UNIVERSITY OF OTTAWA

NOISE IMPACT ASSESSMENT

ADVANCED MEDICAL RESEARCH CENTRE

APRIL 18, 2024

NOISE IMPACT ASSESSMENT

ADVANCED MEDICAL RESEARCH CENTRE

UNIVERSITY OF OTTAWA

VERSION 3.0

PROJECT NO.: CA0009956.0165
DATE: APRIL 18, 2024

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REVISION HISTORY

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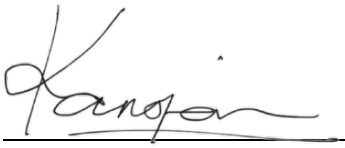
1.0	December 7, 2023	Noise Impact Assessment	For Submission	WSP Canada Inc.
2.0	February 20, 2024	Noise Impact Assessment	Updated based on Design Updates	WSP Canada Inc.
3.0	April 18, 2024	Noise Impact Assessment	ZBLA and SPC Submission	WSP Canada Inc.

SIGNATURES

PREPARED BY



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1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by the University of Ottawa (UOttawa) to prepare a Noise Impact Assessment for the proposed Advanced Medical Research Centre (AMRC), University of Ottawa to be located at 451 Smyth Rd, Ottawa, Ontario. This study addresses the noise impacts of stationary sources associated with the proposed development. In addition, it also considers the transportation sources associated with the nearby future arterial road and current transit priority corridor. This report is prepared in support of a ZBLA and SPC Submission applications required at this stage of the development.

The noise impact assessment was conducted in accordance with the "Environmental Noise Control Guidelines (ENCG)", by City of Ottawa's, Planning Infrastructure and Economic Development (Ottawa Guidelines) as well as Ontario Ministry of the Environment, Conservation and Parks (MECP's) Noise Pollution Control (NPC) publication NPC-300 "Environmental Noise Guideline, Stationery and Transportation Sources – Approval and Planning".

In accordance with the Ottawa Guidelines as well as NPC-300 requirements, this report discusses environmental noise from proposed stationary sources and transportation sources.

Road traffic data was obtained from Ottawa Guidelines assuming the proposed arterial road is a 4-Lane Urban Arterial-divided. Using this traffic data and proposed site plan, a predictive analysis was completed to estimate the future sound level at the proposed building façades. Similarly, using the information in the preliminary mechanical design drawings, stationary sources of sound from the development onto nearby sensitive land uses were estimated. Both sound level from transportation sources and stationary sources were compared to the guideline limits provided in the Ottawa Guidelines and MECP publication NPC-300. The details are discussed within this report.

2 SITE DESCRIPTION

The proposed development is located at the right of way of Ring Road. In the City of Ottawa official plan, Schedule C4 – Urban Road Network, Ring Road will become an arterial road in future, commonly referred to as the Alta Vista Corridor.

The location of the proposed development and surrounding land uses are presented in **Figure 1.**

The proposed development will include 6-storey institutional medical research building and mechanical penthouse. The site plan of the proposed development is included in **Appendix A**.

The acoustical environment surrounding the site is considered urban in nature, where anthropogenic noise dominates day and nighttime acoustic environment. Directly southwest of the proposed development is the Children's Hospital of Eastern Ontario (CHEO) and southwest is the Ottawa Hospital General Campus. The surrounding area zoned for institutional and residential purposes and a zoning map from the City of Ottawa is provided in **Figure 2**.

3 NOISE IMPACT ASSESSMENT

The environmental noise with potential to have effect on the development are discussed and assessed in this section. The following sources are identified:

- Transportation noise impacts from future arterial road;
- Stationary noise from the proposed development

The proposed development is not within the noise influence area (i.e. Noise Exposure Forecast/Noise Exposure Projection (NEF/NEP) contours) of Ottawa International Airport; therefore, assessment of aircraft noise is not considered in this report.

The Childrens Hospital of Eastern Ontario (CHEO) and Ottawa Hospital General Campus do not have operable windows into sensitive spaces and therefore, were not considered noise sensitive receptors for this assessment. The closest noise receptors to the proposed development were the Ronald McDonald House and Rotel residential buildings and outdoor areas within the UOttawa/CHEO, these are shown in **Figure 3**. The stationary noise analysis will be from planned onsite equipment onto surrounding residential land uses and outdoors spaces meant for quiet enjoyment.

Under the MECP and ENCG guidelines, the proposed development is not considered noise sensitive development due to its inoperable windows (i.e. sealed windows). Therefore, noise impact from other stationary sources such as TransAlta OHSC Cogen Plant (located to the Northwest) were not considered.

3.1 TRANSPORTATION NOISE IMPACTS

3.1.1 NOISE SOURCES

The following transportation sources have the potential to contribute to the sound levels at the proposed development:

- Future Alta Vista Corridor

As per ENCG, future arterial roads 100 meters from site must be considered for road traffic impacts. The Alta Vista corridor is proposed to intersect with Smyth Road which is an undivided 4-lane road. Schedule C2 – Transit Network shows the future arterial road is also a transit priority corridor; therefore, the implied roadway class to determine road traffic volumes was assumed to be a 4-Lane Urban Arterial-Divided.

3.1.2 NOISE GUIDELINES AND ASSESSMENT CRITERIA

Noise is recognized as a pollutant in the Environmental Protection Act, as uncontrolled noise can affect human activities. Ontario provincial noise control guidelines require that noise concerns are addressed in the planning of any new development.

In land use planning, although elimination or control of the source of pollution is usually a primary objective, there are general limits as to what is practical and technically possible. Therefore, Ottawa Guidelines and MECP Publication NPC-300, “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning” provides sound level criteria for acceptable levels of transportation noise impacting on residential developments. Although, this development is not considered a noise sensitive development, the same limits were applied for completeness. These limits are discussed in **Table 3-1** below.

NPC-300 and Ottawa Guideline provides sound level limits in terms of energy equivalent (average) sound levels [L_{EQ}] in units of A-weighted decibels [dBA] at a specific noise-sensitive location.

Table 3-1 NPC-300 Sound Level Criteria for Road

AREA	TIME PERIOD	L_{EQ} (dBA) -ROAD	L_{EQ} (dBA) -LRT
Outdoor Living Area (OLA)	Daytime (0700 – 2300h)	55	
hospitals, nursing homes, schools	Daytime (0700 – 2300h)	45	40
	Nighttime (2300 – 0700h)	45	40

3.1.3 OUTDOOR REQUIREMENTS

If the future daytime (0700 – 2300h) sound level in an OLA is 55 dBA or less, no control is required; an excess of daytime sound level up to 5 dBA over the 55 dBA limit is often acceptable without noise control, however such excess should be notified to the future occupants (in case of residential receptors) with a warning clause. If sound level exceeds 60 dBA, feasibility of controlling the noise in terms of economic, technical and administrative feasibility should be investigated and where possible noise control is to be included in the design. **Table 3-2** summarizes the requirements for OLAs and also provide warning clause requirements typically considered in residential developments.

Table 3-2 Requirements for Outdoor Living Areas

AREA	TIME PERIOD	SOUND EXPOSURE LEVEL $L_{EQ\ 16\text{-}HR}$ (dBA)	WARNING CLAUSE REQUIREMENTS
Outdoor Living Area (OLA)	Daytime (0700 – 2300h)	$\leq$ 55	• None
		> 55 and $\leq$ 60	• Noise mitigation to reduce noise to 55 dBA or below; • Warning Clause (Type A) – generally considered for residential development and not typically considered for institutional development
		> 60	• Preferred: Noise mitigation to reduce noise to 55 dBA **or** • Noise mitigation to reduce noise to 60 dBA and Warning Clause (Type B) – generally considered for residential development and not typically considered for institutional development. •

3.1.4 VENTILATION, BUILDING REQUIREMENTS

In order to decide appropriate control to achieve the above noted sound level limits, NPC-300 and Ottawa Guideline has provided further guidance.

To achieve indoor sound levels listed in **Table 3-1**, the MECP and Ottawa guideline provides guidelines based on predicted sound level at the façade/plane of window. If the predicted sound level at the plane of window exceeds, additional considerations such as the type of ventilation; type of windows, exterior walls, and doors that will be required must be selected. It also provides guidance for warning clauses that are usually considered for residential development. The key control requirements are summarized below in **Table 3-3**.

Table 3-3 Ventilation Requirements

AREA	TIME PERIOD	SOUND LEVEL EXPOSURE LEQ (DBA) ROAD	VENTILATION REQUIREMENTS
Plane of Window [1]	Daytime (0700 – 2300h)	< 55	None
		>55 and <65	Forced Air Heating with provision for central air condition
		> 65	Central air conditioning is required
	Nighttime (2300 – 0700h)	< 50	None
		>51 and <60	Forced Air Heating with the provision to add central air conditioning.
		> 60	Central air conditioning is required

Notes: [1] Plane of Window.
[2] Daytime: $L_{EQ\ 16HR}$; Nighttime: $L_{EQ\ 8\text{-}HR}$.

Table 3-4 provides sound level thresholds, which if exceeded, will require building façade construction to be designed and/or selected to meet indoor sound criteria in **Table 3-1**. The resultant sound isolation parameter is required to be combined to determine the overall limits.

Table 3-4 Building Requirements

AREA	TIME PERIOD	SOUND EXPOSURE LEVEL (dBA) ROAD[2]	BUILDING COMPONENT REQUIREMENTS
Plane of Window [1]	Daytime (0700 – 2300h)	≤ 65	Building components compliant with Ontario Building Code (OBC)
		> 65	Building components designed/selected to meet Indoor Requirements
	Nighttime (2300 – 0700h)	≤ 60	Building components compliant with Ontario Building Code (OBC)
		> 60	Building components designed/selected to meet Indoor Requirements

Notes: [1] Plane of Window.
[2] Daytime: $L_{EQ\ 16HR}$; Nighttime: $L_{EQ\ 8\text{-}HR}$.

Note about Warning Clauses:

The warning clauses are generally applied for residential developments, where purchases, lease or rentals are expected to inform future occupants. In this case the Faculty of Health Sciences Building will be designed to meet the requirements and there are no specific purchase, lease or rental anticipated in an institutional facility and therefore warning clauses are not considered applicable or discuss further.

3.1.5 TRAFFIC DATA

Road traffic volumes were obtained from the Ottawa Guideline (dated January 2016). Traffic data is provided in **Appendix B** for the Alta Vista Corridor is summarized in **Table 3-5**. The data taken from the Ottawa Guideline provides ultimate future traffic volume data for various roadways based on roadway class and number of lanes. The

traffic data used represents future traffic volumes and corresponding to a 4-Lane divided arterial road in the City's Official Plan.

