



# Hummelstown Project

## Noise Study

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## Executive Summary

SLR International Corporation (SLR) has prepared a noise study at the request of The Hanover Company (Hanover) for the Hummelstown Project (Project) located in Hummelstown, Pennsylvania. The Project is a facility consisting of eight buildings and associated generator yards. This report presents the results of the noise study and noise modeling conducted by SLR.

The Township of South Hanover, Dauphin County, Pennsylvania, has proposed a sound level limit for data center land uses of 55 dBA and 55 dBC during daytime (7 am – 7 pm); and 45 dBA and 45 dBC during nighttime (7 pm – 7 am) at any adjoining residential property lines.

An ambient noise survey was conducted by SLR on May 5 through May 8, 2026, and a three-dimensional computer noise model was developed to predict the noise contributions from the future equipment. Continuous monitors were placed at five locations surrounding the Project site in the directions of the nearest property lines.

The ambient survey results at the three measurement locations closest to the nearest residences are summarized in Table A, below.

**Table A: Summary of Nighttime Average Sound Levels**

| Measurement Location              | Description | 12-hour Nighttime Average Levels, $L_{eq}$<br>(7:00 p.m. to 7:00 a.m.) |      |      |      |
|-----------------------------------|-------------|------------------------------------------------------------------------|------|------|------|
|                                   |             | dBA                                                                    |      | dBC  |      |
|                                   |             | Low                                                                    | High | Low  | High |
| 1                                 | North PL    | 60.1                                                                   | 61.9 | 64.2 | 66.6 |
| 4                                 | South PL    | 55.0                                                                   | 57.5 | 64.1 | 65.7 |
| 5                                 | West PL     | 45.3                                                                   | 50.4 | 56.2 | 61.8 |
| Proposed Township Nighttime Limit |             | 45                                                                     |      | 45   |      |

These measured levels include contributions from all noise sources in the area. As shown in Table A, the measured A-weighted sound levels at ML 5 were at 45 dBA, but all other measured average nighttime sound levels were higher than 45 dBA. Measured nighttime average C-weighted sound levels at all locations were significantly higher than the proposed Township limit of 45 dBC, with the lowest nighttime C-weighted average of 56.2 dBC at the West PL.

SLR developed a noise model of the site to evaluate sound levels from the Project HVAC equipment. Four different configurations of HVAC equipment were evaluated, starting with a typical Carrier air-cooled chiller system, then progressively exploring quieter equipment options with the best available manufacturer noise mitigation options. These other options included a Multistack air-cooled chiller with different types of manufacturer-supplied silencers and two EVAPCO cooling tower options with manufacturer noise mitigation.

Predicted Project sound levels for all evaluated cases were higher than the Township's proposed 45 dBC property line limit. Predicted sound levels for Case 3, the quietest set of equipment, EVAPCO 428-4P48 cooling towers with manufacturer silencers, range from 33 to 39 dBA and 51 to 54 dBC at the Project property line.

There is extensive, best-available noise mitigation included in the current Project design. The effects from acoustical barriers, berms, and silencers have essentially been maximized, so there are no other practical, commercially-available noise mitigation options to reduce the C-weighted sound levels from the Project. Based on the results of this study, it is unlikely that there is a



commercially available HVAC equipment solution that would produce sound levels lower than 45 dBC at the Project property line.

The potential noise impact, as indicated by the potential increase in sound levels at the property line, was also evaluated. For Case 3, the quietest equipment arrangement, there is no predicted increase in the nighttime average sound level for the north and south property lines. At the west property line, there is a predicted increase in the nighttime average sound level of 1 dBA and 2 dBC. For most people, this change in the nighttime average sound level would not be perceptible.



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## Acronyms and Abbreviations

|                 |                                                |
|-----------------|------------------------------------------------|
| dB              | Decibel                                        |
| dBA             | A-Weighted Decibel                             |
| DIL             | Dynamic Insertion Loss                         |
| FERC            | Federal Energy Regulatory Commission           |
| Hz              | Hertz                                          |
| IL              | Insertion Loss                                 |
| ISO             | International Organization for Standardization |
| L <sub>d</sub>  | Daytime Average Sound Level                    |
| L <sub>n</sub>  | Nighttime Average Sound Level                  |
| L <sub>dn</sub> | Day-Night Sound Level                          |
| L <sub>eq</sub> | Equivalent Continuous Sound Level              |
| L <sub>p</sub>  | Sound Pressure Level                           |
| L <sub>w</sub>  | Sound Power Level                              |
| ML              | Measurement Location                           |
| NSA             | Noise Sensitive Area                           |
| SLM             | Sound Level Meter                              |
| SLR             | SLR International Corporation                  |
| STC             | Sound Transmission Class                       |
| TL              | Transmission Loss                              |



## 1.0 Introduction

SLR International Corporation (SLR) has prepared a noise study at the request of The Hanover Company (Hanover) for the Hummelstown Project (Project) located in Hummelstown, Pennsylvania. The Project is a facility consisting of eight buildings and generator yards. This report presents the results of the noise study and noise modeling conducted by SLR.

A glossary of common acoustical terminology and metrics is included in **Appendix A**.

## 2.0 Sound Level Criteria

The Township of South Hanover, Dauphin County, Pennsylvania, has proposed noise limits for data center land uses in a proposed addition to the Zoning Code<sup>1</sup>. The proposed addition includes the following limits for data center land uses:

### §2208. Noise Regulations.

1. *As part of any land development plan submission, the applicant shall submit a report providing the details of a sound study that estimates current sound levels and establishes post construction sound levels at the time of operation along all property lines, in compliance with the applicable provisions of this Section 27-2208. The report shall include proposed methods and materials to mitigate excess noise levels and limit the dbA and dbC levels at the property line to the levels stated in the table in paragraph 2 below. The study shall also estimate the dbA and dbC noise levels that adjacent existing dwellings would experience under the existing and/ or proposed conditions and mitigation measures.*
2. *Sound levels shall not exceed the following dBA and dBC levels for the zoning district contiguous to the property line of the subject property measured at the property line:*

| MAXIMUM SOUND LEVELS FOR DATA CENTERS AT PROPERTY LINE          |                     |                       |                     |                       |
|-----------------------------------------------------------------|---------------------|-----------------------|---------------------|-----------------------|
| Affected Zoning District(s)                                     | Daytime Maximum dBA | Nighttime Maximum dBA | Daytime Maximum dBC | Nighttime Maximum dBC |
| Residential<br>(R-A, ESC, R-S, R-U, R-M, V, R-MH, R-MT and R-C) | 55                  | 45                    | 55                  | 45                    |

*\* Such sound level limits shall not apply to any property line of a lot that is located within the Data Center Overlay District and incorporated as part of a principal use permitted in the Data Center Overlay District.*

3. *For the purposes of this section: "Daytime" means 7 a.m. to 7 p.m. and "Nighttime" means 7 p.m. to 7 a.m. for the 24-hour period in question.*

<sup>1</sup> Township of South Hanover, Chapter 27, Zoning, Article, Section 5 – 2208



4. *The sound levels set forth above may be exceeded for:*
  - A. *Testing of auxiliary power generating systems, including generators, between the hours of 7:00 AM and 7:00 PM EST, provided that such testing shall (i) occur only on weekdays between the hours of 7:00 AM and 7:00 PM EST, (ii) not produce sound levels that exceeds a maximum of 70 dbA and 80 dbC as measured at the property line, (iii) be limited to a maximum period of three hours per day, and (iv) be performed a maximum of one time per week.*
  - B. *Auxiliary power generating systems in use when the utility supplied power system fails. Auxiliary power generating systems shall not be used to augment the primary power system for purposes of increased data processing capacity or for normal data center operations.*
5. *Within two years after issuance of a certificate(s) of occupancy for all Data Center buildings that have been constructed pursuant to an approved land development plan, the Township reserves the right, in its sole discretion, to engage a third-party sound expert of its choosing to perform a post-occupancy noise study at the Data Center facilities at the Owner's expense to confirm compliance with the sound level standards set forth in this section 272208. If the study shows that the noise standards are not met, the Owner shall undertake any modifications needed to bring the facilities into compliance with the noise standards..*

### 3.0 A and C Weighting

Sound waves can be described by how rapidly the sound pressure oscillates, termed the frequency of the sound. The unit of frequency is the cycle per second, designated Hertz (Hz). Most young people can hear sounds in the range of about 20 Hz up to about 20,000 Hz. The human ear has different sensitivities to different frequencies, with the highest sensitivity at about 2,000 Hz and with much less sensitivity at lower frequencies.

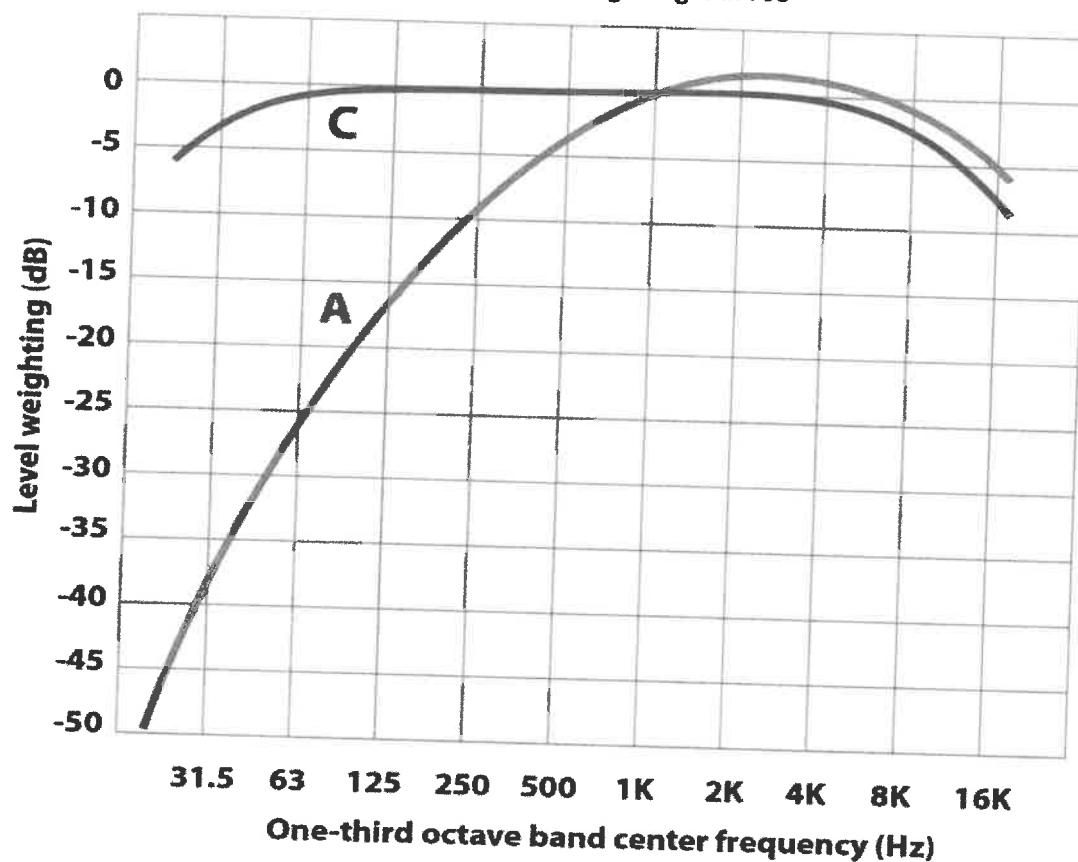
Weighting scales have been developed that mimic the human hearing response at different sound levels. The most common is the A-weighting scale which is used by most noise ordinances, regulations, and federal standards. The C-weighting scale was originally developed to be representative of human hearing at higher sound levels, above 85 dBC. Currently, C-weighting is typically used in cases where low-frequency sound levels are of concern, as it is a relatively flat weighting and does not roll-off low frequency sound levels as significantly as A-weighting. **Figure 1** shows the weighting factors for A and C weighting scales. Note the very large negative low-frequency adjustments, up to -39.4 dB at 31.5 Hz, for the A-weighting scale, while the C-weighting scale is relatively flat.

Sound levels measured using one of these weighting scales and measured in decibels are commonly abbreviated dBA, or dB(A), and dBC, or dB(C), for A or C-weighted sound levels, respectively. Sound levels without any weighting factors are termed Linear or Z-weighted sound levels and are often abbreviated dB, dBL, dB(L), dBZ, or dB(Z). A designation of dB can be applied to any weighting and the weighting used should be indicated in the metric or description of the measurement for clarity.

Most regulations regarding sound levels use the A-weighted sound level. In some cases, C-weighted sound levels are used as a regulatory target, typically when low-frequency sounds are of concern. However, because of the different weighting between the A and C-weighting scales, for typical noise sources and environments, C-weighted sound levels for the same environment or source are typically higher than A-weighted sound levels by 5 – 15 decibels.



Figure 1: Weighting Factors for A and C-Weighting Curves



## 4.0 Description of Site and Facility

### 4.1 Description of Site

The Project site is a former quarry located at 16 Wagner St, Hummelstown, PA 17036. There are residential areas located along the North, West, and South property line of the Project site. The closest noise sensitive area (NSA) is approximately 1,220 feet west from the center of the Project site.

### 4.2 Description of Facility

The proposed facility consists of the following:

- Eight (8) Buildings
- Eight (8) Generator Yards
- Auxiliary Power Generators
- HVAC Equipment (Air Cooled Chillers/Water Cooling Towers)



## 5.0 Sound Level Survey

A sound measurement survey was conducted by Jeff Bregar of SLR on May 5 to May 8, 2026, to capture existing ambient sound levels near the property line.

### 5.1 Measurement Equipment

Sound level equipment used during the sound study included the following instruments:

- Larson Davis Model 821 SLM; Type 1: s/n 40679, 40901, 40902, 40903
- Larson Davis Model 831 SLM; Type 1: s/n 2443
- Larson Davis CAL200 Calibrator; s/n 19864

Windscreens were used on the measurement microphones. The sound level meters were field-calibrated before and after measurement intervals, showing no significant change in sensitivity over the survey period. All instruments have current laboratory certification that can be provided upon request. Measurements were conducted five feet above the ground.

### 5.2 Weather Conditions

Weather conditions were appropriate for an outdoor sound level study. A summary of the weather conditions is shown in **Table 5-1**.

**Table 5-1: Summary of Weather Conditions**

|                         |                 |
|-------------------------|-----------------|
| Date                    | May 5 – 8, 2026 |
| Temperature Range       | 43°F – 81°F     |
| Relative Humidity Range | 29% – 93%       |
| Wind Speed (Average)    | 8 – 15 mph      |
| Wind From               | W/SW            |
| Sky Condition           | Mostly Fair     |
| Ground Condition        | Mostly Dry      |

Complete weather data from the measurement survey were obtained from Weather Underground<sup>2,3,4,5</sup> and are shown in **Appendix C**.

### 5.3 Measurement Methodology

Continuous overnight sound measurements were in terms of 10-second and 15-minute samples. Sound levels were measured using the slow meter response and A-weighting. Broadband A-weighted (dBA) levels, C-weighted (dBC) levels and unweighted whole and one-third octave band levels were also measured.

<sup>2</sup> <https://www.wunderground.com/history/daily/us/pa/middletown/KMDT/date/2026-5-5>

<sup>3</sup> <https://www.wunderground.com/history/daily/us/pa/middletown/KMDT/date/2026-5-6>

<sup>4</sup> <https://www.wunderground.com/history/daily/us/pa/middletown/KMDT/date/2026-5-7>

<sup>5</sup> <https://www.wunderground.com/history/daily/us/pa/middletown/KMDT/date/2026-5-8>



## 5.4 Measurement Locations

Various nearby NSAs (all residences) were identified during the study using aerial imagery and field observations. Continuous sound levels were measured at five locations along the property line to best represent the existing sound levels near each NSA. The measurement locations (ML) are shown in **Figure B-1** and summarized in **Table 5-2**, which shows the distances and directions from the approximate center of the Project site.

**Table 5-2: Summary of Measurement Locations**

| Measurement Location (ML) | Approximate Distance (feet) and Direction from Center of Project Site |
|---------------------------|-----------------------------------------------------------------------|
| ML 1                      | 1,660 / NNW                                                           |
| ML 2                      | 1,915 / N                                                             |
| ML 3                      | 2,725 / E                                                             |
| ML 4                      | 3,090 / SSW                                                           |
| ML 5                      | 1,220 / W                                                             |

Measurements were approximately three days in duration. Observations at the measurement locations are summarized in **Table 5-3**.

**Table 5-3: Summary of Measurement Observations**

| Measurement Location (ML) | Measurement Duration HH:MM | Source Observations During Measurements                                                   |
|---------------------------|----------------------------|-------------------------------------------------------------------------------------------|
| ML 1                      | 69:35                      | Distant and local traffic, leaf rustle, bird and insect noise                             |
| ML 2                      | 69:32                      | Distant and local traffic, leaf rustle, bird and insect noise                             |
| ML 3                      | 76:19                      | Distant construction noise and backup alarms, leaf rustle, traffic along Hershey Park Dr. |
| ML 4                      | 95:36                      | Residential AC noise, traffic along Hanover St., leaf rustle, birds                       |
| ML 5                      | 71:36                      | Wind, rustling leaves, birds, low-frequency noise from traffic on Hanover St.             |

## 5.5 Measurement Results

The sound survey measurement results are summarized in **Table 5-4** and **Table 5-5**. The measured sound levels for daytime,  $L_d$ , (7:00am – 6:59pm) and nighttime,  $L_n$ , (7:00pm – 6:59am) are shown. The results include influence from all sounds present during the measurement duration. These include local traffic, birds, insects, and anything else that occurred during the measurement period. Measurement results are presented in terms of A-weighted and C-weighted sound levels.



**Table 5-4: Measured Existing Ambient Sound Levels and Noise Limit - dBA**

| Date     | A-weighted Sound Levels $L_{eq}$ , dB(A)               |      |      |      |      |       |                                                          |      |      |      |      |       |
|----------|--------------------------------------------------------|------|------|------|------|-------|----------------------------------------------------------|------|------|------|------|-------|
|          | Daytime (7:00am - 6:59pm) at Measurement Location (ML) |      |      |      |      |       | Nighttime (7:00pm - 6:59am) at Measurement Location (ML) |      |      |      |      |       |
|          | 1                                                      | 2    | 3    | 4    | 5    | Limit | 1                                                        | 2    | 3    | 4    | 5    | Limit |
| 5/5/2026 | 66.4                                                   | 68.0 | 52.3 | 58.2 | 52.6 | 55    | 60.7                                                     | 63.6 | 49.6 | 57.5 | 50.4 | 45    |
| 5/6/2026 | 66.1                                                   | 68.4 | 50.3 | 56.3 | 50.3 | 55    | 61.9                                                     | 61.5 | -    | 55.0 | 46.2 | 45    |
| 5/7/2026 | 65.3                                                   | 67.0 | -    | 55.6 | 49.9 | 55    | 60.1                                                     | 61.3 | -    | 55.9 | 45.3 | 45    |
| 5/8/2026 | 65.5                                                   | 66.7 | 51.6 | 59.1 | 47.6 | 55    | -                                                        | -    | -    | -    | -    | 45    |

**Table 5-5: Measured Existing Ambient Sound Levels and Noise Limit - dBC**

| Date     | C-weighted Sound Levels $L_{eq}$ , dB(C)               |      |      |      |      |       |                                                          |      |      |      |      |       |
|----------|--------------------------------------------------------|------|------|------|------|-------|----------------------------------------------------------|------|------|------|------|-------|
|          | Daytime (7:00am - 6:59pm) at Measurement Location (ML) |      |      |      |      |       | Nighttime (7:00pm - 6:59am) at Measurement Location (ML) |      |      |      |      |       |
|          | 1                                                      | 2    | 3    | 4    | 5    | Limit | 1                                                        | 2    | 3    | 4    | 5    | Limit |
| 5/5/2026 | 73.5                                                   | 76.6 | 69.4 | 66.9 | 69.9 | 55    | 66.6                                                     | 70.5 | 61.4 | 65.7 | 61.8 | 45    |
| 5/6/2026 | 69.5                                                   | 74.2 | 61.2 | 64.8 | 60.6 | 55    | 66.3                                                     | 69.0 | -    | 64.3 | 56.2 | 45    |
| 5/7/2026 | 69.4                                                   | 73.0 | -    | 64.7 | 61.9 | 55    | 64.2                                                     | 67.1 | -    | 64.1 | 56.5 | 45    |
| 5/8/2026 | 69.9                                                   | 71.2 | 72.1 | 66.3 | 59.0 | 55    | -                                                        | -    | -    | -    | -    | 45    |

Table 5-4 and Table 5-5 indicate that the existing ambient sound levels at the measurement locations range from 47.6 to 68.4 dBA  $L_d$  and 59.0 to 76.6 dBC  $L_d$ , while the nighttime ambient sound levels ranged from 45.3 to 63.6 dBA  $L_n$  and 56.2 to 70.5 dBC  $L_n$ . These measured levels include contributions from all noise sources in the area. Only A-weighted daytime sound levels measured at ML 3 and ML 5 were lower than the proposed Township daytime noise limit of 55 dBA.

In general, C-weighted nighttime sound levels were 4.1 to 11.8 decibels higher than the A-weighted sound levels for the same period. This demonstrates that in environmental settings, measured C-weighted sound levels are almost always higher than A-weighted sound levels for the same measurement.

Sound Level vs. Time graphs from each measurement location are included in Error! Reference source not found.. The upper graph shows the 10-second  $L_{eq}$ , dBA, represented by a solid dark blue line; the 10-second  $L_{eq}$ , dBC, represented by a solid orange line; the 15-minute  $L_{eq}$ , dBA, a stepped red line; the 15-minute  $L_{eq}$ , dBC, a stepped light blue line; and the 15-minute  $L_{90}$ , dBA, a stepped green line.



The  $L_{90}$  sound level is the level exceeded 90% of the time during a measurement interval and can be considered the “background” sound level, minimally influenced by brief sound events (such as vehicle pass-bys or aircraft flyovers). Each dataset line represents the A-weighted sound level. The lower portion of the graph shows frequency-based data. Sound frequency is plotted on the vertical axis and time on the horizontal axis. The color indicates the A-weighted sound pressure level at each frequency. The frequency data are useful for characterizing the presence of specific noise emissions.

## 6.0 Noise Impact Evaluation

A noise model was developed for the Project to predict the total data center facility sound contribution at the property line, to separate and estimate the contributions from individual equipment items, and to evaluate noise control treatment options.

It is important to note that data center facility sound contributions at residences will vary over time, primarily due to atmospheric stability and wind conditions. Sound propagates most efficiently during nighttime periods having overcast conditions, but is often more attenuated on clear, sunny days. Wind direction also influences propagation; for example, sound levels at southern residences will be higher when winds are out of the north.

### 6.1 Noise Model Development

A three-dimensional noise model was developed to analyze the sound level contributions expected from several different possible data center HVAC equipment configurations. The model was developed using CadnaA, version 2026 MR 1 (build: 215.5625), a commercial modeling package developed by DataKustik GmbH. The software considers spreading losses, ground and atmospheric effects, shielding from barriers and buildings, reflections from surfaces and other sound propagation properties. The CadnaA software is based on published engineering standards. The ISO 9613-2 (2024) standard was used for air absorption and other noise propagation calculations.

To be conservative, foliage was not included in the model. The terrain was modeled based on United States Geological Survey (USGS) topographical data at a resolution of 10 by 10 meters. A temperature of 10 degrees Celsius and 70 percent relative humidity were used for the atmospheric absorption calculations. The ground was modeled as mixed, with a ground absorption coefficient of 0.5. The number of reflections in the model was set to 2.

### 6.2 Data and Assumptions

#### 6.2.1 Site Layout

The modeled site layout is shown in **Figure B-2**. The following assumptions were included in the model layout:

- Each building has a 30-ft eave height and flat roof.
- The site layout is slightly modified to shift Building 7 and Building 8 to the east to comply with a 500 ft. setback distance from the west property line.

A three-dimensional rendering of the rooftop HVAC model, showing the shifted building and parapet barrier, is shown in **Figure B-3**.



### 6.2.2 Evaluation Points

Sound levels were evaluated at three worst-case property line receivers: south, west, and north. The receiver locations that are included in the noise model are shown in **Figure B-4**.

### 6.2.3 HVAC Equipment Options

Four different configurations of HVAC equipment were evaluated, with three different arrangements for Case 1 and three different noise mitigation options for Case 2. Case 3 and 4 equipment includes the highest level of noise mitigation available from the manufacturer.

1. Carrier Model 30XV450H Air-Cooled Chillers, **46** chillers per building
  - a. At grade without barriers
  - b. At grade with 40 ft barriers between buildings
  - c. Rooftop with a 20 ft. tall parapet barrier
2. Multistack, ACF662MCHFM Air Cooler Chillers, **36** chillers per building
  - a. No silencers
  - b. 36" tall discharge silencers (RH36/2E)
  - c. 60" tall discharge silencers (RH60/2D)
3. Evapco AT 428-4P48 Cooling Tower, with noise mitigation, **7** cooling towers per building
4. Evapco LSTE-10536F, with noise mitigation, **21** cooling towers per building

### 6.2.4 HVAC Sound Power Levels

**Table 6-1** shows the sound power levels used as input to the model for the potential future Project site equipment. Note that the C-weighted sound power levels for the equipment are always higher than the A-weighted sound power level. The C-weighted sound power levels exceed the A-weighted levels by 6 to 15 dB.

