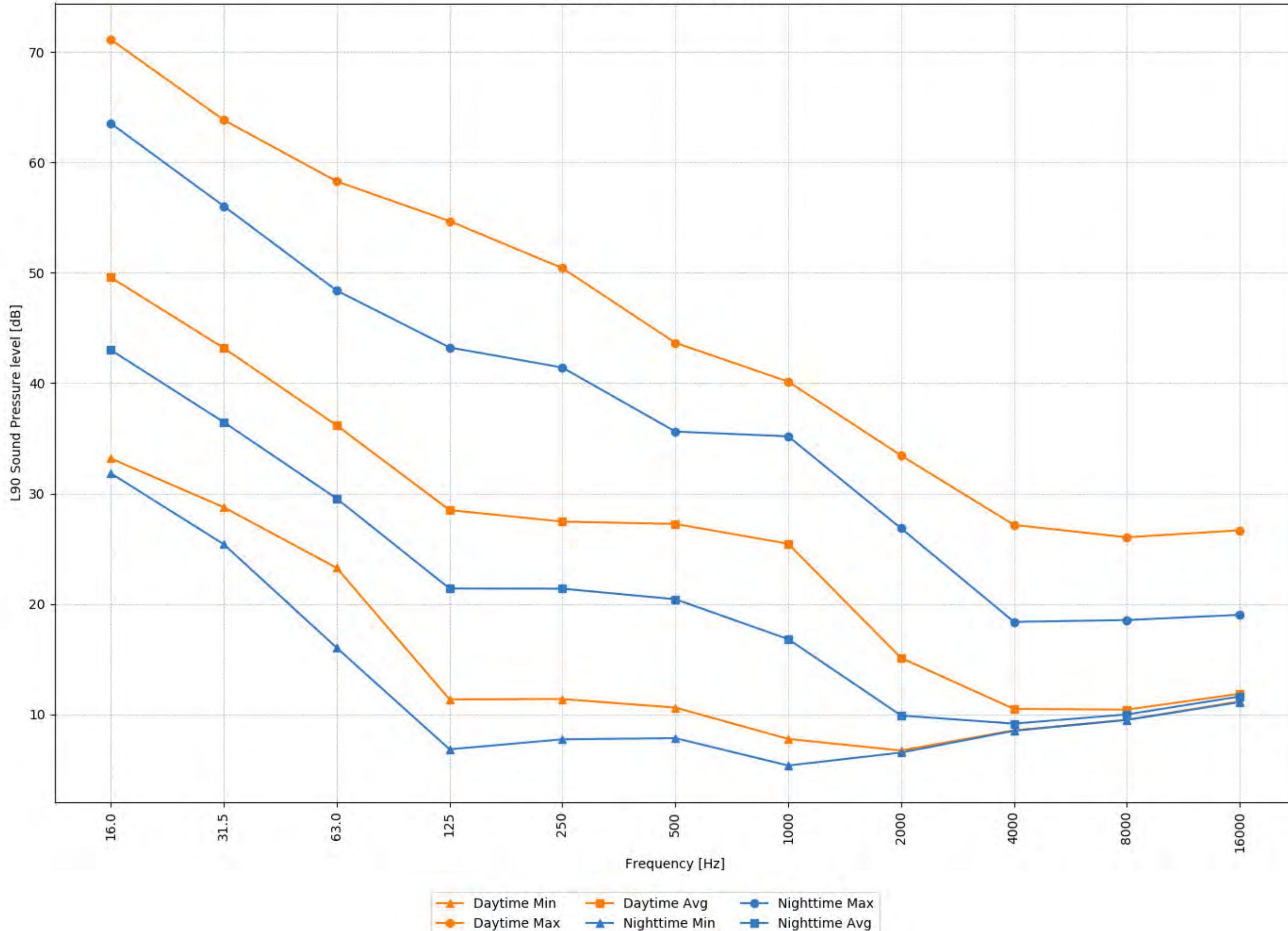


Figure 7-64: Baseline Monitoring Graphical Results – Summer Location 8 - Minimum Maximum and Average L90 Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

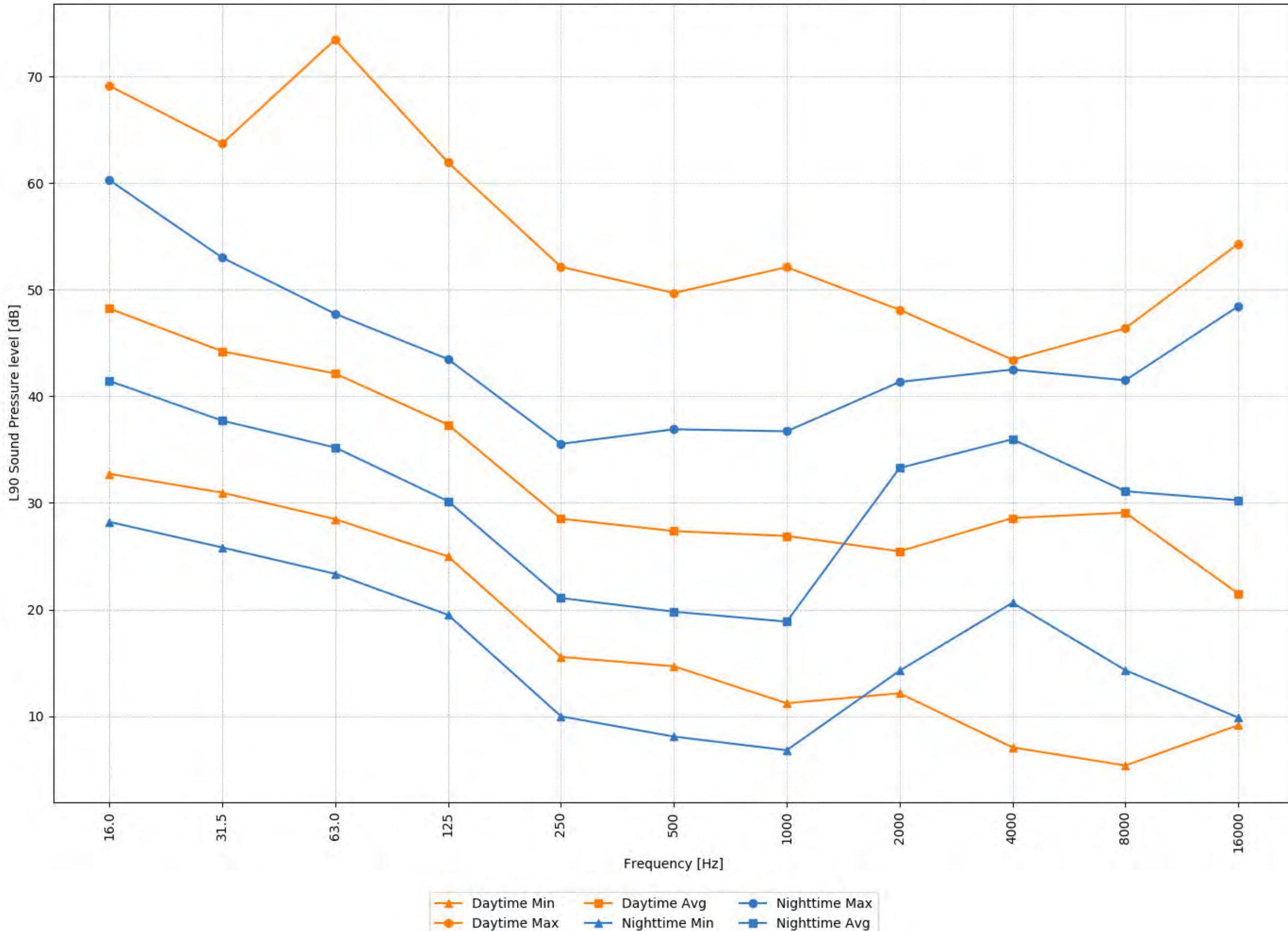


Figure 7-65: Baseline Monitoring Graphical Results – Winter Location 8 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

