CenterPoint Energy Mankato Hydrogen Energy Plant

Pre-Construction Acoustical Assessment

PREPARED FOR

DATE
19 MAY 2026

REFERENCE
0812942

Document details

The details entered below are automatically shown on the cover and the main page footer. PLEASE NOTE: This table must NOT be removed from this document.	
DOCUMENT TITLE	CenterPoint Energy Mankato Hydrogen Plant Project
DOCUMENT SUBTITLE	Pre-Construction Acoustical Assessment
PROJECT NUMBER	0812942
Date	May 19, 2026
Version	02
Author	Nate Born
Client name	CenterPoint Energy

Document history

				ERM APPROVAL TO ISSUE		
VERSION	REVISION	AUTHOR	REVIEWED BY	NAME	DATE	COMMENTS
Version	001	Nate Born	Tony Agresti	Name	05/05/2026	For Client Review
Version	002	Nate Born	Tony Agresti	Name	05/19/2026	For CUP Application

CONTENTS

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

dBA	A-weighted decibels
EEI	Edison Electric Institute
ERM	Environmental Resources Management, Inc.
ISO	International Organization for Standardization
L_{10}	Noise level exceeded 10 percent of the time
L_{50}	Noise level exceeded 50 percent of the time
L_{eq}	Time-equivalent sound pressure levels (L_{eq})
MN	Minnesota
MPCA	Minnesota Pollution Control Agency
MW	Megawatts
NAC	Noise Area Classification

1. INTRODUCTION

1.1 Scope of Report

On behalf of CenterPoint Energy (Client), Environmental Resources Management, Inc. (ERM) completed a pre-construction noise assessment for the installation of a green hydrogen production and storage facility at their existing site located at 2400 North Riverfront Drive in Mankato, Minnesota 56001. The proposed facility is referred to as the Mankato Hydrogen Energy Plant Project (Project). The proposed Project will include a hydrogen plant that uses renewable energy from a 1 MW on-site solar panel array to split water into hydrogen and oxygen. The hydrogen will be blended at low concentrations into the existing natural gas distribution system. A solar panel array will consist of approximately 2,120 590W panels on roughly 3 acres of land within the restored prairie located west of the current facility. The hydrogen production and storage facility will be installed within an existing gravel area located east of the existing on-site propane tanks.

The primary noise generating sources associated with the Project are the solar inverter adjacent to the solar array, and the dry cooler, gas reducing station, and oxygen exhaust vent associated with the hydrogen plant. Figure 1 in Section 2.1 presents the location of the Project sources in relation to the surrounding properties.

ERM completed an acoustical analysis to evaluate whether the contribution of operational noise from the Project would comply with the State of Minnesota's Administrative Rule 7030 which governs allowable noise levels. This report presents the results of ERM's acoustical analysis.

1.2 General Information on Noise

Sound is a sequence of waves of pressure that propagate through compressible media such as air or water. When sound becomes excessive, annoying, or unwanted, it is often referred to as noise. The sound power level is the total acoustic power produced by a piece of equipment. Alternatively, the sound pressure level is the magnitude of the sound pressure wave produced by a noise source at a given distance.

Noise is typically measured on the A-weighted scale (dBA). The A-weighting scale has been shown to provide a good correlation with the human response to sound and is the most widely used descriptor for community noise assessments (Harris, 1991). The faintest sound that can be heard by a healthy ear is about 0 dBA, while an uncomfortably loud sound is about 120 dBA. In order to provide a frame of reference, some common sound levels are listed below.

- Pile Driver at 100 feet 90 to 100 dBA
- Chainsaw at 30 feet 90 dBA
- Truck at 100 feet 85 dBA
- Noisy Urban Environment 75 dBA

- Lawn Mower at 100 feet 65 dBA
- Average Speech 60 dBA
- Average Office 50 dBA
- Rural Residential During the Day 40 dBA
- Quiet Suburban nighttime 35 dBA
- Soft Whisper at 15 feet 30 dBA

2. NOISE REGULATIONS

2.1 Minnesota Noise Regulations

The Minnesota Pollution Control Agency (MPCA) enforces Minnesota's noise standards, which are known as MN Administrative Rule 7030. Minnesota's primary noise limits vary for different "noise area classifications" (NACs) based on the land use. The limits consider the "L_{10}" and "L_{50}", which are noise levels that are exceeded for 10 percent and 50 percent of the time in a one-hour period, respectively. In general, the L_{50} is roughly equivalent to the more commonly used L_{eq} (time equivalent sound level), which is the energy average of all the sounds that are present.