Table 3-5 Summary of Road Traffic Data Used in the Transportation Analysis

ROAD	TRAFFIC VOLUMES (AADT)	NO. OF LANES	DAY/NIGHT SPLIT (%)	MEDIUM TRUCKS (%)	HEAVY TRUCKS (%)	POSTED SPEED LIMIT (KPH)
Alta Vista Corridor	35,000	4	92/8	7%	5%	50-80

3.1.6 NOISE IMPACT ASSESSMENT METHODS

Per MECP Guidelines, the impact at receptors was estimated for the road. The sound level predictions were made using CADNA/A software calibrated against STAMSON version 5.04, a computer algorithm developed by the MECP. A copy of the sample STAMSON output file is also included in **Appendix C**. The angle of -90 and 90 was used in STAMSON for the north façade as it directly fronts the future Alta Vista Corridor (Ref: Figure 1).

The following factors were taken into account in the analysis:

- Vehicle speeds;
- Road traffic and volumes;
- Percentage of trucks;
- Horizontal and vertical road alignment;
- Ground absorption; and
- Screening provided by terrain, houses or existing barriers.

The road noise sources have been included in the model using the Traffic Noise Model prediction algorithm by Federal Highway Administration (TNM, 2004). The model was used to predict traffic noise levels at each of the building facades using CadnaA's building evaluation feature. To assess the potential impacts of transportation noise on the buildings, the maximum sound level on each façade were chosen and summarized in the next section. The following parameters were used in the transportation noise analysis:

- Order of Reflection: 0 (this is consistent with MECP's noise prediction method); and
- Ground absorption coefficients for the following:
  - Soft ground: 1
  - Hard ground: 0

The analysis method in the National Research Council (NRC) document, BPN56 "*Controlling Sound Transmissions into Buildings*", dated September 1985, were used to estimate the acoustical requirements for the building components. The assessment of indoor sound levels and the acoustical requirements for building components were assessed for road noise.

3.1.7 RESULTS

3.1.7.1 PLANE OF WINDOW

Sound levels were predicted at the most impacted façades during the daytime and nighttime hours. The predicted sound levels were used to investigate ventilation and building construction requirements. The results of these predictions are summarized in **Table 3-6**.

Table 3-6 Summary of Predicted Facade Sound Levels – Transportation (Road)

DESCRIPTION	SPL – DAYTIME (dBA)	SPL – NIGHTTIME (dBA)
Nouth Façade	73	65
East Façade	69	61
South Façade	54	47
West Façade	68	60

The façade level indicates that due to the magnitude of exterior sound level, there is potential to exceed indoor sound level; therefore, as per NPC-300 noise control façade construction and ventilation requirements are required.

There are no on-site OLAs noted within the development.

3.1.8 RECOMMENDATIONS

The following discussion outlines the preliminary recommendations for building facade constructions, and ventilation requirements to achieve the noise criteria stated in **Table 3-1**.

3.1.8.1 VENTILATION REQUIREMENTS

The predicted sound level at the plane of window is in the range of 54 to 73 dBA during the daytime and 47 to 65 dBA during the nighttime. Therefore, as per the MECP's requirements, alternative means of ventilation to open windows is required; A central air conditioning is included within the development (Ref: **Appendix A** – Ventilation).

3.1.8.2 BUILDING REQUIREMENTS

Based on the predicted sound level at the plane of window the sound exceeds 60 dBA during the daytime and 55 dBA during the nighttime. Therefore, the upgraded window glazing and façade constructions exceeding the minimum requirements of Ontario Building Code (OBC) are required to meet indoor sound level requirements as outlined in **Table 3-4**.

Exterior wall: Exterior wall can be constructed with a variety or material providing a minimum STC-45 or more. The exterior façade can be brick veneer, masonry, spandrel glass or metal panels. Majority of the exterior wall includes:

- 38mm Aluminum Panels
- 25mm Air Space (min.)
- 125mm Semi-rigid insulation with thermally broken 'T' clips
- Air/Vapour Membrane
- 16mm Exterior Sheathing
- 152mm Structural Steel Studs
- 16mm Gypsum board

This exterior wall assembly is expected to meet STC-51 or more (exceeds the minimum requirement of STC-45)

Window assembly – A window assembly providing STC-32 (Sealed) or better, is also required. A fully sealed 12mm single glazed window or double glazed window consisting of 4mm pane separated by 16mm air space can achieve STC-32 or better.

3.2 STATIONARY NOISE IMPACTS

Stationary source is defined in MECP publication NPC-300 as source of sound or combination of sources of sound that are included and normally operated within the property lines of a facility. The drawings indicate that there will be a mechanical rooftop equipment including cooling towers, exhaust fans, and dry coolers. Cooling and air exhaust load is higher during the daytime than compared to nighttime. Therefore, full load conditions during the daytime and lower load during the nighttime when the facility is largely unoccupied were considered for this assessment approach. The planned emergency generator was assessed separate from other equipment against emergency NPS-300 guidelines.

3.2.1 NOISE GUIDELINES AND ASSESSMENT CRITERIA

For stationary sources, the MECP Publication NPC-300 provides criteria based on one-hour equivalent sound level. In order to comply with the noise impact from stationary sources, the predicted sound level must comply with the noise guidelines stipulated in the MECP publication, NPC-300.

NPC-300 provides sound level limits for development (or receptors) based on the acoustical environment in which the development is located. NPC-300 categorizes the acoustical environment into four classes: Class 1 (urban), Class 2 (suburban), Class 3 (rural), or Class 4 (special cases). This classification depends on the local land use and the existing ambient sound environment. **Table 3-7** summarizes the MECP exclusionary limits for Class 1, 2, 3 and 4 areas.

Table 3-7 MECP's Exclusion Limits in dBA

	CLASS 1		CLASS 2		CLASS 3		CLASS 4	
PERIOD	PLANE OF WINDOW[2]	OUTDOOR POR[1]	PLANE OF WINDOW[2]	OUTDOOR POR[1]	PLANE OF WINDOW[2]	OUTDOOR POR[1]	PLANE OF WINDOW[2]	OUTDOOR POR[1]
Daytime (07:00 – 19:00)	50	50	50	50	45	45	60	55
Evening (19:00 – 23:00)	50	50	50	45	40	40	60	55
Night-time (23:00 – 07:00)	45	N/A[3]	45	N/A[3]	40	N/A[3]	55	N/A[3]

Notes:
1 PoR means point of reception; representing a point in a receptor location as defined by MECP.
2 Plane of window means a point in space corresponding with the location of the centre of a window of a noise sensitive space. The noise effects assessment excludes the effect of sound reflection from the plane of the window on which it is located. In general, the plane of a window is a point used for prediction (including extrapolation), rather than measurement, of sound levels (MOE 2013).

Since the area is considered a Class 1 acoustical environment, the sound level limit corresponding to Class 1 is considered in the assessment (i.e. 50 dBA during the daytime/evening and 45 dBA during the nighttime).

Applicable limits are 5 dBA higher than exclusion limits in Table 3-7 for emergency stationary sources, as a 5 dBA tolerance is allowed for emergency equipment.

3.2.2 SOURCE DATA

Based on the available preliminary manufacturer data and database information the following sources were identified in **Table 3-8** and the source locations are shown in **Figure 3**.

The drawing shows 3 types of Lab Exhaust Fans (LEF) duty, standby and future exhaust fans. It is understood that the standby LEFs only operate when duty LEFs are unavailable (i.e. maintenance issues), therefore the standby

LEFs were not included in the assessment. The duty and future LEFs were included in the assessment as a conservative approach. In addition, exhaust fans are expected to operate during the daytime (i.e. the regular operations of the labs). Additionally, these exhaust fans were also assumed to operate at full load during the night-time hours. The HVAC related sources cycle on and off, however as a worst-case scenario they were assumed to operate at full load during the daytime hours and at a reduced load (50% load) during the night-time hours. The supply trucks are expected to be during the daytime hours only to deliver supplies.

Table 3-8 Stationary Source Sound Data

SOURCE ID[1]	DESCRIPTION	NUMBER OF SOURCES DURING PREDICTABLE WORST-CASE HOUR	OVERALL SOUND POWER LEVEL OF EACH SOURCE [DBA REF 10-12 W]
SS_BCEF1-1/2	2 Duty Exhaust Fans	2	93
SS_CWEF-1	1 Exhaust Fan	1	86
SS_LEF-1-1	2 Duty and 1 Future Exhaust Fans	3	92
SS_LEF-2-1	2 Duty and 1 Future Exhaust Fans	3	92
SS_LEF-2-2	2 Duty and 1 Future Exhaust Fans	3	92
SS_LEF-2-3	2 Duty and 1 Future Exhaust Fans	3	92
SS_LEF-2-4	2 Duty and 1 Future Exhaust Fans	3	92
SS_LoadingBayIdle	Truck Idling at Loading Bay	1	100
SS_AC-01	Air Cooled Chiller 1	1	96
SS_AC-02	Air Cooled Chiller 2	1	96
SS_CT1	Cooling Tower 1	1	92
SS_CT2	Cooling Tower 2	1	92
SS_CT3	Cooling Tower 3	1	92
SS_CT4_Future	Cooling Tower Future	1	92
SS_LoadingBayTruckMovement	Truck Movement	1	106
EM_GEN	Emergency Generator	1	100
SS_Louvres_North[2]	North Facade	1	105
SS_Louvres_South[2]	South Facade	1	105

Note:

[1] Refer to **Figure 3** for source locations and Appendix A for design drawings.

[2] Collective Louvres on Mechanical Penthouse and the sound power level is without acoustic louvre effects.

3.2.3 RESULTS AND DISCUSSION

The receptor locations are shown in **Figure 3**. **Table 3-9** and **Table 3-10** compares the predicted sound level for non-emergency operation and emergency operation respectively to the criteria at noise sensitive buildings and surrounding outdoor living areas. The sample calculations are included in **Appendix C.**

Table 3-9 Predicted Sound Level - Non-emergency Operation

LOCATION[1]	RECEIVER HEIGHT (M)	SOUND LEVEL DAY/NIGHT [DBA REF 10-6 PA]	LIMIT DAY/NIGHT [DBA REF 10-6 PA]	MEETING THE LIMIT?
Ronald McDonald House	4.5	47 / 45	50 / 45	Yes
Rotel	4.5	45 / 44	50 / 45	Yes
OLA1	1.5	45 / -	50 / -	Yes
OLA2	1.5	46 / -	50 / -	Yes

Notes:
1 Refer to **Figure 3** for receptor locations.