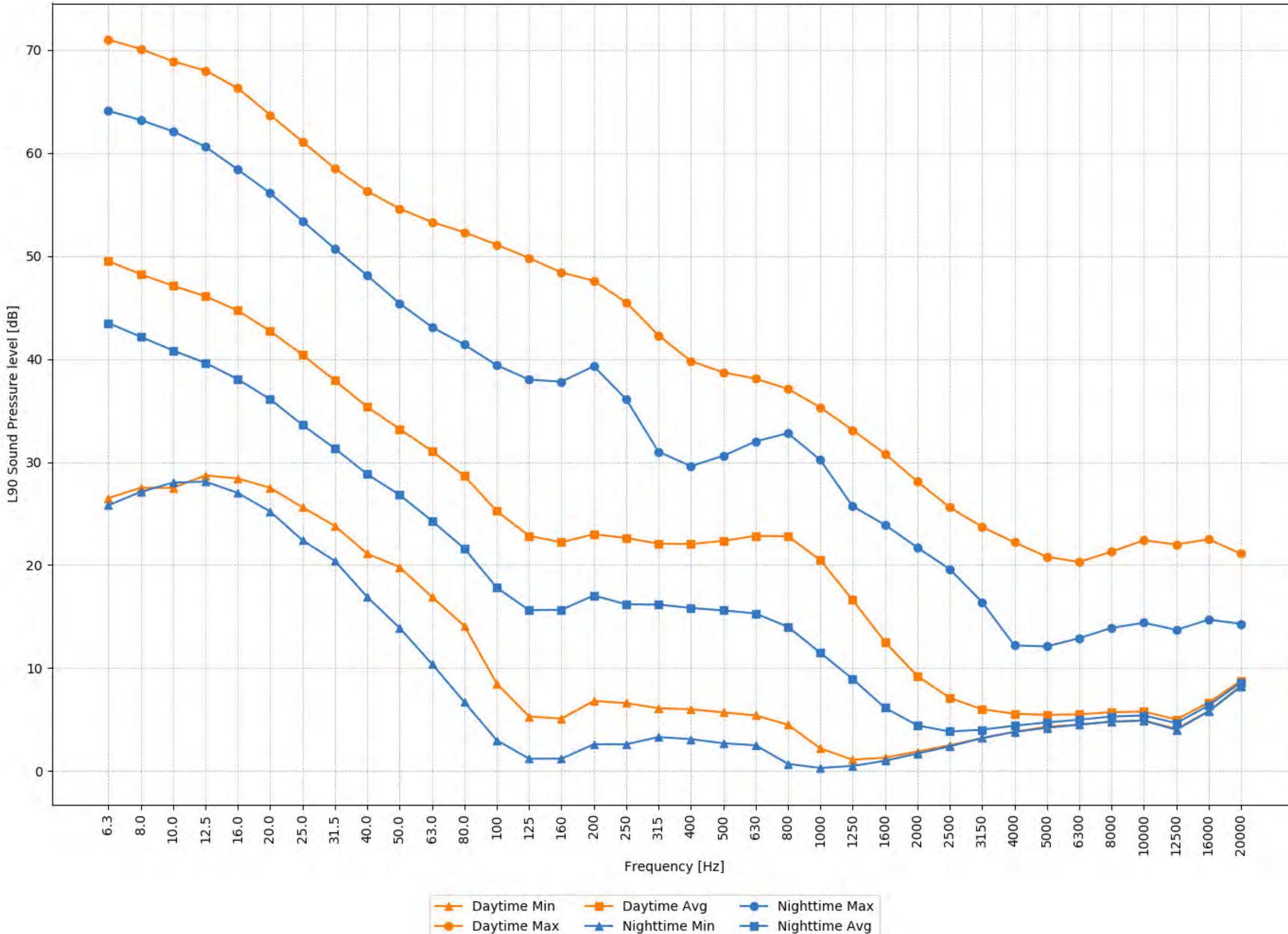


Figure 7-66: Baseline Monitoring Graphical Results – Summer Location 8 - Minimum Maximum and Average L90 Third Octave Band Sound Pressure Levels
10-Minute Ambient Sound Level Data

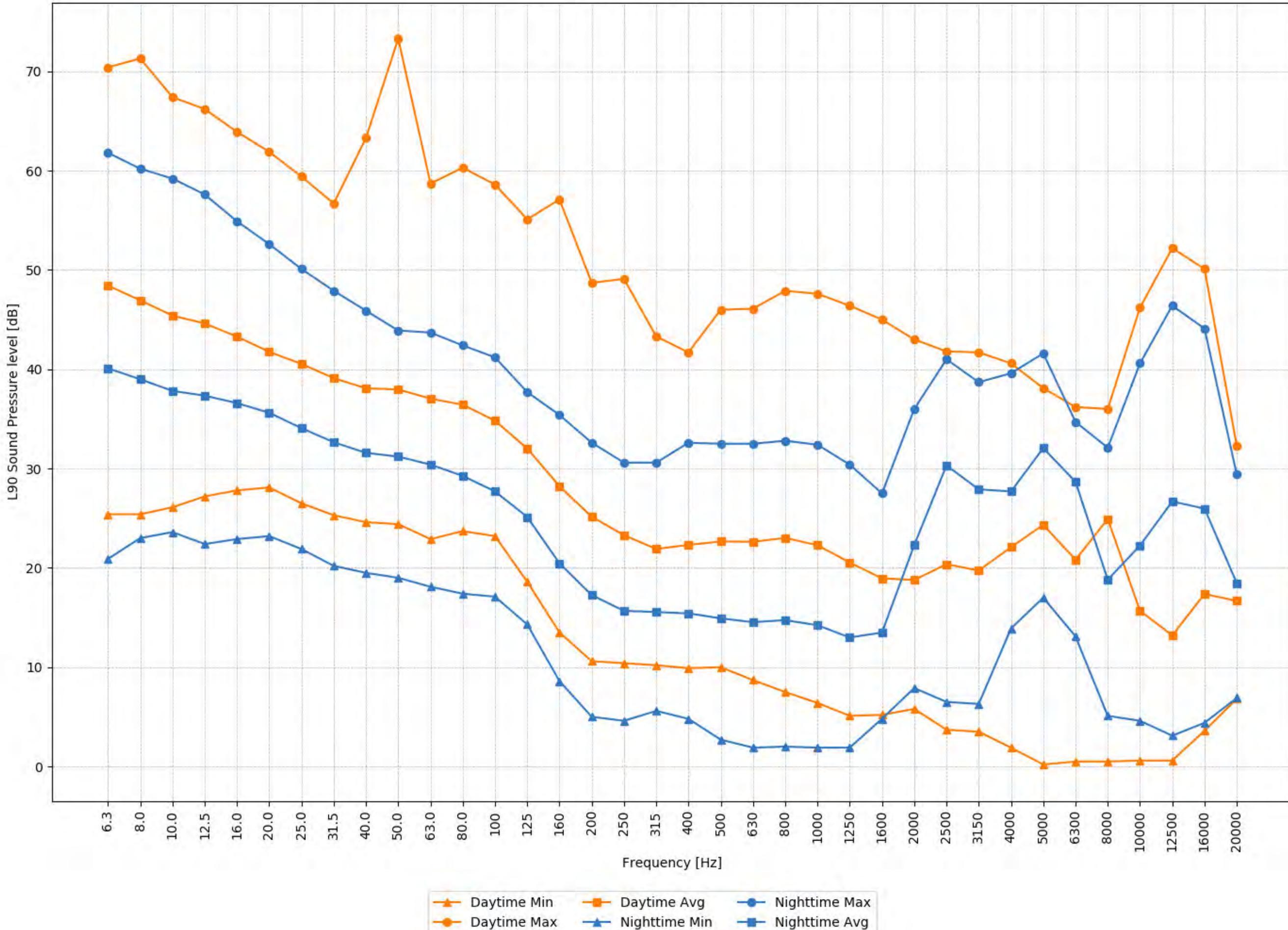


Figure 7-67: Baseline Monitoring Graphical Results - All Locations - Winter Sound Level Consistency
10-Minute Ambient Sound Level Data

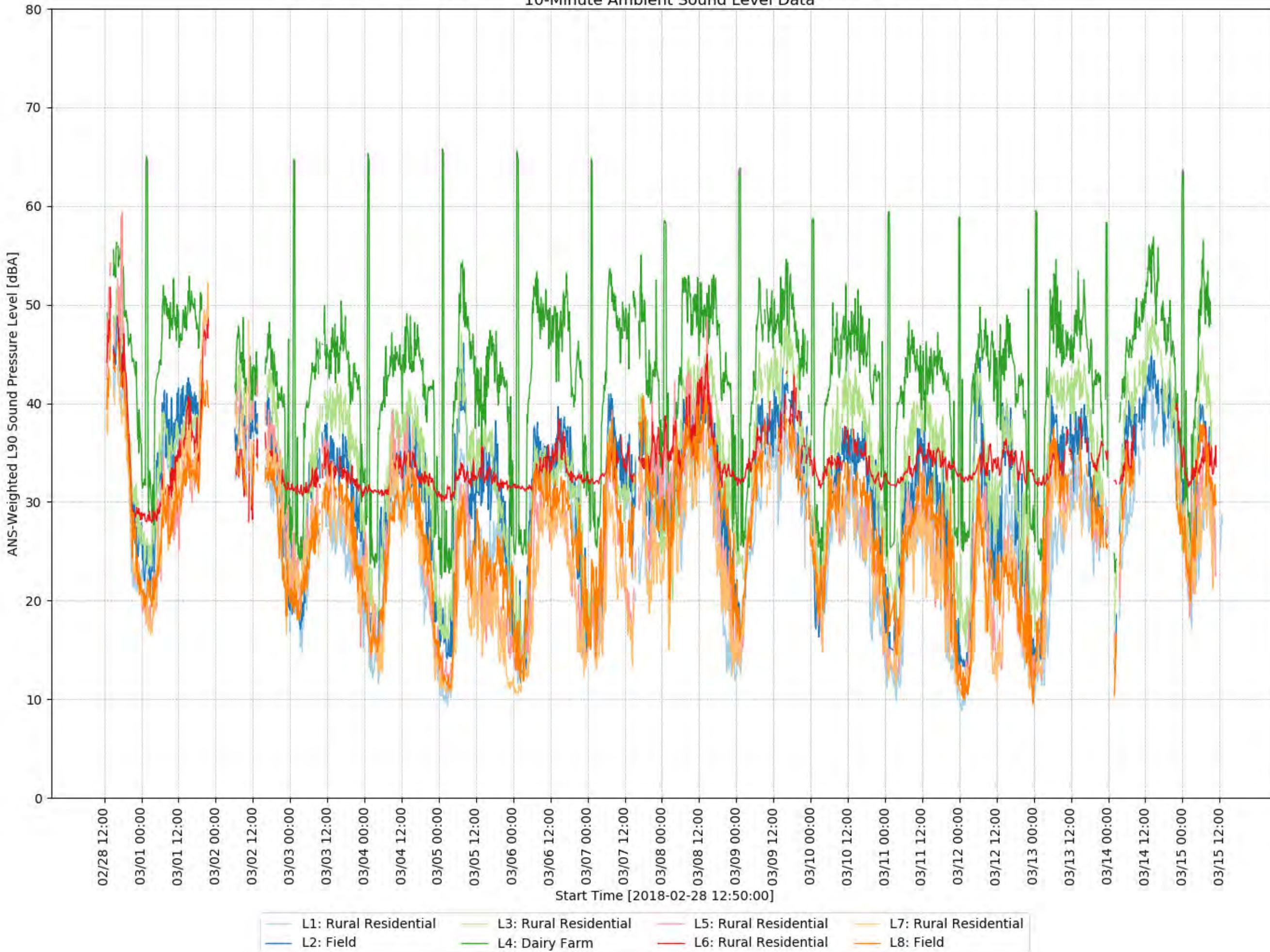
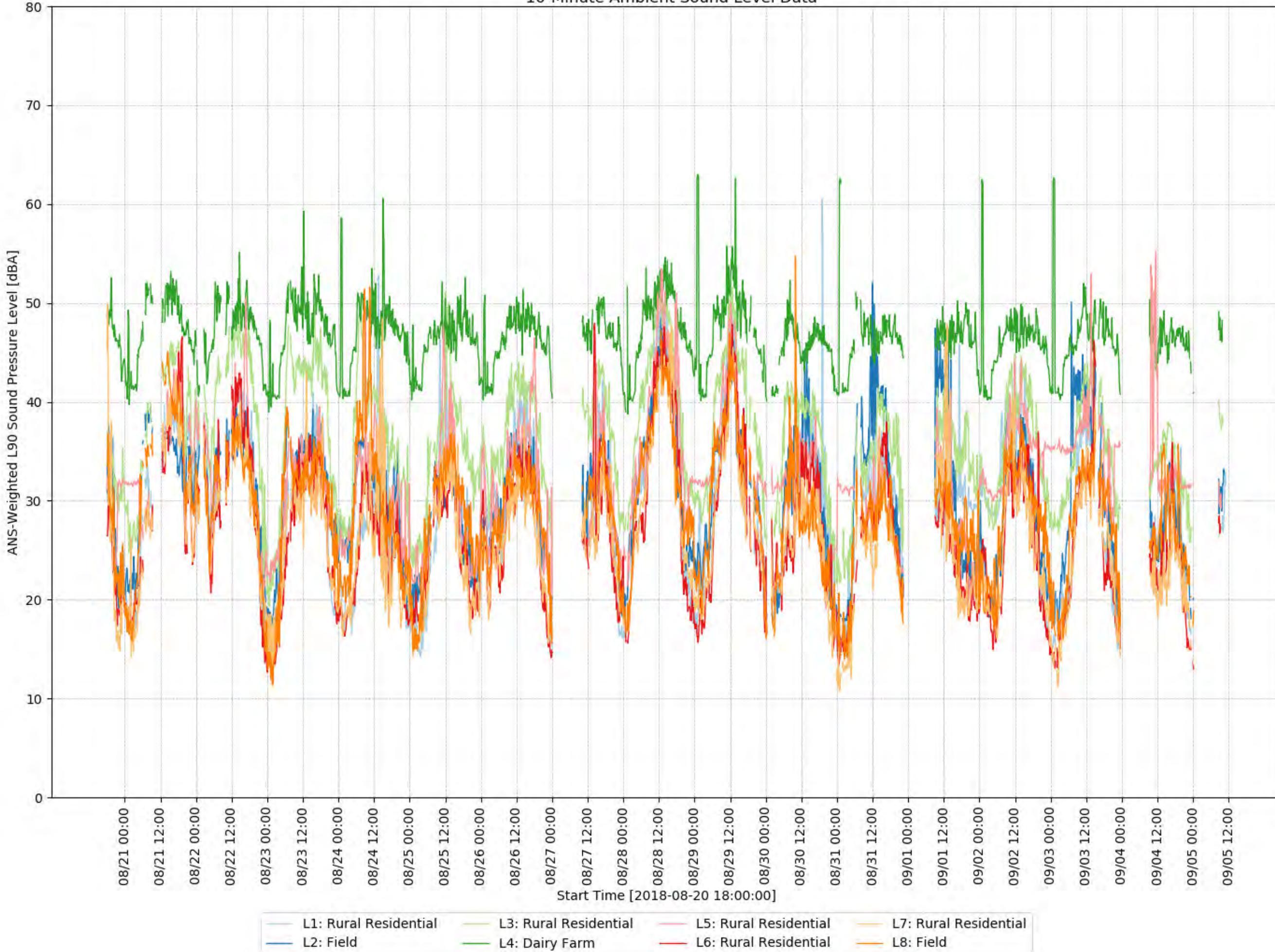