For residential locations (NAC 1), the limits are L_{10} = 65 dBA and L_{50} = 60 dBA during the daytime (7:00 a.m. – 10:00 p.m.) and L_{10} = 55 dBA and L_{50} = 50 dBA during the nighttime (10:00 p.m. – 7:00 a.m.). This means that during a one-hour period of monitoring, daytime noise levels generated by the Project cannot exceed 65 dBA for more than 10 percent of the time (six minutes) and cannot exceed 60 dBA for more than 50 percent of the time (30 minutes).

For recreational locations (NAC 2), the limits are L_{10} = 70 dBA and L_{50} = 65 dBA during both the daytime and nighttime hours. This means that during a one-hour period, Project noise levels cannot exceed 70 dBA for more than 10 percent of the time (six minutes) and cannot exceed 65 dBA for more than 50 percent of the time (30 minutes).

A summary of the noise rules based on noise area classification is shown in table 1.

Table 1. Summary of Noise Rules based on Noise Area Classification

Noise Area Classification	Daytime		Nighttime	
	L_{10}	L_{50}	L_{10}	L_{50}
1 (Residences, religious activities, camping areas, hospitals, hotels, schools)	65	60	55	50
2 (Retail, businesses, recreational activities, transit terminals)	70	65	70	65
3 (Manufacturing, fairgrounds, agriculture)	80	75	80	75

2.1.1 Project-Specific Noise Area Classifications

The Project is located within an industrial zoning district, which qualifies as NAC 3. The nearest NAC 1 boundary is a residential parcel located on the east side of North Riverfront Drive, south of Augusta Drive, denoted "RES1". The nearest recreational area NAC 2 boundary is a golf course on the east side of North Riverfront Drive, north of Augusta Drive, denoted "REC1". The locations of RES1 and REC1 and their distances to the Project noise sources are shown in Figure 1.