Table 3-10 Predicted Sound Level - Emergency Generator Testing

LOCATION[1]	RECEIVER HEIGHT (M)	SOUND LEVEL DAY&NIGHT [DBA REF 10-6 PA]	LIMIT DAY/NIGHT [DBA REF 10-6 PA]	MEETING THE LIMIT?
Ronald McDonald House	4.5	41	55 / 50	Yes
Rotel	4.5	31	55 / 50	Yes
OLA1	1.5	17	55 / -	Yes
OLA2	1.5	21	55 / -	Yes

Notes:
1 Refer to **Figure 3** for receptor locations.

As shown in **Table 3-9** and **Table 3-10**, the sound level limits are predicted to be met at each receptor location.

4 CONCLUSIONS AND CLOSURE

The predicted sound levels from surface transportation and stationary sources were assessed separately per MECP publication NPC-300 requirements. Each noise source type was assessed at the points of reception and their compliance with the NPC-300 requirements is evaluated.

4.1 SUMMARY

The following recommendations are offered:

1. The development will require central air conditioning system as an alternate means of open window and the development includes central air condition system. As shown in the design drawings (Appendix A), the air conditioning system is integral part of the design.
2. The preliminary acoustical performance requirements for exterior façade elements (i.e. exterior walls, and windows) for the development are discussed in Section 3.1
    a. Exterior wall: Exterior wall providing a minimum STC 45 or better. The selected wall assembly achieves STC-51 or better.

b. Exterior window: Exterior windows glazing into sensitives spaces providing a STC 32 or better. A fully sealed 12mm single glazed window or double glazed window consisting of 4mm pane separated by 16mm air space can achieve STC-32 or better.

3. Acoustic Assessment of stationary sources are discussed in Section 3.2
    a. Generator will be an outdoor packaged units with specification of 75 dBA at 7 meters. No additional control will be required.
    b. Majority of the HVAC units are located inside mechanical penthouse.
    c. Vents to mechanical rooms include 6" acoustic louvers.

4.2 CONCLUSIONS AND CLOSURE

Based on the content of this study report, it is concluded that the design includes feasible controls to develop the proposed development is in compliance with the City's and MECP's noise criteria.

This report has been prepared to support the site plan approval application being prepared. Once the design is finalized and details becomes available it will be reviewed further by the design team.

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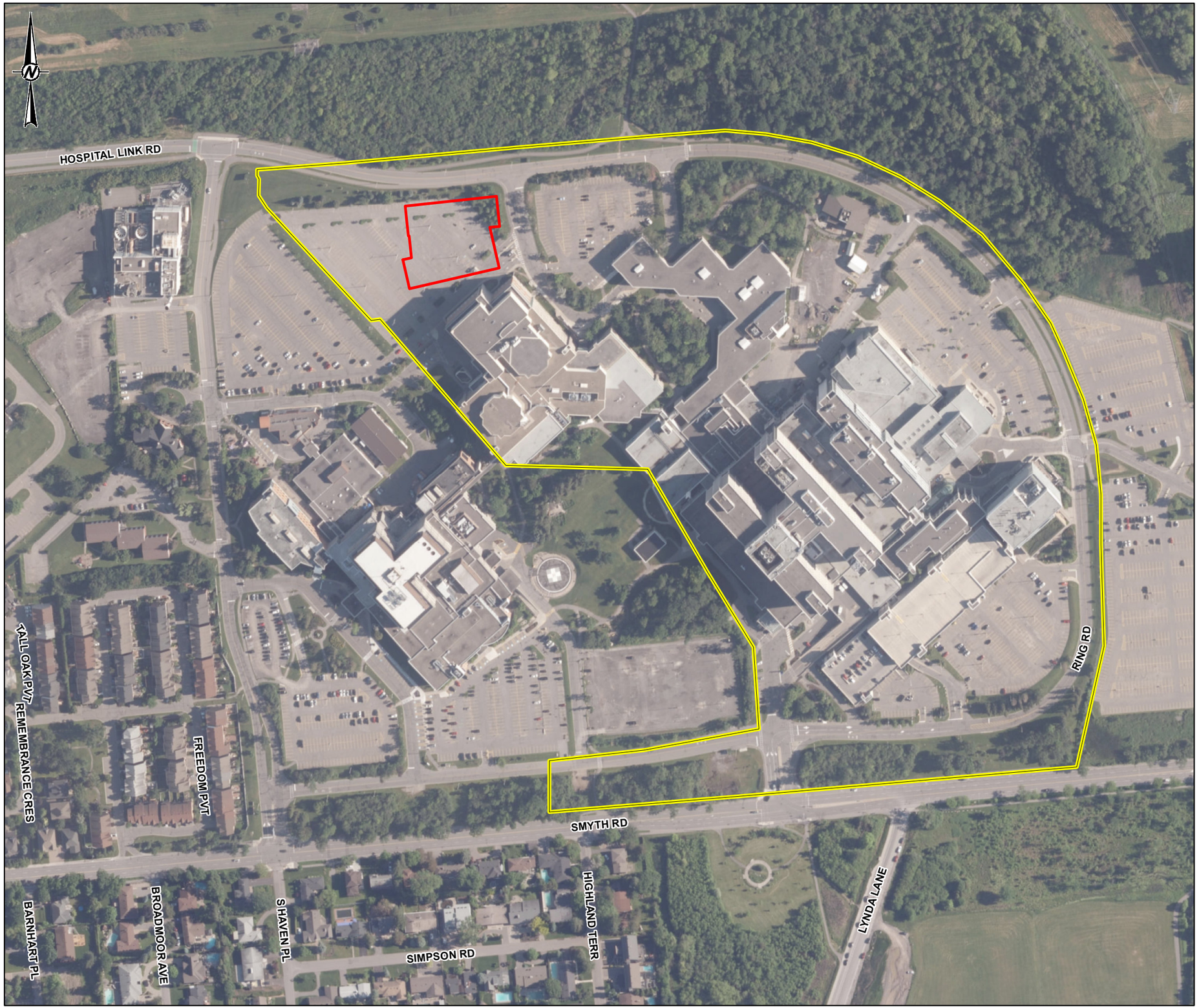
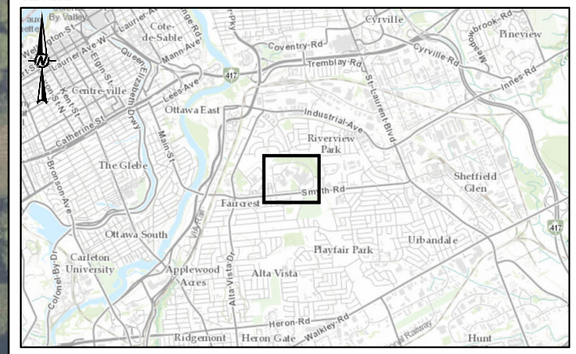
FIGURES



KEY MAP



SCALE 1:100,000

LEGEND

- PROPOSED BUILDING
- SITE BOUNDARY

Note: angle of -90 and 90 with the north façade and Ring Road (Alta Vista Corridor)

0 25 50 100
1:3,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: CITY OF OTTAWA, 2022
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 18N

CLIENT
CITY OF OTTAWA

PROJECT
451 SMYTH RD, OTTAWA, ON

TITLE
SITE LOCATION

CONSULTANT

YYYY-MM-DD	2023-10-23
DESIGNED	----
PREPARED	AR
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
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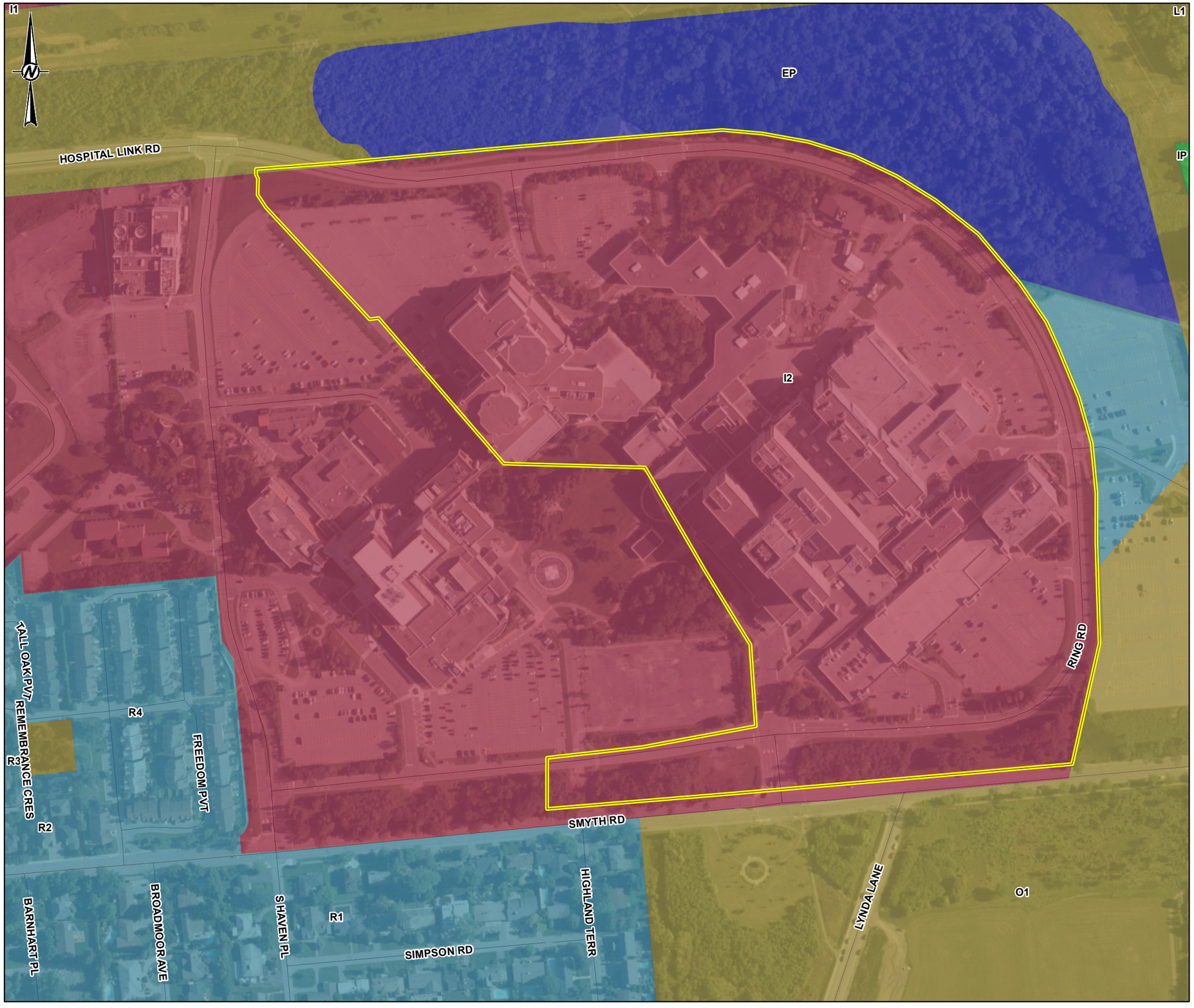