Figure 7-68: Baseline Monitoring Graphical Results - All Locations - Summer Sound Level Consistency
10-Minute Ambient Sound Level Data



Section 8.0

Seasonal Sound Level Monitoring Summary

8.0 SEASONAL SOUND LEVEL MONITORING SUMMARY

A two-season baseline monitoring program was performed for Heritage Wind in 2018 to characterize the existing sound level environment in the Project area. The sound levels measured during the winter and summer monitoring periods are summarized in the following subsections as tabular data by location. Respective ANS-weighted broadband sound levels calculated for the desired summary of interest are tandemly provided with the measured broadband levels within each table. Only valid⁴² 10-minute measurement periods are included in the summary tables. Daytime is defined as the period from 7 AM to 10 PM. Nighttime is defined as the period from 10 PM to 7 AM.

8.1 Daytime Ambient – Lower Tenth Percentile

Measured daytime ambient L₉₀ sound levels are shown below in Table 8-1, as per the Project's understanding of the required DPS scope of studies. Values are separated by monitoring season as well as for both seasons combined. These values represent the L₉₀ of the measured L₉₀ values.

Table 8-1 Daytime Ambient L₉₀ (dBA) Sound Pressure Level Summary

Location	Overall (dBA)		Winter (dBA)		Summer (dBA)	
	Measured	ANS	Measured	ANS	Measured	ANS
Location 1	25.8	23.4	23.0	21.9	41.2	24.7
Location 2	31.5	26.4	29.3	28.4	35.7	25.0
Location 3	33.4	31.7	31.2	30.8	44.1	33.0
Location 4	43.8	42.9	42.3	41.4	47.6	45.6
Location 5	25.4	22.6	22.8	19.9	35.4	25.9
Location 6	33.0	23.7	32.4	32.1	43.3	21.9
Location 7	24.5	20.2	21.8	18.3	32.7	21.3
Location 8	26.5	24.4	23.9	23.1	33.2	25.8

8.2 Nighttime Ambient – Lower Tenth Percentile

Measured nighttime ambient L₉₀ sound levels are presented below in Table 8-2, as per the Project's understanding of the required DPS scope of studies for summer and winter. Values are separated by monitoring season as well as for both seasons combined. These values represent the L₉₀ of the measured L₉₀ values.

⁴² Refer to Chapter 7 for details concerning valid periods.

Table 8-2 **Nighttime Ambient L₉₀ (dBA) Sound Pressure Level Summary**

Location	Overall (dBA)		Winter (dBA)		Summer (dBA)	
	Measured	ANS	Measured	ANS	Measured	ANS
Location 1	17.1	13.7	16.3	12.0	38.7	16.6
Location 2	20.7	17.2	19.7	15.4	37.7	18.8
Location 3	21.6	20.3	20.3	18.4	40.0	24.6
Location 4	27.6	26.8	26.5	25.6	44.4	40.6
Location 5	19.0	14.6	18.1	13.4	35.7	23.0
Location 6	31.5	17.5	31.0	30.6	54.5	15.7
Location 7	17.8	12.7	16.6	11.7	33.4	15.4
Location 8	18.7	15.1	17.3	13.9	35.4	16.6

8.3 Daytime Ambient - Average

Measured daytime average ambient levels are presented in Table 8-3, as per the Project's understanding of the required DPS scope of studies. The daytime ambient average noise level was calculated by logarithmically averaging sound pressure levels (L_{eq}) (after exclusions) from the background sound level measurements over the daytime period at each monitoring location. These calculations include both summer and winter data combined.

Table 8-3 **Daytime Ambient L_{eq} (dBA) Sound Pressure Level Summary**

Location	Overall (dBA)	
	Measured	ANS
Location 1	52.9	50.5
Location 2	52.5	51.7
Location 3	50.2	46.8
Location 4	65.3	63.8
Location 5	51.4	49.3
Location 6	51.4	46.5
Location 7	50.1	48.4
Location 8	49.7	48.4

8.4 Nighttime Ambient - Average

Measured nighttime average ambient levels are presented in Table 8-4. The nighttime ambient average noise level was calculated by logarithmically averaging sound pressure levels (L_{eq}) (after exclusions) from the background sound level measurements over the nighttime period at each monitoring location. These calculations include both summer and winter data combined.

Table 8-4 **Nighttime Ambient L_{eq} (dBA) Sound Pressure Level Summary**

Location	Overall (dBA)	
	Measured	ANS
Location 1	49.1	42.7
Location 2	46.6	41.9
Location 3	48.7	41.1
Location 4	60.5	58.7
Location 5	47.2	38.5
Location 6	55.3	39.8
Location 7	43.8	41.1
Location 8	44.6	41.0

8.5 Comparison of Sound Levels to Wind Speed

8.5.1 *Hub Height Wind Speed*

Ten-minute monitored L_{eq} and L₉₀ sound levels at Location 5 and corresponding on-site hub height wind speed data are presented in Figures 8-1 and 8-2. These data are inclusive of both the winter and summer monitoring seasons, and are separated into daytime and nighttime values.

All hub height wind speeds were plotted, even those below the cut-in turbine wind speed. Figure 8-1 shows some correlation between L₉₀ levels and hub height wind speed, which improves as the wind speed increases. The range L₉₀ of sound levels at low hub height wind speeds is significant and generally ranges from 10-55 dBA during the day and 10-40 dBA during the night. At higher hub height wind speeds this range decreases to approximately 40-60 dBA during the day and 25-45 dBA at night. Figure 8-2 shows a similar trend with the L_{eq} values. This correlation is more pronounced during the nighttime hours.

8.5.2 *Ground Level Wind Speed*

Figure 8-3 shows on-site ground level wind speeds against ten-minute L₉₀ sound levels at Location 5 for both summer and winter monitoring periods combined. The maximum⁴³, minimum, and average sound levels are plotted using 0.5 m/s binned ground level wind speeds. There is not much correlation between ground level wind speed and L₉₀ sound levels shown here; although it improves slightly as wind speeds increase.

⁴³ The period during which the maximum sound level occurred within the 1.5 m/s ground level wind speed bin was reviewed. The sound level data suggest that a loud event was occurring during that hour in the early afternoon during the summer. Location 2 was an active youth camp during the summer monitoring program.

8.5.3 Wind Speed at 10 meters

The sound level measurement standard used by all wind turbine manufacturers reports sound level data as a function of hub height wind speed and a reference height of 10 meters above ground level (AGL).⁴⁴ No direct measurement of wind speed at 10 meters AGL was available during the existing condition measurement program. However, the hub height wind speed collected by the on-site meteorological towers was extrapolated down to 10 meters using the technique in IEC 61400-11. The resultant 10-meter AGL wind speeds were then plotted against the valid, ANS-corrected 10-minute L₉₀ sound levels measured during each program (summer and winter). Figure 8-4 shows the results for the daytime and nighttime periods combined during the winter program, while Figures 8-5 and 8-6 show the winter day and winter night periods broken out. Figures 8-7, 8-8, and 8-9 show the same analyses for the summer measurement program.

8.6 Temporal Accuracy

The temporal accuracy section of the ANSI S12.9-1992/Part 2 document requires that the data collection must be long enough to achieve the desired confidence interval. The goal of the sound measurement program is to achieve a 95% confidence interval which would allow for a statement of 95% confidence that the true long-term average sound level falls within the given interval. The size of this confidence interval places the data set into one of three categories referred to as Class A, Class B, and Class C, listed here from most precise to least precise.