**Table 6-1: Sound Power Levels ( $L_w$ ) for Project Site Equipment**

| Source                                                                    | Linear Sound Power Level at Octave Center Frequency, per Single Unit |     |     |     |     |    |    |    |    | Total |      |
|---------------------------------------------------------------------------|----------------------------------------------------------------------|-----|-----|-----|-----|----|----|----|----|-------|------|
|                                                                           | 31.5                                                                 | 63  | 125 | 250 | 500 | 1k | 2k | 4k | 8k | dBA   | dB C |
| 1) Carrier Air Cooled Chiller, $L_w$ <sup>2</sup>                         | 108                                                                  | 95  | 94  | 92  | 101 | 93 | 95 | 90 | 84 | 102   | 108  |
| Transformer, $L_w$ <sup>2</sup>                                           | 76                                                                   | 85  | 90  | 89  | 89  | 83 | 78 | 73 | 66 | 89    | 95   |
| 2a) Multistack Air Cooled Chiller with No Silencer, $L_w$ <sup>1</sup>    | 106                                                                  | 106 | 102 | 98  | 96  | 94 | 93 | 90 | 90 | 100   | 109  |
| 2b) Multistack Air Cooled Chiller with 30-in Silencer, $L_w$ <sup>1</sup> | 105                                                                  | 105 | 101 | 94  | 89  | 86 | 86 | 84 | 84 | 94    | 108  |
| 2c) Multistack Air Cooled Chiller with 60-in Silencer, $L_w$ <sup>1</sup> | 105                                                                  | 105 | 99  | 92  | 84  | 79 | 84 | 83 | 83 | 92    | 107  |
| 3) EVAPCO Cooling Tower Option 1 (AT 428-4P48), $L_w$ <sup>1</sup>        | 101                                                                  | 101 | 95  | 89  | 84  | 84 | 82 | 82 | 81 | 90    | 103  |
| 4) EVAPCO Cooling Tower Option 2 (LSTE-10536F), $L_w$ <sup>1</sup>        | 99                                                                   | 99  | 94  | 87  | 82  | 77 | 74 | 73 | 74 | 86    | 101  |

1. Manufacturer data provided by client.  
2. Manufacturer data/measurements from other data center projects



### 6.2.5 Property Line Berm

- All calculations include a property-line berm along the south, west, and north property lines that has a top height of 25-ft above grade with a top width of 15-ft.
- The berm includes a setback distance from the property line by approximately 30 feet.
- This berm is required by the Township zoning ordinance along all residential property lines.

### 6.2.6 Other Assumptions

The following additional assumptions were made when developing the noise model:

- All required HVAC equipment is assumed to fit on the roof and/or in the generator yards.
- For all cases with rooftop mounted HVAC equipment, a 20 foot tall parapet wall, with acoustical absorption on the equipment / interior side of the barrier, is included around the perimeter of each data center building
- For cases with equipment mounted at grade, 40 foot tall barriers are located on the west side of each data center building, spanning across the generator / HVAC equipment yard area.
- All evaluated cases are for all eight data center buildings in simultaneous operation.

### 6.2.7 Emergency Generators

It is expected that with the berm and standard noise mitigation, that sound levels from the emergency generator equipment will be able to meet the special Township sound level limits for generators during testing. Generator sound levels are exempt from Township limits during emergency power-outage operation. As such, sound levels from generators have not been modeled or assessed at this time.

## 6.3 Noise Model Results

### 6.3.1 Results Summary

**Table 6-2** presents a summary of the predicted A-weighted and C-weighted property line sound levels for each evaluated HVAC case. Predicted sound levels that exceed the proposed 45 dBA and 45 dBC nighttime limits are shown in shaded cells. The sound levels presented are the contribution of only the modeled Project HVAC equipment, without any influence from existing ambient sound levels.



**Table 6-2: Summary of Predicted Sound Level Contributions**

| Case | Description                                   | Property Line | Predicted Project Sound Level Contribution |       |
|------|-----------------------------------------------|---------------|--------------------------------------------|-------|
|      |                                               |               | dBA                                        | dB(C) |
| 1a   | Carrier Chiller at Grade without Barriers     | West          | 53                                         | 67    |
|      |                                               | North         | 51                                         | 63    |
|      |                                               | South         | 48                                         | 62    |
| 1b   | Carrier Chiller at Grade with a 40-ft Barrier | West          | 49                                         | 65    |
|      |                                               | North         | 51                                         | 63    |
|      |                                               | South         | 46                                         | 62    |
| 1c   | Carrier Chiller on Roof                       | West          | 51                                         | 65    |
|      |                                               | North         | 48                                         | 63    |
|      |                                               | South         | 48                                         | 62    |
| 2a   | Multistack Chiller on Roof with No Silencers  | West          | 49                                         | 65    |
|      |                                               | North         | 46                                         | 63    |
|      |                                               | South         | 46                                         | 63    |
| 2b   | Multistack Chiller on Roof with 36" Silencers | West          | 44                                         | 64    |
|      |                                               | North         | 41                                         | 62    |
|      |                                               | South         | 41                                         | 62    |
| 2c   | Multistack Chiller on Roof with 60" Silencers | West          | 43                                         | 64    |
|      |                                               | North         | 40                                         | 61    |
|      |                                               | South         | 39                                         | 61    |
| 3    | EVAPCO AT 428-4P48 on Roof                    | West          | 39                                         | 54    |
|      |                                               | North         | 36                                         | 53    |
|      |                                               | South         | 33                                         | 51    |
| 4    | EVAPCO LSTE-10536F on Roof                    | West          | 39                                         | 57    |
|      |                                               | North         | 37                                         | 55    |
|      |                                               | South         | 34                                         | 54    |

### 6.3.2 Results Discussion

The noise model results indicate that even for Cases 3 and 4, with the quietest cooling tower options from EVAPCO, including manufacturer silencers on the cooling tower intake and exhaust, the predicted C-weighted sound levels exceed 45 dB(C) by several decibels. The quietest option is Case 3, with A-weighted sound levels of lower than 40 dBA at all residential property lines and C-weighted sound levels of lower than 54 dB(C).



## 7.0 Noise Mitigation

The proposed Project HVAC design cases include significant noise mitigation as described below.

### 7.1 Property Line Berm

The Township required property line berm is included in the noise model. The berm is extensive, at a height of 25 feet above grade and with a top width of 15 feet. Berms and barriers are not particularly effective at reducing C-weighted sound levels so increasing the size or extent of this berm would not have much impact on the predicted C-weighted sound levels.

### 7.2 Building Parapet Wall

All of the cases evaluated with rooftop HVAC equipment include a 20 foot tall parapet wall around the perimeter of each building. This parapet wall can be constructed of many different types of material, but for rooftop mounting, a metal, fiberglass, or plastic modular panel is typically used. The parapet wall must be seamless, with no cracks or gaps, and the inside / equipment facing side of the parapet wall should be acoustically absorptive, with a Noise Reduction Coefficient (NRC) of 0.8 or greater. The sound transmission class rating of the barrier should be STC-30 or greater.

A 20 foot tall parapet wall is substantial and is tall enough to break the line of sight from the HVAC equipment to most of the property line. A taller parapet barrier would not provide any significant decrease in the C-weighted sound levels at the property line.

### 7.3 Manufacturer Noise Mitigation

Cases 2, 3, and 4 include various manufacturer noise mitigation. For Case 2, this consists of silencers on the fan discharges with two different lengths evaluated. For Case 3 and 4, the manufacturer noise mitigation includes silencers on the cooling tower intake and discharge. In all three cases, these are the quietest version of this equipment that is currently available.

## 8.0 Impact Assessment

Table 8-1 shows a summary of the data center sound levels combined with the measured existing nighttime average ambient sound levels, both A-weighted and C-weighted. The right two columns show the potential change in sound level at each property line receiver, for both A-weighted and C-weighted sound levels.

For A-weighted sound levels, most people consider a three decibel increase to be barely perceptible, a five decibel increase to be clearly noticeable, and a 10 decibel increase to sound twice as loud.

For Case 3, the quietest equipment arrangement, there is no predicted increase in the nighttime average sound level for the north and south property lines. At the west property line, there is a predicted increase in the nighttime average sound level of 1 dBA and 2 dBC. For most people, this change in the nighttime average sound level would not be perceptible.

During especially quiet periods, when ambient sound levels are low and under certain atmospheric conditions, sound from the data center would likely be audible at all property line locations, even at these low sound levels.



**Table 8-1: Summary of Potential Project Noise Impact**

| Case | Description                                      | Property Line | Predicted Data center Sound Level Contribution |     | Existing Ambient, Nighttime |     | Combined, Data center and Ambient |     | Potential Change in Sound Level |     |
|------|--------------------------------------------------|---------------|------------------------------------------------|-----|-----------------------------|-----|-----------------------------------|-----|---------------------------------|-----|
|      |                                                  |               | dBA                                            | dBC | dBA                         | dBC | dBA                               | dBC | dBA                             | dBC |
| 1a   | Carrier Chiller at Grade without a 40-ft Barrier | West          | 53                                             | 67  | 45                          | 56  | 53                                | 67  | 8                               | 11  |
|      |                                                  | North         | 51                                             | 63  | 60                          | 64  | 61                                | 67  | 1                               | 3   |
|      |                                                  | South         | 48                                             | 62  | 55                          | 64  | 56                                | 66  | 1                               | 2   |
| 1b   | Carrier Chiller at Grade with a 40-ft Barrier    | West          | 49                                             | 65  | 45                          | 56  | 51                                | 66  | 6                               | 10  |
|      |                                                  | North         | 51                                             | 63  | 60                          | 64  | 61                                | 67  | 1                               | 3   |
|      |                                                  | South         | 46                                             | 62  | 55                          | 64  | 56                                | 66  | 1                               | 2   |
| 1c   | Carrier Chiller on Roof                          | West          | 51                                             | 65  | 45                          | 56  | 52                                | 65  | 7                               | 9   |
|      |                                                  | North         | 48                                             | 63  | 60                          | 64  | 60                                | 66  | 0                               | 2   |
|      |                                                  | South         | 48                                             | 62  | 55                          | 64  | 56                                | 66  | 1                               | 2   |
| 2a   | Multistack Chiller on Roof with No Silencers     | West          | 49                                             | 65  | 45                          | 56  | 50                                | 66  | 5                               | 10  |
|      |                                                  | North         | 46                                             | 63  | 60                          | 64  | 60                                | 67  | 0                               | 3   |
|      |                                                  | South         | 46                                             | 63  | 55                          | 64  | 56                                | 66  | 1                               | 2   |
| 2b   | Multistack Chiller on Roof with 36" Silencers    | West          | 44                                             | 64  | 45                          | 56  | 48                                | 65  | 3                               | 9   |
|      |                                                  | North         | 41                                             | 62  | 60                          | 64  | 60                                | 66  | 0                               | 2   |
|      |                                                  | South         | 41                                             | 62  | 55                          | 64  | 55                                | 66  | 0                               | 2   |
| 2c   | Multistack Chiller on Roof with 60" Silencers    | West          | 43                                             | 64  | 45                          | 56  | 47                                | 65  | 2                               | 9   |
|      |                                                  | North         | 40                                             | 61  | 60                          | 64  | 60                                | 66  | 0                               | 2   |
|      |                                                  | South         | 39                                             | 61  | 55                          | 64  | 55                                | 66  | 0                               | 2   |
| 3    | EVAPCO AT 428-4P48 on Roof                       | West          | 39                                             | 54  | 45                          | 56  | 46                                | 58  | 1                               | 2   |
|      |                                                  | North         | 36                                             | 53  | 60                          | 64  | 60                                | 64  | 0                               | 0   |
|      |                                                  | South         | 33                                             | 51  | 55                          | 64  | 55                                | 64  | 0                               | 0   |
| 4    | EVAPCO LSTE-10536F on Roof                       | West          | 39                                             | 57  | 45                          | 56  | 46                                | 60  | 1                               | 4   |
|      |                                                  | North         | 37                                             | 55  | 60                          | 64  | 60                                | 65  | 0                               | 1   |
|      |                                                  | South         | 34                                             | 54  | 55                          | 64  | 55                                | 64  | 0                               | 0   |

## 9.0 Conclusions

SLR has completed a Noise Impact Assessment for the proposed Hummelstown Project. Sound levels from several different options of HVAC equipment were evaluated. Predicted Project sound levels for all evaluated cases were higher than the Township's proposed 45 dBC property line limit. Predicted sound levels for the quietest set of equipment, EVAPCO 428-4P48 cooling towers with manufacturer silencers, range from 33 – 39 dBA and 51– 54 dBC at the Project property line. There is extensive noise mitigation included in the current Project design, so there are not many other available noise mitigation options to reduce the C-weighted sound levels from the Project. Based on the results of this study, it is unlikely that there is an HVAC



equipment solution available that would produce sound levels lower than 45 dBC at the Project property line.

The potential noise impact, as indicated by the predicted increase in average nighttime sound levels at the property line, was also evaluated. For Case 3, the quietest equipment arrangement, there is no predicted increase in the nighttime average sound level for the north and south property lines. At the west property line, there is a predicted increase in the nighttime average sound level of 1 dBA and 2 dBC. For most people, this change in the nighttime average sound level would not be perceptible.

## 10.0 Closure

This document has been prepared by SLR International Corporation (SLR). The material and data in this report were prepared under the supervision and direction of the undersigned.

Sincerely,

**SLR International Corporation**

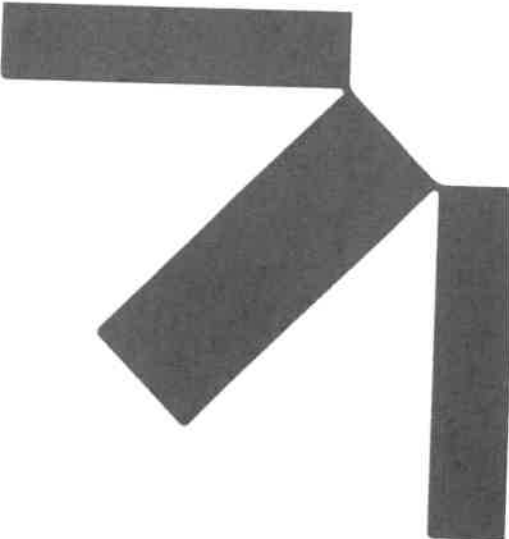


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# **Appendix A    Glossary of Common Acoustical Terminology**

## **Hummelstown**

Noise Study

**The Hanover Company**

SLR Project No.: 135.000170.00001

June 8, 2026

**A-weighting:** a weighting scale in which sound pressure levels in individual frequency bands are adjusted to match the response for the human ear. The reference adjustment is 0 dB at 1,000 Hz. The human ear is much less responsive at low frequencies. An A-weighted sound level is the total contribution from all sound frequencies, with the appropriate weighting factors applied and is designated as dBA.

**C-weighting:** a weighting scale that is relatively flat from 31.5 Hz to 8,000 Hz with a roll-off higher and lower than those frequencies. The adjustment is 0 dB from 200 Hz to 1,250 Hz. A C-weighted sound level is the total contribution from all sound frequencies, with the appropriate weighting factors applied and is designated as dBC.

**Hertz (Hz):** the unit of measure of frequency or the speed of vibration of a sound wave. Also referred to as "cycles per second".

**Insertion Loss (IL):** the decrease (in decibels, dB) in sound power level measured at the location of the receiver when a sound attenuator (e.g., muffler), barrier, or other sound reduction element is inserted in the transmission path between the source and receiver.

**$L_d$ :** the daytime average sound level. The  $L_{eq}$  averaged over daytime hours. Daytime hours may be defined differently by various ordinances and regulations. The hours between 7:00 am and 10:00 pm is the interval used by the U.S. Federal Energy Regulatory Commission (FERC) and the U.S. Department of Housing and Urban Development (HUD).

**$L_{dn}$  (also DNL):** the day-night average sound level, a metric used by many regulatory bodies (including FERC and HUD) as an overall representation of the sound at a measurement location. The  $L_{dn}$  is calculated by averaging the sound measured over a 24-hour period, with 10 decibels added to sound levels measured during nighttime hours.

**$L_{eq}$ :** the equivalent-continuous sound level is a time-average sound level for a specified time period. It is the most commonly used form of sound level averaging. Specifically, the  $L_{eq}$  is the level of a steady sound that has the same sound energy as a time-varying sound during a stated time period and at a stated location.

**$L_n$ :** the nighttime average sound level. The  $L_{eq}$  averaged over nighttime hours. Nighttime hours may be defined differently by various ordinances and regulations. The hours between 10:00 pm and 7:00 am is the interval used by the U.S. Federal Energy Regulatory Commission (FERC) and the U.S. Department of Housing and Urban Development (HUD).

**$L_{90}$ :** a statistical parameter (percentile) that describes the sound level that is exceeded 90 percent of the time during a stated time period. For example, for a stated hourly  $L_{90}$  of 45 dBA, the sound level at the measurement location has a 90% chance of being greater than 45 dBA and a 10% chance of being less than or equal to 45 dBA. The  $L_{90}$  is often used as the "background" or "ambient" sound level for a given measurement period. Other percentile values are defined similarly (e.g.,  $L_{50}$ ,  $L_{10}$ , etc.).

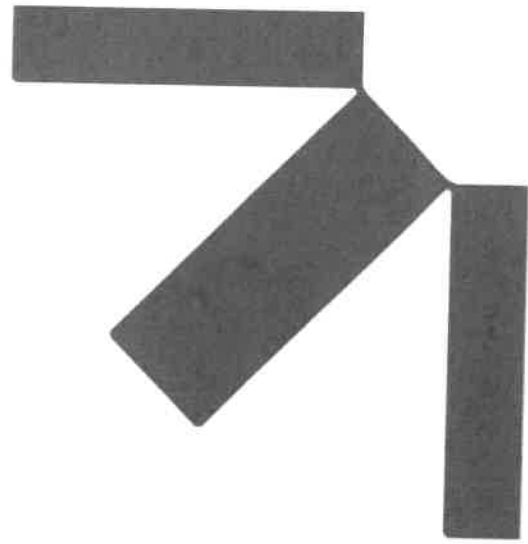
**Sound Power Level (PWL or  $L_w$ ):** a logarithmic parameter that describes the power characteristics of a noise source, relative to a reference power value, expressed in decibels, dB or dBA. The sound power level should not be confused with the sound pressure level. The sound power level is a characteristic of a noise source analogous to the wattage rating of a light bulb, and it is independent of the surroundings. It is calculated from measurements of the sound pressure level. A 75-watt light bulb will look much brighter in a white, reflective room than in a black, absorptive one. A noise source rated with a sound power level of 95 dBA will produce a much higher sound pressure level (will be much louder) in a small hard box than outside in a soft grass meadow.

**Sound Pressure Level (SPL or  $L_p$ ):** a logarithmic parameter that describes the quantity of sound relative to a reference pressure value, expressed in decibels, dB or dBA. The SPL is the quantity that is measured with a sound level meter, and it is dependent upon the surroundings of a noise source.

**Sound Transmission Class (STC):** a single number rating for describing sound transmission loss of a wall or partition. A rating system designed to facilitate comparison of the sound transmission characteristics of various architectural materials and constructions.

**Transmission Loss (TL):** the difference (in decibels) between sound power incident upon a sound reduction element (wall or muffler) to that transmitted. The less sound energy is transmitted, the higher the TL value.





# **Appendix B   Figures**

## **Hummelstown**

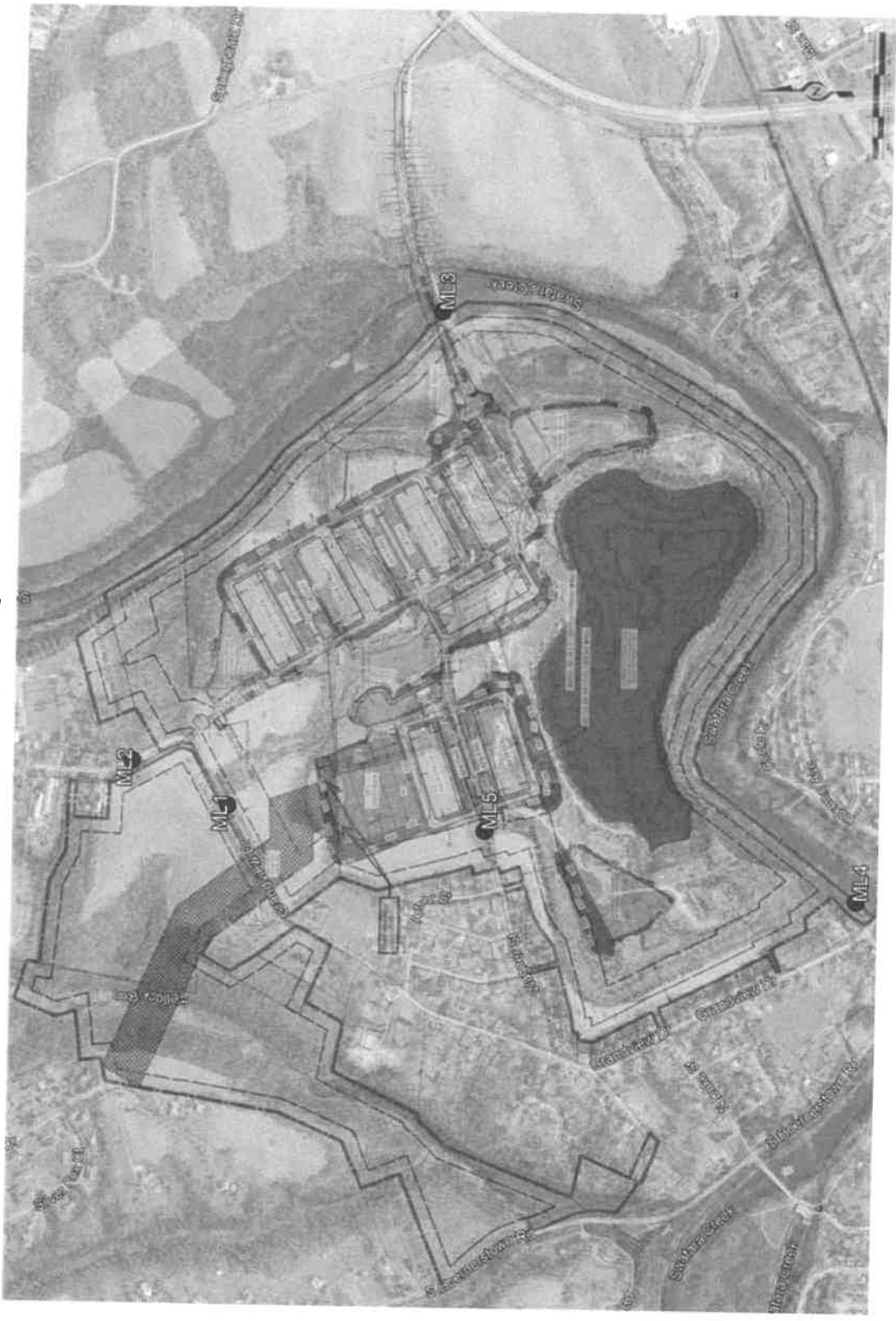
Noise Study

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SLR Project No.: 135.000170.00001

