

May 20, 2021

Londell Pease

Senior Planner

City of Bloomington Minnesota
1800 West Old Shakopee Road
Bloomington, Minnesota 55431-3027

Re: Independent School District #271
Jefferson-Olson Mechanical Plant
Re: Permit Application No. PRBD202104233
Commission No. 202115

Dear Londell:

The above mentioned project includes the installation of two chillers and evaporative cooling tower to provide a central cooling plant for Olson Elementary School, Olson Middle School, and Jefferson High School. As requested, we have performed a noise impact study to demonstrate compliance with Ordinance No. 2016-8, Article IV: Noise Code, section 10.29.02.

Attachment 1 is a site plan showing the location of the proposed chiller building and cooling towers in relation to the neighboring properties.

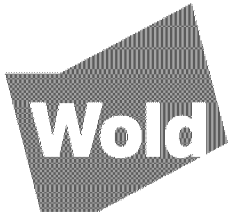
Attachment 2 contains the product data for the basis-of-design cooling towers that will be located on the roof as shown on the site diagram. The sound power levels included in this product data were used in Attachment 3 to calculate the A-weighted sound pressure level at the property line in dBA.

Attachment 3 contains sound analysis at the property line for one cooling tower in operation, two cooling towers in simultaneous operation, and four cooling towers in simultaneous operation. The sound analysis was performed with a distance of 300 feet between the new chiller building and the property line as shown in Attachment 1.

As stated above, the proposed chiller building will include installation of two cooling towers. The chiller building includes space for two additional cooling towers to be installed in the future when all buildings are connected to the new chilled water plant. Upon completion of this project, two cooling towers operating at peak capacity would result in 50 dBA at the residential property line. When the chiller plant is connected to all buildings in the future, two additional cooling towers will be in operation. All four cooling towers operating at peak capacity would result in 52 dBA at the residential property line.

Wold Architects and Engineers
332 Minnesota Street, Suite W2000
Saint Paul, MN 55101
woldae.com | 651 227 7773

**PLANNERS
ARCHITECTS
ENGINEERS**



Since the cooling towers are only in operation when temperatures are warm enough to require mechanical cooling in the building HVAC systems, the chiller plant will mostly be in operation from May through September. A significant portion of the time the plant is in operation, it will not be operating at full capacity. Outside air temperature and occupancy levels will frequently only require that one of the cooling towers is in operation. One cooling tower operating at peak capacity would result in 46 dBA at the residential property line. We understand that all four cooling towers running simultaneously would exceed the residential sound level that goes into effect at 10:00 p.m., however based on the occupancy and expected cooling demand that late at night, we would expect that at most two cooling towers would be in operation at night. In most cases one or none of the cooling towers would be in operation after 10:00 p.m. Overnight, the cooling towers would typically be off to conserve energy except on very warm nights.

We hope this study provides adequate information to satisfy Ordinance No. 2016-8, Article IV: Noise Code, section 10.29.04. Feel free to contact me directly with any additional questions relating to this noise impact study.