To determine the temporal accuracy, the mean square average sound level must be obtained using equation 2 of section 9.5 of the ANSI S12.9-1992/Part 2 document. In this equation, the sample standard deviation and average are used to determine the mean square average. These pieces of information are then combined with the information presented in Table 1 of section 9.5 of the standard to determine the upper and lower bounds of the 95% confidence interval. The equations for the upper and lower bound of the confidence interval are equations 3 and 4 of section 9.5 of the standard respectively. If there are data sets where the number of samples was outside the range covered by the information in Table 1, the source data presented in the Crow et al. document cited in the standard is used to calculate the necessary ‘k1’ and ‘k2’ values. A two-tailed ‘t’ interval function is used to generate the necessary ‘t’ value.

To use the equations in the Temporal Accuracy section, the raw data set must be shown to be approximately normal. This can be obtained by following the directions laid out in Appendix D of the standard. The method used in the standard is the Kolmogorov-Smirnov test for normality of data. In general, the Kolmogorov-Smirnov test takes the actual repetition of a measurement and compares it to the expected repetition based on the average and standard deviation of the

⁴⁴ *Wind turbines—Part 11: Acoustic noise measurement techniques*, International Electrotechnical Commission IEC 61400-11, Edition 3.0, Geneva, Switzerland, 2012.

sample. The difference between the actual and expected recurrence is then compared to a critical value that is based on the number of samples and desired confidence level. If any measured value has a difference between expected and actual recurrence that exceeds the critical value, the data shall not be approximated as normal.

Tables 8-5 through 8-10 present the 95% CI of the valid measured L₉₀ sound level data at each site for Summer Daytime, Summer Nighttime, Winter Daytime, Winter Nighttime, Yearly Daytime, and Yearly Nighttime periods, respectively. The “Yearly Daytime” and “Yearly Nighttime” are composed of the summer and winter data combined for each time period (day or night). Each sample represents one full daytime (7 a.m. – 10 p.m.) or nighttime (10 p.m. – 7 a.m.) period in which more than 50% of the 10-minute records were valid. The same information is presented in Tables 8-11 to 8-16 for the measured L_{eq} sound levels at each site. All sound levels in Tables 8-5 to 8-16 are ANS-filtered.

Table 8-5 Temporal Accuracy Summary – Summer Daytime L90

Location	# of Samples	95% CI Mean (dBA)	Lower CI (dBA)	Upper CI (dBA)	Measurement Class	Normality
Location 1	15	26.18	1.48	1.68	Class A	Normal
Location 2	15	27.54	1.68	1.94	Class A	Normal
Location 3	15	35.08	1.53	1.74	Class A	Normal
Location 4	15	45.91	0.39	0.39	Class A	Normal
Location 5	15	28.78	2.05	2.48	Class B	Normal
Location 6	15	23.39	1.36	1.52	Class A	Normal
Location 7	15	23.63	1.55	1.77	Class A	Normal
Location 8	15	28	1.62	1.85	Class A	Normal

Table 8-6 Temporal Accuracy Summary – Summer Nighttime L90

Location	# of Samples	95% CI Mean (dBA)	Lower CI (dBA)	Upper CI (dBA)	Measurement Class	Normality
Location 1	12	21.2	3.03	4.09	Class C	Normal
Location 2	12	21.6	1.97	2.35	Class B	Normal
Location 3	12	28.12	2.27	2.81	Class B	Normal
Location 4	12	40.84	0.28	0.28	Class A	Normal
Location 5	12	28.24	2.9	3.85	Class C	Normal
Location 6	12	17.91	1.59	1.81	Class A	Normal
Location 7	12	18.35	2.16	2.63	Class B	Normal
Location 8	12	20.05	2.44	3.07	Class C	Normal

Table 8-7 Temporal Accuracy Summary – Winter Daytime L90

Location	# of Samples	95% CI Mean (dBA)	Lower CI (dBA)	Upper CI (dBA)	Measurement Class	Normality
Location 1	14	27.21	3.89	5.64	Worse than Class C	Normal
Location 2	14	31.81	2.58	3.33	Class C	Normal
Location 3	14	34.01	2.16	2.65	Class B	Normal
Location 4	14	42.67	1.22	1.33	Class A	Normal
Location 5	14	26.45	3.31	4.58	Class C	Normal
Location 6	14	32.6	0.82	0.85	Class A	Normal
Location 7	14	25.86	3.58	5.07	Worse than Class C	Normal
Location 8	14	27.52	2.13	2.61	Class B	Normal

Table 8-8 Temporal Accuracy Summary – Winter Nighttime L90

Location	# of Samples	95% CI Mean (dBA)	Lower CI (dBA)	Upper CI (dBA)	Measurement Class	Normality
Location 1	14	17.94	3.09	4.18	Class C	Normal
Location 2	14	19.6	2.56	3.29	Class C	Normal
Location 3	14	22.26	2.19	2.69	Class B	Normal
Location 4	14	26.96	1.32	1.46	Class A	Normal
Location 5	14	18.7	2.89	3.85	Class C	Normal
Location 6	14	31.61	0.69	0.71	Class A	Normal
Location 7	14	17.15	2.51	3.2	Class C	Normal
Location 8	14	19.08	2.76	3.61	Class C	Normal

Table 8-9 Temporal Accuracy Summary – Yearly Daytime L90

Location	# of Samples	95% CI Mean (dBA)	Lower CI (dBA)	Upper CI (dBA)	Measurement Class	Normality
Location 1	29	26.79	1.95	2.36	Class B	Normal
Location 2	29	29.92	1.64	1.92	Class A	Normal
Location 3	29	34.65	1.31	1.47	Class A	Normal
Location 4	29	44.74	0.95	1.02	Class A	Normal
Location 5	29	28.08	2.07	2.52	Class B	Normal
Location 6	29	30.5	2.36	2.95	Class B	Normal
Location 7	29	24.71	1.8	2.14	Class B	Normal
Location 8	29	27.8	1.29	1.45	Class A	Normal

Table 8-10 Temporal Accuracy Summary – Yearly Nighttime L90

Location	# of Samples	95% CI Mean (dBA)	Lower CI (dBA)	Upper CI (dBA)	Measurement Class	Normality
Location 1	26	19.83	2.32	2.9	Class B	Normal
Location 2	26	20.76	1.73	2.04	Class B	Normal
Location 3	26	25.99	2.12	2.59	Class B	Normal
Location 4	26	39.32	4.03	5.62	Worse than Class C	Normal
Location 5	26	25.89	3.41	4.61	Class C	Normal
Location 6	26	31.06	3.98	5.54	Worse than Class C	Normal
Location 7	26	17.8	1.67	1.96	Class A	Normal
Location 8	26	19.6	1.84	2.2	Class B	Normal

Table 8-11 Temporal Accuracy Summary - Summer Daytime Leq

Location	# of Samples	95% CI Mean (dBA)	Lower CI (dBA)	Upper CI (dBA)	Measurement Class	Normality
Location 1	15	49.44	2.54	3.25	Class C	Normal
Location 2	15	47.65	1.1	1.19	Class A	Normal
Location 3	15	46.98	1.42	1.59	Class A	Normal
Location 4	15	64.44	0.52	0.53	Class A	Normal
Location 5	15	48.75	3.14	4.27	Class C	Normal
Location 6	15	46.58	1.43	1.6	Class A	Normal
Location 7	15	49.71	0.93	0.98	Class A	Normal
Location 8	15	49.6	1.58	1.81	Class A	Normal

Table 8-12 Temporal Accuracy Summary - Summer Nighttime Leq

Location	# of Samples	95% CI Mean (dBA)	Lower CI (dBA)	Upper CI (dBA)	Measurement Class	Normality
Location 1	12	37.82	0.95	1	Class A	Normal
Location 2	12	38.98	1.41	1.56	Class A	Normal
Location 3	12	39.43	1.38	1.52	Class A	Normal
Location 4	12	58.49	0.62	0.63	Class A	Normal
Location 5	12	36.29	0.91	0.95	Class A	Normal
Location 6	12	35.2	1.07	1.14	Class A	Normal
Location 7	12	41.99	1.44	1.61	Class A	Normal
Location 8	12	39.87	1.12	1.2	Class A	Normal

Table 8-13 Temporal Accuracy Summary - Winter Daytime Leq

Location	# of Samples	95% CI Mean (dBA)	Lower CI (dBA)	Upper CI (dBA)	Measurement Class	Normality
Location 1	14	47.96	0.9	0.95	Class A	Normal
Location 2	14	51.16	2.73	3.58	Class C	Normal
Location 3	14	46.68	1.37	1.52	Class A	Normal
Location 4	14	62.93	0.86	0.9	Class A	Normal
Location 5	14	47.28	2.51	3.2	Class C	Normal
Location 6	14	46.77	2.41	3.05	Class C	Normal
Location 7	14	45.84	1.34	1.49	Class A	Normal
Location 8	14	46	1.35	1.5	Class A	Normal

Table 8-14 Temporal Accuracy Summary - Winter Nighttime Leq

Location	# of Samples	95% CI Mean (dBA)	Lower CI (dBA)	Upper CI (dBA)	Measurement Class	Normality
Location 1	14	44.7	2.44	3.09	Class C	Normal
Location 2	14	43.42	1.47	1.66	Class A	Normal
Location 3	14	42.34	1.97	2.36	Class B	Normal
Location 4	14	58.81	0.66	0.68	Class A	Normal
Location 5	14	39.83	1.32	1.46	Class A	Normal
Location 6	14	41.63	2.55	3.27	Class C	Normal
Location 7	14	40	1.44	1.61	Class A	Normal
Location 8	14	41.76	2.2	2.71	Class B	Normal

Table 8-15 Temporal Accuracy Summary - Yearly Daytime Leq

Location	# of Samples	95% CI Mean (dBA)	Lower CI (dBA)	Upper CI (dBA)	Measurement Class	Normality
Location 1	29	48.73	1.3	1.46	Class A	Normal
Location 2	29	49.44	1.41	1.61	Class A	Normal
Location 3	29	46.84	0.95	1.02	Class A	Normal
Location 4	29	63.79	0.57	0.59	Class A	Normal
Location 5	29	48.05	1.97	2.39	Class B	Normal
Location 6	29	46.69	1.33	1.5	Class A	Normal
Location 7	29	48.34	1.15	1.27	Class A	Normal
Location 8	29	48.18	1.23	1.37	Class A	Normal

Table 8-16 Temporal Accuracy Summary - Yearly Nighttime Leq

Location	# of Samples	95% CI Mean (dBA)	Lower CI (dBA)	Upper CI (dBA)	Measurement Class	Normality
Location 1	26	42.35	1.83	2.17	Class B	Normal
Location 2	26	41.89	1.37	1.54	Class A	Normal
Location 3	26	41.14	1.28	1.43	Class A	Normal
Location 4	26	58.67	0.43	0.44	Class A	Normal
Location 5	26	38.49	1.05	1.14	Class A	Normal
Location 6	26	39.34	1.8	2.13	Class B	Normal
Location 7	26	41.04	1.08	1.17	Class A	Normal
Location 8	26	40.9	1.24	1.37	Class A	Normal

8.7 Infrasound and Low Frequency

Infrasound and low frequency sound pressure levels were measured at Location 2 and Location 5 in both the summer and winter seasons. The frequency range of the summertime data is from 6.3 Hz to 200 Hz and the frequency range of the wintertime data is from 0.5 Hz to 200 Hz. The sound levels were summarized by averaging⁴⁵ sound level data from all valid⁴⁶ winter daytime hours, winter nighttime hours, summer daytime hours, and summer nighttime hours within each one-third octave band. Winter and summer infrasound data collected at Location 2 and Location 5 are presented graphically in Figure 8-10 and Figure 8-11 respectively.