June 8, 2026

Figure B-1: Aerial Image Showing Ambient Measurement Locations



**Data Center 7 and 8**  
shifted east in the  
model for a 500 ft.  
setback

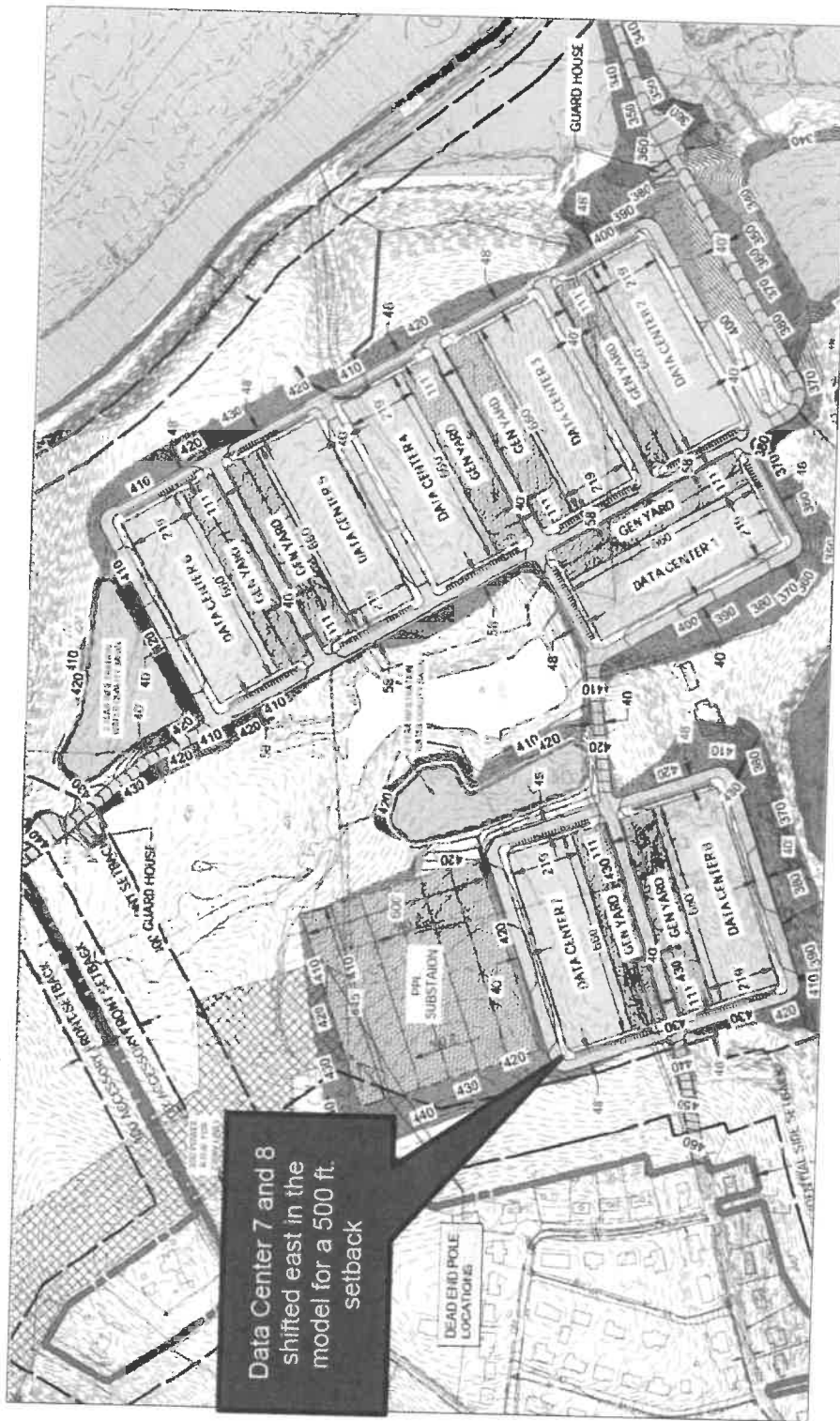


**Figure B-3: Model Layout – Rooftop HVAC Equipment**

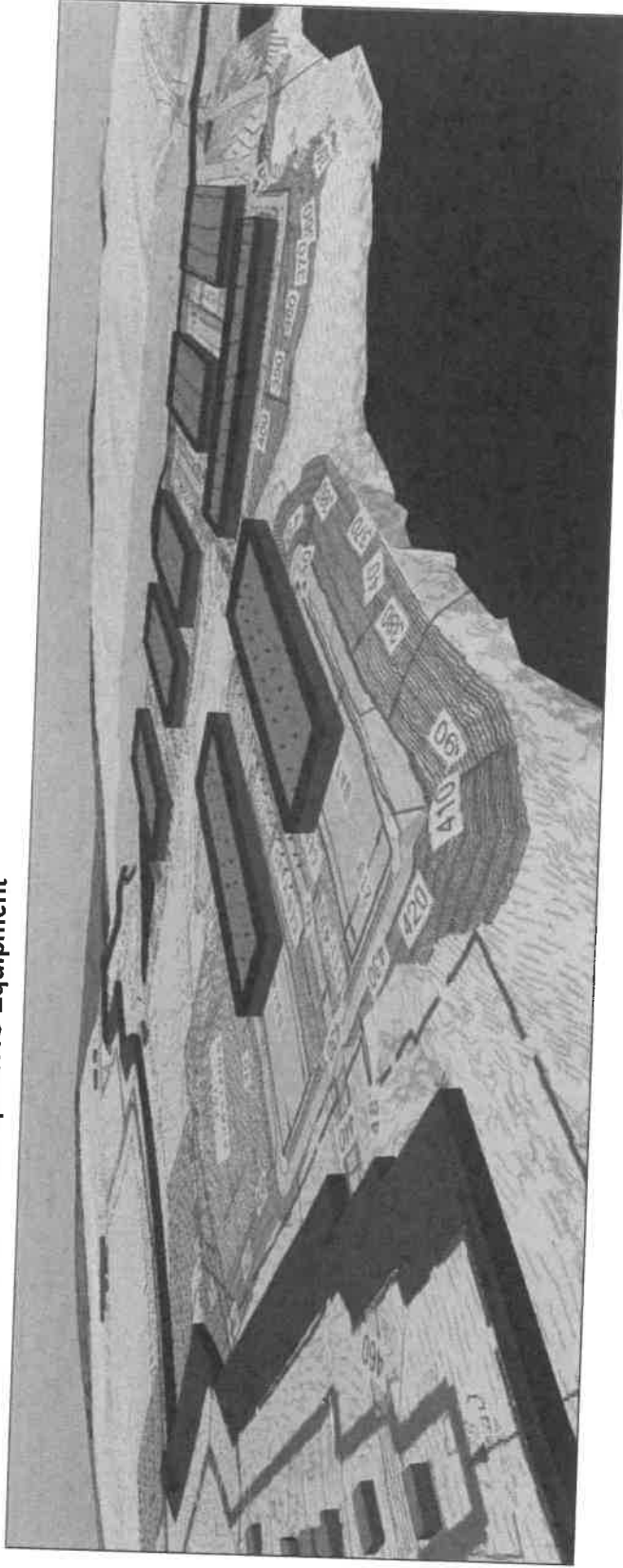


**Figure B-4: Model Layout – Rooftop HVAC Equipment –**

Note the property line calculation points and shifted Buildings 7 and 8.

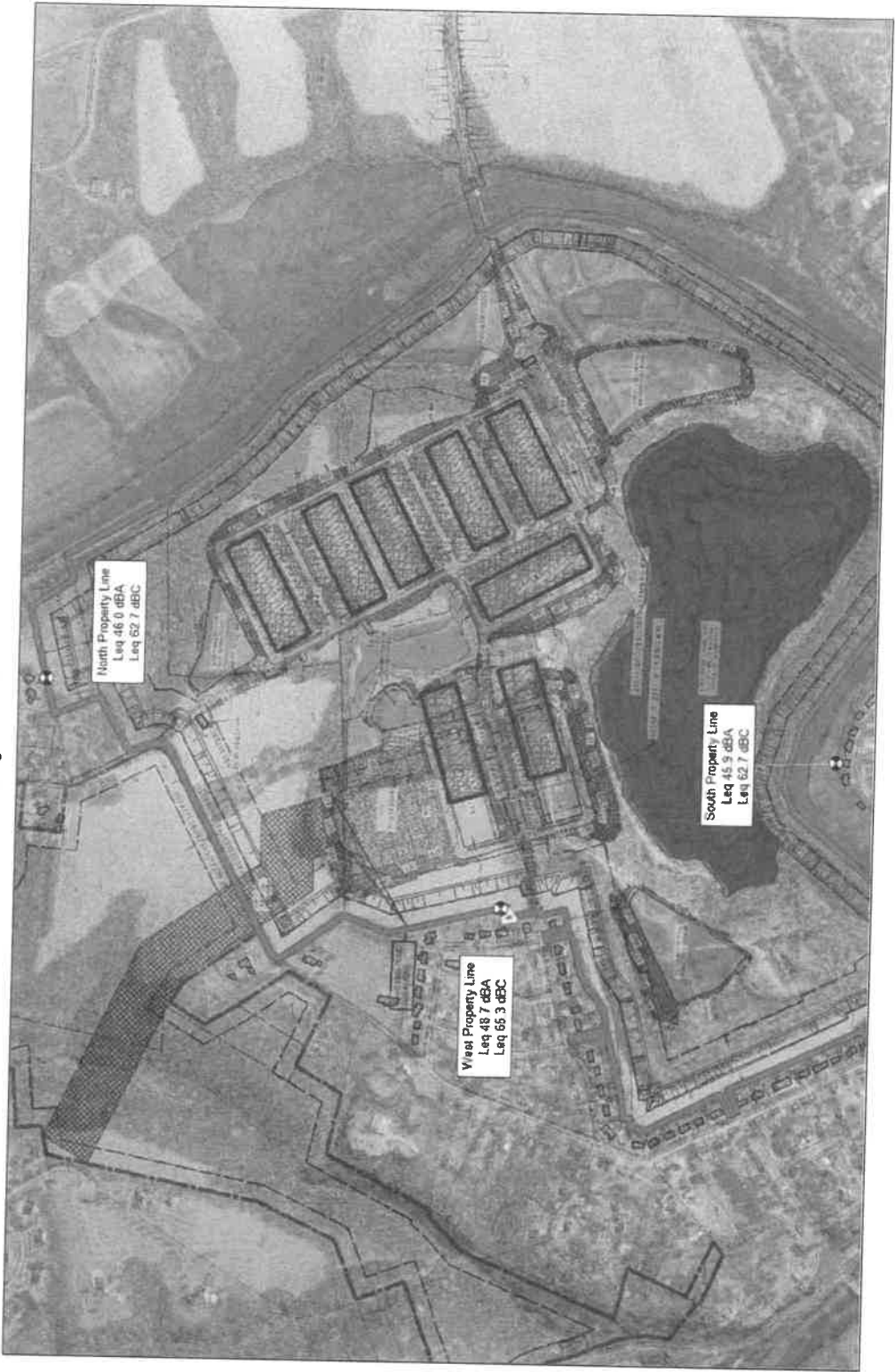
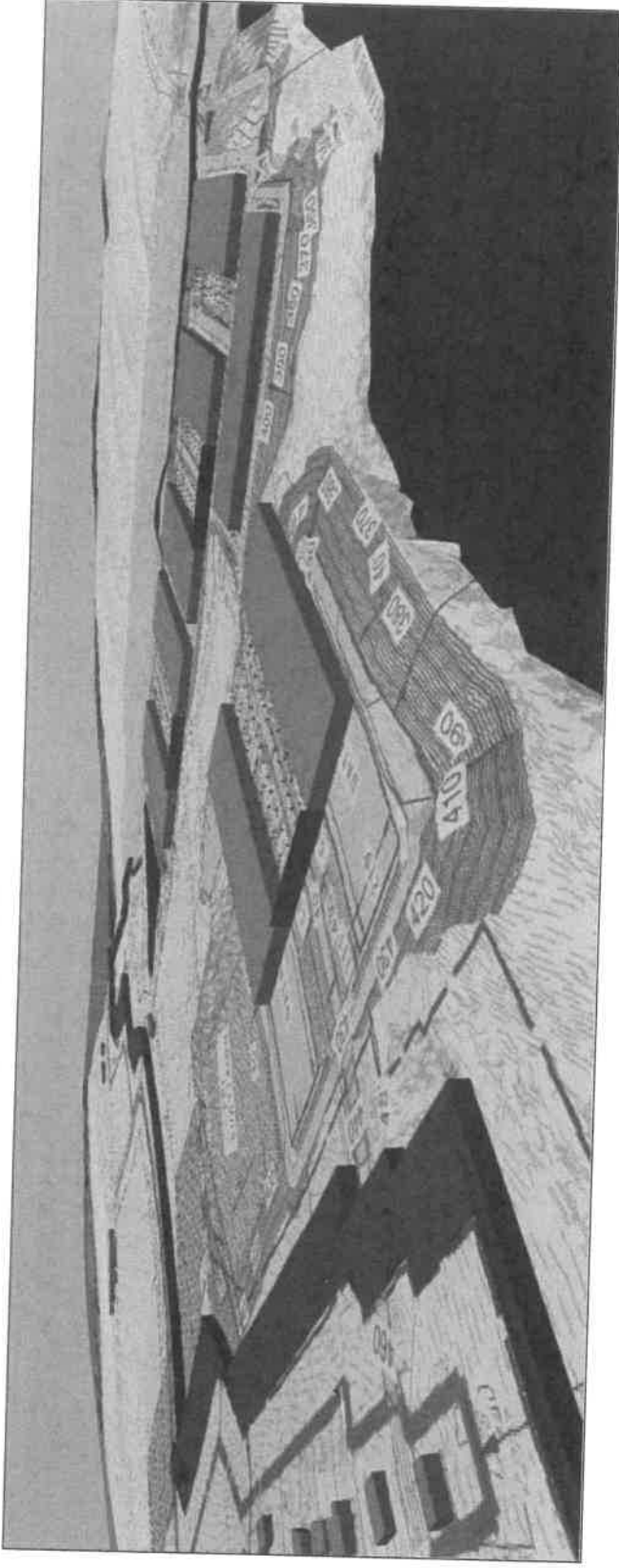
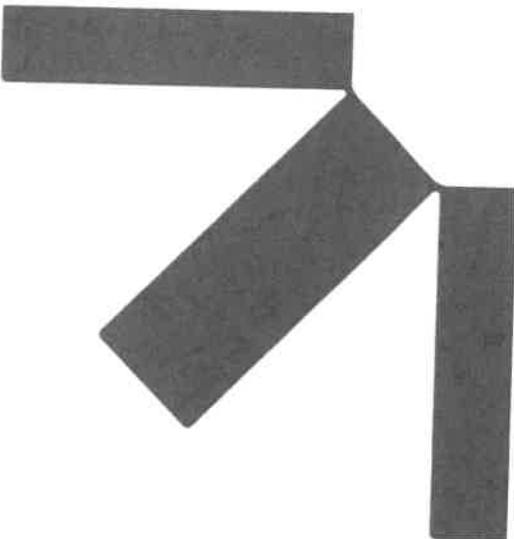


**Figure B-5: Model Layout –HVAC Equipment at Grade**





# **Appendix C   Weather Data**

## **Hummelstown**

Noise Study

**The Hanover Company**

SLR Project No.: 135.000170.00001

June 8, 2026

Figure C-1: Weather Data – May 5, 2026

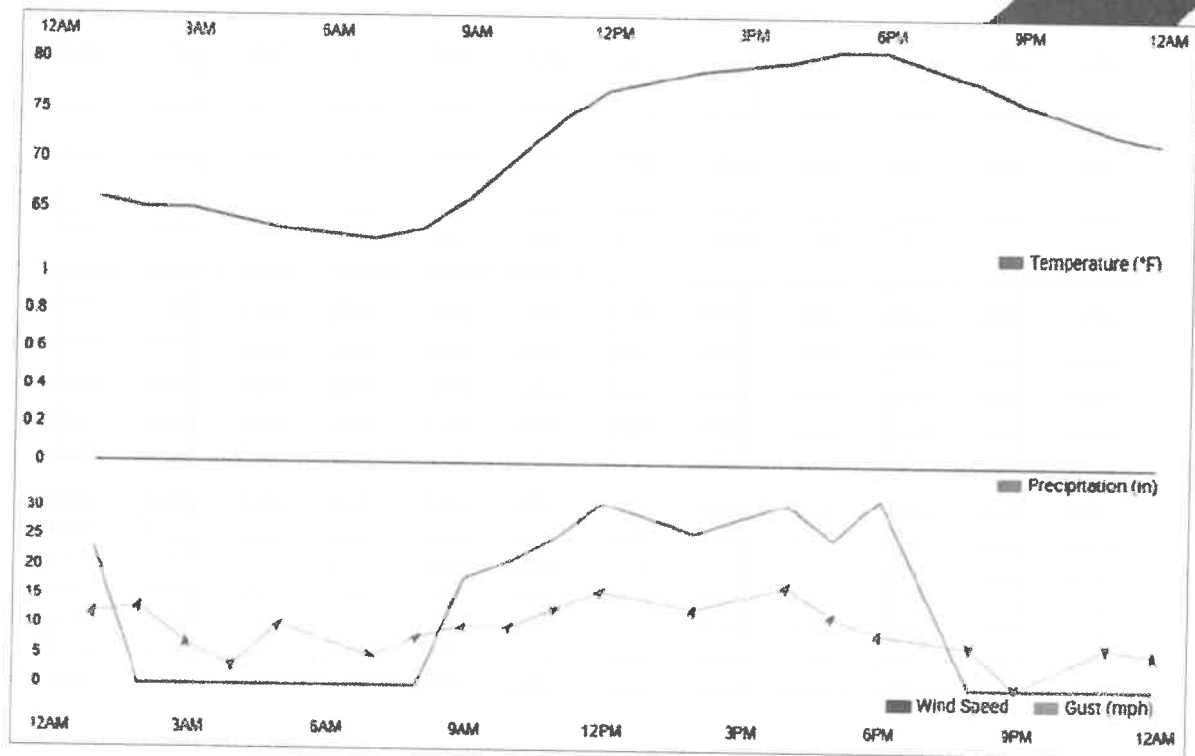


Figure C-2: Weather Data – May 6, 2026

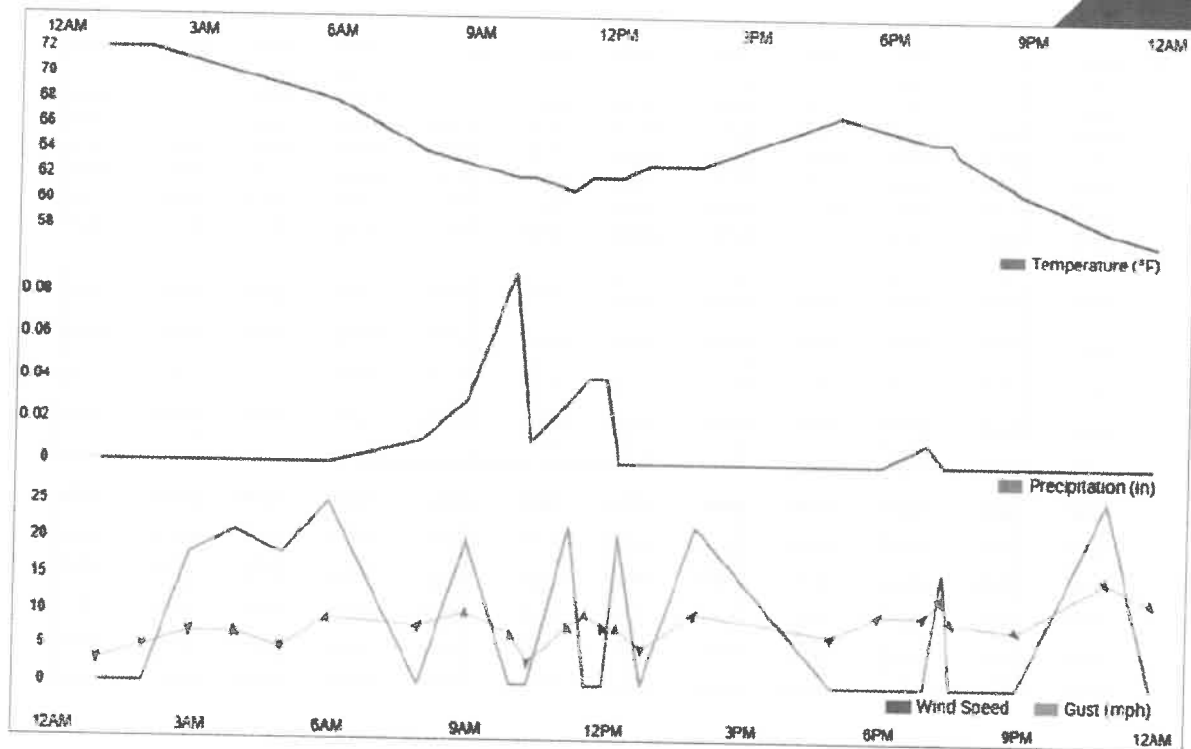


Figure C-3: Weather Data – May 7, 2026

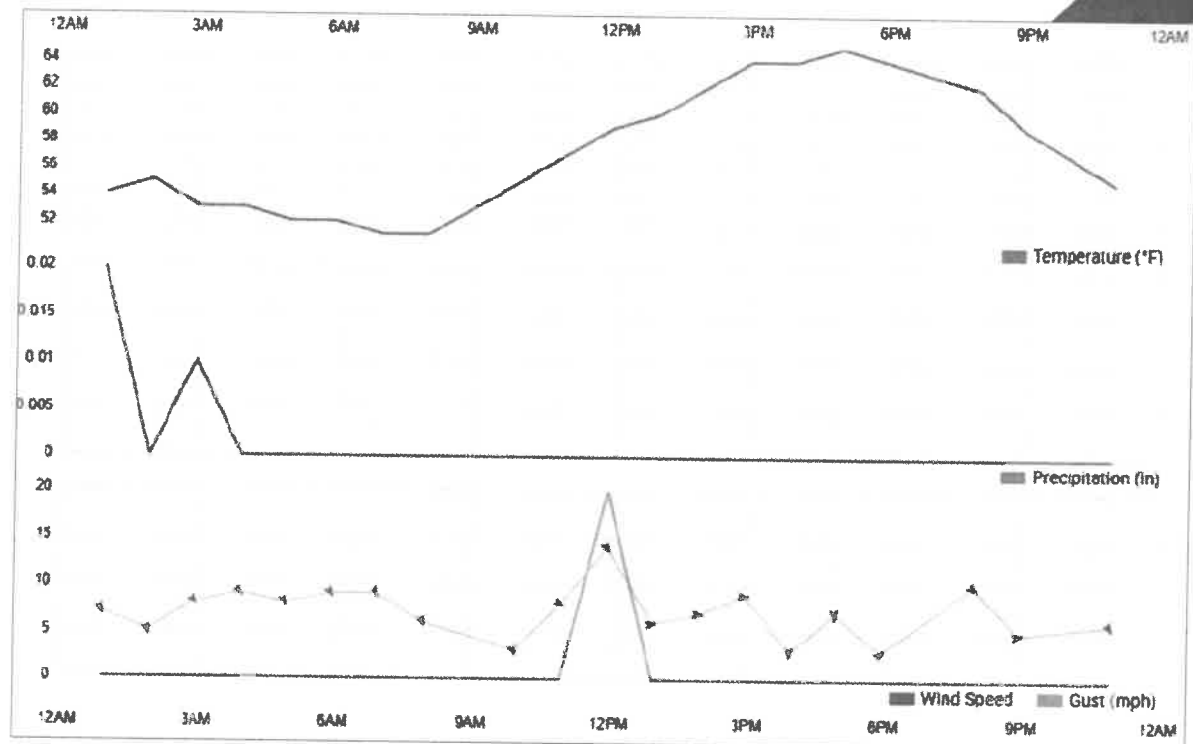
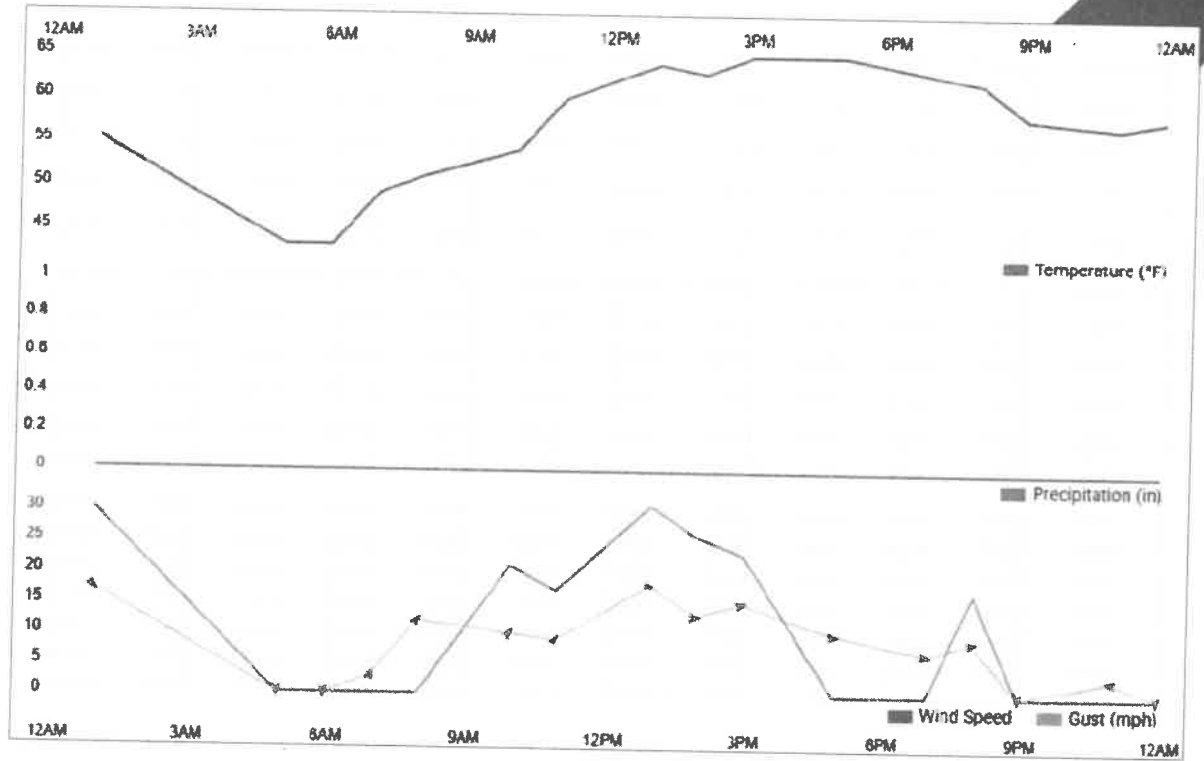
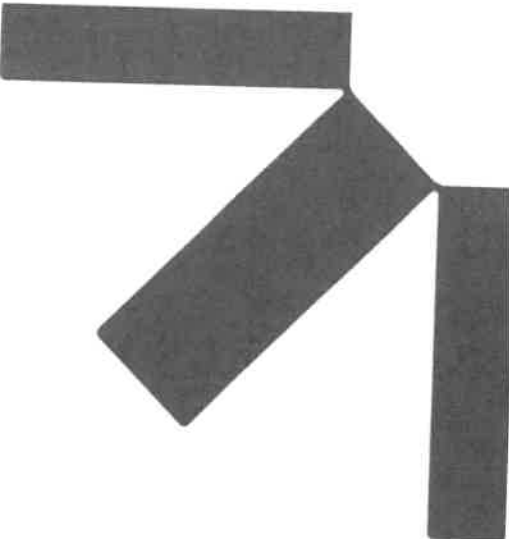