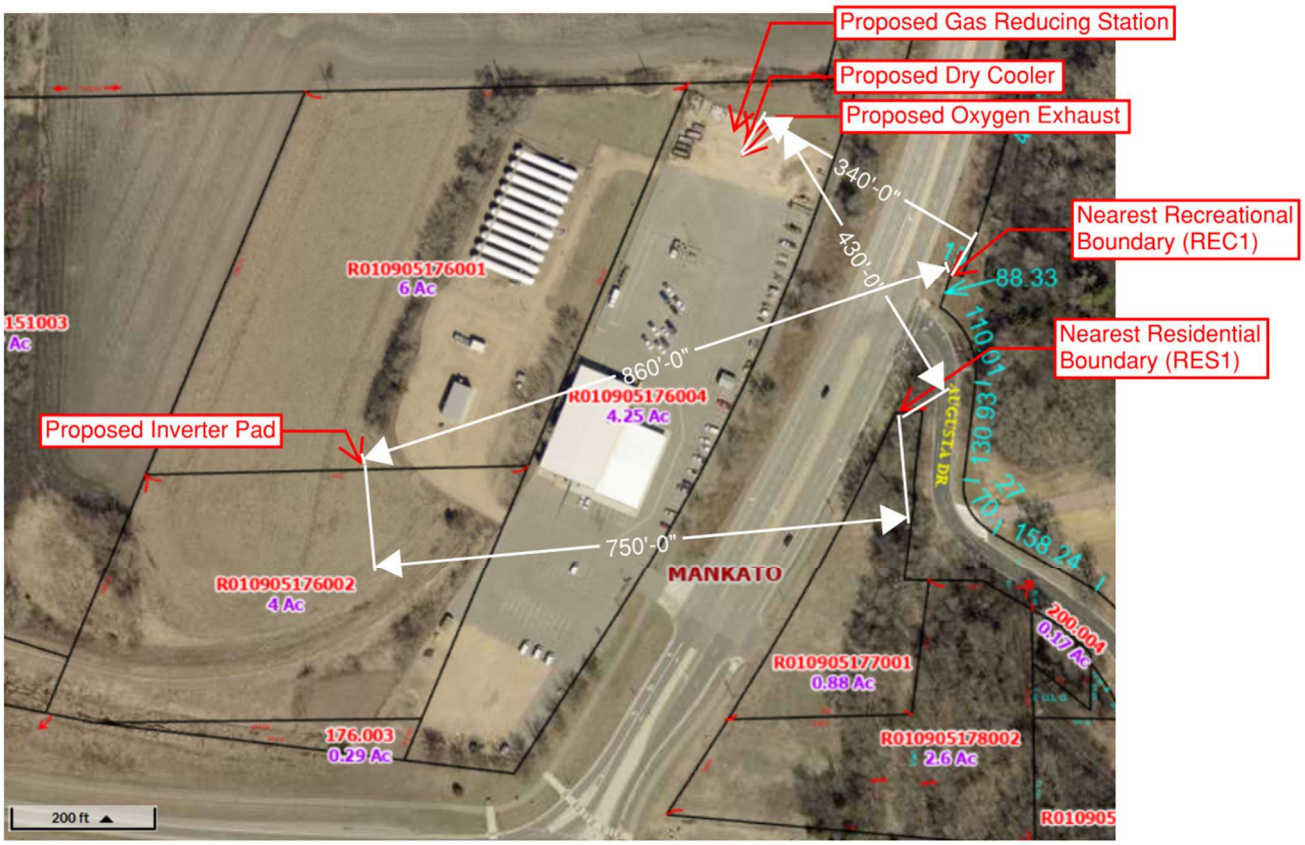

Figure 1. Nearest Noise Area Classification locations to Project Noise Sources

2.2 City of Mankato Noise Regulations

The City of Mankato's noise ordinance is within their "nuisances" section of their city ordinances. This section mainly deals with noise nuisances as they relate to motor vehicles, hobby crafts, etc. The ordinance does not contain any numerical noise limits, nor any objective criteria for what noise constitutes a "nuisance".

3. REDUCING STATION NOISE LEVELS

Manufacturer-provided noise emissions data for the reducing station were not available. ERM staff therefore mobilized to CenterPoint Energy's existing Minneapolis hydrogen plant on April 30, 2026 to measure the noise levels for that facility's existing reducing station. Sound pressure levels were measured using a Casella CEL-633 hand-held analyzer (Serial Number 2031901) equipped with a microphone windscreen. Field calibration was performed before and after monitoring using a Casella CEL Acoustics Type 1 calibrator. The sound measurement equipment included current certificates of calibration from the manufacturer. Sound measurements were recorded at 1-minute intervals at locations around the reducing station. A-weighted time-equivalent sound pressure levels (L_{eq}) were measured on slow response with the sound level meter set at a height of approximately 4 feet above ground level (the same height as the valves on the reducing station). During the measurement periods, field personnel recorded meteorological data (wind speed and direction, temperature, relative humidity, barometric pressure, and sky condition), and the predominant audible noise sources. No precipitation occurred during the measurement periods.

Eleven measurements were taken around the reducing station, at distances ranging from 4-18.5 feet. Measured sound pressure levels ranged from 69.8-85.3 dBA. The measured sound pressure levels were converted into sound power levels by considering the dimensions of the reducing station valves and the distances at which the measurements were obtained. The associated calculated sound power levels range from 90.4-98.8 dBA. A summary of the noise measurement and sound power calculation results is shown in Table 2.

Table 2. Reducing Station Noise Emission Data

Location	X distance (feet)	Y distance (feet)	Measured Sound Pressure Level[a] (dBA)	Calculated Sound Power Level[a] (dBA)
1	4	0	84.8	94.5
2	4	3.5	85.3	97.5
3	0	7.5	82.4	97.6
4	4	3.5	83.5	95.7
5	4	0	83.1	92.8
6	4	3.5	79.3	91.5
7	0	7.5	75.2	90.4
8	4	3.5	78.9	91.1
9	0	18.5	69.8	92.8
10	15	0	76.7	97.9
11	0	18.5	75.8	98.8 [b]

[a.] The sound power level is the total acoustic power produced by a piece of equipment; the sound pressure level is the magnitude of the sound pressure wave produced by a noise source at a given distance.
[b.] To be conservative, ERM attributed the highest calculated sound power level of 98.8 dBA to the reducing station.

4. ACOUSTICAL ANALYSIS

4.1 Methodology

Noise emissions data for the remaining sources were obtained from potential equipment vendors and from CenterPoint Energy. ERM completed spreadsheet calculations for each of the proposed sources to predict noise levels that will be generated during Project operation. The calculations accounted for spreading losses and atmospheric effects, but did not account for shielding from barriers or buildings, shielding from topography. No credit was taken for existing foliage or vegetation. These assumptions are conservative in nature and yield predictions that are likely higher than actual noise levels.

A summary of the equipment sources included in the noise assessment is provided in Table 3, along with the noise emissions data and the data source for each. Only continuous noise sources were considered in the calculations; intermittent noise sources, such as safety alarms, backup generators, and emergency vents are not included in the calculations.