Sincerely,

Wold Architects and Engineers

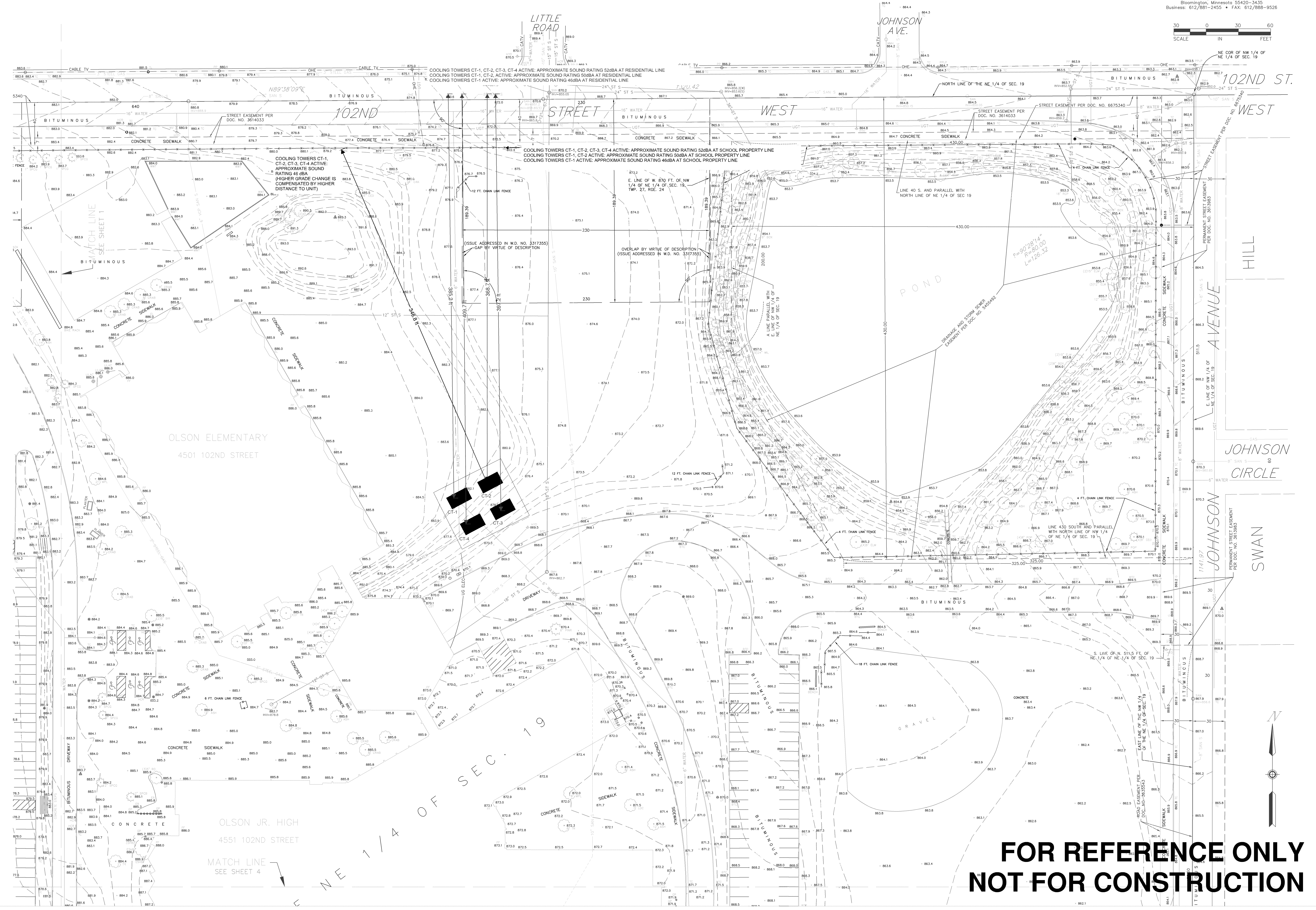
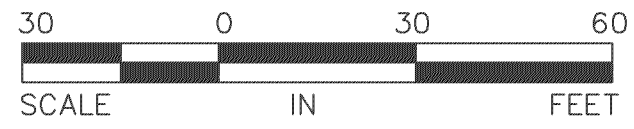
A handwritten signature in black ink, appearing to read "Kyle Edsten". The signature is fluid and cursive, with the first name "Kyle" and last name "Edsten" clearly distinguishable.

Kyle Edsten | P.E.
Associate

Enclosures

cc: Tim Rybak, ISD#761
Kent Kenry, KA
Andrew Dahlquist, Wold
Patrick Triggs, Wold
Joseph Matlock, Wold
Noa Nelson, Wold

LW/ISD_271/202115/crsp/may21



FOR REFERENCE ONLY
NOT FOR CONSTRUCTION



Baltimore Aircoil Company Cooling Tower Selection Report

Version: 8.11.0 NA
Product data correct as of: October 15, 2020

Project Name: ISD 271
Selection Name: 1222 - 40hp
Project State/Province: Minnesota
Project Country: United States
Date: October 23, 2020

Model Information

Product Line: Series 3000
Model: S3E-1222-07P
Number of Units: 1
Fan Type: Standard Fan
Fan Motor: (1) 40.00 = 40.00 HP/Unit
Total Standard Fan Power: Full Speed, 40.00 BHP/Unit
IBC 2018 Code Compliance: No
California OSHPD Project: No
Special Seismic Certification: No
Intake Option: None
Internal Option: None
Discharge Option: None

Design Conditions

Flow Rate: 1,800.00 USGPM
Hot Water Temp.: 95.00 °F
Cold Water Temp.: 85.00 °F
Wet Bulb Temp.: 78.00 °F
Tower Pumping Head: 4.91 psi
Reserve Capability: 1.23 %
Heat Rejection: 8,996,400 BTUH

Thermal performance at design conditions and standard total fan motor power is certified by the Cooling Technology Institute (CTI).