Figure C-4: Weather Data – May 8, 2026





# **Appendix D    Ambient Measurement Result Graphs**

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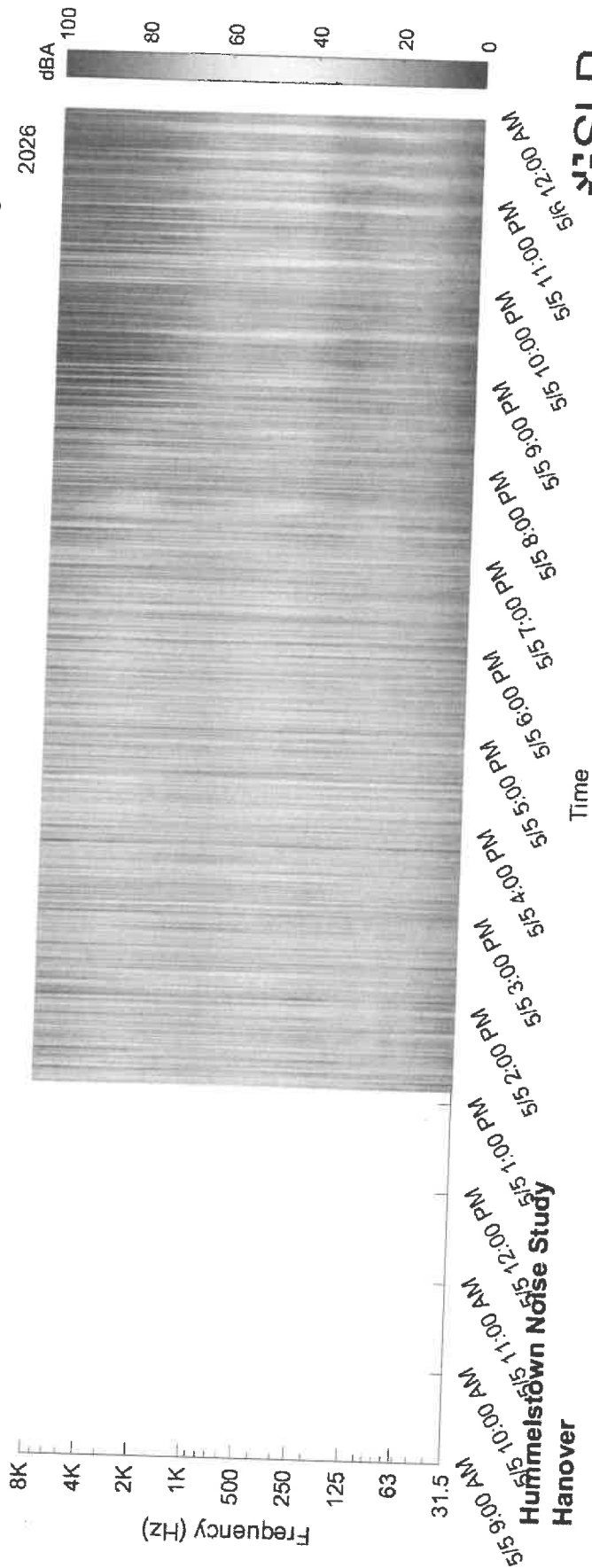
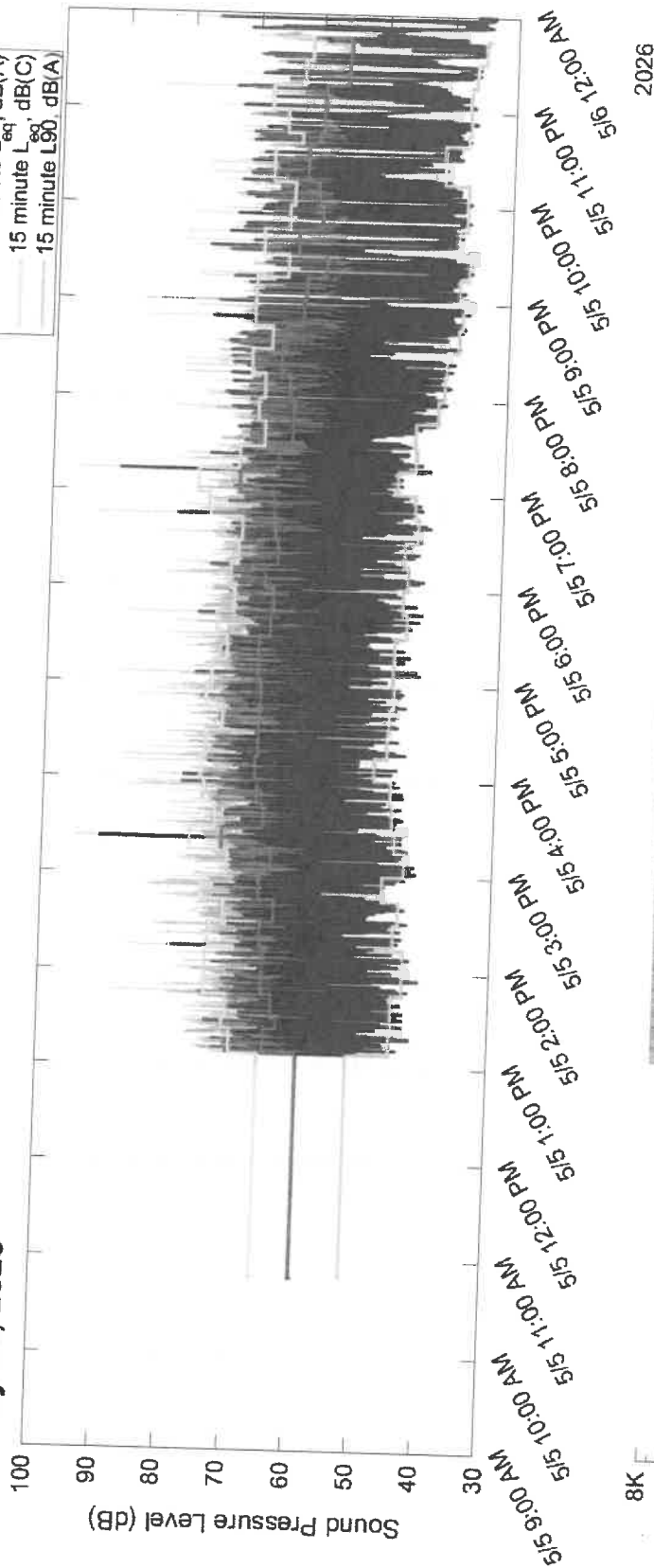
June 8, 2026



# Graph 1

Measurement Location 1 - NW Property Line  
May 05, 2026

- 10 second  $L_{eq}$ , dB(A)
- 10 second  $L_{eq}$ , dB(C)
- 15 minute  $L_{eq}$ , dB(A)
- 15 minute  $L_{eq}$ , dB(C)
- 15 minute  $L_{90}$ , dB(A)



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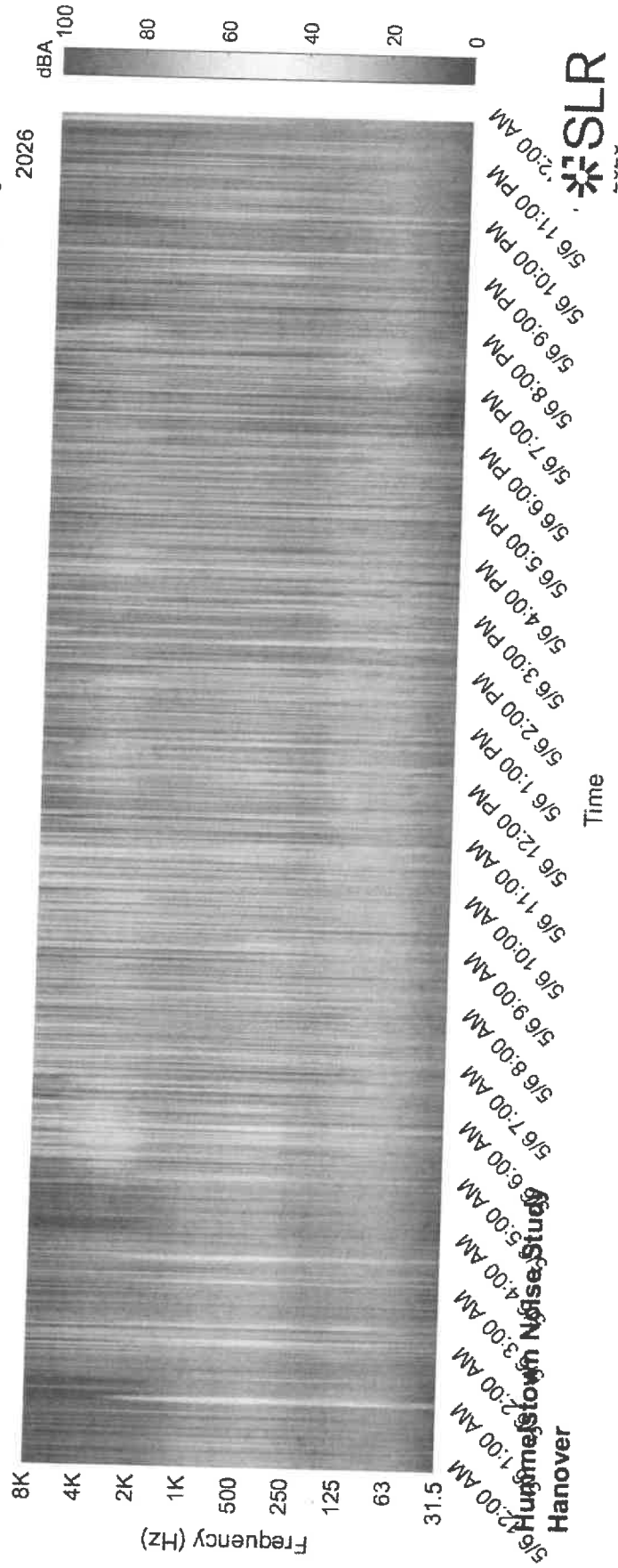
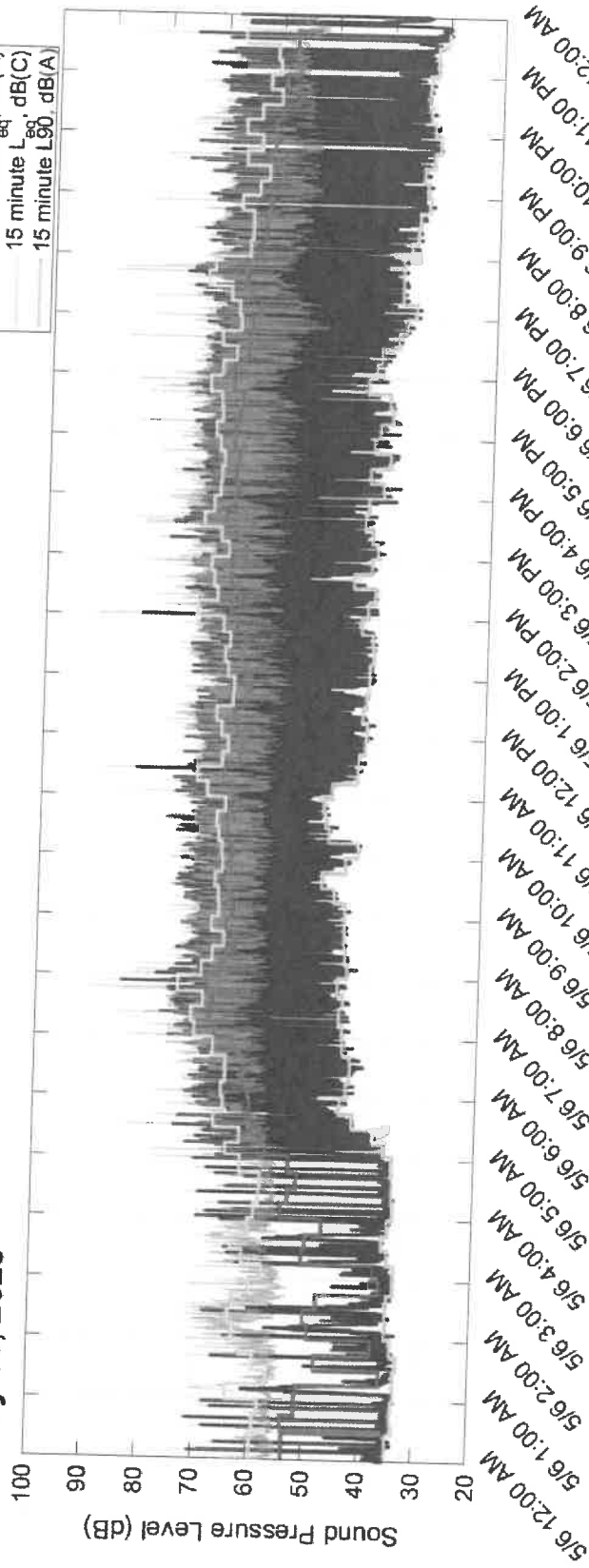
\*SLR

# Graph 2

Measurement Location 1 - NW Property Line

May 06, 2026

- 10 second  $L_{eq}$ , dB(A)
- 10 second  $L_{eq}$ , dB(C)
- 15 minute  $L_{eq}$ , dB(A)
- 15 minute  $L_{eq}$ , dB(C)
- 15 minute  $L_{90}$ , dB(A)



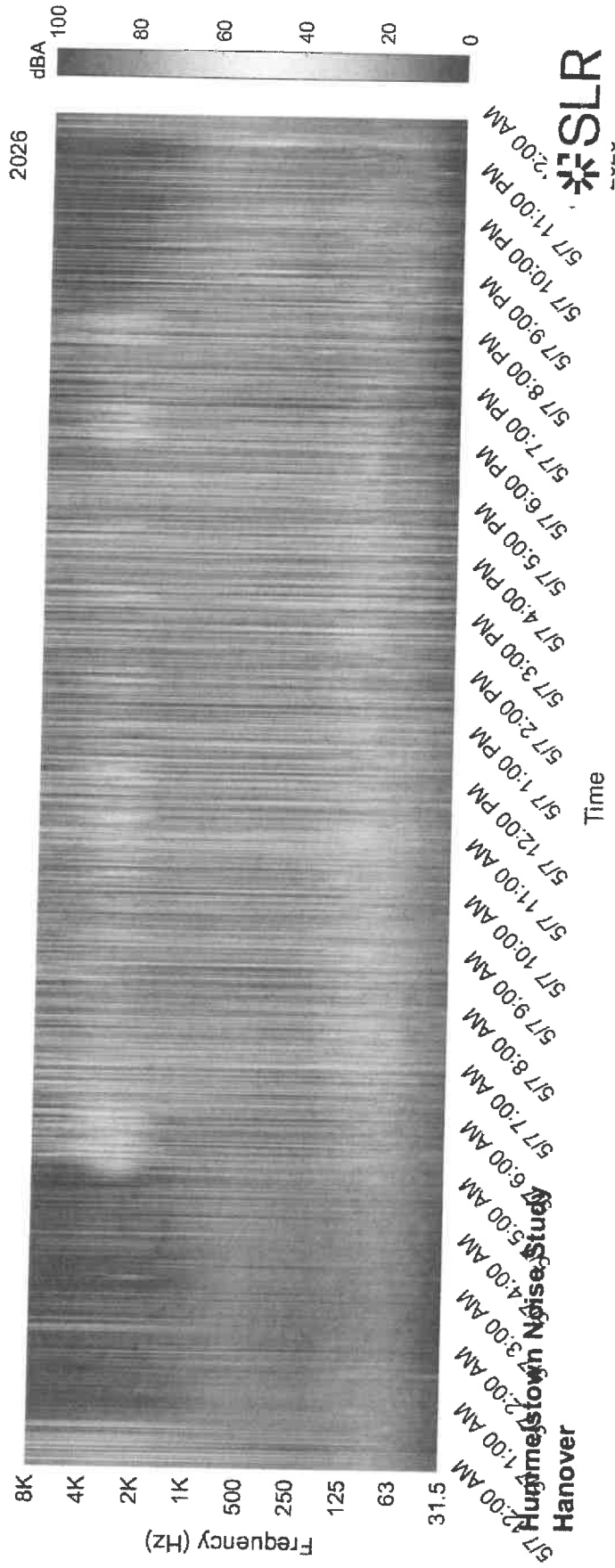
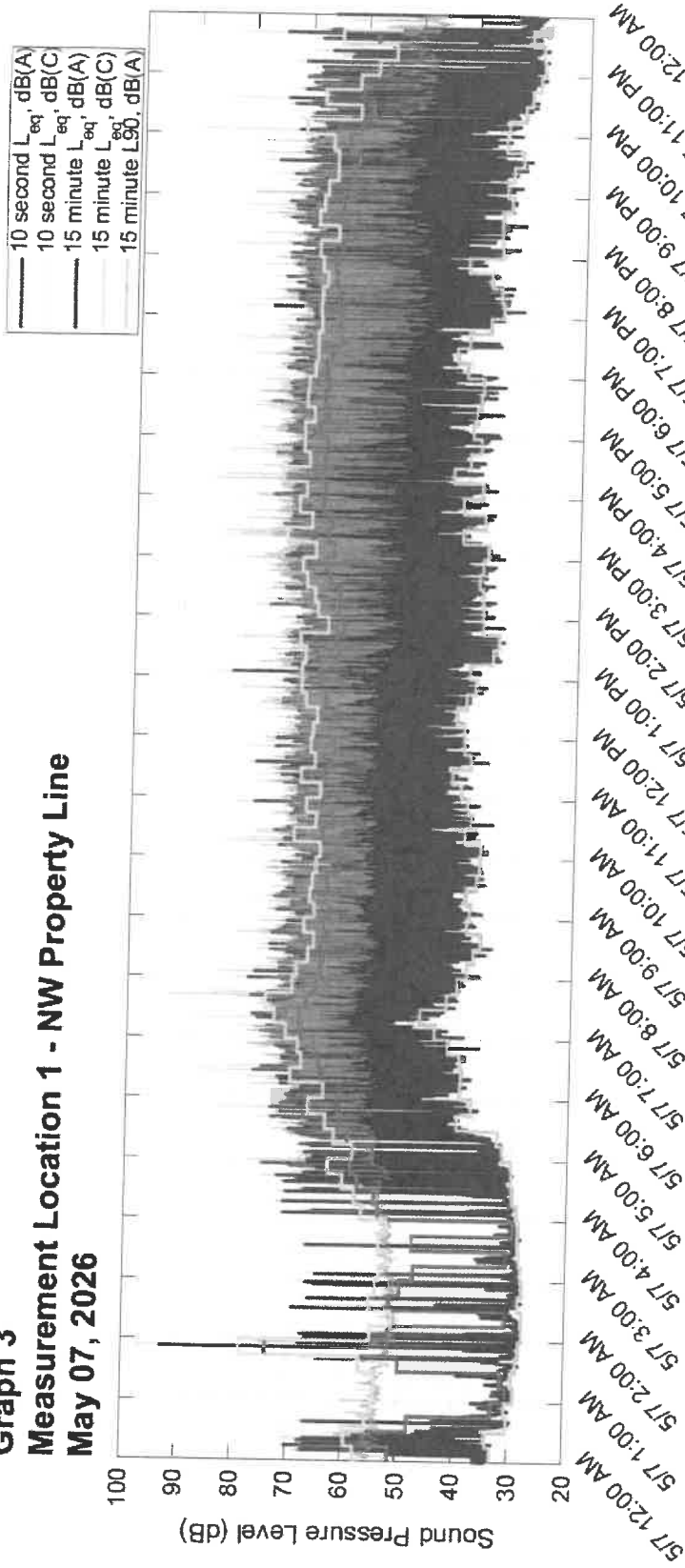
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Time

Graph 3

Measurement Location 1 - NW Property Line

May 07, 2026

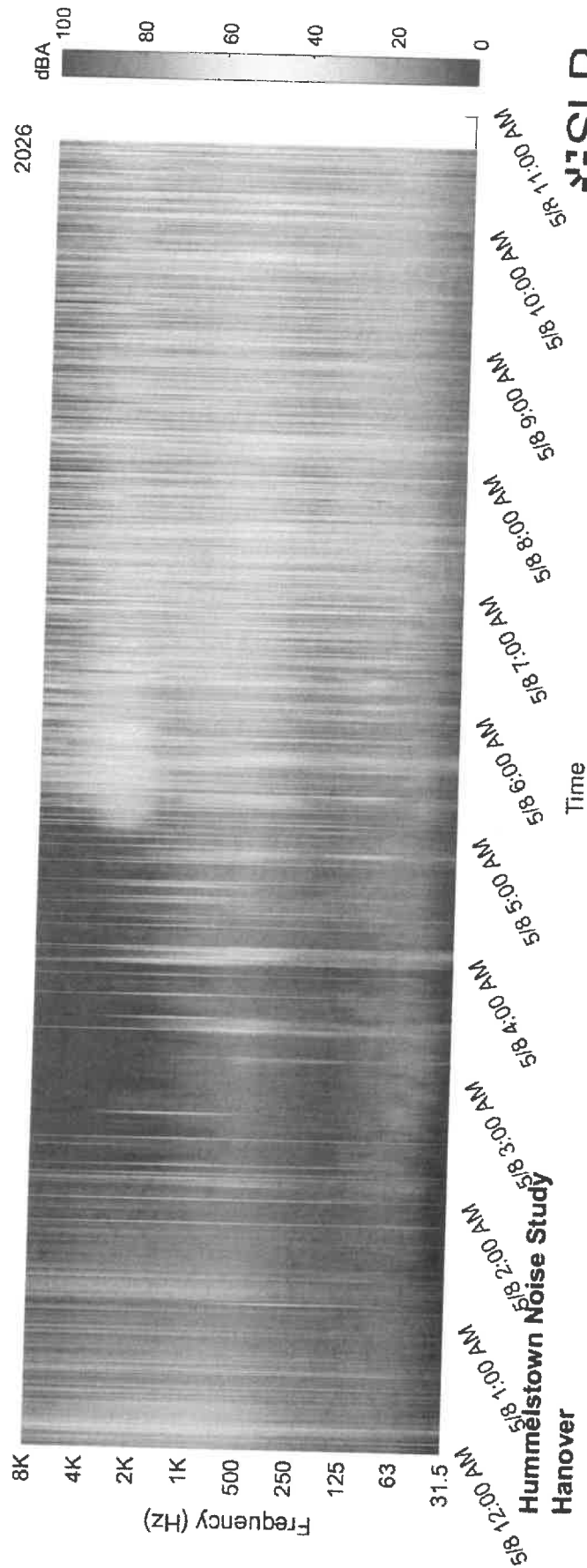
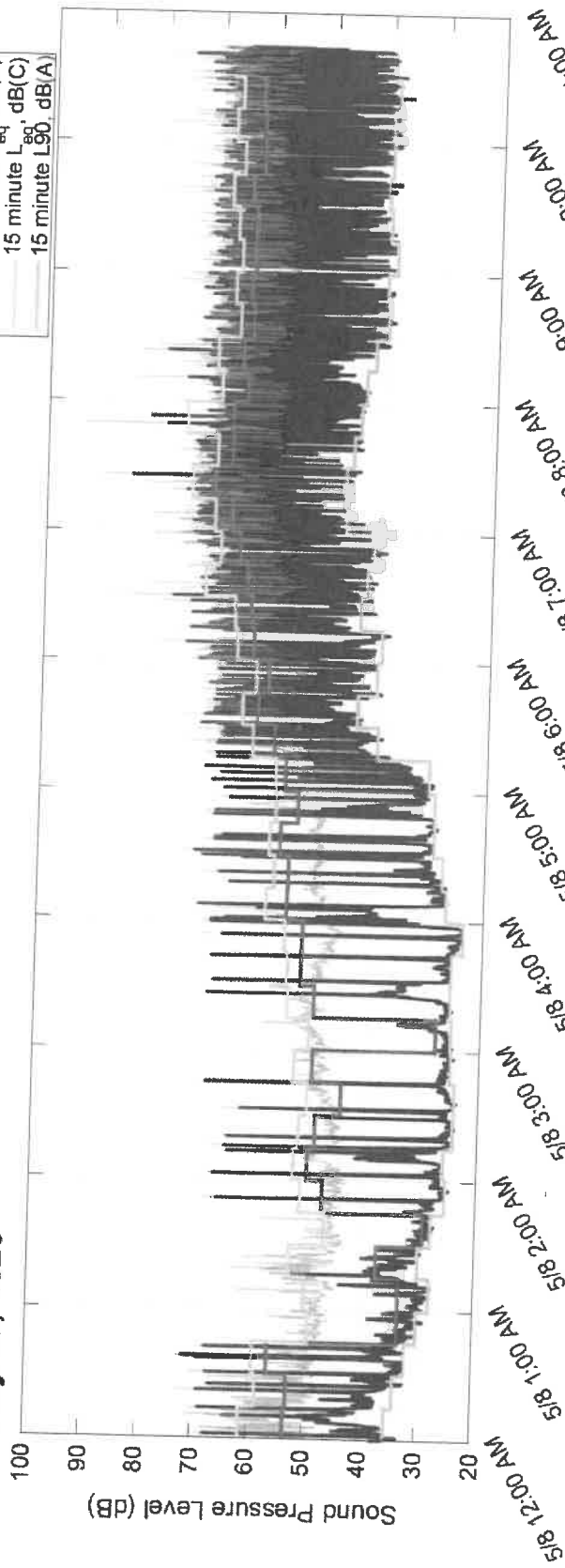


# Graph 4

Measurement Location 1 - NW Property Line

May 08, 2026

10 second  $L_{eq}$ , dB(A)  
 10 second  $L_{eq}$ , dB(C)  
 15 minute  $L_{eq}$ , dB(A)  
 15 minute  $L_{eq}$ , dB(C)  
 15 minute  $L_{90}$ , dB(A)