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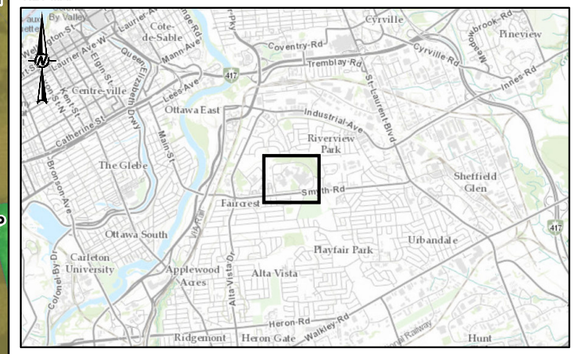


SCALE 1:100,000

LEGEND

- ROADWAY
- SITE BOUNDARY

ZONING

- RESIDENTIAL ZONES
- INDUSTRIAL ZONES
- INSTITUTIONAL ZONES
- ENVIRONMENTAL ZONE
- OPEN SPACE AND LEISURE ZONES

0 25 50 100
1:3,000 METRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: CITY OF OTTAWA, 2022
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 18N

CLIENT
CITY OF OTTAWA

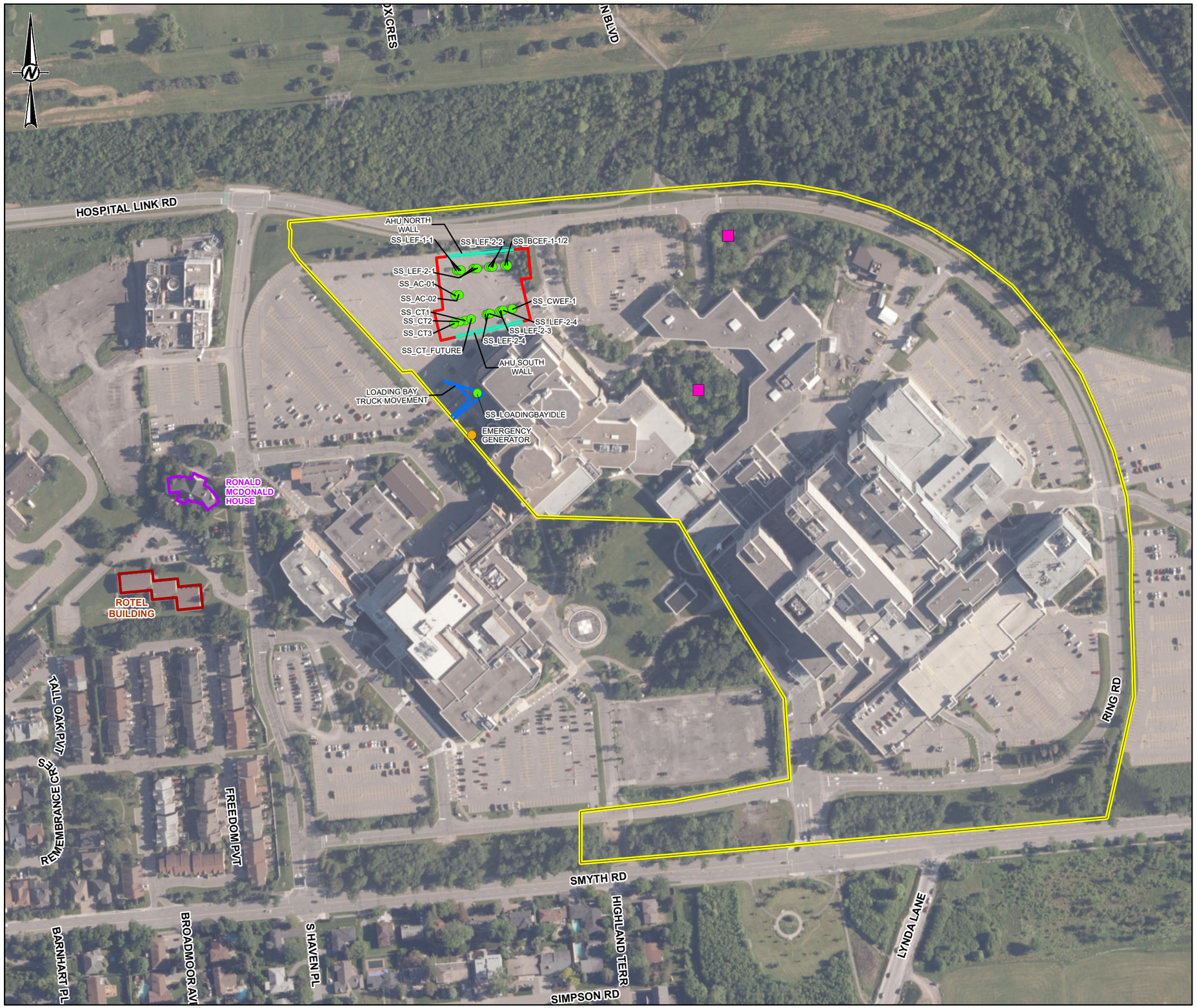
PROJECT
451 SMYTH RD, OTTAWA, ON

TITLE
ZONING MAP

CONSULTANT

YYYY-MM-DD	2023-10-23
DESIGNED	----
PREPARED	AR
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0009956.0165	0001	A	2



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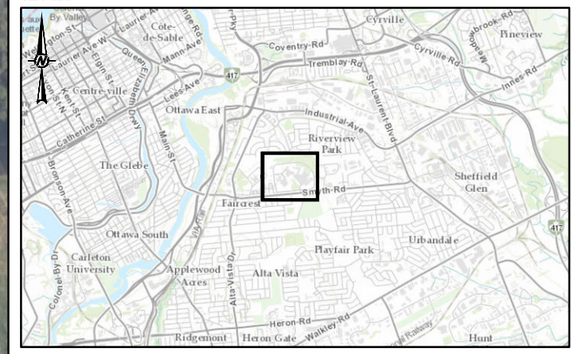


SCALE 1:100,000

LEGEND

- NON-EMERGENCY POINT SOURCES
- EMERGENCY POINT SOURCES
- OUTDOOR LIVING AREAS
- LINE SOURCES
- VERTICAL AREA SOURCES
- ROTEL BUILDING
- RONALD MCDONALD HOUSE
- PROPOSED BUILDING
- SITE BOUNDARY

0 25 50 100

1:3,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. IMAGERY CREDITS: CITY OF OTTAWA, 2022
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 18N

CLIENT
CITY OF OTTAWA

PROJECT
451 SMYTH RD, OTTAWA, ON

TITLE
PROPOSED STATIONARY SOURCES & RECEPTOR LOCATIONS

CONSULTANT

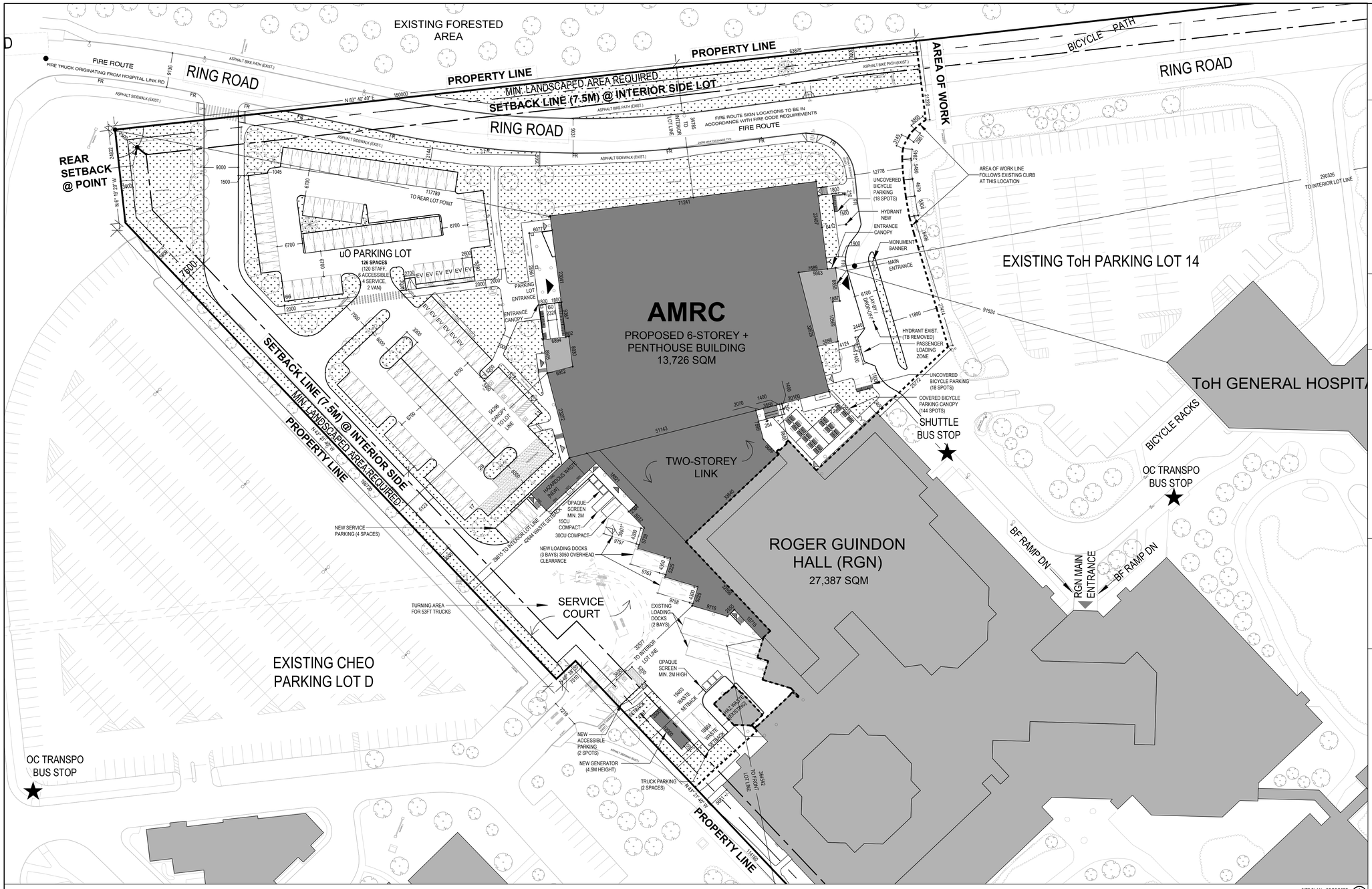
wsp

YYYY-MM-DD	2024-02-15
DESIGNED	----
PREPARED	AR
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0009956.0165	0001	A	3

