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

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

ATTACHMENT 1

Sunde Land Surveying, LLC.
9001 East Bloomington Freeway (35W) • Suite 118
Bloomington, Minnesota 55420-3435
Business: 612/881-2455 • FAX: 612/888-9526

SCALE 30 0 30 60 IN FEET

LITTLE ROAD

JOHNSON AVE.

102ND STREET WEST

COOLING TOWERS CT-1, CT-2, CT-3, CT-4 ACTIVE: APPROXIMATE SOUND RATING 52dBA AT RESIDENTIAL LINE
COOLING TOWERS CT-1, CT-2, ACTIVE: APPROXIMATE SOUND RATING 50dBA AT RESIDENTIAL LINE
COOLING TOWERS CT-1 ACTIVE: APPROXIMATE SOUND RATING 46dBA AT RESIDENTIAL LINE

COOLING TOWERS CT-1, CT-2, CT-3, CT-4 ACTIVE: APPROXIMATE SOUND RATING 52dBA AT SCHOOL PROPERTY LINE
COOLING TOWERS CT-1, CT-2 ACTIVE: APPROXIMATE SOUND RATING 50dBA AT SCHOOL PROPERTY LINE
COOLING TOWERS CT-1 ACTIVE: APPROXIMATE SOUND RATING 46dBA AT SCHOOL PROPERTY LINE

COOLING TOWERS CT-1, CT-2, CT-3, CT-4 ACTIVE: APPROXIMATE SOUND RATING 46 dBA (HIGHER GRADE CHANGE IS COMPENSATED BY HIGHER DISTANCE TO UNIT)

CT-1
CT-2
CT-3
CT-4

STREET EASEMENT PER DOC. NO. 3614033

STREET EASEMENT PER DOC. NO. 6675340

NORTH LINE OF THE NE 1/4 OF SEC. 19

NE COR OF NW 1/4 OF NE 1/4 OF SEC. 19

E. LINE OF W. 870 FT. OF NW 1/4 OF NE 1/4 OF SEC. 19, TWP. 27, RGE. 24

LINE 40 S. AND PARALLEL WITH NORTH LINE OF NE 1/4 OF SEC 19

LINE 430 SOUTH AND PARALLEL WITH NORTH LINE OF NW 1/4 OF NE 1/4 OF SEC. 19

S. LINE OF N. 511.5 FT. OF NE 1/4 OF NE 1/4 OF SEC. 19

EAST LINE OF THE NW 1/4 OF THE NE 1/4 OF SEC. 19

E. LINE OF NE 1/4 OF SEC. 19

A LINE PARALLEL WITH E. LINE OF NW 1/4 OF SEC. 19

(ISSUE ADDRESSED IN W.D. NO. 3317355) GAP BY VIRTUE OF DESCRIPTION

OVERLAP BY VIRTUE OF DESCRIPTION (ISSUE ADDRESSED IN W.D. NO. 3317355)

DRAINAGE AND STORM SEWER EASEMENT PER DOC. NO. 5456422

PERMANENT STREET EASEMENT PER DOC. NO. 3613983

PERMANENT STREET EASEMENT PER DOC. NO. 6675340

ROAD EASEMENT PER DOC. NO. 3635543

P=90°28'14" R=80.00 L=126.32

346.6 ft
385.2 ft
368.2 ft
391.2 ft
189.39
200.00
430.00
325.00
511.5

OLSON ELEMENTARY
4501 102ND STREET

OLSON JR. HIGH
4551 102ND STREET

POND

GRAVEL

HILL AVENUE

JOHNSON CIRCLE

SWAN

MATCH LINE SEE SHEET 1

MATCH LINE SEE SHEET 4

NE 1/4 OF SEC. 19

1741.97

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

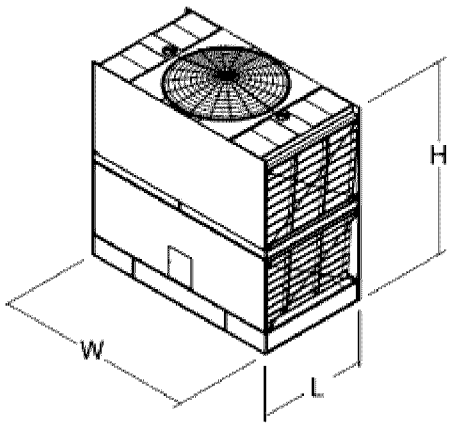
Thermal performance at design conditions and standard total fan motor power is certified by the Cooling Technology Institute (CTI).