Hummelstown Noise Study

Hanover

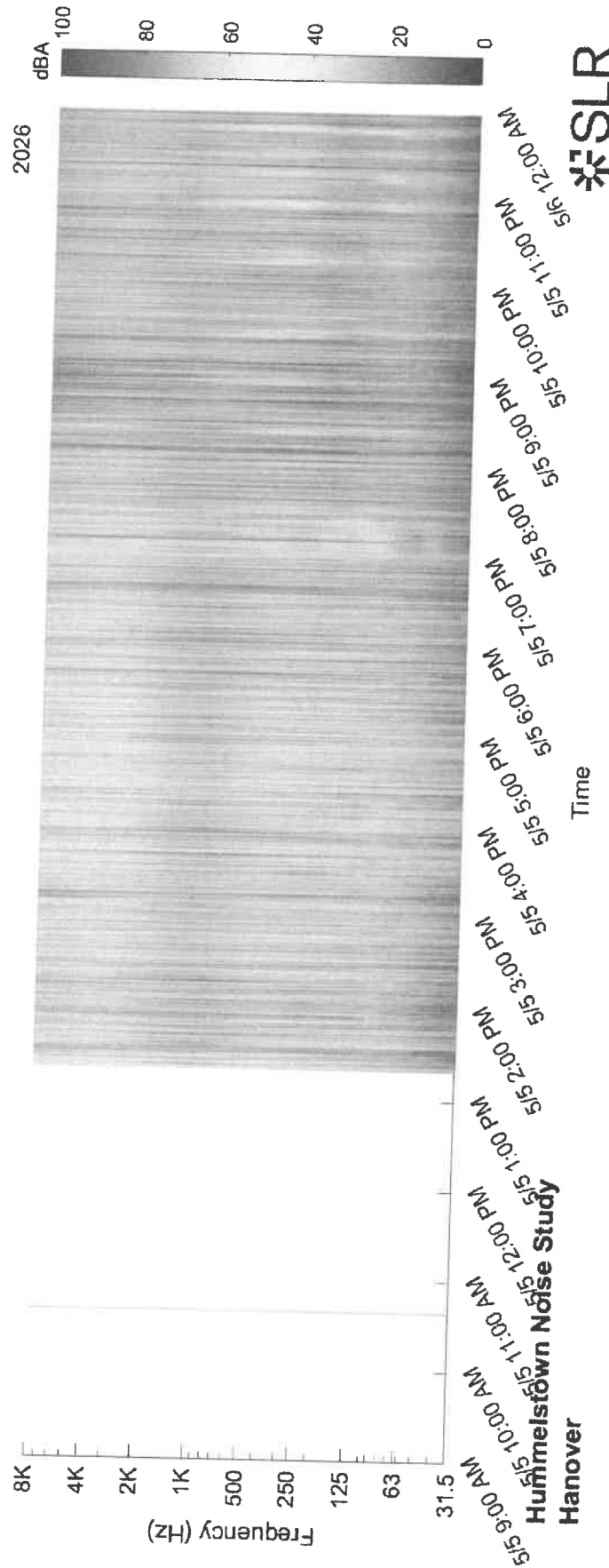
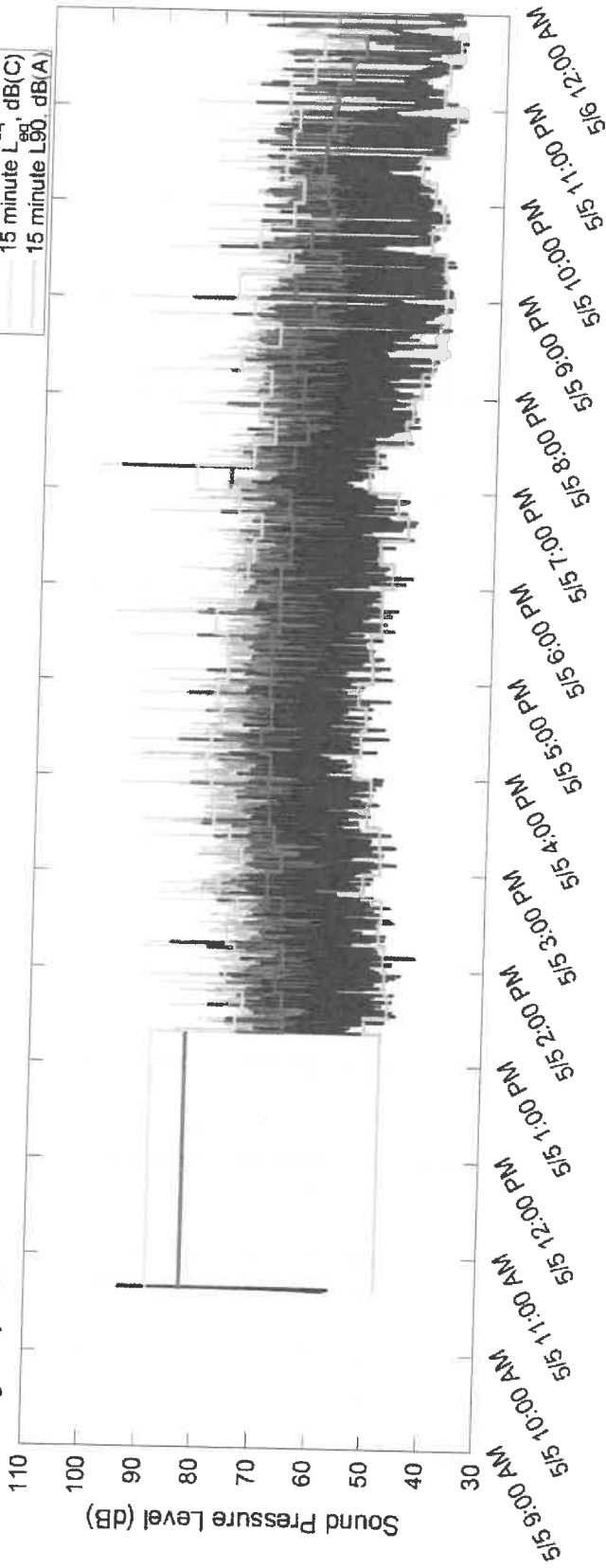
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Graph 1

Measurement Location 2 - NE Property Line

May 05, 2026

10 second  $L_{eq}$ , dB(A)  
10 second  $L_{eq}$ , dB(C)  
15 minute  $L_{eq}$ , dB(A)  
15 minute  $L_{eq}$ , dB(C)  
15 minute  $L_{90}$ , dB(A)



Hummelstown Noise Study

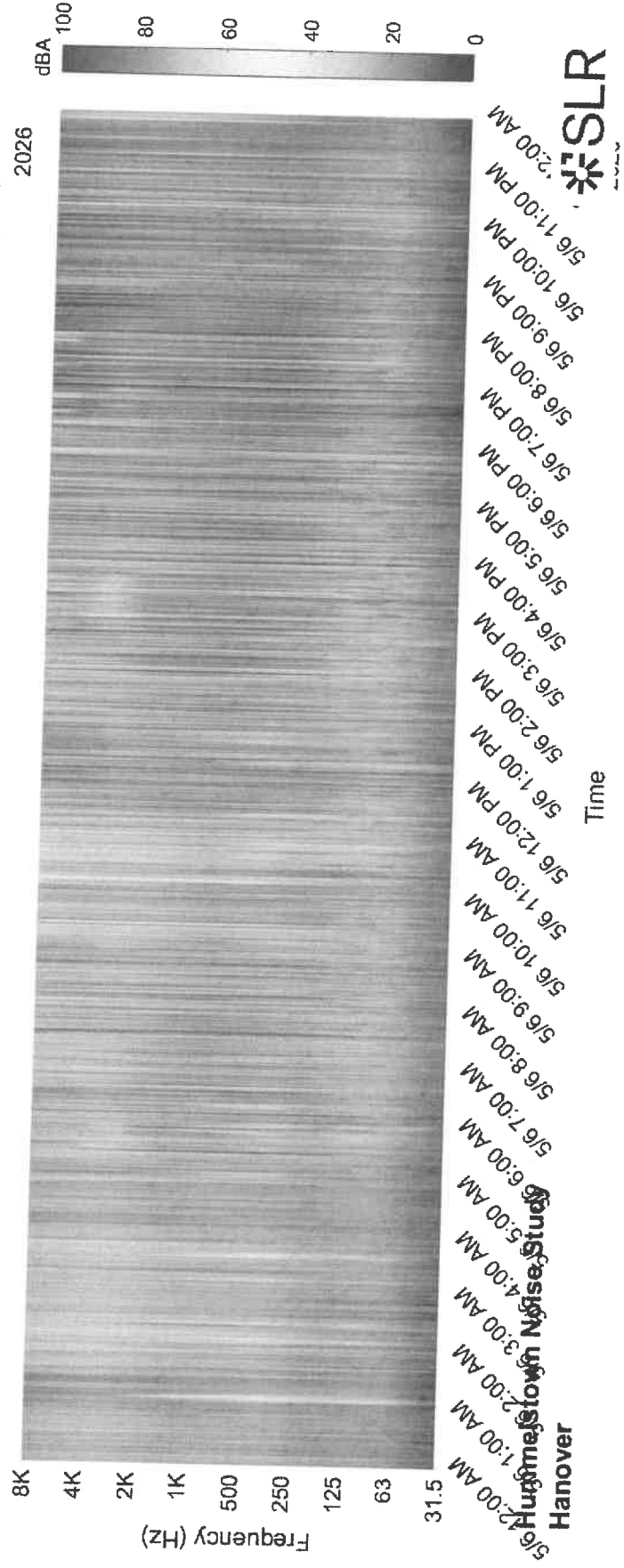
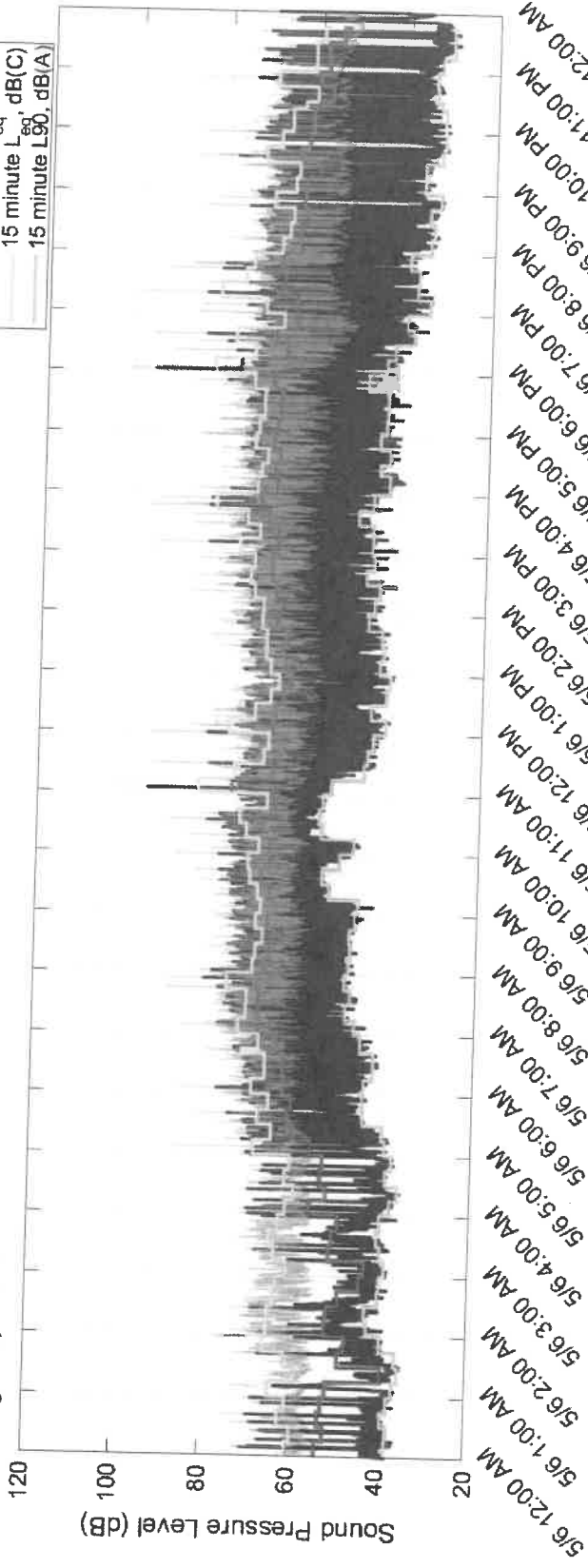
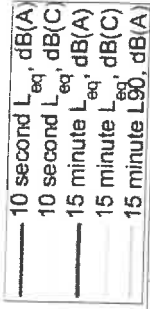
Hanover

\*SLR

# Graph 2

Measurement Location 2 - NE Property Line

May 06, 2026



SLR

Hanover

Sturges

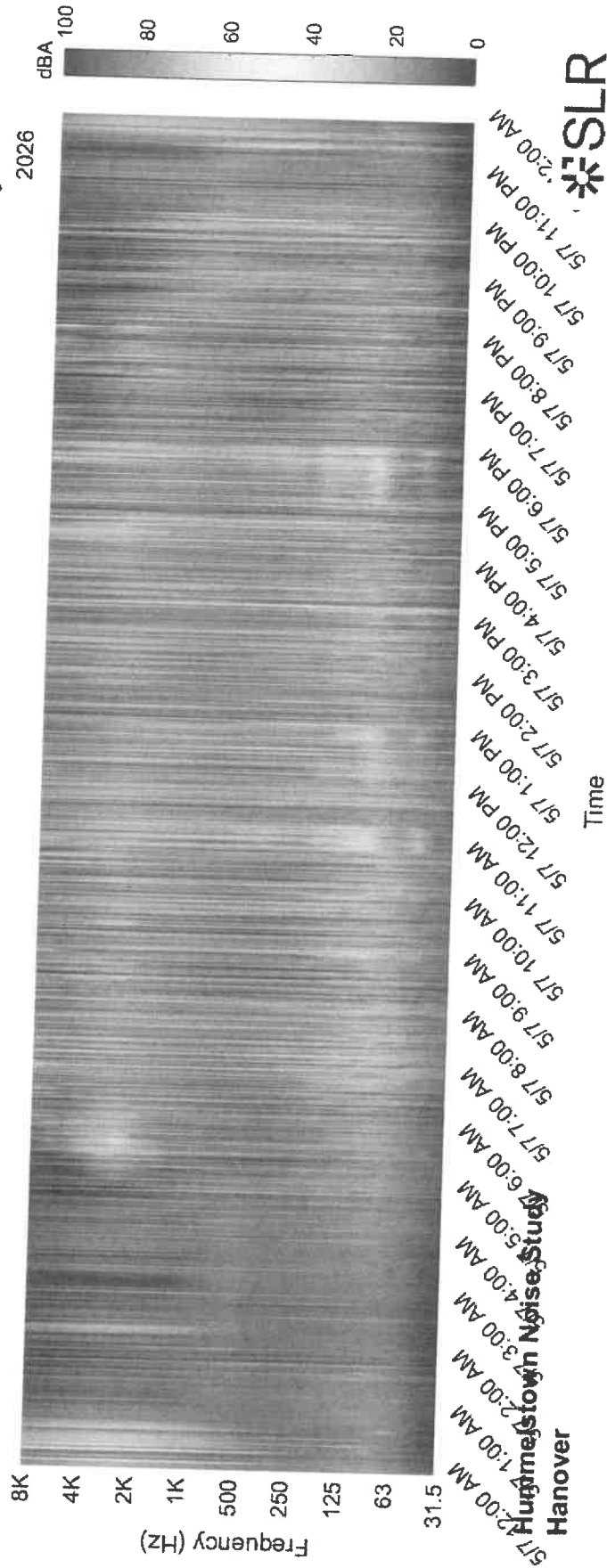
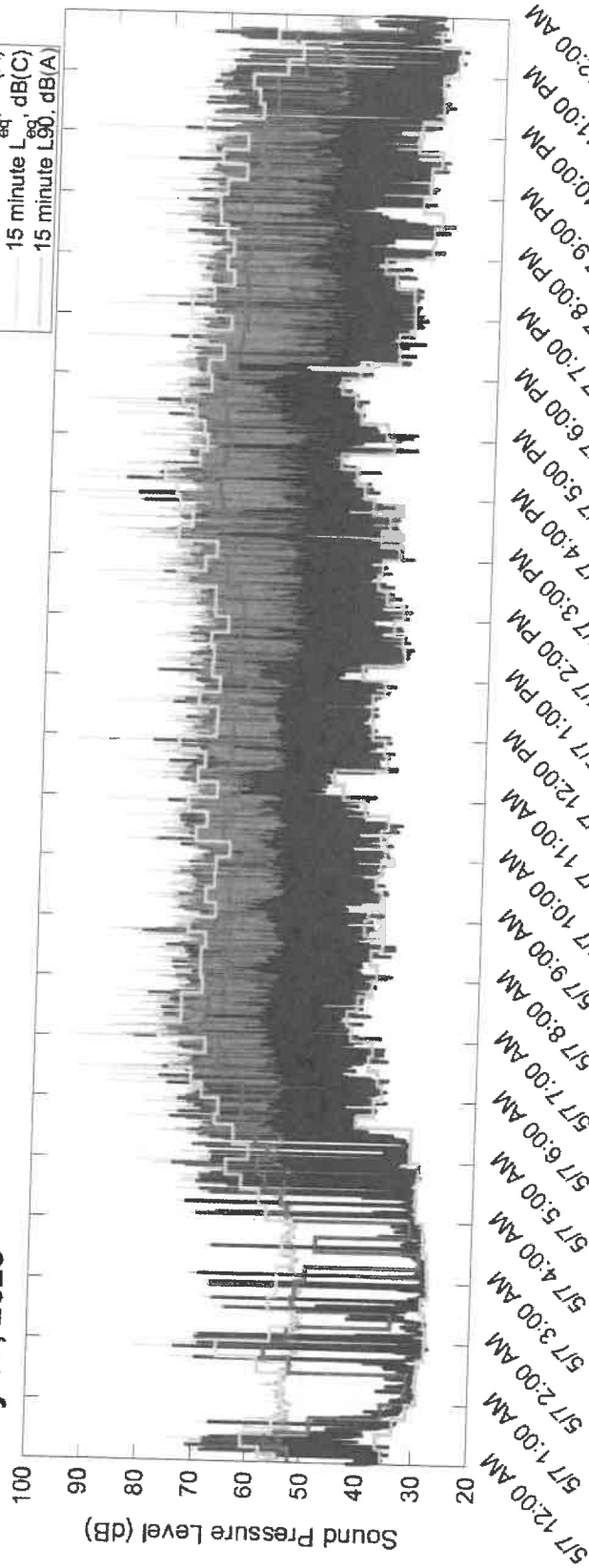
5/6 12:00 AM  
5/6 1:00 AM  
5/6 2:00 AM  
5/6 3:00 AM  
5/6 4:00 AM  
5/6 5:00 AM  
5/6 6:00 AM  
5/6 7:00 AM  
5/6 8:00 AM  
5/6 9:00 AM  
5/6 10:00 AM  
5/6 11:00 AM  
5/6 12:00 PM  
5/6 1:00 PM  
5/6 2:00 PM  
5/6 3:00 PM  
5/6 4:00 PM  
5/6 5:00 PM  
5/6 6:00 PM  
5/6 7:00 PM  
5/6 8:00 PM  
5/6 9:00 PM  
5/6 10:00 PM  
5/6 11:00 PM  
5/7 12:00 AM

### Graph 3

Measurement Location 2 - NE Property Line

May 07, 2026

10 second  $L_{eq}$ , dB(A)  
10 second  $L_{eq}$ , dB(C)  
15 minute  $L_{eq}$ , dB(A)  
15 minute  $L_{eq}$ , dB(C)



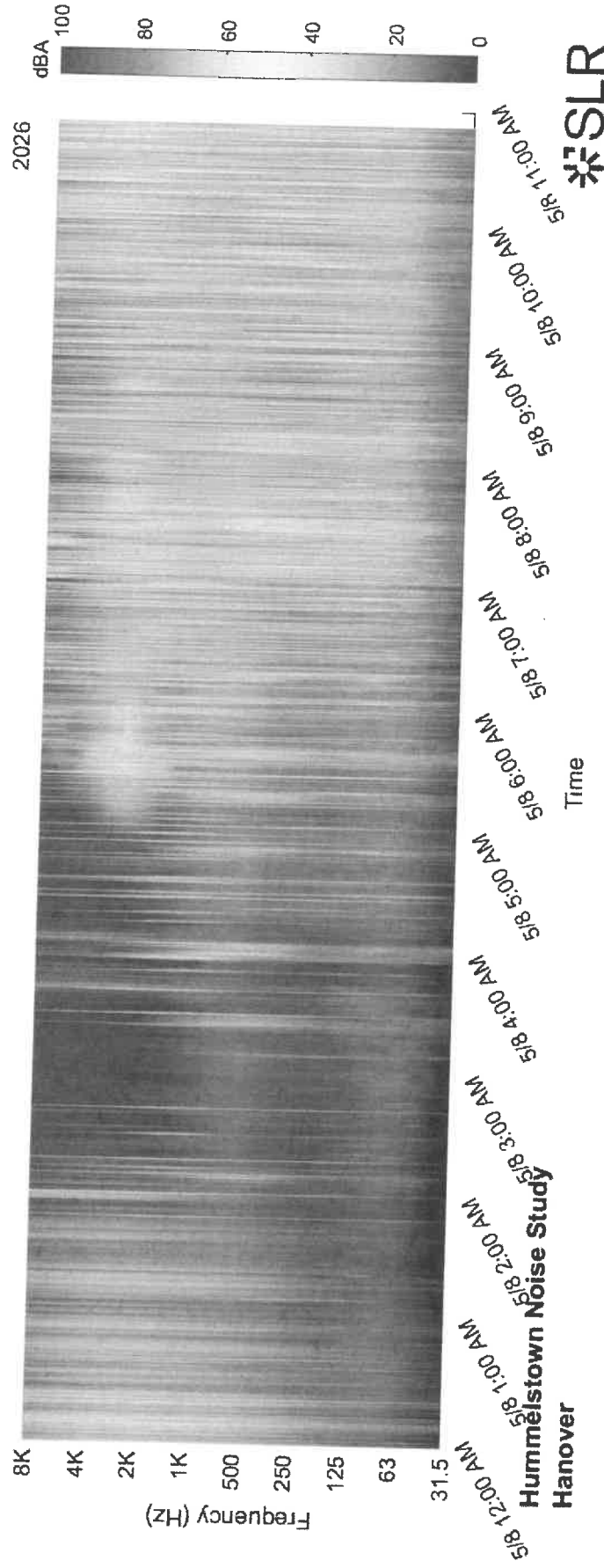
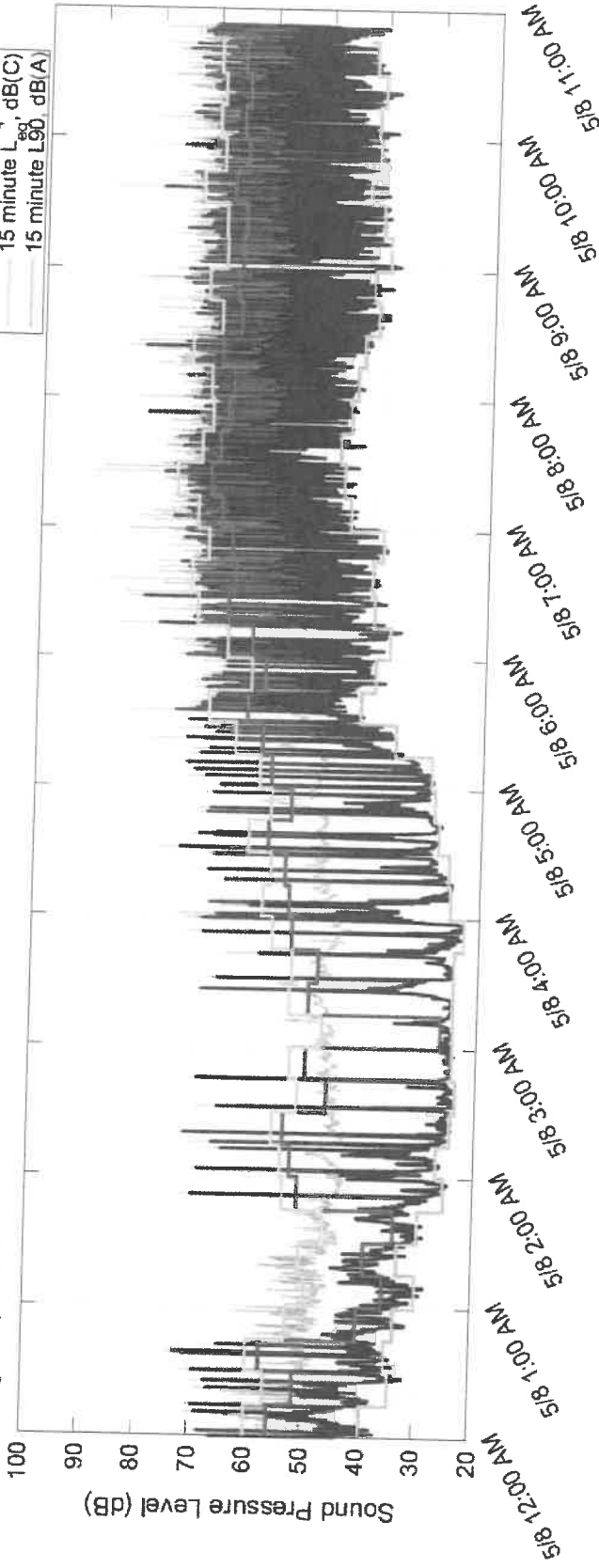
SLR

Hannover  
Hummelstown Noise Study

# Graph 4

Measurement Location 2 - NE Property Line  
May 08, 2026

|                           |       |
|---------------------------|-------|
| 10 second L <sub>eq</sub> | dB(A) |
| 10 second L <sub>eq</sub> | dB(C) |
| 15 minute L <sub>eq</sub> | dB(A) |
| 15 minute L <sub>eq</sub> | dB(C) |
| 15 minute L <sub>90</sub> | dB(A) |