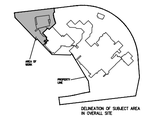
APPENDIX

A DRAWINGS



SITE PLAN - PROPOSED 1/500

KEY PLAN



REFERENCE SURVEY:	1) 2023-11-25 REF. NO. 105 - 15 (JG) GR* 2) 2022-11-22 FILE NO. 623-22**
MUNICIPAL ADDRESS:	451 SMYTH ROAD, OTTAWA, ON K1H 8M5, CANADA
PIN:	04258-0412
ZONE:	I2 [402] F(1.5) S144
SCHEDULE 1A:	AREA B - INNER URBAN
SCHEDULE 1B:	AREA B
AREA OF WORK:	24,078.02 M2
COMPLETE SITE AREA:	204,834.211 M2
GFA*** OF PROPOSED AMRC:	13,726.17 M2
GFA*** OF EXISTING BUILDINGS ON SITE:	128,023 M2
GFA*** OF PROPOSED EXIST. BUILDINGS ON SITE:	141,749.17 M2
BUILDING HEIGHT:	40.3M (6 STOREYS + MECH. PENTHOUSE AND ATRIUM ROOF)

ZONING PROVISION	REQUIRED	PROVIDED
MIN. LOT WIDTH	NO MINIMUM	257.13 M
MIN. LOT AREA	NO MINIMUM	204834.211 M
MIN. FRONT YARD SETBACK	46M	YES - 364.54M
MIN. REAR YARD SETBACK****	7.5M	YES - 117.79
MIN. INTERIOR YARD SETBACK	7.5M	YES - 34.79M
MAX. HEIGHT	NO MAXIMUM	39.1 M
LANDSCAPED AREA (AREA OF WORK)	15%	22.8% (5502.69 M2)
LANDSCAPED AREA (SITE)	15%	29% (59721.75 M2)

PARKING QUEING + LOADING	REQUIRED	PROVIDED
EXISTING PARKING SPACES	1617	2079
EXISTING SPACES TB ELIMINATED	N/A	361
PROPOSED PARKING SPACES	N/A	120
PROPOSED SERVICE SPACES	N/A	6
PROPOSED ACCESSIBLE SPACES	3	6
PROPOSED TOTAL SPACES	103	126
TOTAL PARKING (EXIST. + PROPOSED)	1720	1863
BY USE: AMRC (POST-SEC. FACTOR)	103	126
BY USE: RGN (POST-SEC. FACTOR)	205	191
BY USE: TOTAL POST-SEC. FACTOR	308	317
BY USE: DAYCARE FACTOR	13	11
BY USE: HOSPITAL FACTOR	1399	1535
EXISTING BICYCLE PARKING	267	477
PROPOSED BICYCLE PARKING (AMRC)	55	222
TOTAL BICYCLE PARKING(PRO.+EXIST.)	322	699
BY USE: AMRC (POST-SEC. FACTOR)	55	222
BY USE: RGN (POST-SEC. FACTOR)	109	190
BY USE: TOTAL POST-SEC. FACTOR	164	412
BY USE: DAYCARE FACTOR	3	0
BY USE: HOSPITAL FACTOR	100	287
EXISTING LOADING DOCKS	2	2
NEW LOADING DOCKS	2	3
TOTAL LOADING DOCKS	2	5

SITE PLAN GENERAL NOTES:
1. ALL SITE INFORMATION GATHERED FROM SURVEYS 2022-11-22 FILE NO. 623-22 AND 2023-11-25 REF. NO. 101 - 15 (JG) GR
2. NO EXISTING TREES TO BE RETAINED - ALL TREES IN PLAN WILL BE PLANTED.
3. SNOW STORAGE WILL OCCUR OFF SITE. AN INTERIM SNOW STORAGE LOCATION HAS BEEN OUTLINED AS PER THE RELEVANT HATCH (SEE LEGEND).

* A PORTION OF THE LAND OWNED BY THE OTTAWA HEALTH SCIENCES CENTRE INC. AND CHILDREN'S HOSPITAL OF EASTERN ONTARIO CHILDREN'S TREATMENT CENTRE, 1211 ST OTTAWA FARLEY, SMITH & DENIS SURVEYING LTD. 2022-11-22
** PART OF LOTS 19, 21 & 22, PART OF TORRAGE ROAD CLOSED BY ASSE'S ORDER INSTRUMENT REGISTERED AS NO. 1000 ON PLAN 4R-1000 AND PART OF LOT 20 ON REGISTERED PLAN 4R-1000 AND PART OF LOT 1 ON REGISTERED PLAN 4R-4224, CITY OF OTTAWA FARLEY, SMITH & DENIS SURVEYING LTD. 2022-11-25
*** GFA AS PER CITY OF OTTAWA DEFINITION
**** MEASURED TO REAR LOT POINT (REAR LOT IS A POINT, NOT A LINE)

PARKING CALCULATIONS:

VEHICLE:

GFA OF BUILDINGS ON SITE (PER CITY OF OTTAWA DEFINITION)*:

AMRC = 13,726.17 m2
RGN = 27,387 m2
TOH = 99,988 m2
OASIS = 648 m2

POST-SECONDARY FACTOR (AMRC + RGN)
= 0.75 * ((13,726.17 + 27,387)/100)
= 0.75 * (411.1317)
= 308 SPOTS

HOSPITAL FACTOR (TOH)
= 1.4 * (99,988/100)
= 1399.83 SPOTS

DAYCARE FACTOR (OASIS)
= 2 * (648/100)
= 12.96 SPOTS

TOTAL =(308+1399.83+12.96)= 1720.79 SPOTS REQ.
= 1720 SPOTS (ROUNDED)

*BUILDING AREAS AS PER PLANNING RATIONALE

BICYCLE:

GFA OF BUILDINGS ON SITE (PER CITY OF OTTAWA DEFINITION):

AMRC = 13,726.17 m2
RGN = 27,387 m2
TOH = 99,988 m2*
OASIS = 648 m2*

POST-SECONDARY FACTOR (AMRC + RGN)
= 1 * ((13,726.17 + 27,387)/250)
= 164.45 SPOTS

HOSPITAL FACTOR (TOH)
= 1 * (99,988/1000)
= 99.98 SPOTS

DAYCARE FACTOR (OASIS)
= 1 * (648/250)
= 2.59 SPOTS

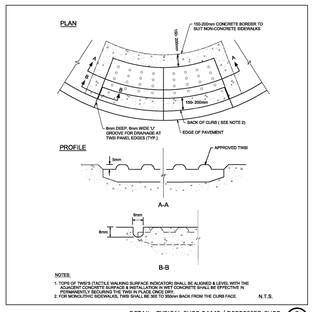
TOTAL = (164.45 + 99.98 + 2.59) = 267.02 SPOTS REQ.
= 267 SPOTS TOTAL

LEGEND

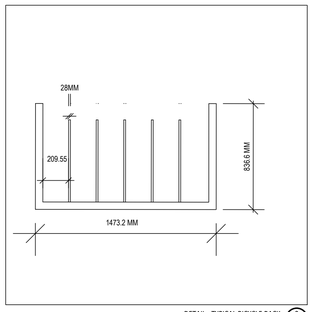
EXISTING ELEMENT	EMERGENCY EXIT	EV	ELECTRIC VEHICLE PARKING SPOT
NEW ELEMENT	PROPERTY LINE	FR	FIRE ACCESS ROUTE SIGN
NEW ELEMENT - CANOPY	SETBACK LINE	CR	CURB RAMP
SNOW STORAGE AREA	LANDSCAPE BUFFER LINE		STANDARD EXT. LIGHT FIXTURE
LANDSCAPED AREA	AREA OF WORK LINE		STANDARD EXT. POST LIGHT
BUILDING ENTRANCE	TREE		
SERVICE ENTRANCE	ACCESSIBLE PARKING SPOT		

0 5 10 25 50

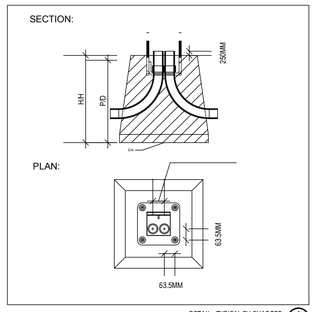
SCALE BAR 1:500



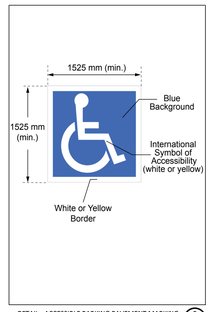
DETAIL - TYPICAL CURB RAMP / DEPRESSED CURB 2 A100D



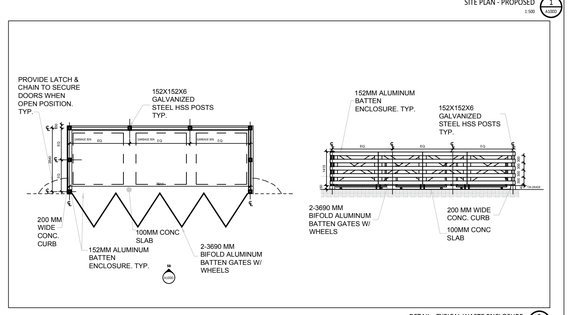
DETAIL - TYPICAL BICYCLE RACK 3 A100D



DETAIL - TYPICAL EV CHARGER 4 A100D



DETAIL - ACCESSIBLE PARKING PAVEMENT MARKING 5 A100D



DETAIL - TYPICAL WASTE ENCLOSURE 6 A100D

TN

No.	Description	Date
4	ISSUED FOR ZBLA AND SPC SUBMISSION	04/18/24
3	ISSUED FOR SPA PHASE 3 RESUBMISSION	04/10/24
2	ISSUED FOR SPA PHASE 3 RESUBMISSION	02/26/24
1	ISSUED FOR REVISED SITE PLAN APPL.	01/22/24

Revisions:

ONTARIO ASSOCIATION OF ARCHITECTS
RICHARD WILSON HUOT
LICENCE 7932

All measurements are to be checked and verified on site by the contractor before proceeding with the work.

Do not scale the drawings.