Table 3. Equipment Source Listing and Noise Emission Data

Source	Number of Each	Noise Emissions Data		Data Source
		Sound Pressure Level [a]	Sound Power Level [a]	
Dry Cooler	1 set of 8	Rated at 64 dBA at 33 feet [b]	92.4	Kelvion [c]
Reducing Station	1	Measured at 75.8 dBA at 18.5 feet [d]	98.8	ERM
Oxygen Exhaust	1	Rated at 60 dBA at 3 feet	60.0	CenterPoint [e]
Solar Inverters	1	62.5 dBA at 33 feet	90.9	Sungrow [f]

[a.] The sound power level is the total acoustic power produced by a piece of equipment; the sound pressure level is the magnitude of the sound pressure wave produced by a noise source at a given distance.

[b.] Dry cooler emissions data for when it is operating at full load, which would only occur on very hot days.

[c.] Kelvion Model ULV-LA204K6X-091Z090 Dry Cooler Datasheet

[d.] ERM measured sound levels of the reducing station at the existing Minneapolis Hydrogen Plant, as detailed in Section 3. To be conservative, ERM attributed the highest calculated sound power level of 98.8 dBA to the Mankato reducing station.

[e.] From CenterPoint Energy, based on manufacturer's information.

[f.] Although the exact model of inverter is not known at this point, Sungrow is a typical inverter used in utility-scale solar projects. Sungrow Model SG4400UD Inverter Noise Test Report TR_20231130.

4.2 Predicted Noise Levels

The calculations allowed for the quantification of noise levels from each source, based on the sound characteristics (overall level, frequency data etc.). Individual spreadsheet calculations were

conducted for each source, and the results logarithmically added for the RES 1 and REC 1 locations to arrive at a total noise contribution from the Project at each location. The calculations were conducted for all sources operating simultaneously at or near full load conditions, and assumed 24-hour operation, with the exception of the solar inverters, which would only be operational during daytime hours.

The predicted noise contribution of each predominant noise source, the combined noise level for all sources attributed to the Project, and the associated Minnesota Standard are presented in Table 4.

Table 4. Predicted Noise Levels at nearest NAC points

Location	Time	Dry Cooler [a]	Reducing Station [b]	O2 exhaust	Inverter [c]	Sum	MPCA Standard [d]
REC1 (NAC1)	Day	40.7	46.9	8.3	32.0	47.9	65
	Night	40.7	46.9	8.3	0.0	47.8	65
RES1 (NAC2)	Day	40.5	46.7	8.1	32.2	47.8	60
	Night	40.5	46.7	8.1	0.0	47.6	50

[a.] Conservatively assumes Dry Cooler is operating at full load, which would only occur on very hot days.
[b.] ERM measured sound levels of the reducing station at the existing Minneapolis Hydrogen Plant, as detailed in Section 3. To be conservative, ERM attributed the highest sound power level of 98.8 dBA to the reducing station.
[c.] Assumes solar inverters only operate during daytime hours.
[b.] Corresponds to the L_{50} Noise Standard

As provided in Table 4, expected Project noise levels at full load conditions are shown to be in compliance with the MN noise standard for daytime and nighttime hours at both receiver locations.

5. CONCLUSION

This report presents the results of the acoustical assessment ERM conducted for the CenterPoint Mankato Hydrogen Plant Project in Mankato, Minnesota. The assessment included detailed noise calculations of the major facility noise generating equipment operating under full-load conditions and a comparison to the noise regulations within the State of Minnesota Administrative Rules.

The operational noise assessment revealed that Project-generated noise levels are expected to be in compliance with the applicable noise regulations. Operational Project noise levels were shown to be less than 50 dBA at the nearest residential and recreational property lines for both daytime and nighttime hours. The noise calculations did not include factors such as the barrier effect of existing

buildings and equipment, the screening effect of vegetation, or changes in topography, resulting in a conservative assessment.

6. REFERENCES

City of Mankato, Minnesota, Code of Ordinances, Section 10-1772. Accessed April 29, 2026.

Harris, 1991. Handbook of Acoustical Measurements and Noise Control, Third Edition (McGraw-Hill, Inc., 1991).

ISO, 2024. International Organization for Standardization. Standard ISO 9613-2 Acoustics – Attenuation of Sound During Propagation Outdoors, Part 2 General Method of Calculation. Geneva, Switzerland.

Minnesota Rules, part 7030.0040, subparts 1 and 2, online. Accessed April 29, 2026.

Sungrow Power Supply Co. Ltd. 2024. Noise Test Report TR_20231130.