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

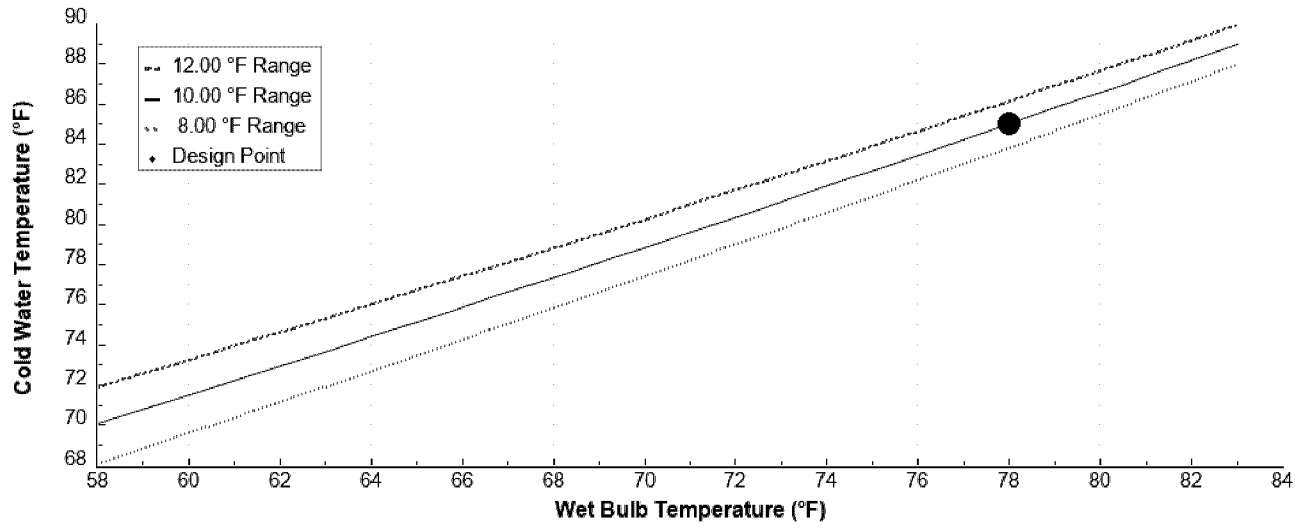
IBC 2018 Code Compliance: No
California OSHPD Project: No
Special Seismic Certification: No
Intake Option: None
Internal Option: None
Discharge Option: None
Fan Type: Standard Fan

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)



These performance curves are based on constant fan power.

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

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

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

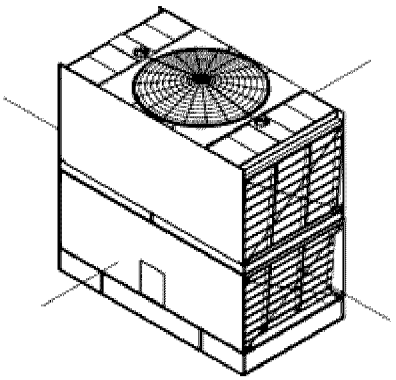
Octave band and A-weighted sound pressure levels (Lp) are expressed in decibels (dB) reference 0.0002 microbar. Sound power levels (Lw) are expressed in decibels (dB) reference one picowatt. Octave band 1 has a center frequency of 63 Hertz.

Top
Sound Pressure (dB)

Octave Band	Distance 5 ft.	Distance 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.	Distance 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.	Distance 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.	Distance 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**

Air Inlet
Sound Pressure (dB)

Octave Band	Distance 5 ft.	Distance 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**

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**

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

Element	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	Comments
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**

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	
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**

Path1

Custom Element	106	107	106	100	96	91	87	
Outdoor	-49	-49	-49	-49	-49	-49	-49	CT-2
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**

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**