Engineering Data, per Unit

Unit Length: 11' 09.75"
Unit Width: 21' 06.50"
Unit Height: 12' 03.00"
Air Flow: 149,530 CFM
Approximate Shipping Weight: 12,330 pounds
Heaviest Section: 12,330 pounds
Approximate Operating Weight: 25,360 pounds
Heater kW Data (Optional)
0°F (-17.8°C) Ambient Heaters: (2) 10 kW
-20°F (-28.9°C) Ambient Heaters: (2) 14 kW

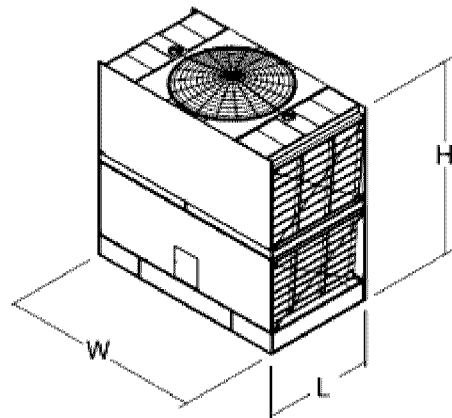
Minimum Distance Required for Single Unit:
(For multiple units, refer to Layout Guidelines)

From Solid Wall: 6.5 ft.
From 50% Open Wall: 3 ft.

Energy Rating:

54.58 per ASHRAE 90.1, ASHRAE 189 and CA Title 24.

Note: These unit weights and dimensions account for the selected fan type for the standard cataloged drive configuration, but they do not account for other options/accessories. Please contact your local BAC sales representative for weights and dimensions of units with other options/accessories.





Baltimore Aircoil Company Cooling Tower Selection Report

Version: 8.11.0 NA
Product data correct as of: October 15, 2020

Project Name: ISD 271
Selection Name: 1222 - 40hp
Project State/Province: Minnesota
Project Country: United States
Date: October 23, 2020

Model & Fan Motor

Product Line: Series 3000
Model: S3E-1222-07P
Number of Units: 1
Fan Motor: (1) 40.00 = 40.00 HP/Unit
Total Standard Fan Power: Full Speed, 40.00 BHP/Unit

Model Accessories and Code Compliance

IBC 2018 Code Compliance: No
California OSHPD Project: No
Special Seismic Certification: No
Intake Option: None
Internal Option: None
Discharge Option: None
Fan Type: Standard Fan

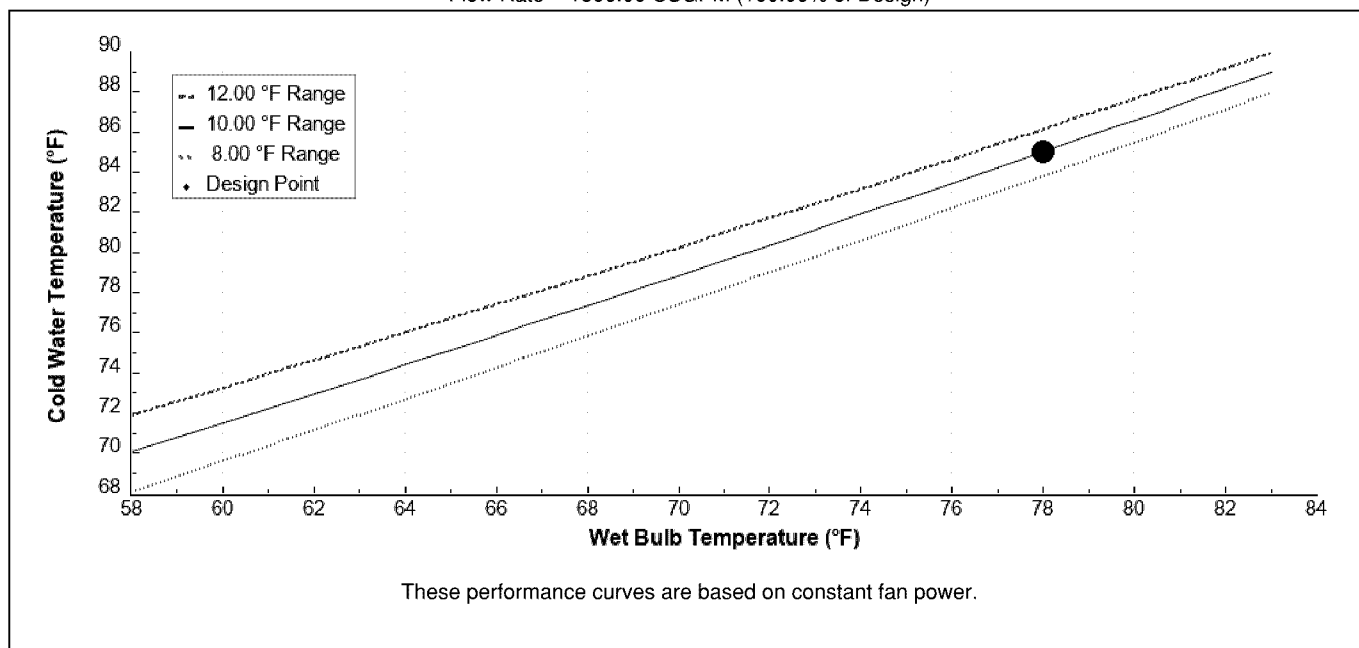
Design Conditions @ Standard Total Fan Motor Power per Unit (40.00 HP)