PARKIN

Owner:
uOttawa
UNIVERSITY OF OTTAWA
451 SMYTH ROAD
OTTAWA, ONTARIO, K1H 8M5
TEL: 613-229-7104

Applicant:
PCL
PCL CONSTRUCTORS CANADA INC.
49 AURIGA DRIVE
NEPEAN, ONTARIO, K2E 8A1
TEL: 613-229-7104

Consultants:
WSP
2611 QUEENSVIEW DRIVE, SUITE 300
OTTAWA, ONTARIO, K2B 8K2
TEL: 613-829-2800

Fairhall Moffatt & Woodland LIMITED
FAIRHALL MOFFATT & WOODLAND LTD.
600 TERRY FOX DRIVE, SUITE 100
OTTAWA, ONTARIO, K2L 4B6
TEL: 613-591-1495

CLELAND JARDINE
CLELAND JARDINE ENGINEERING LTD.
580 TERRY FOX DRIVE
KANATA, ONTARIO, K2L 4B9
TEL: 613-591-1495

MERRICK CANADA
MERRICK
580 TERRY FOX DRIVE
KANATA, ONTARIO, K2L 4B9
TEL: 613-592-5289

Project:
ADVANCED MEDICAL RESEARCH CENTRE

Address:
451 SMYTH ROAD
OTTAWA, ON K1H 8M5

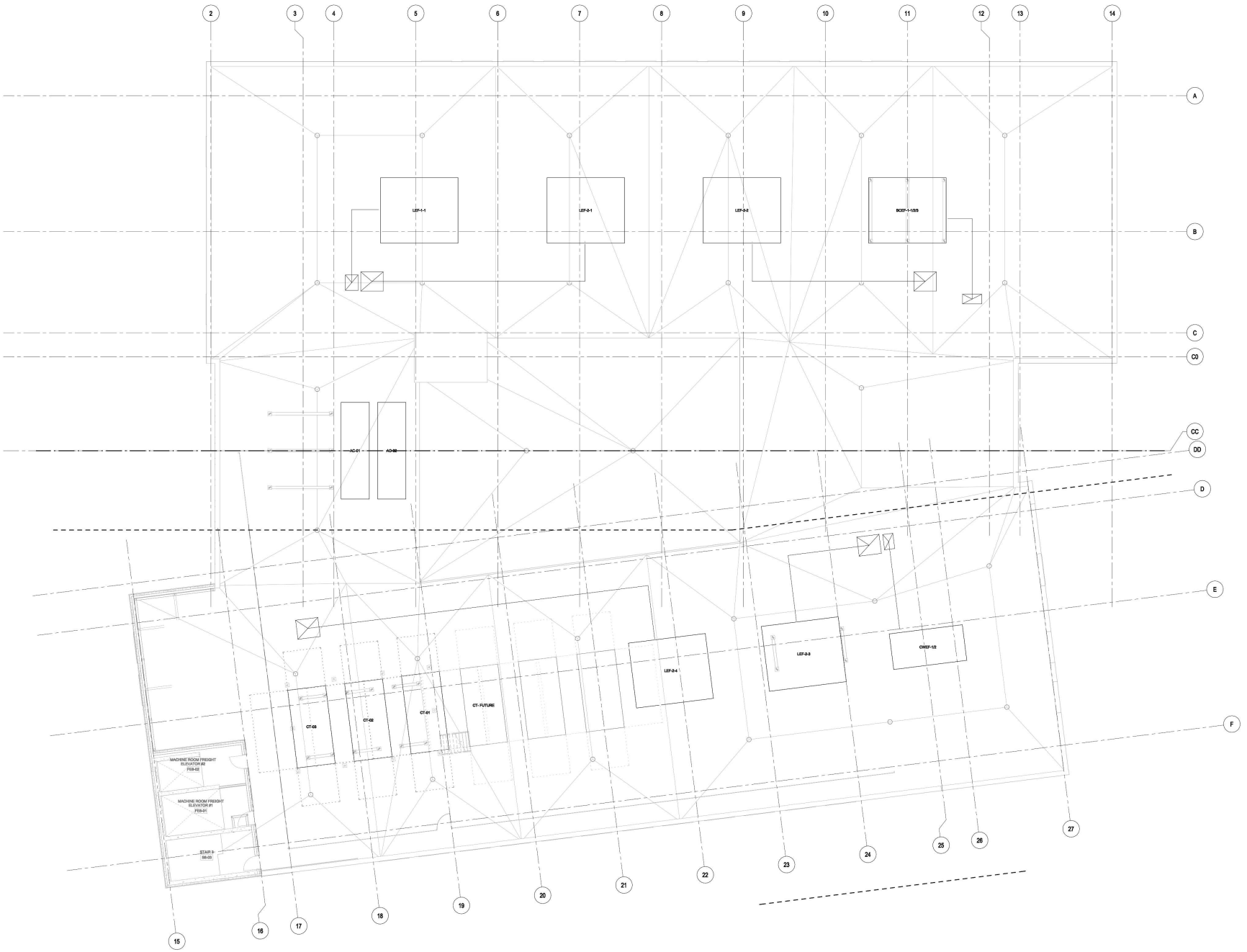
Drawn By:	Date: 04/18/2024
Checked By:	Scale: 1:500

Sheet Title:
SITE PLAN - PROPOSED

Sheet Number:
A100D

20 James Street, Suite 200, Ottawa, Canada K2P 0T6 613 749 7787

FILENAME: N:\OTT\projects\22007\2000\22007-04 AMRC\graphics\cad\working\Architecture design-Dialog\PARKIN Updated\A1000-SITE PLAN - PROPOSED_PAL.dwg
PLOTTED: Apr 18, 2024 - 1:19pm



1 M-508 ROOF - HVAC PLAN
1 : 100

A0 - 841x1189

PCL

Key Plan:

NORTH

Engineering Consultant:

wsp

WSP Canada Inc.
2611 Queensview Drive, Suite 300
Ottawa, ON, Canada, K2B 8K2
T 613-829-2800 | www.wsp.com

No.	Description	Date
1	ISSUED FOR PRICING PROPOSAL	06/11/2023

Revisions:

All measurements are to be checked and verified on site by the contractor before proceeding with the work.
Do not scale the drawings.

PARKIN
ARCHITECTS LIMITED

20 James Street, Suite 300, Ottawa, Canada K2P 0T6 613.730.7750

Project:

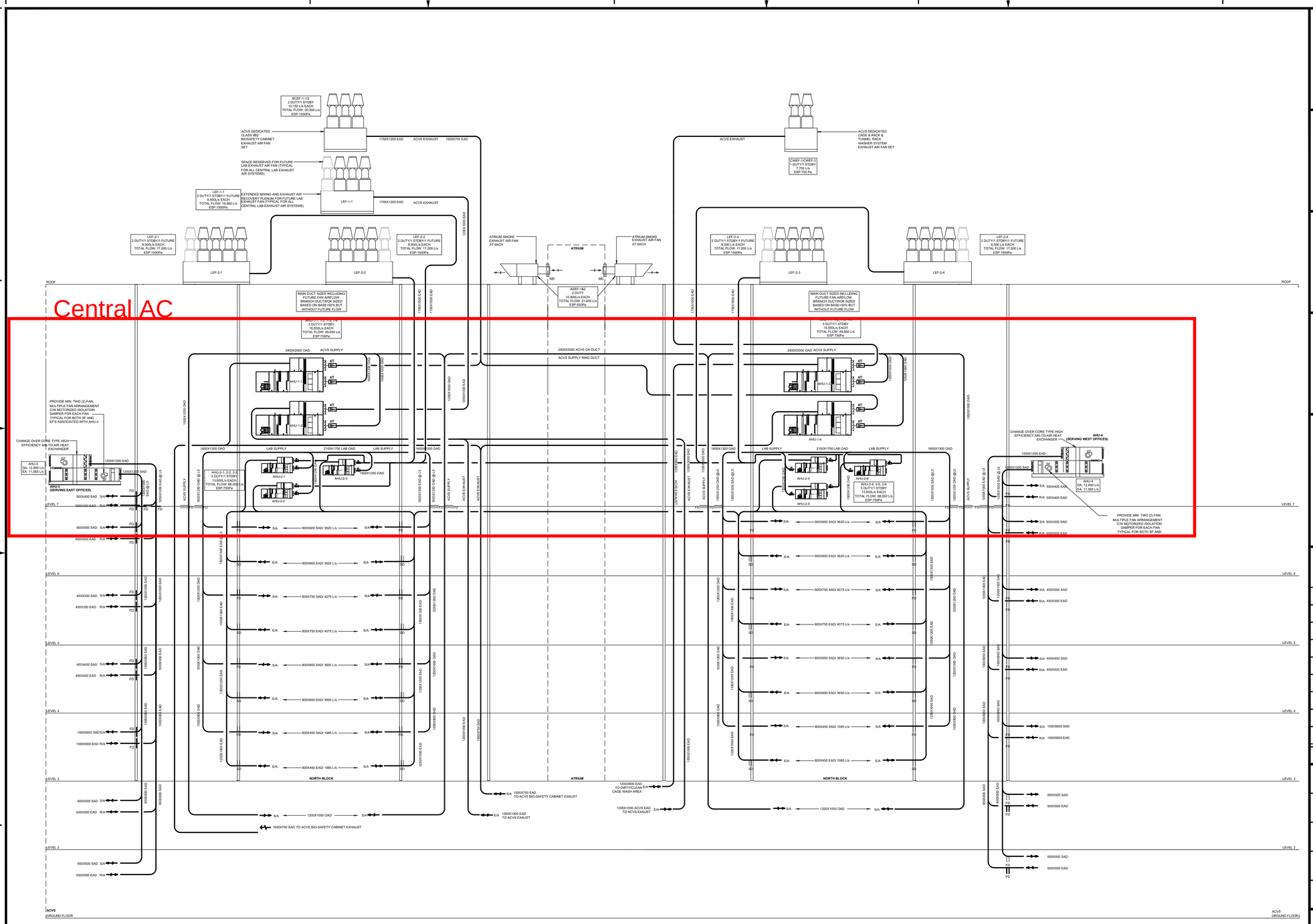
uOttawa
Advanced Medical Research Center (AMRC)

Drawn By:	Date:
MH / LC / NI	06/11/2023
Checked By:	Scale:
VL / JB / PK	1 : 100

Sheet Title:
ROOF - HVAC PLAN

Sheet Number:
M-508

PLOTDATE: 2023/06/14 4:07:09 PM



1 VENTILATION SCHEMATIC
M4.00 SCALE: N.T.S.

wsp
300-2611 QUEENSVIEW DRIVE
OTTAWA ONTARIO CANADA K2B 8K2
TEL 1-613-829-2800 | FAX 1-613-829-8299
WWW.WSP.COM

CLIENT:
CLIENT NAME

CLIENT REF. #: --

PROJECT:
PROJECT NAME

KEY PLAN:

ISSUED FOR - REVISION:

A		YYYY/MM/DD	ISSUE_DESCRIPTION
IS	RE	DATE	DESCRIPTION

PROJECT NO: PROJECT #
DATE: YYYY/MM/DD
ORIGINAL SCALE: ORIGINAL_SCALE
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
DESIGNED BY: DESIGNED_BY
DRAWN BY: DRAWN_BY
CHECKED BY: CHECKED_BY
25mm

DISCIPLINE: DISCIPLINE_NAME

TITLE:
SHEET_TITLE_1
SHEET_TITLE_2

SHEET NUMBER:
A2
CURRENT_SHEET_NUMBER OF TOTAL_NO_OF_SHEETS

ISSUE: ISSUED_FOR
DATE OF: YYYY/MM/DD
REV # REV_#

PATH: C:\USERS\CJASS0749141\WSP O365\CA-NATIONAL CAPITAL REGION - 6 DRAWINGS\VENTILATION SCHEMATIC.DWG

APPENDIX

B TRAFFIC DATA

Appendix B: Table of Traffic and Road Parameters To Be Used For Sound Level Predictions

Table B1 Traffic And Road Parameters To Be Used For Sound Level Predictions

Row Width (m)	Implied Roadway Class	AADT Vehicles/Day	Posted Speed Km/Hr	Day/Night Split %	Medium Trucks %	Heavy Trucks % [1]
NA [2]	Freeway, Queensway, Highway	18,333 per lane	100	92/8	7	5
37.5-44.5	6-Lane Urban Arterial-Divided (6 UAD)	50,000	50-80	92/8	7	5
34-37.5	4-Lane Urban Arterial-Divided (4-UAD)	35,000	50-80	92/8	7	5
23-34	4-Lane Urban Arterial-Undivided (4-UAU)	30,000	50-80	92/8	7	5
23-34	4-Lane Major Collector (4-UMCU)	24,000	40-60	92/8	7	5
30-35.5	2-Lane Rural Arterial (2-RAU)	15,000	50-80	92/8	7	5
20-30	2-Lane Urban Arterial (2-UAU)	15,000	50-80	92/8	7	5
20-30	2-Lane Major Collector (2-UMCU)	12,000	40-60	92/8	7	5
30-35.5	2-Lane Outer Rural Arterial (near the extremities of the City) (2-RAU)	10,000	50-80	92/8	7	5
20-30	2-Lane Urban Collector (2-UCU)	8,000	40-50	92/8	7	5

[1] The MOE Vehicle Classification definitions should be used to estimate automobiles, medium trucks and heavy trucks.

[2] The number of lanes is determined by the future mature state of the roadway.

APPENDIX

C SAMPLE CALCULATIONS

APPENDIX

C-1 *SAMPLE - STAMSON*

STAMSON 5.0 NORMAL REPORT Date: 17-10-2023 13:49:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: riversi.te Time Period: Day/Night 16/8 hours
Description: Stamson Validation North Facade

Road data, segment # 1: Alta Vista (day/night)

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 35000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Alta Vista (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 20.00 / 20.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Alta Vista (day)

Source height = 1.50 m

ROAD (0.00 + 72.64 + 0.00) = 72.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	76.17	0.00	-2.07	-1.46	0.00	0.00	0.00	72.64

Segment Leq : 72.64 dBA

Total Leq All Segments: 72.64 dBA

Results segment # 1: Alta Vista (night)

Source height = 1.50 m

ROAD (0.00 + 65.04 + 0.00) = 65.04 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	68.57	0.00	-2.07	-1.46	0.00	0.00	0.00	65.04

Segment Leq : 65.04 dBA

Total Leq All Segments: 65.04 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 72.64
(NIGHT): 65.04

C-2 *SAMPLE – CADNA/A*

Configuration

Configuration	
Parameter	Value
General	
Max. Error (dB)	0
Max. Search Radius (#(Unit,LEN))	2000
Min. Dist Src to Rcvr	0
Partition	
Raster Factor	0.5
Max. Length of Section (#(Unit,LEN))	1000
Min. Length of Section (#(Unit,LEN))	1
Min. Length of Section (%)	0
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960
Reference Time Night (min)	480
Daytime Penalty (dB)	0
Recr. Time Penalty (dB)	0
Night-time Penalty (dB)	0
DTM	
Standard Height (m)	0
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	1
Search Radius Src	100
Search Radius Rcvr	100
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rvcr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.1
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Excl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (#(Unit,TEMP))	10
rel. Humidity (%)	70
Ground Absorption G	0.7
Wind Speed for Dir. (#(Unit,SPEED))	3
Roads (TNM)	
Railways (Schall 03 (1990))	
Strictly acc. to Schall 03 / Schall-Transrapid	
Aircraft (???)	
Strictly acc. to AzB	

Point Sources

Name	M.	ID	Result. PWL			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night						X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)		(m)		(m)	(m)	(m)
Loading Bay Truck Idling		SS_LoadingBayIdle	100.0	100.0	100.0	Lw	HTidling		0.0	0.0	0.0				15.00	15.00	0.00	0.0		(none)	2.10	r	449034.39	5027884.38	2.10
LEF-2-4		SS_LEF-2-4	92.0	92.0	92.0	Lw	LEF2		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.00	g	449041.47	5027945.89	39.50
LEF-2-4		SS_LEF-2-4	92.0	92.0	92.0	Lw	LEF2		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.00	g	449042.81	5027946.22	39.50
LEF-2-4		SS_LEF-2-4	92.0	92.0	92.0	Lw	LEF2		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.00	g	449044.37	5027946.56	39.50
LEF-2-3		SS_LEF-2-3	92.0	92.0	92.0	Lw	LEF2		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.00	g	449051.61	5027948.21	39.50
LEF-2-3		SS_LEF-2-3	92.0	92.0	92.0	Lw	LEF2		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.00	g	449053.08	5027948.57	39.50
LEF-2-3		SS_LEF-2-3	92.0	92.0	92.0	Lw	LEF2		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.00	g	449054.51	5027948.96	39.50
LEF-2-2		SS_LEF-2-2	92.0	92.0	92.0	Lw	LEF2		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.00	g	449043.43	5027982.59	39.50
LEF-2-2		SS_LEF-2-2	92.0	92.0	92.0	Lw	LEF2		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.00	g	449044.92	5027982.67	39.50
LEF-2-2		SS_LEF-2-2	92.0	92.0	92.0	Lw	LEF2		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.00	g	449046.38	5027982.89	39.50
LEF-2-1		SS_LEF-2-1	92.0	92.0	92.0	Lw	LEF2		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.00	g	449031.40	5027981.45	39.50
LEF-2-1		SS_LEF-2-1	92.0	92.0	92.0	Lw	LEF2		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.00	g	449032.85	5027981.54	39.50
LEF-2-1		SS_LEF-2-1	92.0	92.0	92.0	Lw	LEF2		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.00	g	449034.34	5027981.72	39.50
LEF-1-1		SS_LEF-1-1	92.0	92.0	92.0	Lw	LEF1		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.56	g	449018.41	5027980.01	40.06
LEF-1-1		SS_LEF-1-1	92.0	92.0	92.0	Lw	LEF1		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.56	g	449020.10	5027980.19	40.06
LEF-1-1		SS_LEF-1-1	92.0	92.0	92.0	Lw	LEF1		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.56	g	449021.58	5027980.33	40.06
Emergency Generator	~	EM_GEN	99.8	99.8	99.8	Lw	EMGEN+3		0.0	0.0	0.0							0.0		(none)	4.50	r	449030.27	5027851.93	4.50
CWEF-1		SS_CWEF-1	85.7	85.7	85.7	Lw	CWEF		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.00	g	449061.74	5027950.05	39.50
Cooling Towers		SS_CT1	91.9	91.9	91.9	Lw	CT		0.0	0.0	0.0				60.00	60.00	30.00	0.0		(none)	5.15	g	449024.95	5027941.10	40.65
Cooling Towers		SS_CT2	91.9	91.9	91.9	Lw	CT		0.0	0.0	0.0				60.00	60.00	30.00	0.0		(none)	5.15	g	449020.66	5027940.27	40.65
Cooling Towers		SS_CT3	91.9	91.9	91.9	Lw	CT		0.0	0.0	0.0				60.00	60.00	30.00	0.0		(none)	5.15	g	449016.19	5027938.93	40.65
Cooling Towers		SS_CT_Future	91.9	91.9	91.9	Lw	CT		0.0	0.0	0.0				60.00	60.00	30.00	0.0		(none)	5.15	g	449029.66	5027942.29	40.65
BCEF-1-1/2		SS_BCEF-1-1/2	92.5	92.5	92.5	Lw	BCEF		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.56	g	449056.06	5027984.03	40.06
BCEF-1-1/2		SS_BCEF-1-1/2	92.5	92.5	92.5	Lw	BCEF		0.0	0.0	0.0				60.00	60.00	60.00	0.0		(none)	4.56	g	449057.77	5027984.07	40.06
AC-02		SS_AC-02	96.3	96.3	96.3	Lw	AC		0.0	0.0	0.0				60.00	60.00	30.00	0.0		(none)	2.40	g	449020.17	5027961.20	37.90
AC-01		SS_AC-01	96.3	96.3	96.3	Lw	AC		0.0	0.0	0.0				60.00	60.00	30.00	0.0		(none)	2.40	g	449017.33	5027960.76	37.90

Line Sources

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Moving Pt. Src			
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night				Number			Speed
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)		Day	Evening	Night	(km/h)
Loading Bay Truck Movement		SS_LoadingBayTruckMovement	87.5	87.5	-15.5	67.1	67.1	-35.9	PWL-Pt	HeavyTruckMovement		0.0	0.0	0.0							0.0		(none)	2.0	2.0	0.0	15.0

Vertical Area Sources

Name	M.	ID	Result. PWL			Result. PWL"			Lw / Li			Correction			Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night			
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)	
AHU South Wall		SS_Louvres_South	93.5	93.5	93.5	73.2	73.2	73.2	Lw	AHU+10*log(6)		0.0	0.0	0.0			AcousticLouvres	60.00	60.00	30.00	3.0		(none)
AHU North Wall		SS_Louvres_North	93.5	93.5	93.5	73.3	73.3	73.3	Lw	AHU+10*log(6)		0.0	0.0	0.0			AcousticLouvres	60.00	60.00	30.00	3.0		(none)