⁴⁵ Logarithmic (energy) average of equivalent (Leq) sound pressure levels.

⁴⁶ Refer to Chapter 7 for details concerning valid periods.

Figure 8-1: Measured L90 Sound Level Against Hub Height Wind Speed
Location 5 All Seasons

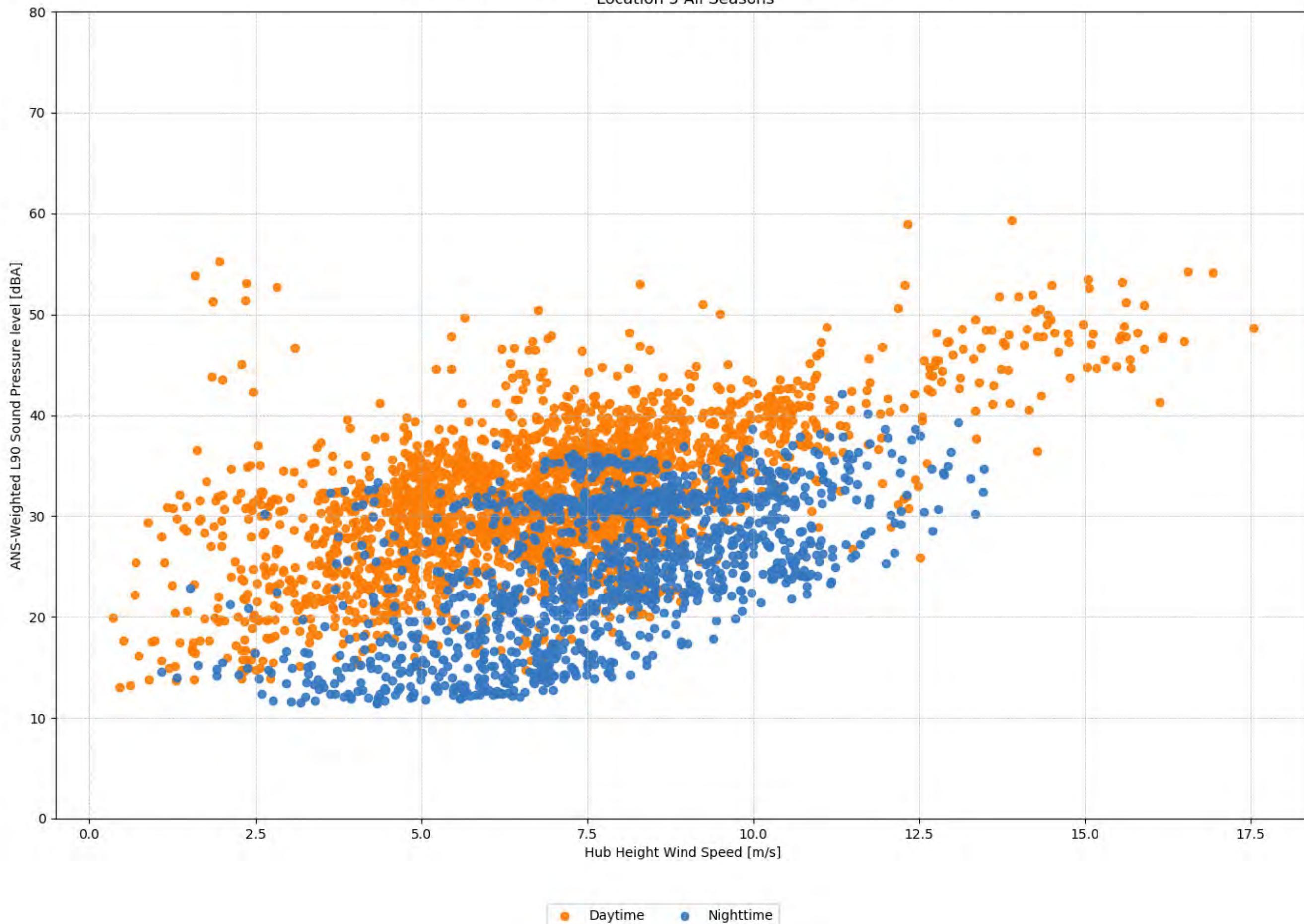


Figure 8-2: Measured Leq Sound Level Against Hub Height Wind Speed
Location 5 All Seasons