Thermal performance at design conditions and standard total fan motor power is certified by the Cooling Technology Institute (CTI).

Flow Rate: 1,800.00 USGPM
Hot Water Temp.: 95.00 °F
Cold Water Temp.: 85.00 °F
Wet Bulb Temp.: 78.00 °F
Heat Rejection: 8,996,400 BTUH

Predicted Performance

Fan Motor Alternative = Full Speed, 40.00 BHP
Flow Rate = 1800.00 USGPM (100.00% of Design)



Warning	Applies to Design Conditions	Applies to OffDesign Conditions
1. One or more selection parameters are outside of CTI Certification limits.	No	Yes



Baltimore Aircoil Company Cooling Tower Selection Report

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Project Name: ISD 271
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Project State/Province: Minnesota
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Model Information

Product Line: Series 3000
Model: S3E-1222-07P
Number of Units: 1
Fan Type: Standard Fan
Fan Motor: (1) 40.00 = 40.00 HP/Unit

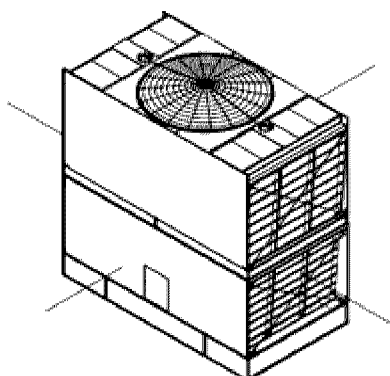
IBC 2018 Code Compliance: No
California OSHPD Project: No
Special Seismic Certification: No
Intake Option: None
Internal Option: None
Discharge Option: None

Total Standard Fan Power: Full Speed, 40.00 BHP/Unit

Octave band and A-weighted sound pressure levels (Lp) are expressed in decibels (dB) reference 0.0002 microbar. Sound power levels (Lw) are expressed in decibels (dB) reference one picowatt. Octave band 1 has a center frequency of 63 Hertz.

Top Sound Pressure (dB)		
Octave Band	Distance	
	5 ft.	50 ft.
1	86	74
2	86	75
3	85	74
4	82	68
5	79	64
6	73	59
7	69	55
8	67	52
A-wgtd	84	71

Air Inlet Sound Pressure (dB)		
Octave Band	Distance	
	5 ft.	50 ft.
1	82	68
2	84	67
3	82	70
4	76	66
5	69	61
6	63	52
7	58	46
8	55	43
A-wgtd	78	67



End Sound Pressure (dB)		
Octave Band	Distance	
	5 ft.	50 ft.
1	79	72
2	79	67
3	77	68
4	70	63
5	65	58
6	58	49
7	51	44
8	48	39
A-wgtd	73	64

End Sound Pressure (dB)		
Octave Band	Distance	
	5 ft.	50 ft.
1	79	72
2	79	67
3	77	68
4	70	63
5	65	58
6	58	49
7	51	44
8	48	39
A-wgtd	73	64

Total Sound Power (dB)		
Octave Band	Center Frequency (Hertz)	Lw
1	63	106
2	125	107
3	250	106
4	500	100
5	1000	96
6	2000	91
7	4000	87
8	8000	84
A-wgtd		102

Air Inlet Sound Pressure (dB)		
Octave Band	Distance	
	5 ft.	50 ft.
1	82	68
2	84	67
3	82	70
4	76	66
5	69	61
6	63	52
7	58	46
8	55	43
A-wgtd	78	67

Note: The use of frequency inverters (variable frequency drives) can increase sound levels.
Extra Notes: Sound data provided by CTI ATC-128 sound test code revision 2019

COOLING TOWERS CT-1, CT-2, CT-3, AND CT-4 ACTIVE NORTH OF 102ND STREET. REFER TO ATTACHED SURVEY.