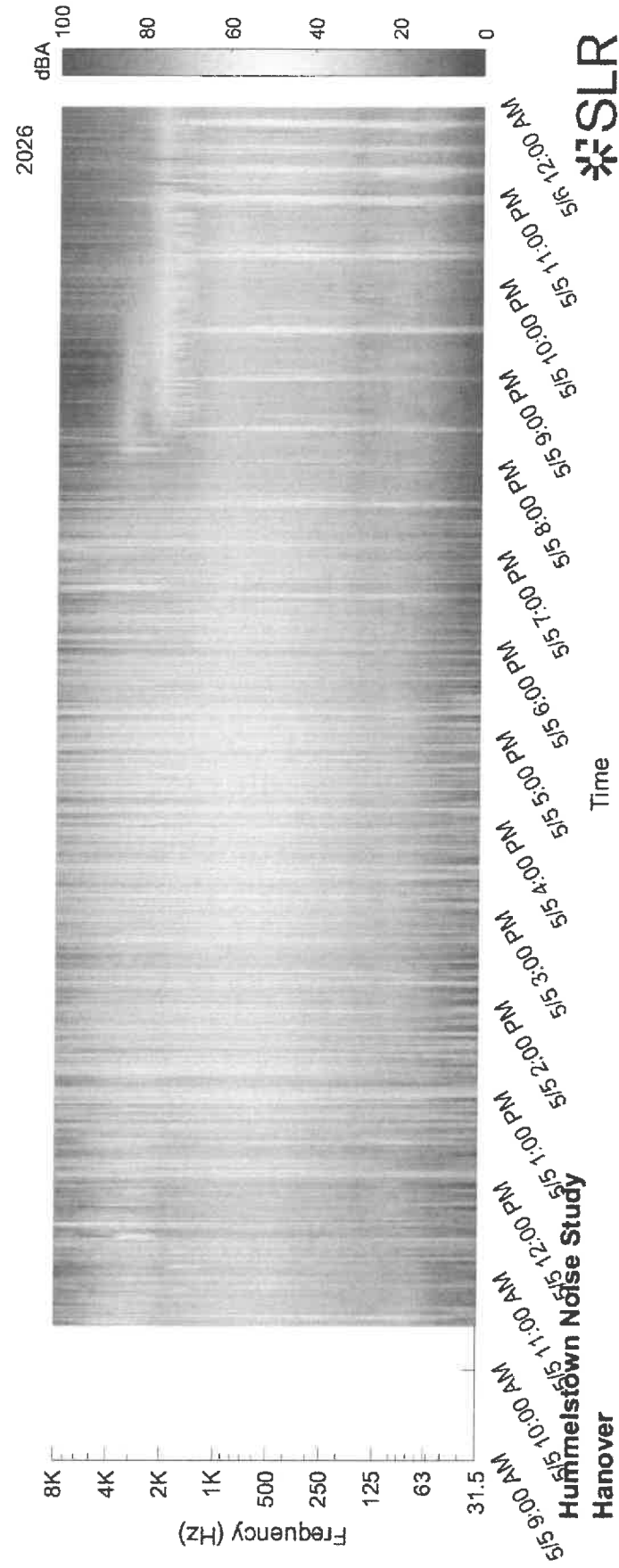
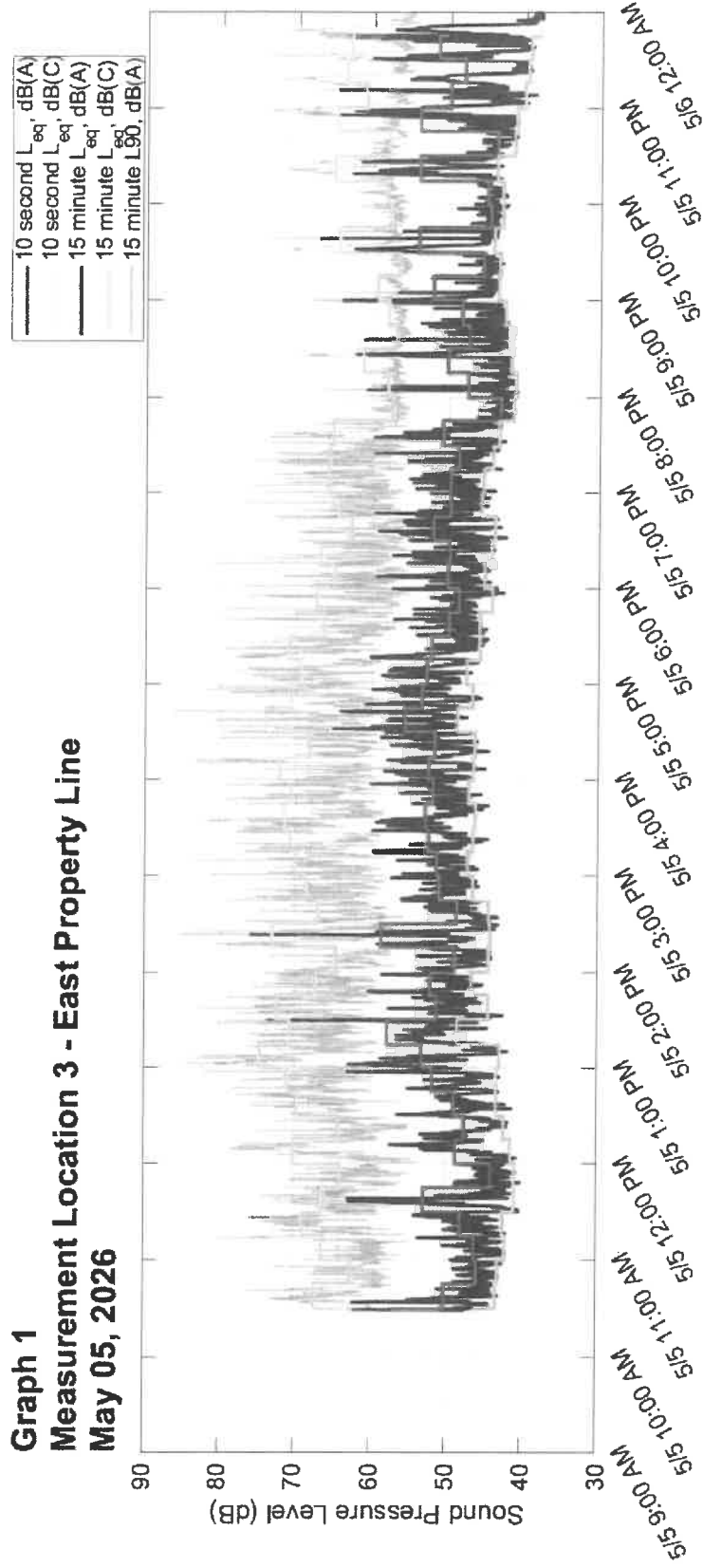


Hummelstown Noise Study

Hanover

\*SLR

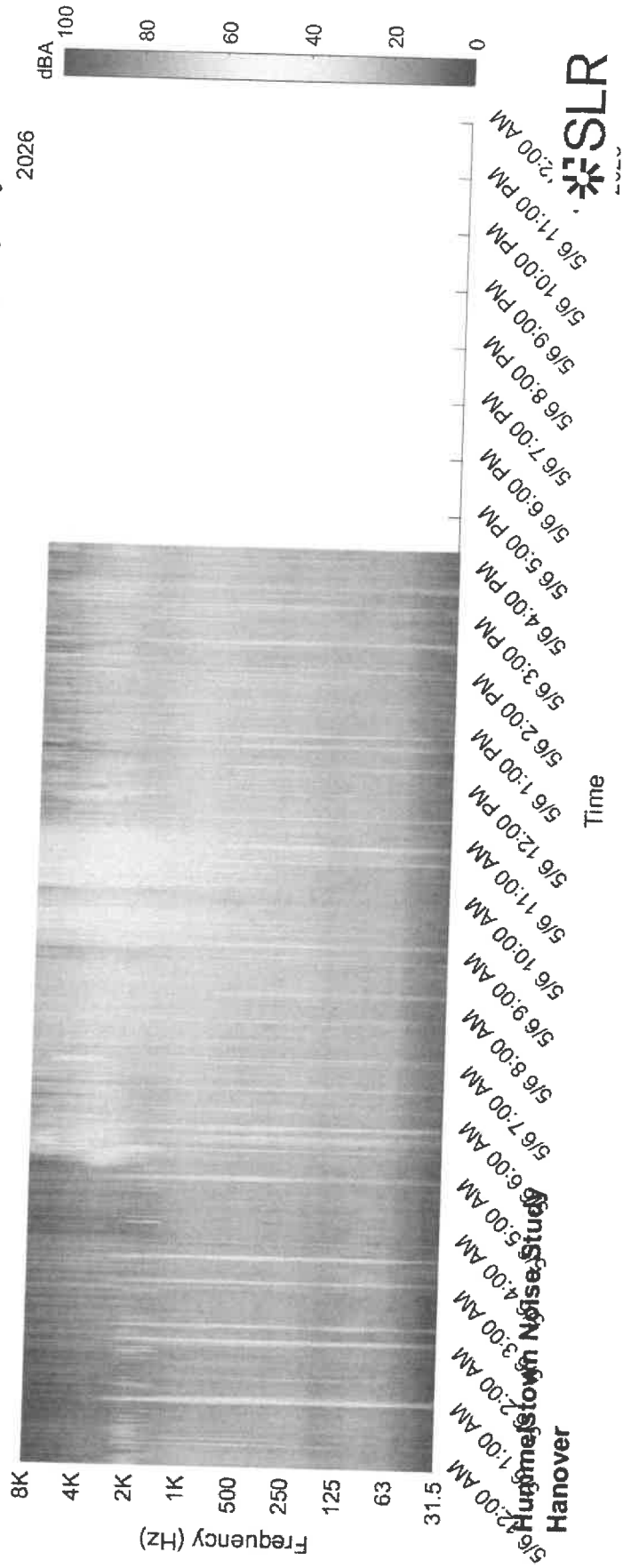
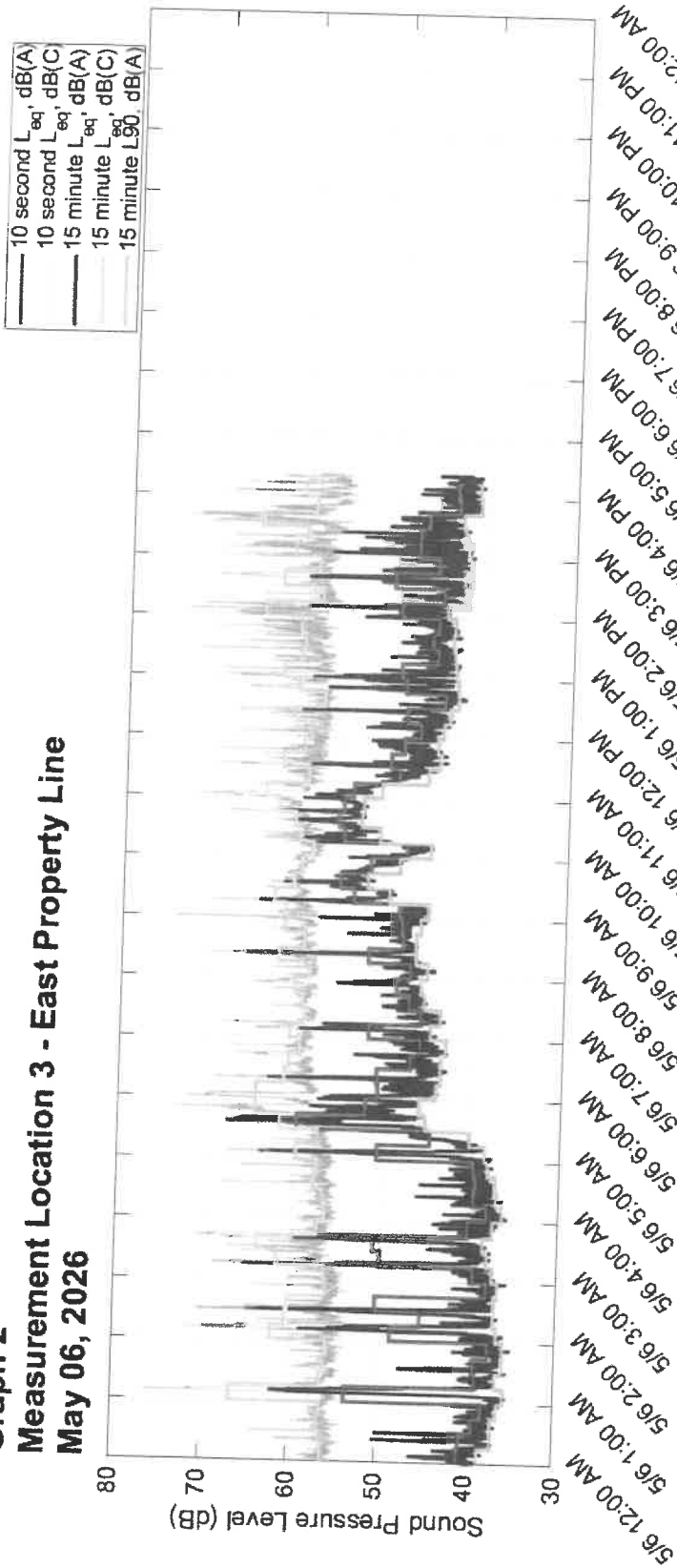
# **Graph 1** **Measurement Location 3 - East Property Line** **May 05, 2026**



**\*SLR**

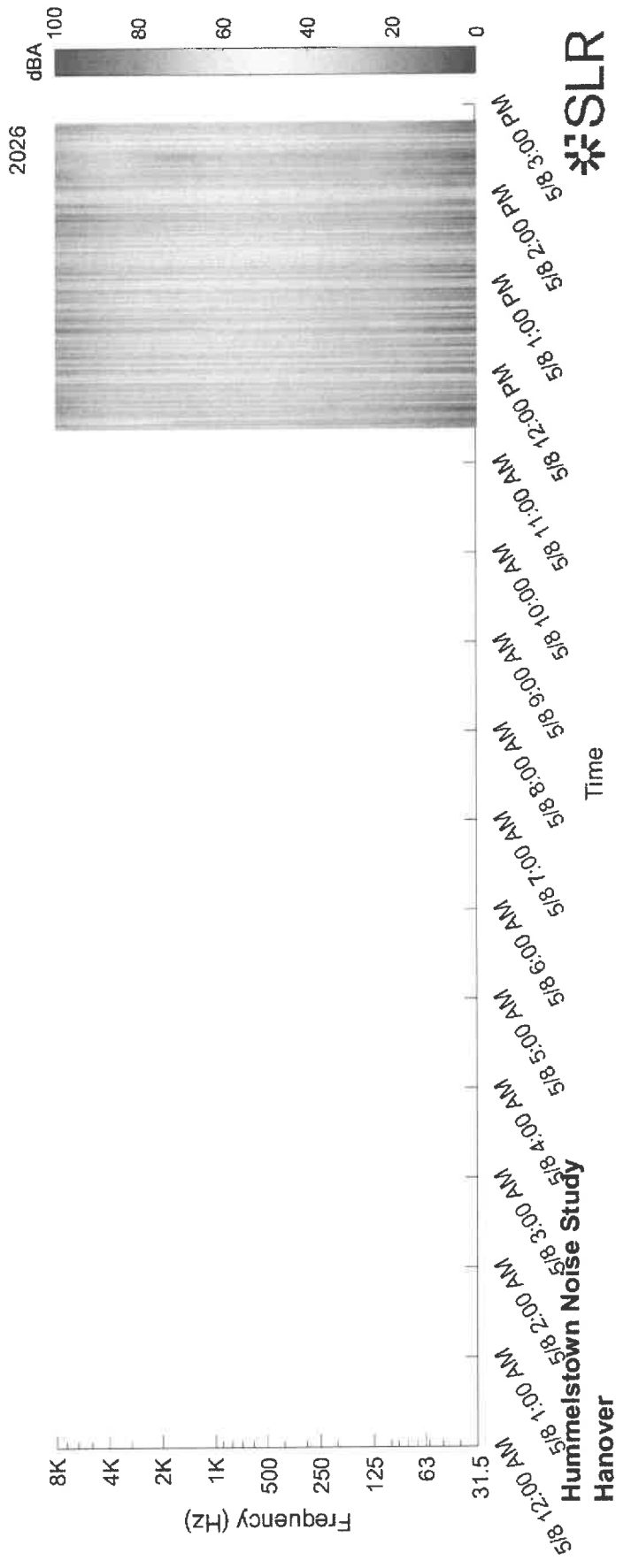
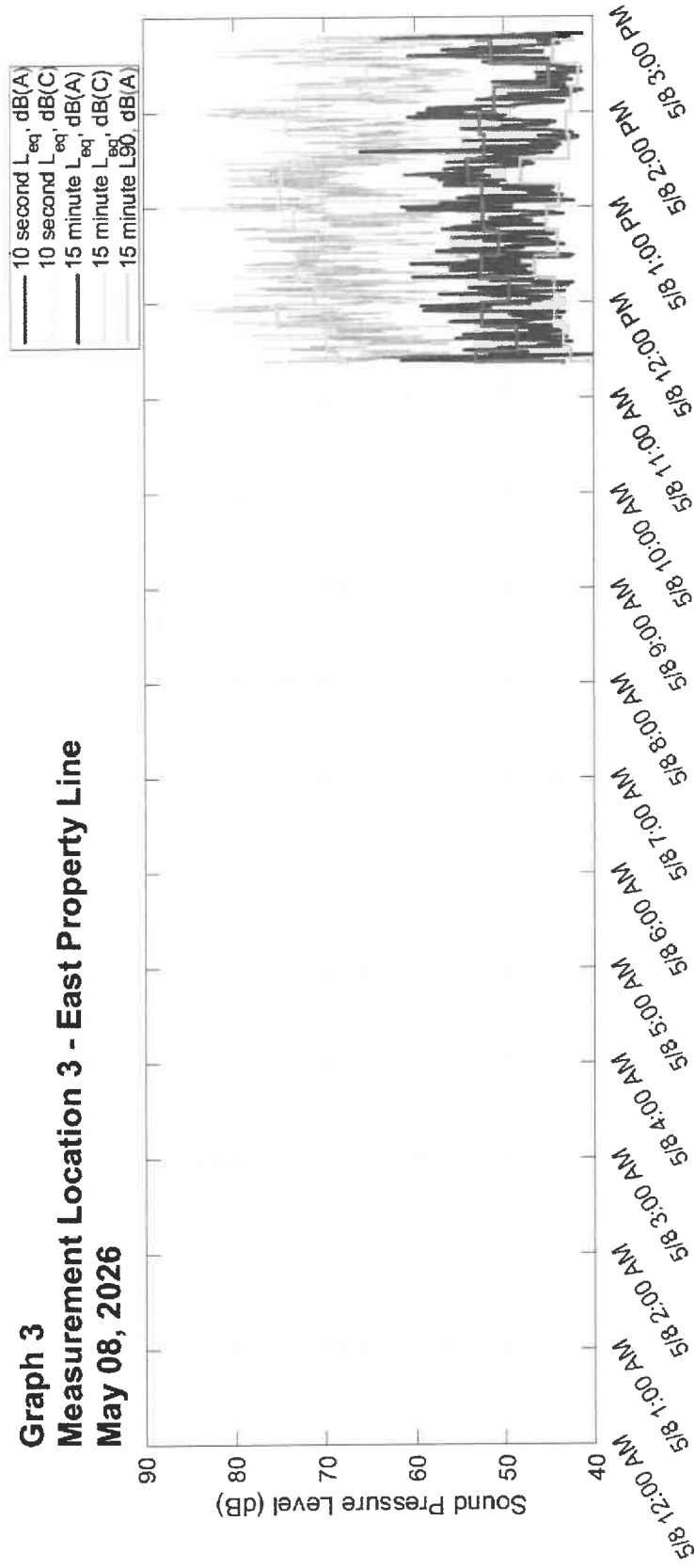
**Hummelstown Noise Study**  
**Hanover**

**Graph 2**  
**Measurement Location 3 - East Property Line**  
**May 06, 2026**



**Hunterdon County  
 Hanover**

**Graph 3**  
**Measurement Location 3 - East Property Line**  
**May 08, 2026**

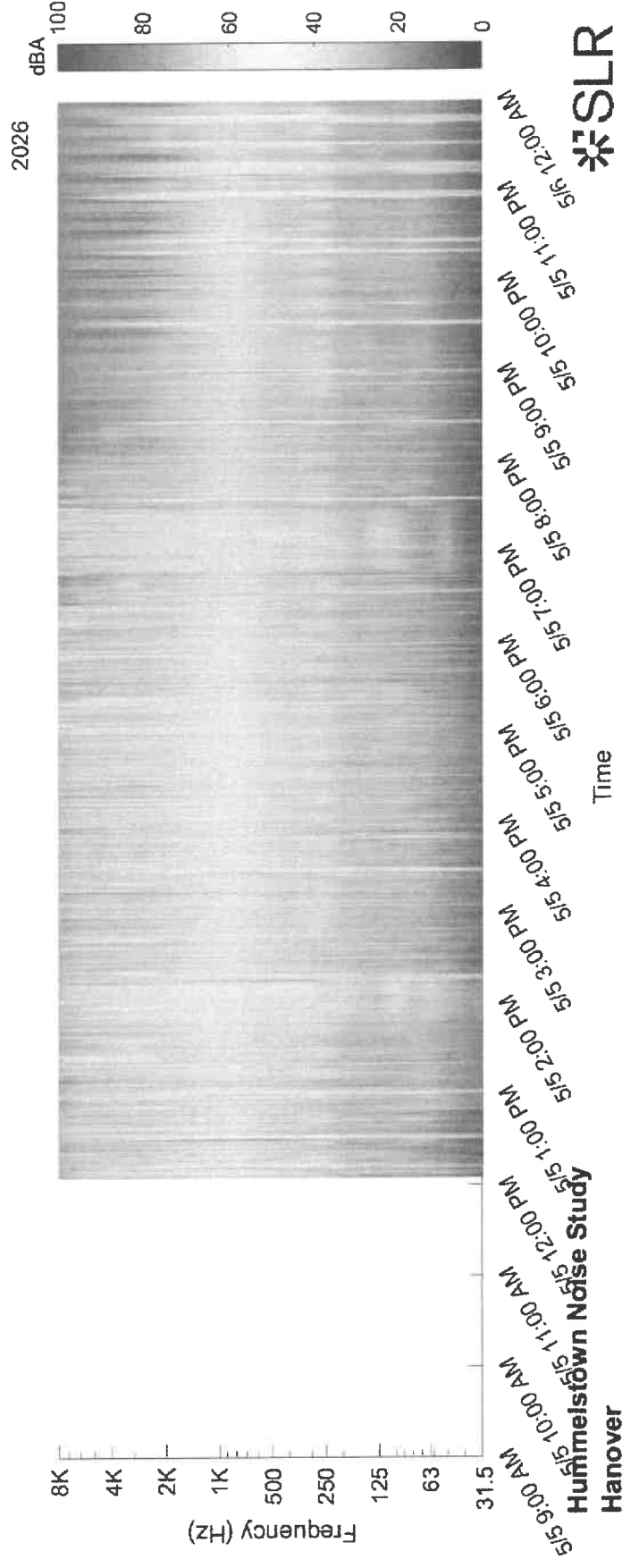
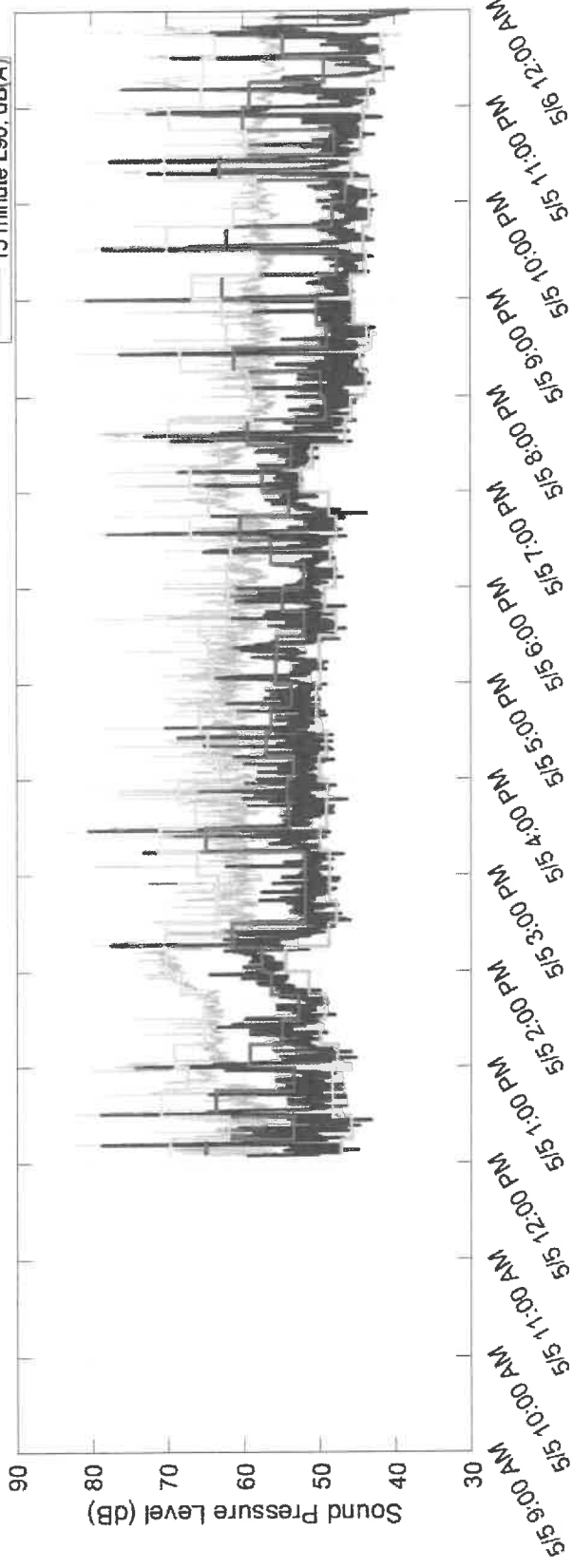