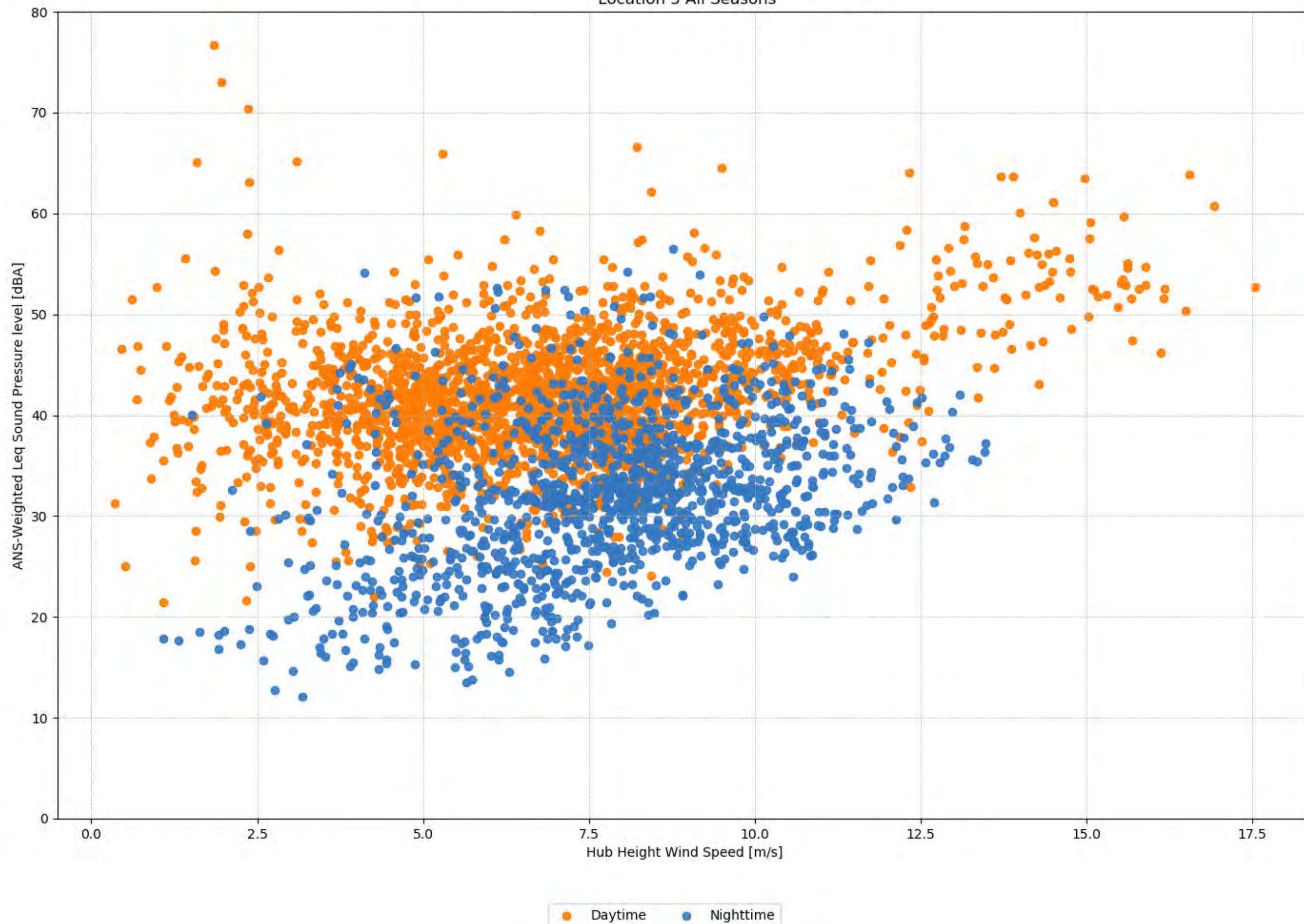


Figure 8-3: Monitored L90 Against Ground Level Wind Speed
Location 5 All Seasons

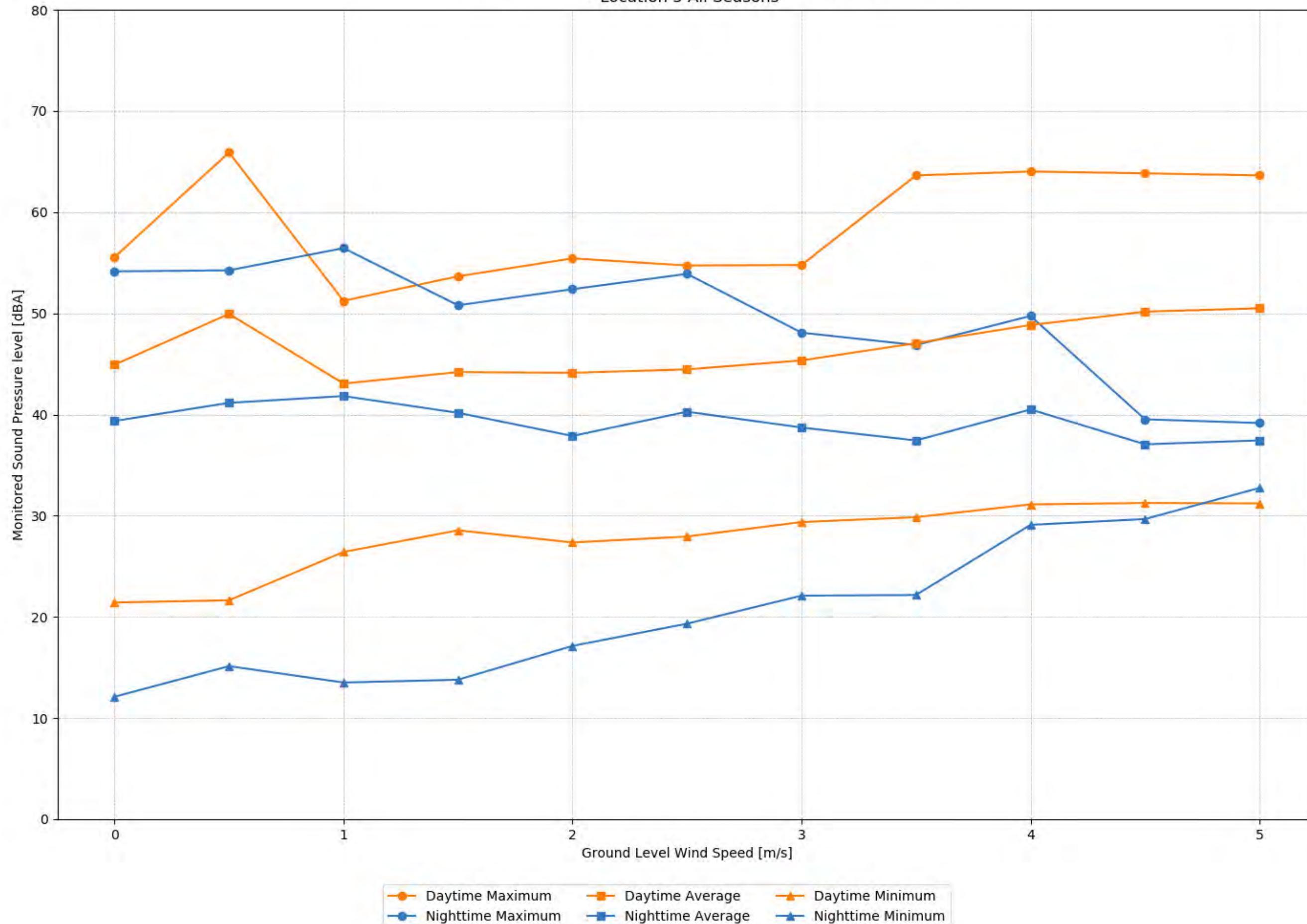


Figure 8-4: Measured L90 Sound Level vs. Normalized Wind Speed
Winter Overall Survey Period

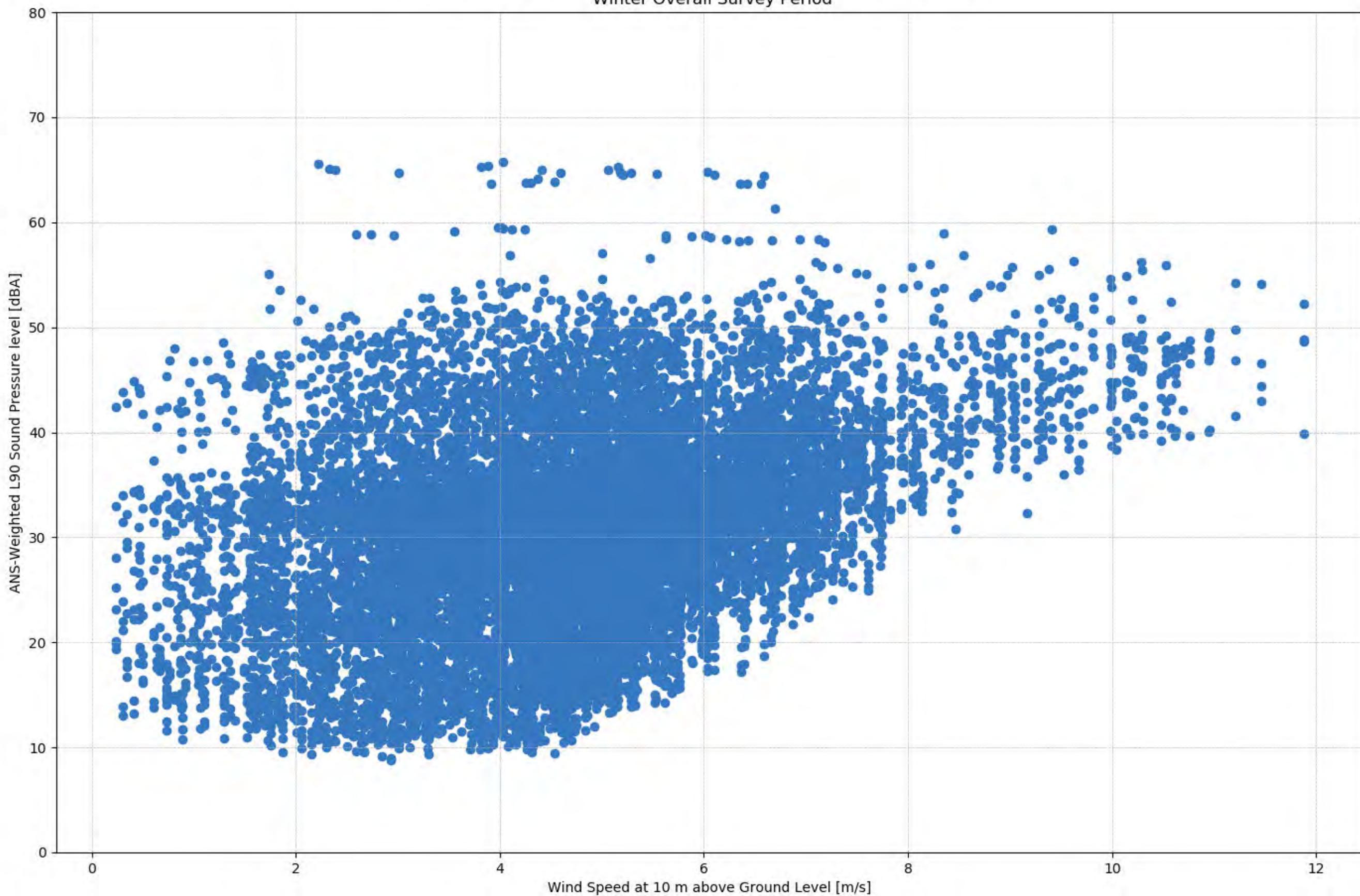


Figure 8-5 Measured L90 Sound Level vs. Normalized Wind Speed
Winter Overall Survey Period - Day

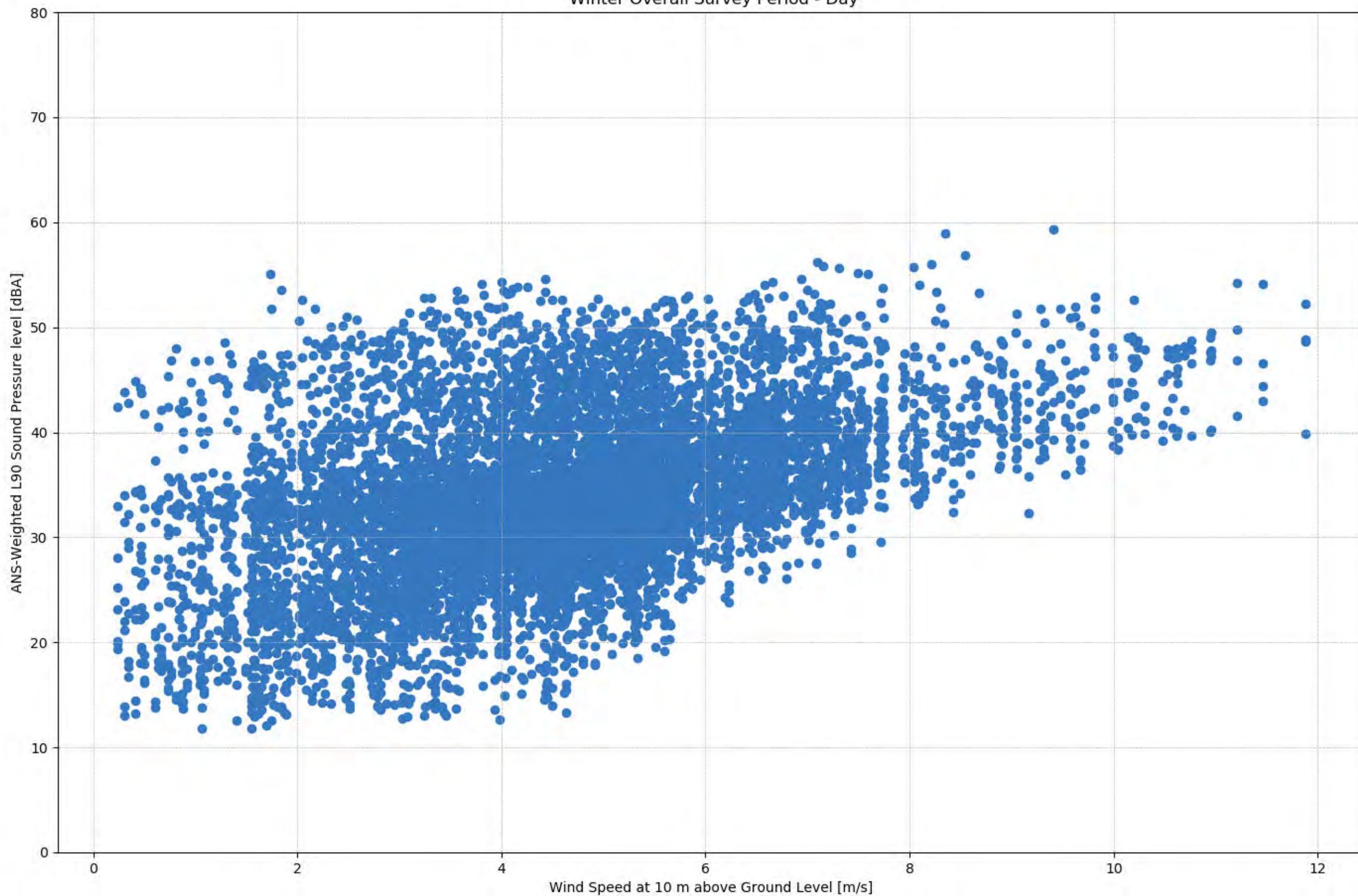


Figure 8-6 Measured L90 Sound Level vs. Normalized Wind Speed
Winter Overall Survey Period - Night