Selected Sum or Path Report

Project Name:
Location:
Building Owner:
Project ID:

Sum 1

Element	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	Comments
Path2	52	53	51	45	39	33	27	
Path1	52	53	51	44	39	32	26	
Path3	51	52	50	43	38	31	25	
Path4	51	52	50	43	37	30	24	
Sum	57	58	56	50	44	38	32	
NC 47	RC 44(N)		52 dBA					

COOLING TOWERS CT-1, AND CT-2 ACTIVE NORTH OF 102ND STREET. REFER TO ATTACHED SURVEY.

Selected Sum or Path Report

Project Name:

Location:

Building Owner:

Project ID:

Sum 1

<u>Element</u>	<u>63Hz</u>	<u>125Hz</u>	<u>250Hz</u>	<u>500Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>	<u>Comments</u>
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Path2	52	53	51	44	39	32	26	
Path1	52	53	51	45	39	33	27	
Sum	55	56	54	48	42	36	30	

NC 45	RC 42(N)	50 dBA						
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COOLING TOWER CT-1 ACTIVE NORTH OF 102ND STREET. REFER TO ATTACHED SURVEY.

Selected Sum or Path Report

Project Name:
Location:
Building Owner:
Project ID:

Sum 1

Element	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	Comments
Path2	52	53	51	44	39	32	26	
Sum	52	53	51	44	39	32	26	
NC 41	RC 38(N)		46 dBA					

COOLING TOWERS CT-1, CT-2, CT-3, AND CT-4 ACTIVE NORTH OF 102ND STREET.

Paths Report

Project Name:

Location:

Building Owner:

Project ID:

Path2

Element	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	Comments
Custom Element	106	107	106	100	96	91	87	
Outdoor	-49	-49	-49	-49	-49	-49	-49	CT-1
Barrier	-5	-5	-6	-6	-8	-9	-11	Barrier insertion loss
Sum	52	53	51	45	39	33	27	
NC 41	RC 39(N)		47 dBA					

Path1

Custom Element	106	107	106	100	96	91	87	
Outdoor	-49	-49	-49	-49	-49	-49	-49	CT-2
Barrier	-5	-5	-6	-7	-8	-10	-12	Barrier insertion loss
Sum	52	53	51	44	39	32	26	
NC 41	RC 38(N)		46 dBA					

Path3

Custom Element	106	107	106	100	96	91	87	
Outdoor	-50	-50	-50	-50	-50	-50	-50	CT-3
Barrier	-5	-5	-6	-7	-8	-10	-12	Barrier insertion loss
Sum	51	52	50	43	38	31	25	
NC 40	RC 37(N)		45 dBA					

Path4

Custom Element	106	107	106	100	96	91	87	
Outdoor	-50	-50	-50	-50	-50	-50	-50	CT-4
Barrier	-5	-5	-6	-7	-9	-11	-13	Barrier insertion loss
Sum	51	52	50	43	37	30	24	
NC 40	RC 37(N)		45 dBA					

COOLING TOWERS CT-1, AND CT-2 ACTIVE NORTH OF 102ND STREET.

Paths Report

Project Name:
Location:
Building Owner:
Project ID:

Path2

Element	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	Comments
Custom Element	106	107	106	100	96	91	87	CT-1 Barrier insertion loss
Outdoor	-49	-49	-49	-49	-49	-49	-49	
Barrier	-5	-5	-6	-7	-8	-10	-12	
Sum	52	53	51	44	39	32	26	
NC 41	RC 38(N)		46 dBA					

Path1

Custom Element	106	107	106	100	96	91	87	CT-2 Barrier insertion loss
Outdoor	-49	-49	-49	-49	-49	-49	-49	
Barrier	-5	-5	-6	-6	-8	-9	-11	
Sum	52	53	51	45	39	33	27	
NC 41	RC 39(N)		47 dBA					

COOLING TOWER CT-1 ACTIVE NORTH OF 102ND STREET.

Paths Report

Project Name:
Location:
Building Owner:
Project ID:

Path2

Element	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	Comments
Custom Element	106	107	106	100	96	91	87	
Outdoor	-49	-49	-49	-49	-49	-49	-49	CT-1
Barrier	-5	-5	-6	-7	-8	-10	-12	Barrier insertion loss
Sum	52	53	51	44	39	32	26	
NC 41	RC 38(N)		46 dBA					