Graph 1

Measurement Location 4 - SW Property Line

May 05, 2026

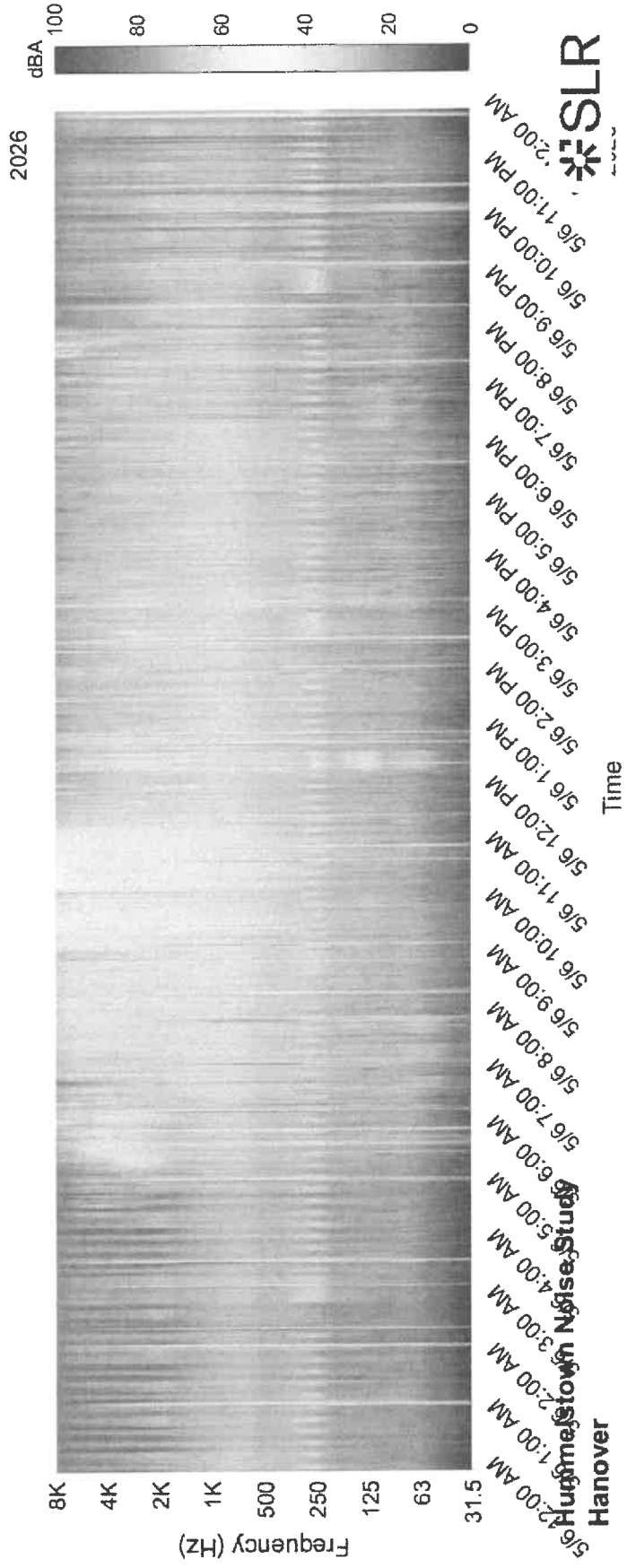
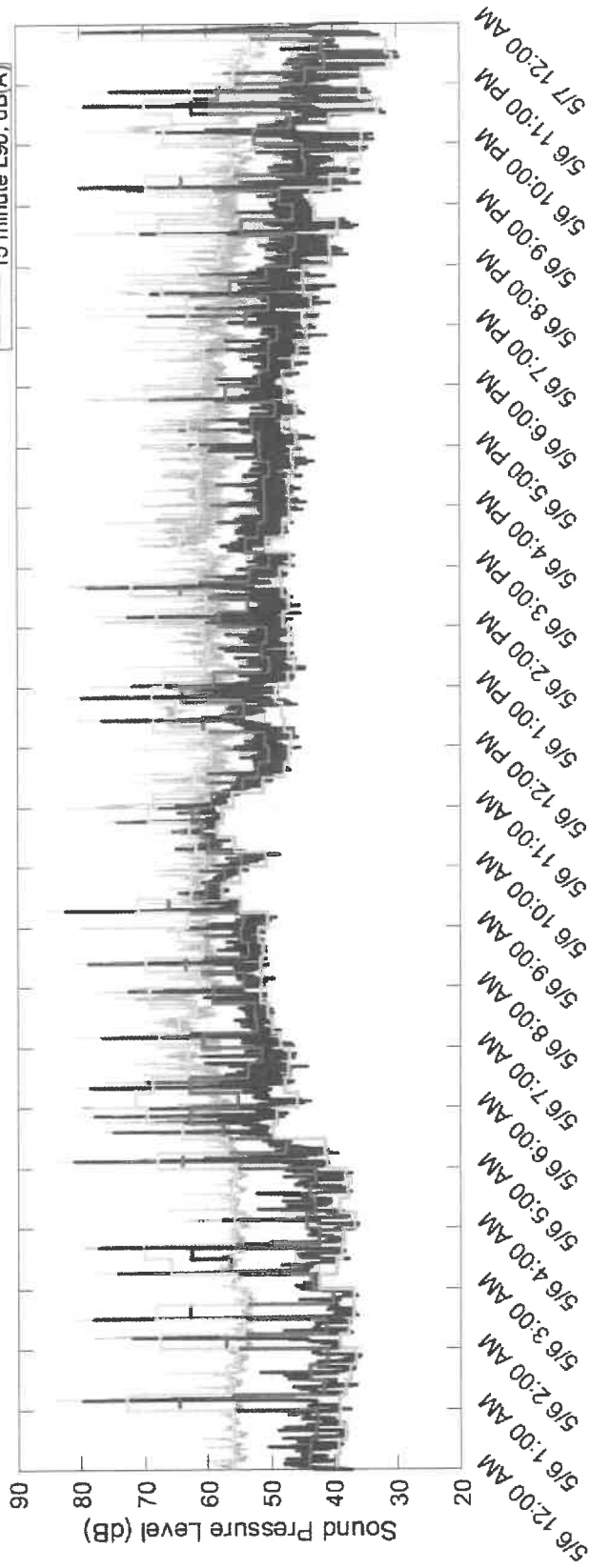
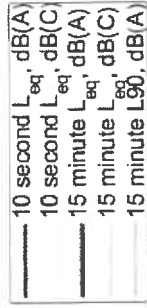
- 10 second  $L_{eq}$ , dB(A)
- 10 second  $L_{eq}$ , dB(C)
- 15 minute  $L_{eq}$ , dB(A)
- 15 minute  $L_{eq}$ , dB(C)
- 15 minute  $L_{90}$ , dB(A)



Graph 2

Measurement Location 4 - SW Property Line

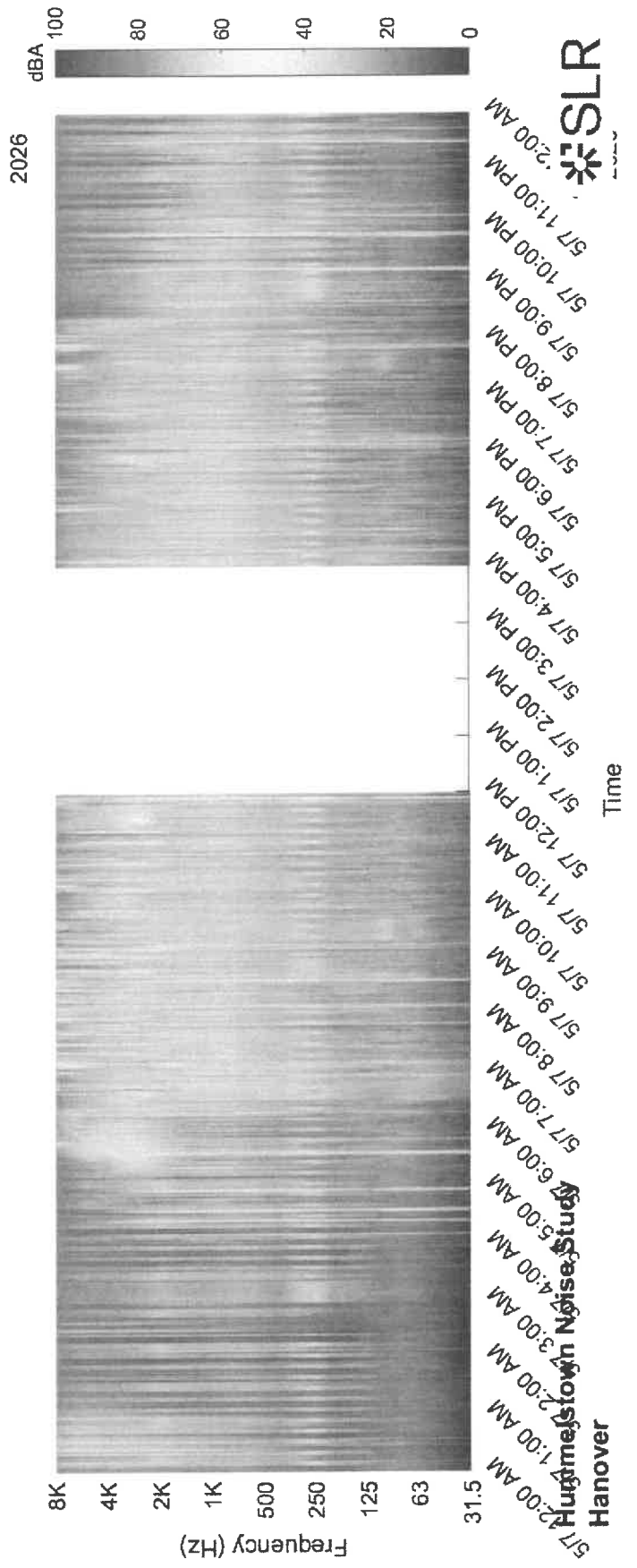
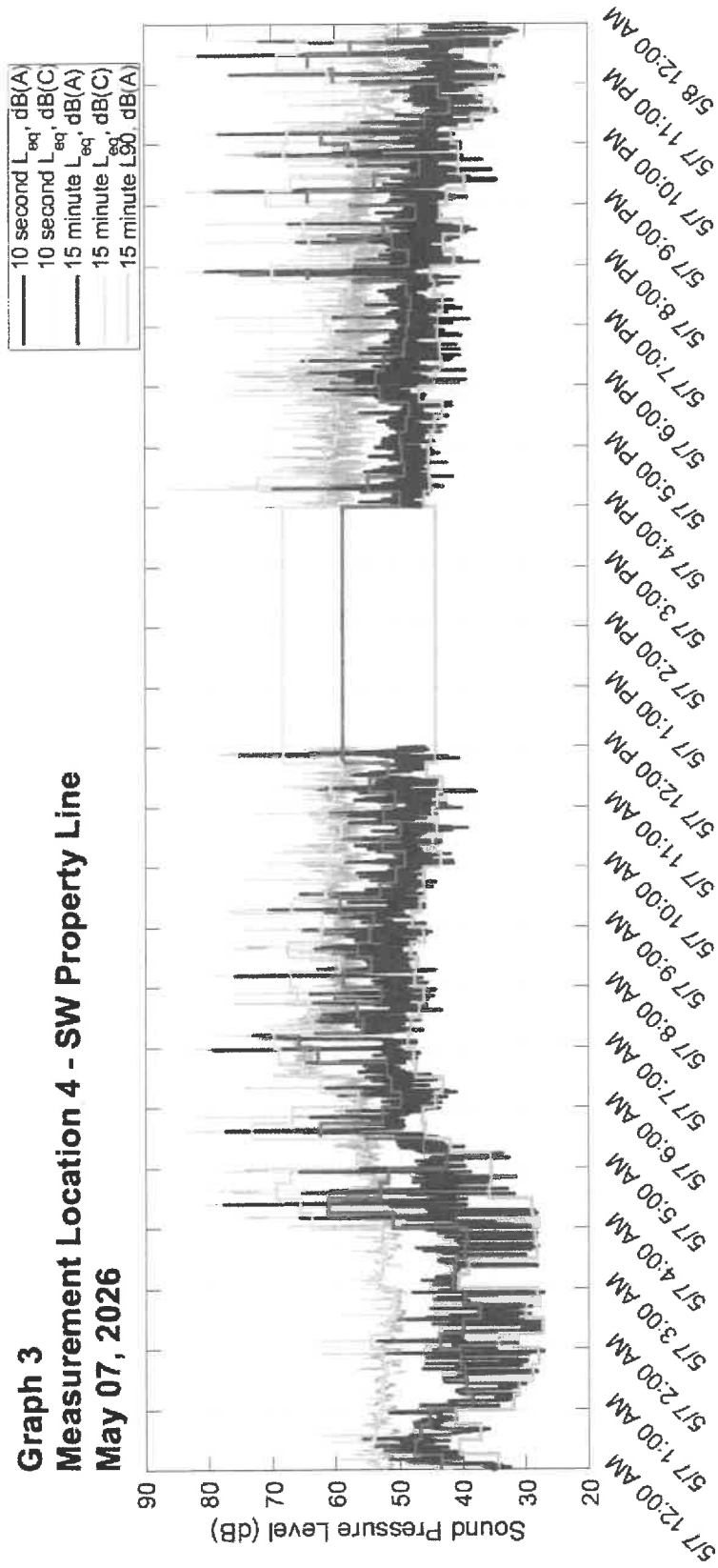
May 06, 2026



Graph 3

Measurement Location 4 - SW Property Line

May 07, 2026

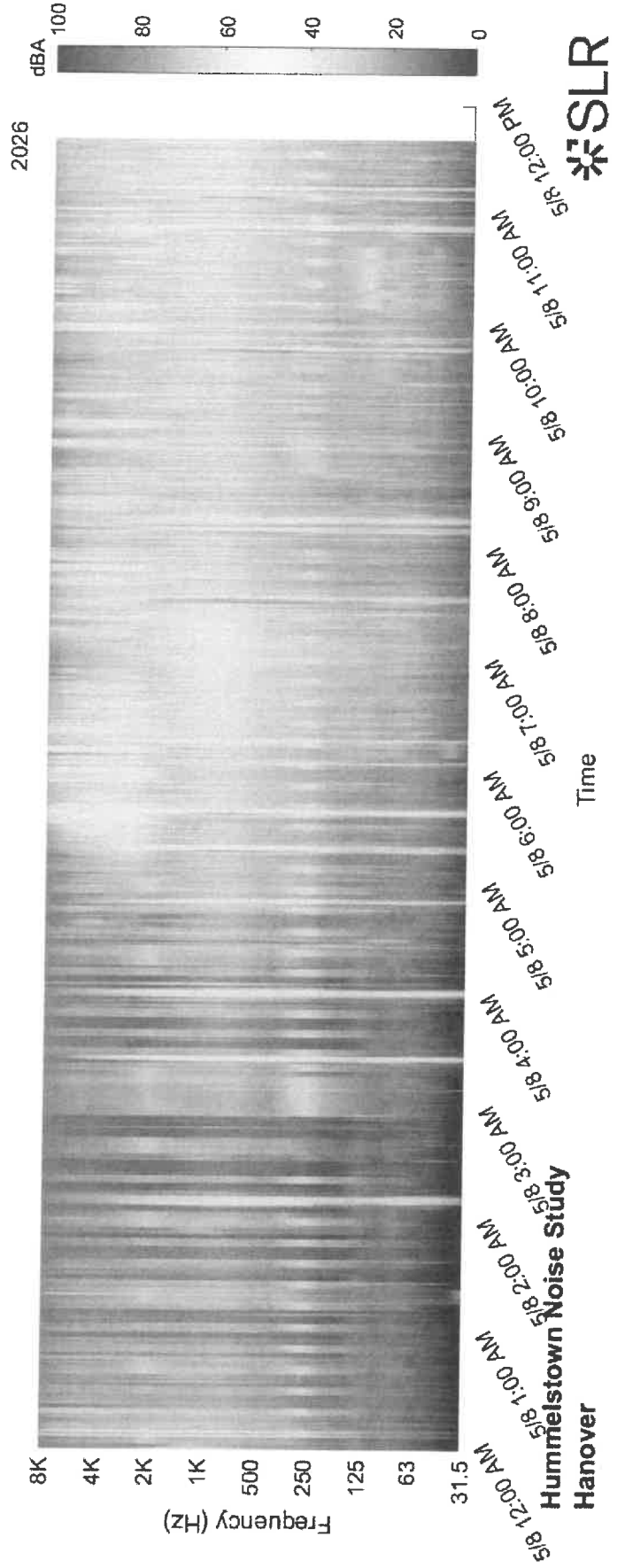
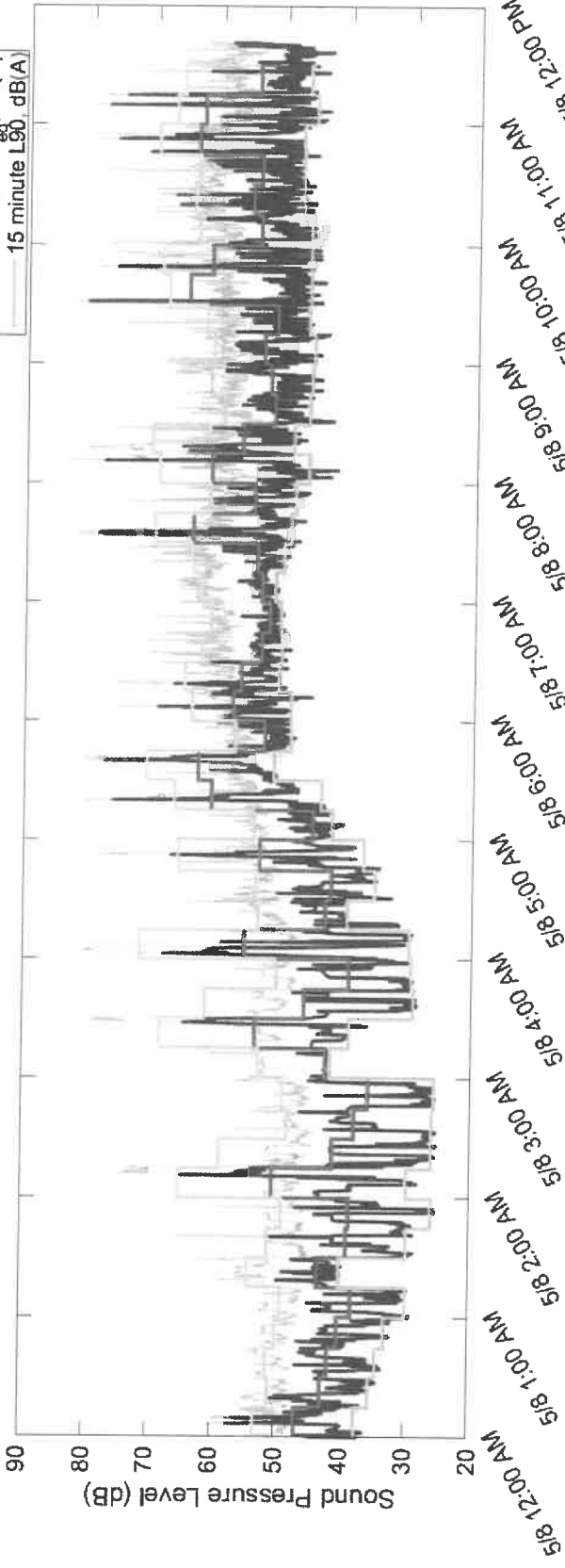


# Graph 4

Measurement Location 4 - SW Property Line

May 08, 2026

- 10 second  $L_{eq}$ , dB(A)
- 10 second  $L_{eq}$ , dB(C)
- 15 minute  $L_{eq}$ , dB(A)
- 15 minute  $L_{eq}$ , dB(C)
- 15 minute  $L_{90}$ , dB(A)



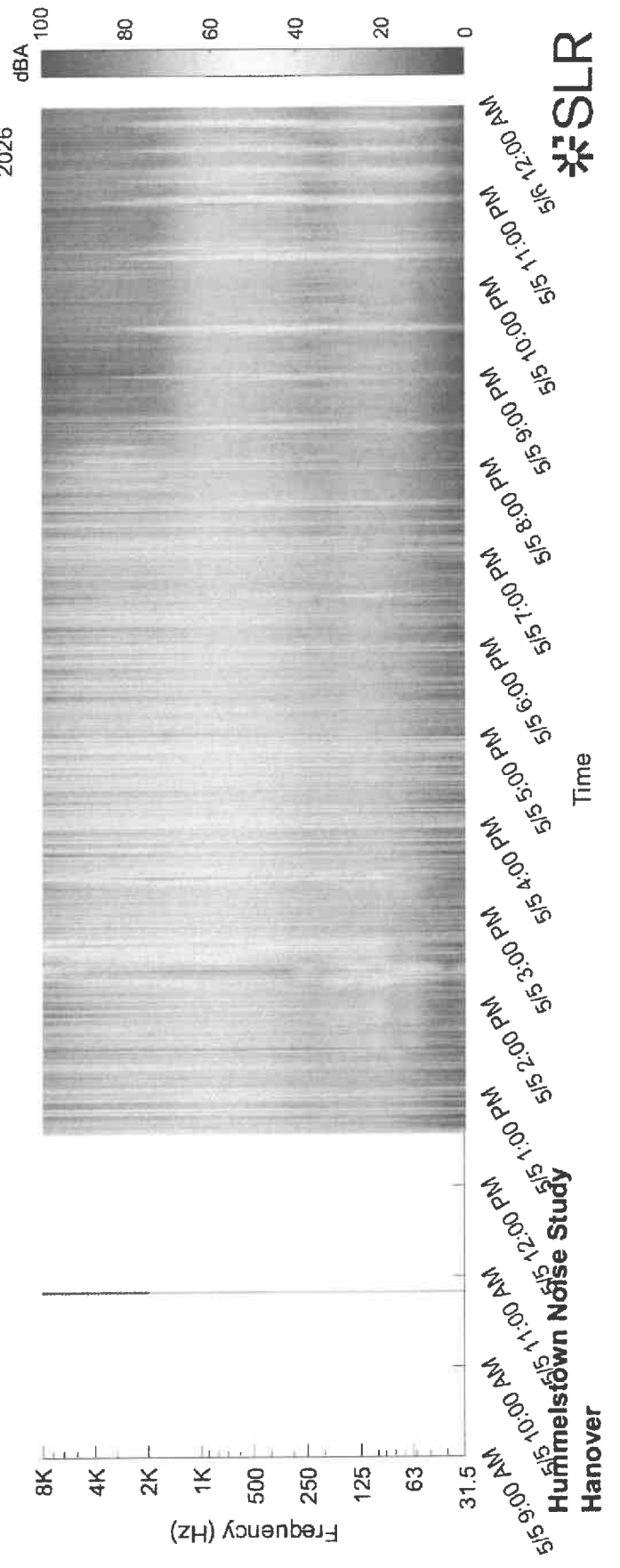
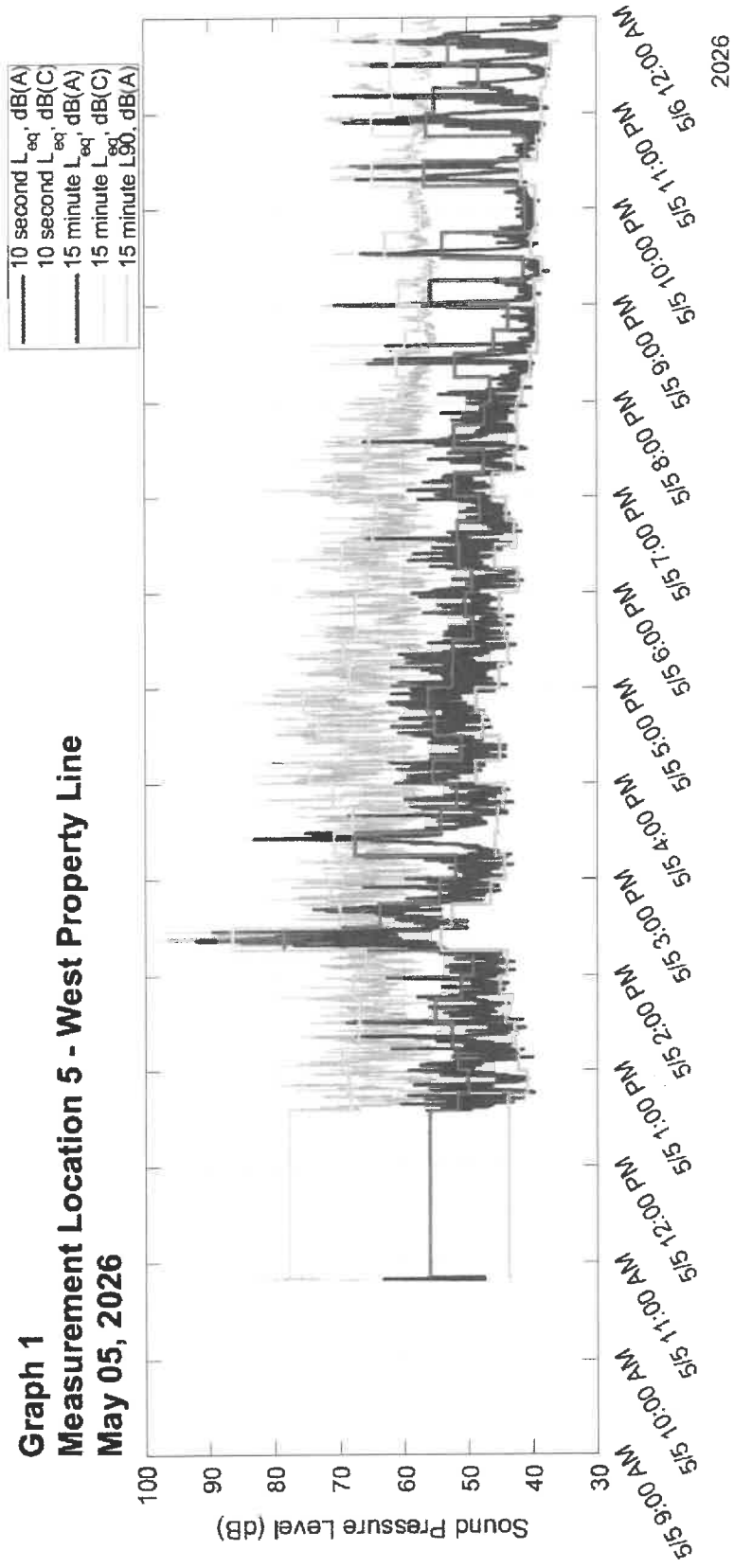
SLR