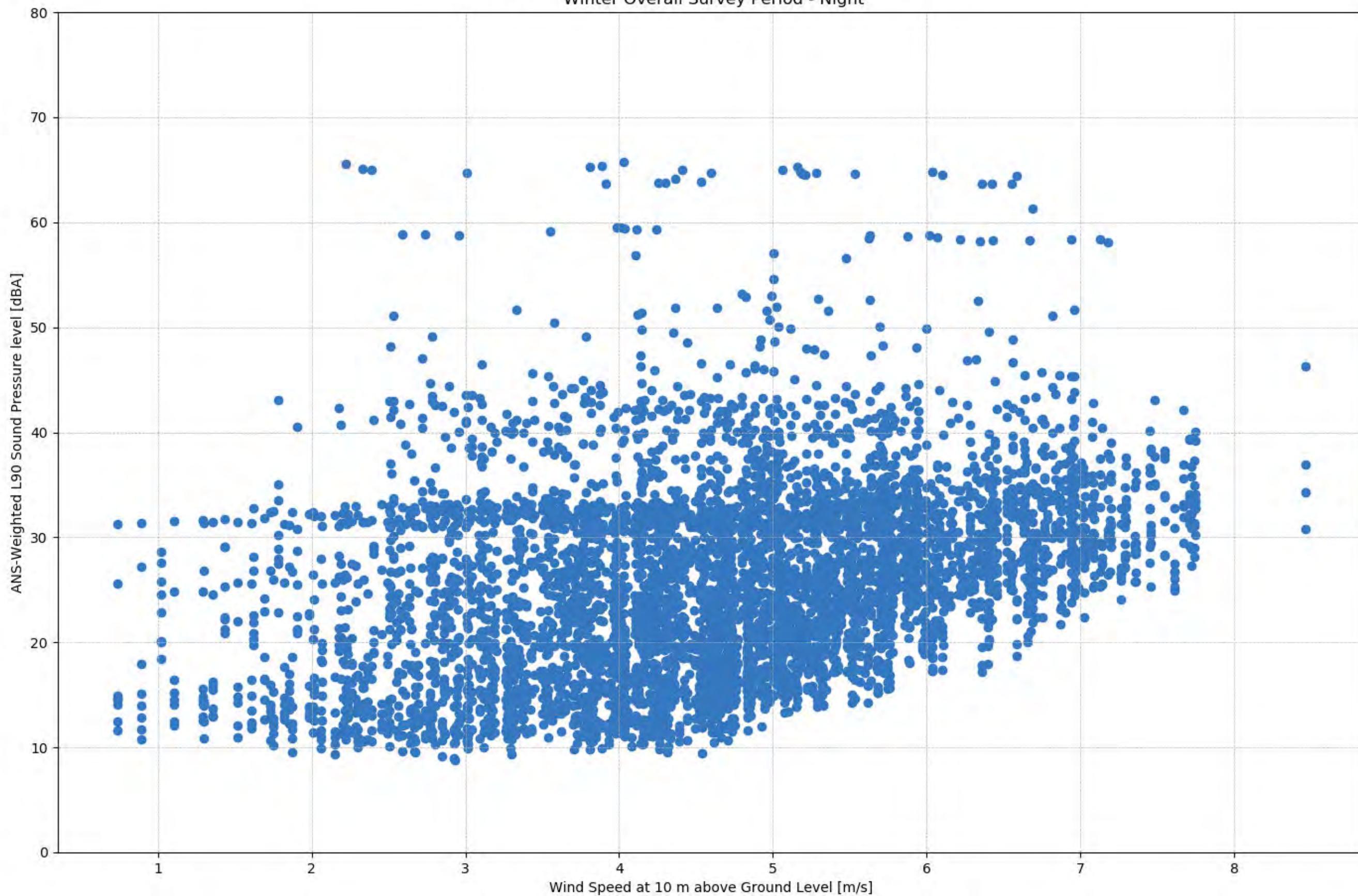


Figure 8-7 Measured L90 Sound Level vs. Normalized Wind Speed
Summer Overall Survey Period

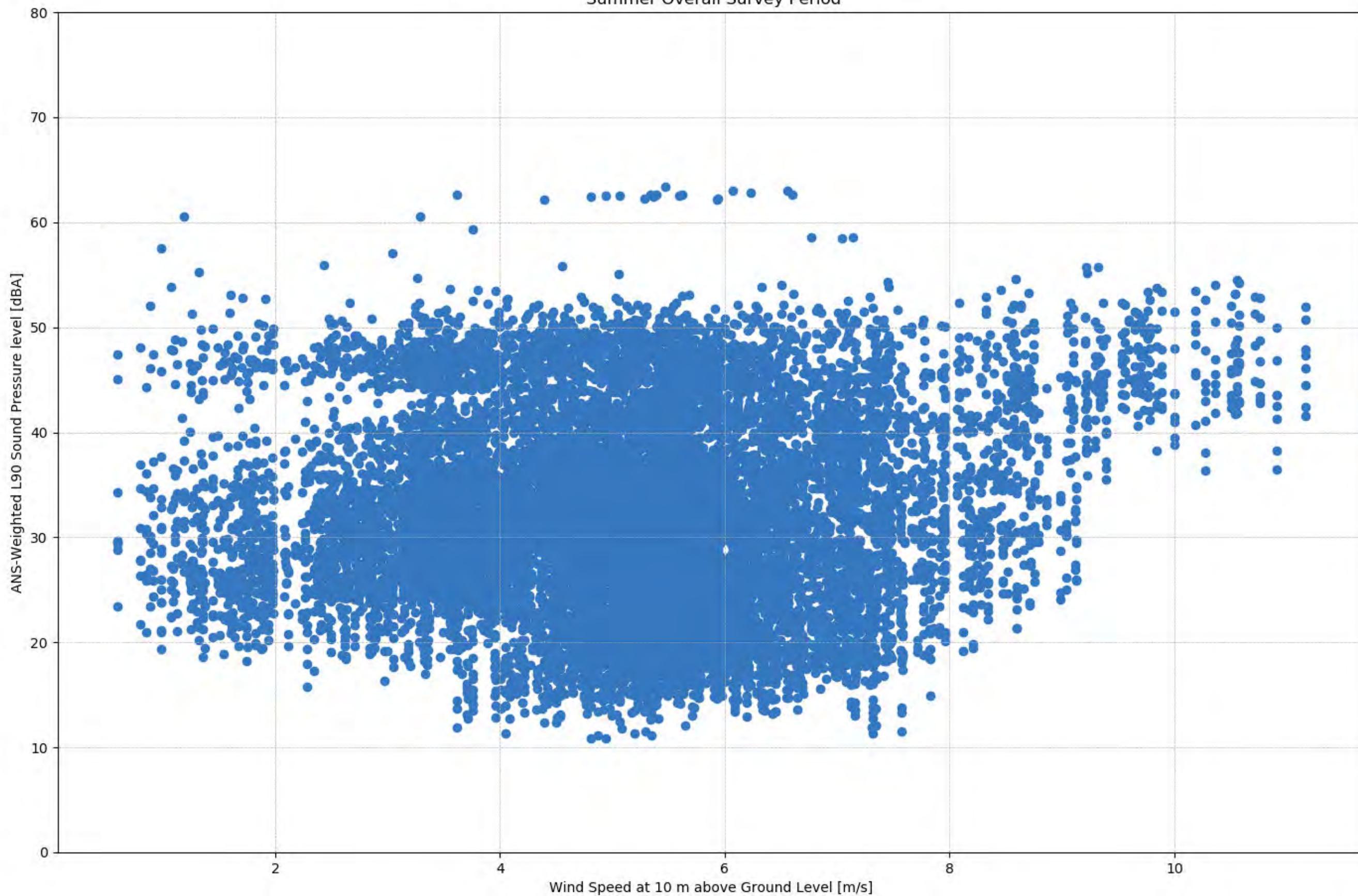


Figure 8-8 Measured L90 Sound Level vs. Normalized Wind Speed
Summer Overall Survey Period - Day