Time

Hummelstown Noise Study

Hanover

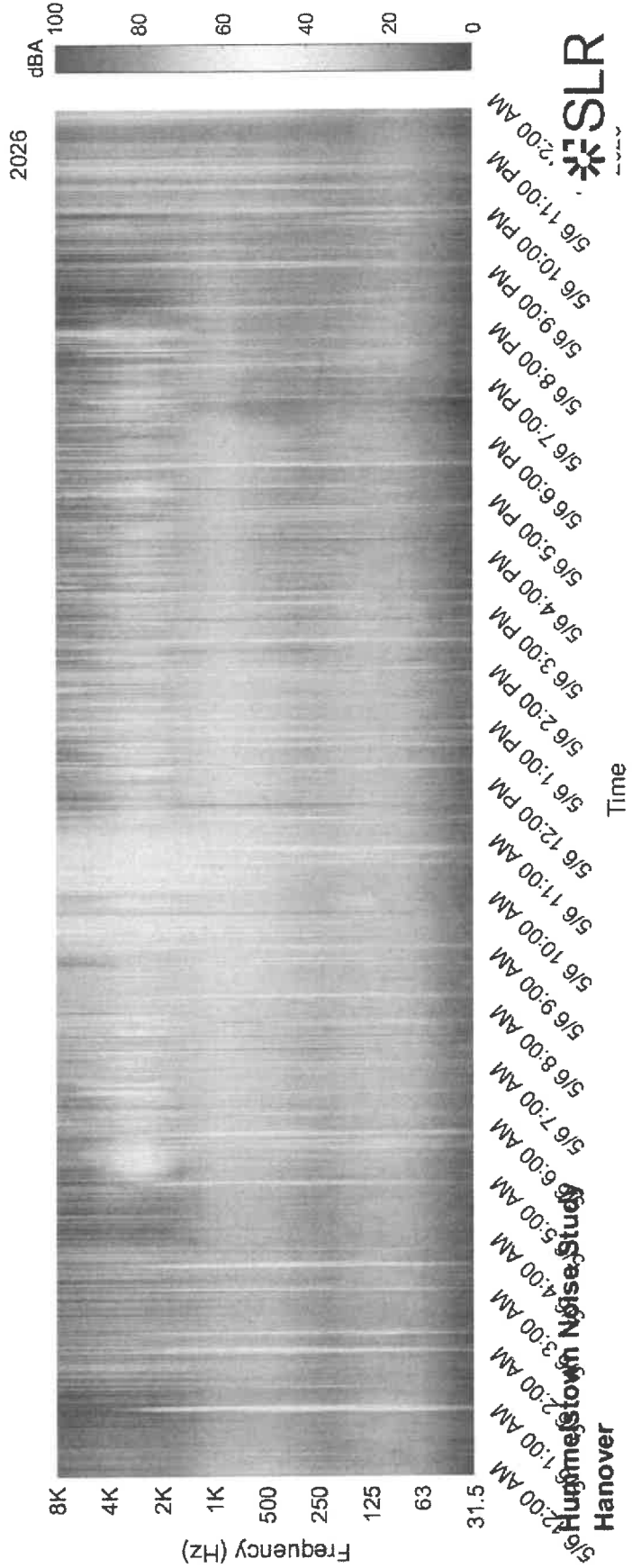
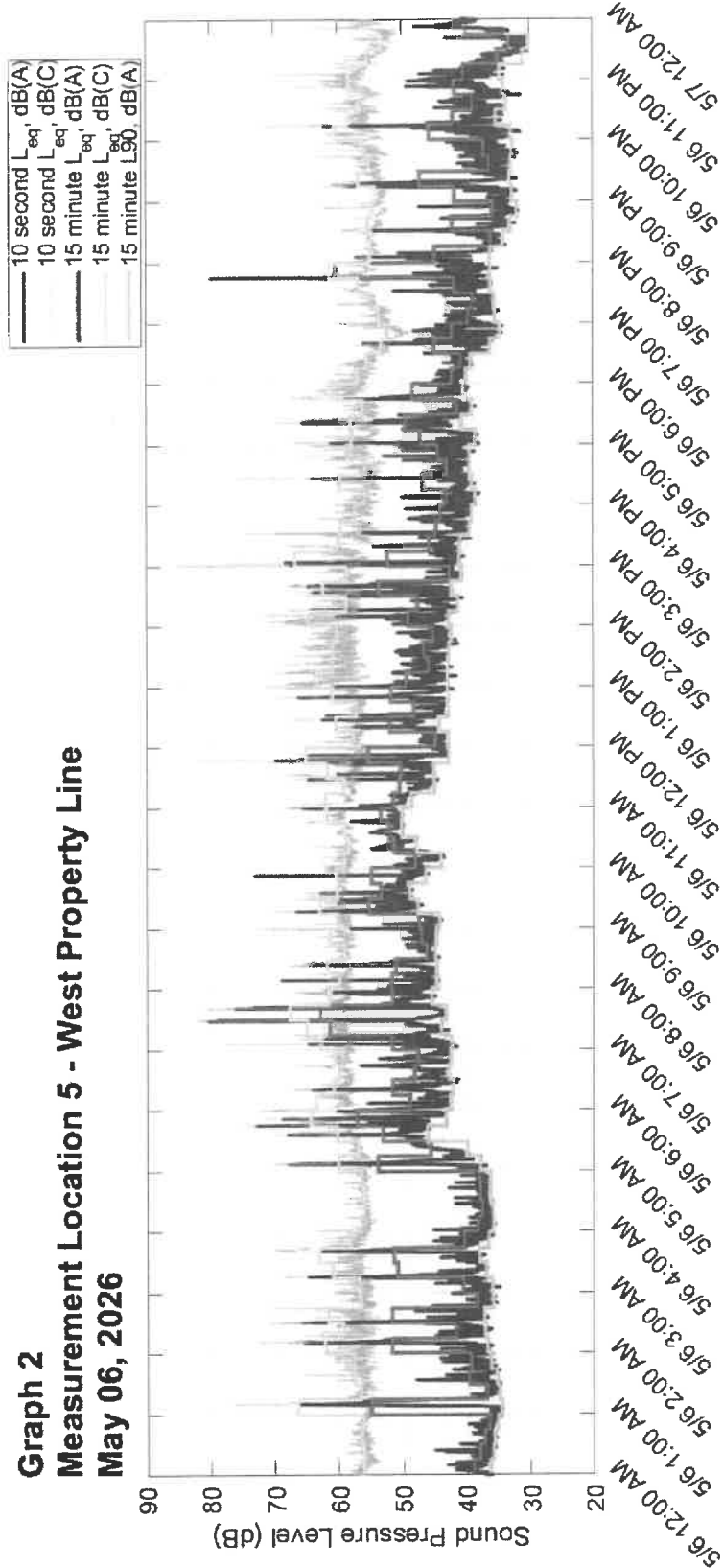
**Graph 1**  
**Measurement Location 5 - West Property Line**  
**May 05, 2026**



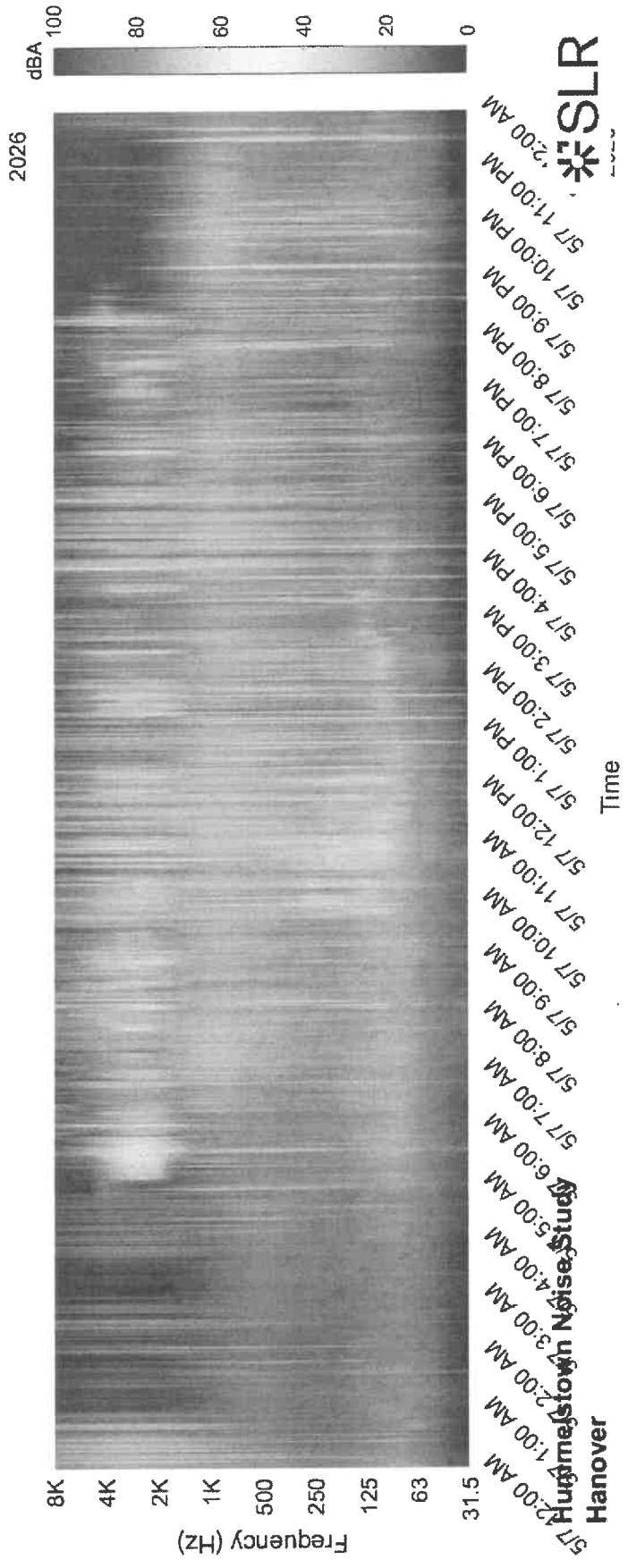
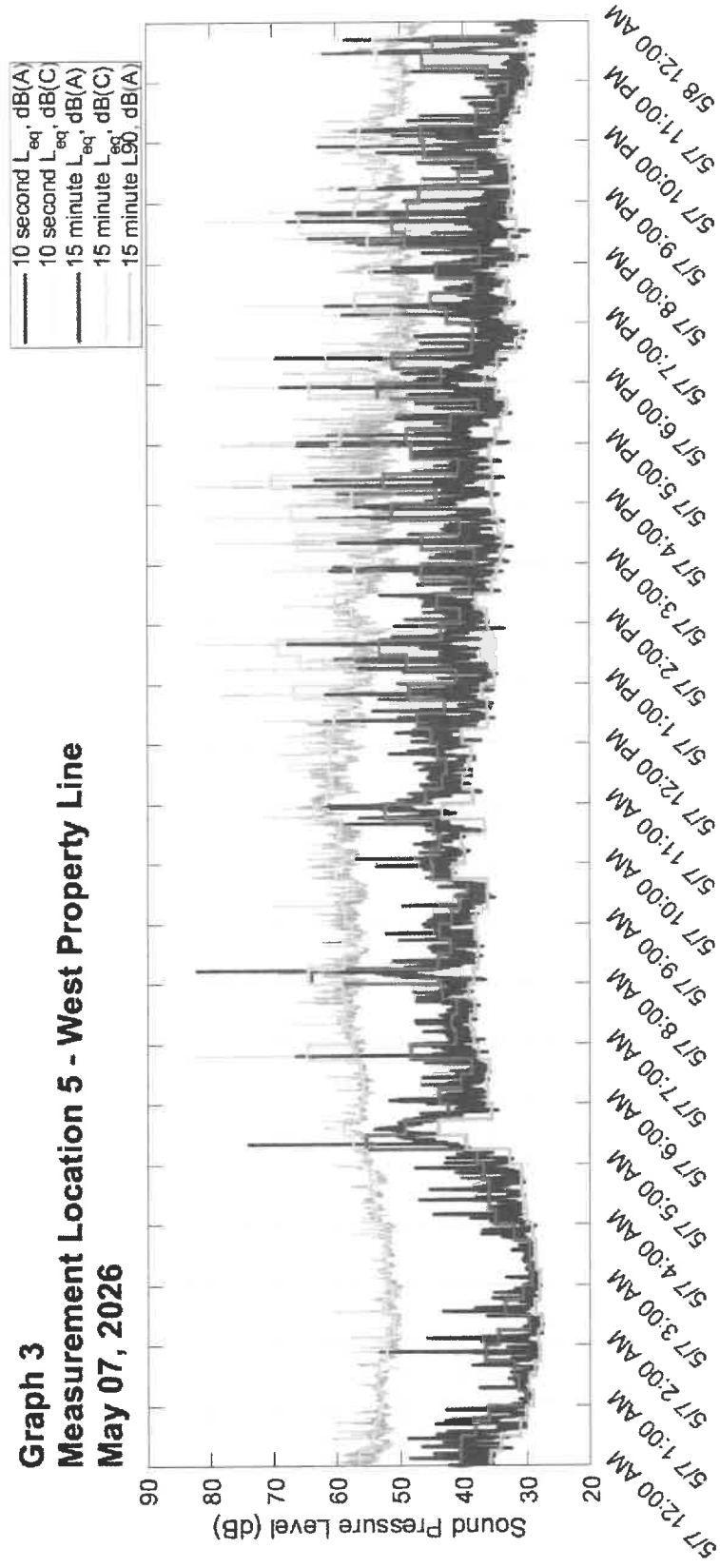
**\*SLR**

**Hummelstown Noise Study**  
**Hanover**

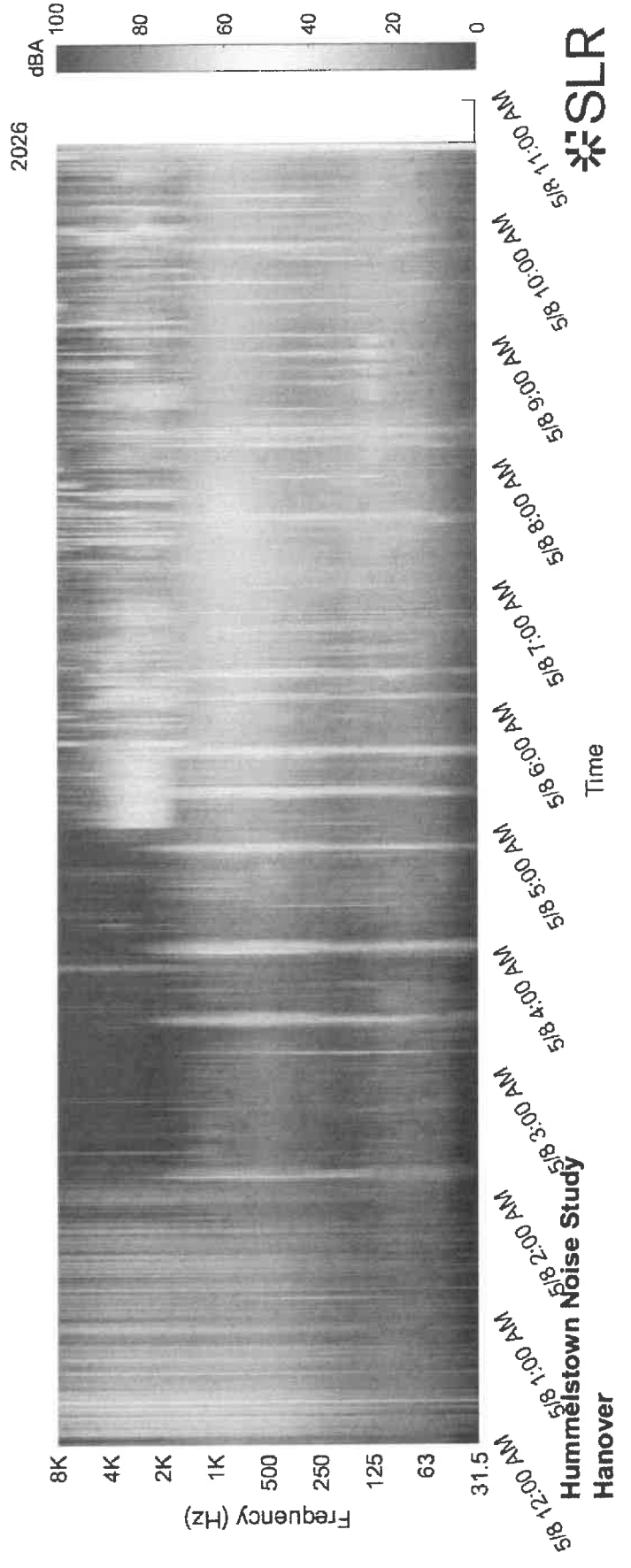
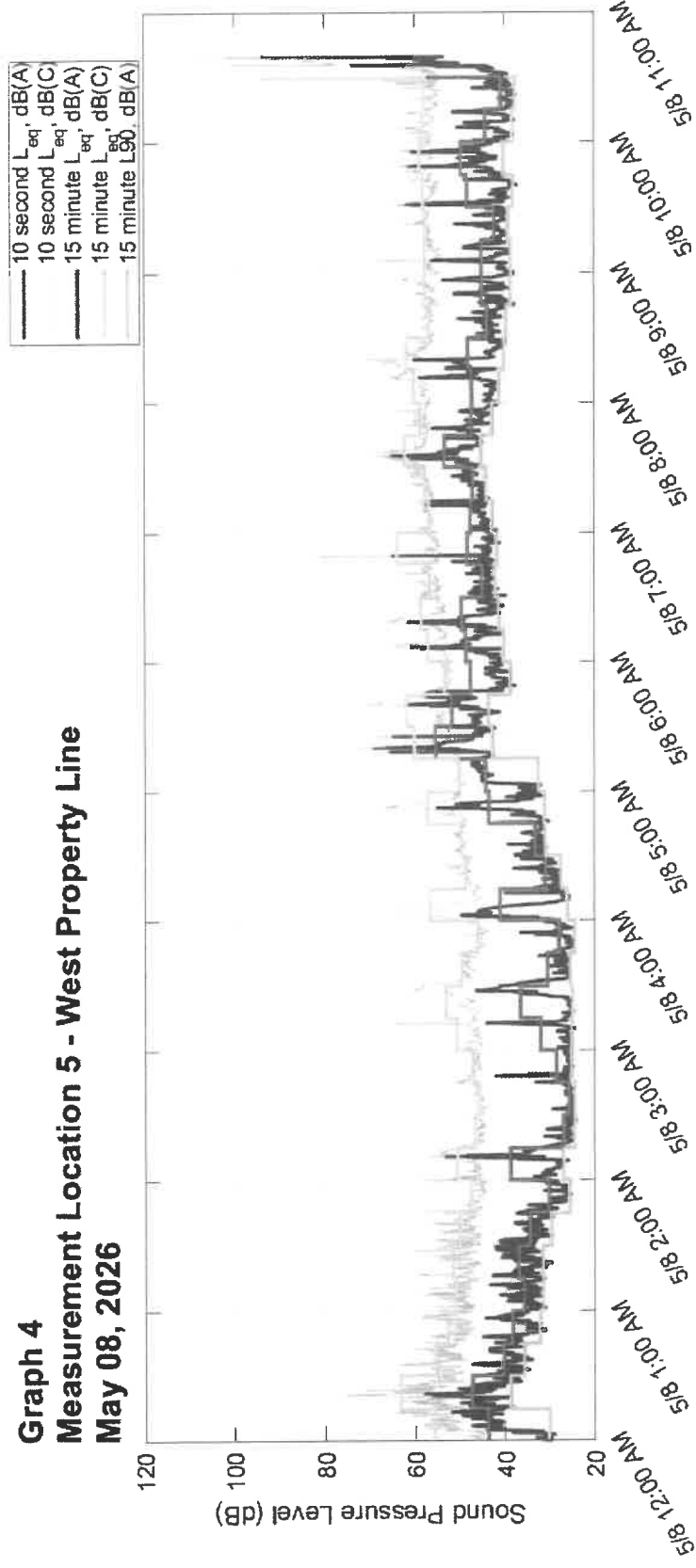
**Graph 2**  
**Measurement Location 5 - West Property Line**  
**May 06, 2026**

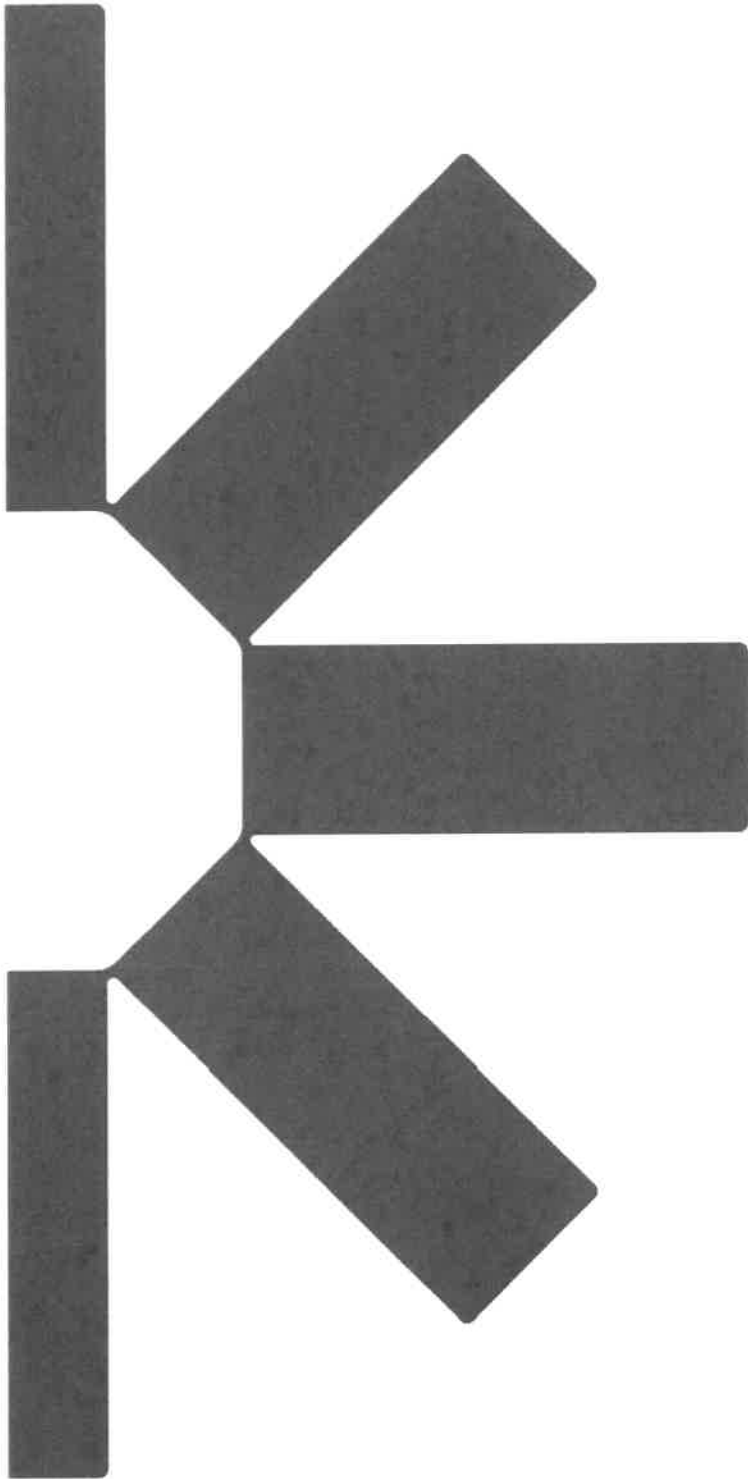


**Graph 3**  
**Measurement Location 5 - West Property Line**  
**May 07, 2026**



**Graph 4**  
**Measurement Location 5 - West Property Line**  
**May 08, 2026**





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