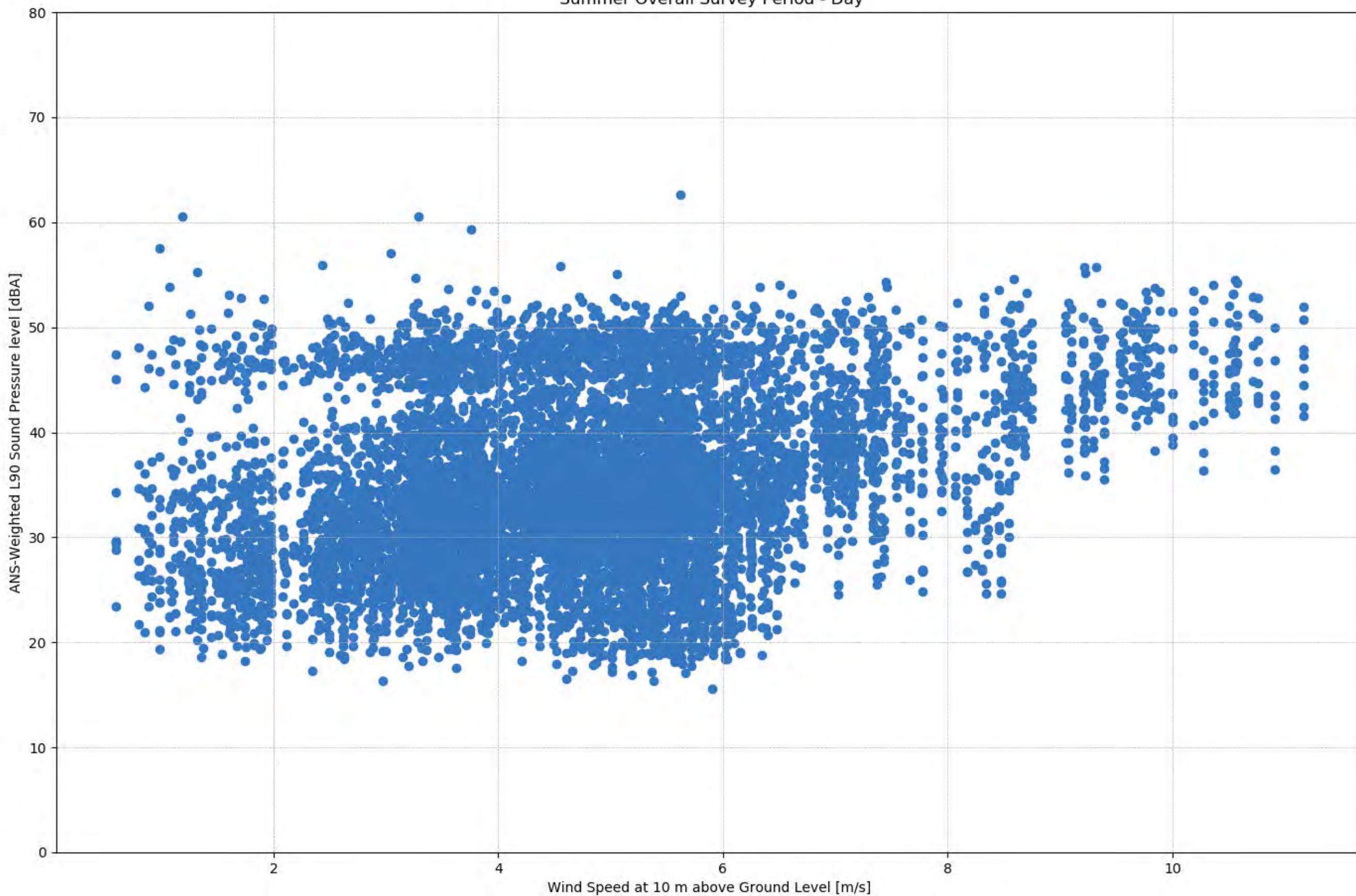


Figure 8-9 Measured L90 Sound Level vs. Normalized Wind Speed
Summer Overall Survey Period - Night

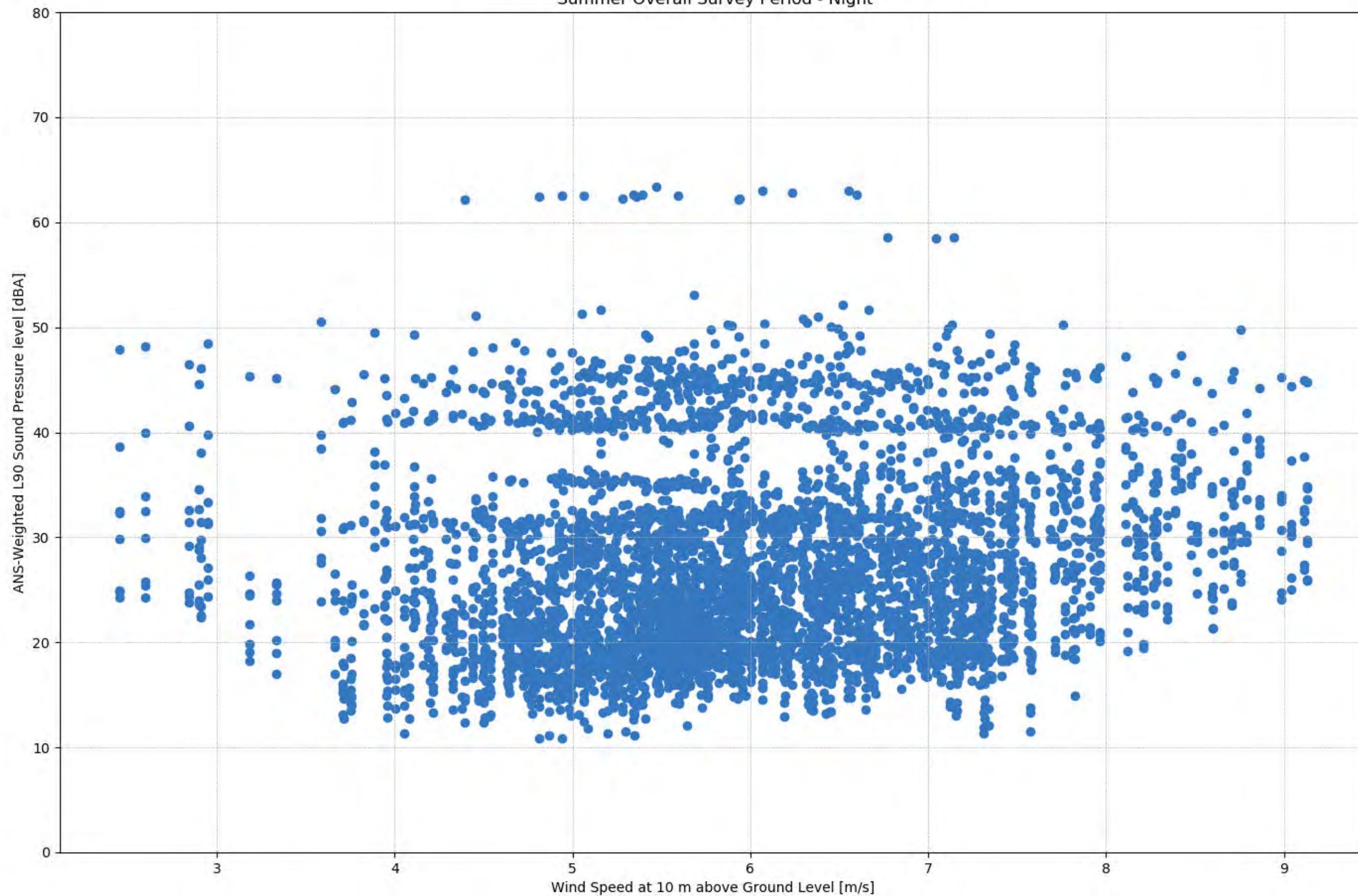


Figure 8-10 Baseline Monitoring Graphical Summary – Location 2
One-Third Octave-Band Low Frequency and Infrasound Sound Pressure Levels

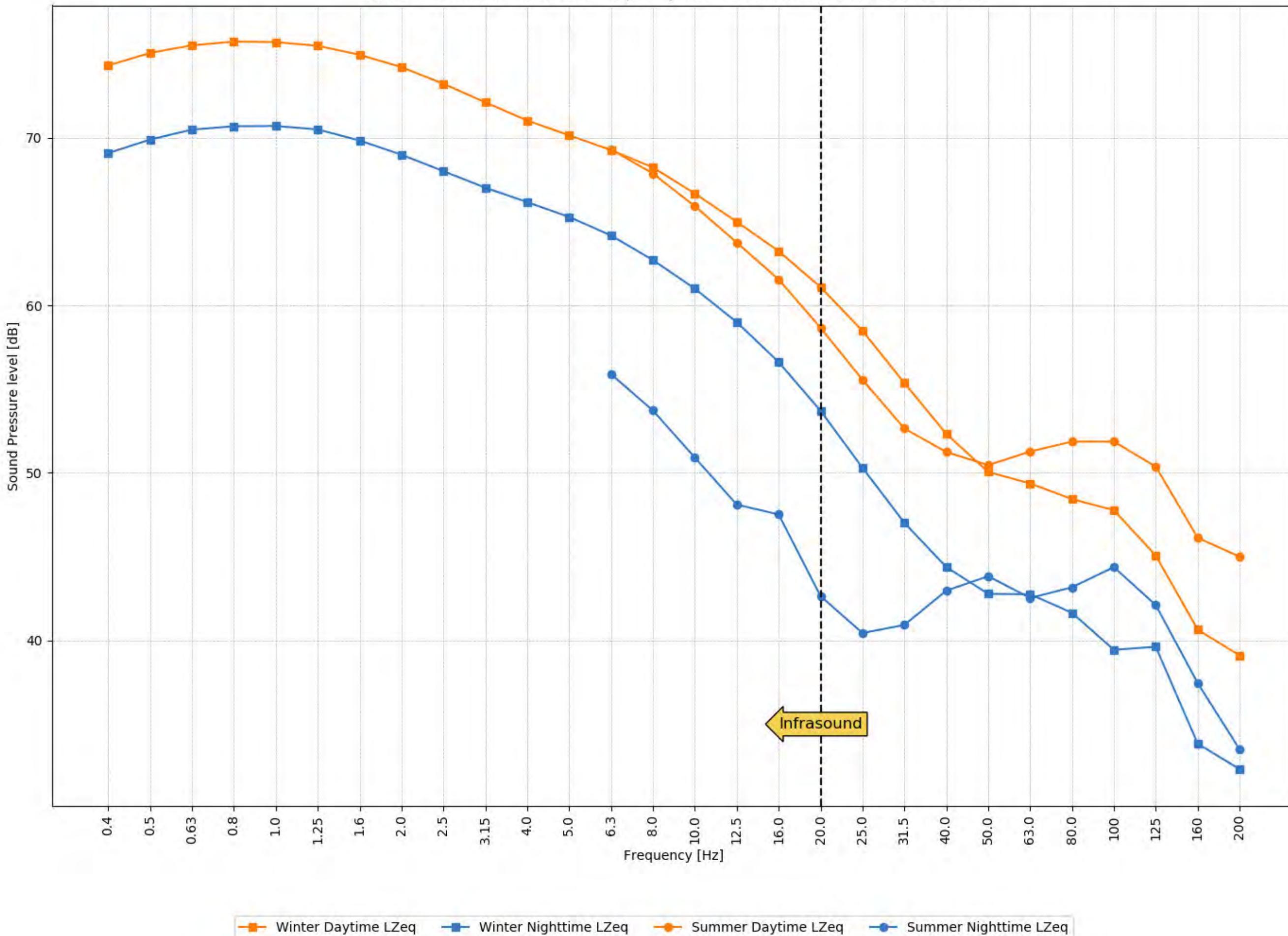


Figure 8-11 Baseline Monitoring Graphical Summary – Location 5
One-Third Octave-Band Low Frequency and Infrasound Sound Pressure Levels