Sound Level Library

Name	ID	Type	1/3 Oktave Spectrum (dB)													Source
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	10000	A	lin	
CT	CT	Lw			98.0	98.0	93.0	87.0	88.0	81.0	77.0	72.0		91.9	102.0	B-1044-XES15E-1218-10JN Manufacturer Spec
BCEF	BCEF	Lw			98.0	96.0	91.0	86.0	87.0	87.0	80.0	71.0		92.5	101.2	MKP - AXIJET-FSW 4025 1125RPM
CWEF	CWEF	Lw			89.0	89.0	83.0	80.0	81.0	80.0	72.0	62.0		85.7	93.3	MKP - AXIJET-FSW 3650 985RPM
LEF1	LEF1	Lw			98.0	96.0	90.0	86.0	87.0	86.0	80.0	70.0		92.0	101.0	MKP - AXIJET-FSW 4025 1114RPM
LEF2	LEF2	Lw			97.0	96.0	92.0	86.0	86.0	86.0	80.0	71.0		92.0	100.7	MKP - AXIJET-FSW 3650 1247RPM
Emergency Generator	EMGEN	Lw			89.0	93.0	93.0	92.0	92.0	91.0	85.0	78.0		96.8	99.8	72 @ 7 m
Air Cooled Chillers	AC	Lw				97.4	89.3	87.6	91.9	91.5	84.5	73.6		96.3	100.1	AERMEC NRB 2200
AHU	AHU	Lw			87.0	85.2	84.6	84.9	82.2	78.4	75.3	72.9		87.1	92.4	Manu Spec 16Ton Carrier unit
HeavyTruckMovement	HeavyTruckMovement	Lw		98.0	94.0	93.0	87.0	91.0	93.0	98.0	102.0	100.0		105.9	106.7	TNM
	HTidling	Lw			102.0	102.0	97.0	97.0	96.0	92.0	85.0	79.0		100.0	106.8	

Sound Reduction Index Library

Name	ID	1/3 Oktave Spectrum (dB)																												Source
		25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	Rw	
Standard Louvres	Louvres		0.0			4.0			4.0			3.0			2.0			4.0			5.0			7.0			8.0		4	wsp spreadsheet
Plenum	Plenum					3.0			4.0			5.0			4.0			4.0			4.0			4.5			3.0		5	wsp spreadsheet
Plenum Lined	LinedPlenum					8.0			8.0			8.0			8.0			8.0			8.0			8.0			8.0		9	
6" Acoustic Louvres	AcousticLouvres					8.0			7.0			7.0			10.0			14.0			17.0			13.0			13.0		14	wsp spreadsheet

Receivers

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Evening	Night	Day	Evening	Night	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
OLA2		OLA2	45.8	45.8	44.8	0.0	0.0	0.0		x	Total	1.50	r	449202.42	5027893.63	1.50
OLA1		OLA1	45.1	45.1	44.7	0.0	0.0	0.0		x	Total	1.50	r	449228.81	5028000.63	1.50
Ronald House		RHouse	47.3	47.3	45.2	0.0	0.0	0.0		x	Total	4.50	r	448821.98	5027814.14	4.50
Rotel		Rotel	45.4	45.4	44.0	0.0	0.0	0.0		x	Total	4.50	r	448806.86	5027734.30	4.50

Receiver
Name: Rotel
ID: Rotel
X: 448806.86 m
Y: 5027734.30 m
Z: 4.50 m

Point Source, ISO 9613, Name: "AC-01", ID: "SS_AC-01"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
4	449017.33	5027960.76	37.90	0	D	A	96.3	0.0	0.0	0.0	0.0	60.9	2.1	-0.8	0.0	0.0	4.7	0.0	0.0	29.4
4	449017.33	5027960.76	37.90	0	N	A	96.3	0.0	-3.0	0.0	0.0	60.9	2.1	-0.8	0.0	0.0	4.7	0.0	0.0	26.4
4	449017.33	5027960.76	37.90	0	E	A	96.3	0.0	0.0	0.0	0.0	60.9	2.1	-0.8	0.0	0.0	4.7	0.0	0.0	29.4
6	449017.33	5027960.76	37.90	1	D	A	96.3	0.0	0.0	0.0	0.0	61.1	2.2	-0.8	0.0	0.0	0.0	0.0	2.1	31.7
6	449017.33	5027960.76	37.90	1	N	A	96.3	0.0	-3.0	0.0	0.0	61.1	2.2	-0.8	0.0	0.0	0.0	0.0	2.1	28.7
6	449017.33	5027960.76	37.90	1	E	A	96.3	0.0	0.0	0.0	0.0	61.1	2.2	-0.8	0.0	0.0	0.0	0.0	2.1	31.7

Point Source, ISO 9613, Name: "AC-02", ID: "SS_AC-02"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
10	449020.17	5027961.20	37.90	0	D	A	96.3	0.0	0.0	0.0	0.0	60.9	2.1	-0.8	0.0	0.0	4.7	0.0	0.0	29.3
10	449020.17	5027961.20	37.90	0	N	A	96.3	0.0	-3.0	0.0	0.0	60.9	2.1	-0.8	0.0	0.0	4.7	0.0	0.0	26.3
10	449020.17	5027961.20	37.90	0	E	A	96.3	0.0	0.0	0.0	0.0	60.9	2.1	-0.8	0.0	0.0	4.7	0.0	0.0	29.3
12	449020.17	5027961.20	37.90	1	D	A	96.3	0.0	0.0	0.0	0.0	61.1	2.2	-0.8	0.0	0.0	4.7	0.0	2.2	26.9
12	449020.17	5027961.20	37.90	1	N	A	96.3	0.0	-3.0	0.0	0.0	61.1	2.2	-0.8	0.0	0.0	4.7	0.0	2.2	23.9
12	449020.17	5027961.20	37.90	1	E	A	96.3	0.0	0.0	0.0	0.0	61.1	2.2	-0.8	0.0	0.0	4.7	0.0	2.2	26.9

vert. Area Source, ISO 9613, Name: "AHU South Wall", ID: "SS_Louvres_South"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
15	449043.68	5027934.23	29.50	0	D	A	73.2	17.3	0.0	3.0	0.0	60.9	1.0	-0.6	0.0	0.0	0.0	0.0	0.0	32.1
15	449043.68	5027934.23	29.50	0	N	A	73.2	17.3	-3.0	3.0	0.0	60.9	1.0	-0.6	0.0	0.0	0.0	0.0	0.0	29.1
15	449043.68	5027934.23	29.50	0	E	A	73.2	17.3	0.0	3.0	0.0	60.9	1.0	-0.6	0.0	0.0	0.0	0.0	0.0	32.1
17	449043.68	5027934.23	29.50	1	D	A	73.2	17.3	0.0	3.0	0.0	61.1	1.1	-0.6	0.0	0.0	0.0	0.0	2.2	29.6
17	449043.68	5027934.23	29.50	1	N	A	73.2	17.3	-3.0	3.0	0.0	61.1	1.1	-0.6	0.0	0.0	0.0	0.0	2.2	26.6
17	449043.68	5027934.23	29.50	1	E	A	73.2	17.3	0.0	3.0	0.0	61.1	1.1	-0.6	0.0	0.0	0.0	0.0	2.2	29.6
22	449043.68	5027934.23	30.50	0	D	A	73.2	17.3	0.0	3.0	0.0	60.9	1.0	-0.6	0.0	0.0	0.0	0.0	0.0	32.1
22	449043.68	5027934.23	30.50	0	N	A	73.2	17.3	-3.0	3.0	0.0	60.9	1.0	-0.6	0.0	0.0	0.0	0.0	0.0	29.1
22	449043.68	5027934.23	30.50	0	E	A	73.2	17.3	0.0	3.0	0.0	60.9	1.0	-0.6	0.0	0.0	0.0	0.0	0.0	32.1
24	449043.68	5027934.23	30.50	1	D	A	73.2	17.3	0.0	3.0	0.0	61.1	1.1	-0.6	0.0	0.0	0.0	0.0	2.2	29.6
24	449043.68	5027934.23	30.50	1	N	A	73.2	17.3	-3.0	3.0	0.0	61.1	1.1	-0.6	0.0	0.0	0.0	0.0	2.2	26.6
24	449043.68	5027934.23	30.50	1	E	A	73.2	17.3	0.0	3.0	0.0	61.1	1.1	-0.6	0.0	0.0	0.0	0.0	2.2	29.6

Point Source, ISO 9613, Name: "Loading Bay Truck Idling", ID: "SS_LoadingBayIdle"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
33	449034.39	5027884.38	2.10	0	D	A	100.0	0.0	-6.0	0.0	0.0	59.7	1.2	-0.4	0.0	0.0	6.2	0.0	0.0	27.3
33	449034.39	5027884.38	2.10	0	E	A	100.0	0.0	-6.0	0.0	0.0	59.7	1.2	-0.4	0.0	0.0	6.2	0.0	0.0	27.3
35	449034.39	5027884.38	2.10	1	D	A	100.0	0.0	-6.0	0.0	0.0	61.0	1.4	-0.5	0.0	0.0	19.2	0.0	4.4	8.5
35	449034.39	5027884.38	2.10	1	E	A	100.0	0.0	-6.0	0.0	0.0	61.0	1.4	-0.5	0.0	0.0	19.2	0.0	4.4	8.5
37	449034.39	5027884.38	2.10	1	D	A	100.0	0.0	-6.0	0.0	0.0	60.0	1.3	-0.4	0.0	0.0	6.4	0.0	2.4	24.3
37	449034.39	5027884.38	2.10	1	E	A	100.0	0.0	-6.0	0.0	0.0	60.0	1.3	-0.4	0.0	0.0	6.4	0.0	2.4	24.3
39	449034.39	5027884.38	2.10	1	D	A	100.0	0.0	-6.0	0.0	0.0	60.5	1.3	-0.4	0.0	0.0	15.5	0.0	2.0	15.2
39	449034.39	5027884.38	2.10	1	E	A	100.0	0.0	-6.0	0.0	0.0	60.5	1.3	-0.4	0.0	0.0	15.5	0.0	2.0	15.2
41	449034.39	5027884.38	2.10	1	D	A	100.0	0.0	-6.0	0.0	0.0	59.9	1.3	-0.4	0.0	0.0	6.4	0.0	2.4	24.5
41	449034.39	5027884.38	2.10	1	E	A	100.0	0.0	-6.0	0.0	0.0	59.9	1.3	-0.4	0.0	0.0	6.4	0.0	2.4	24.5

vert. Area Source, ISO 9613, Name: "AHU North Wall", ID: "SS_Louvres_North"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
46	449036.62	5027993.61	29.50	0	D	A	73.3	17.2	0.0	3.0	0.0	61.8	1.1	-0.6	0.0	0.0	20.7	0.0	0.0	10.4
46	449036.62	5027993.61	29.50	0	N	A	73.3	17.2	-3.0	3.0	0.0	61.8	1.1	-0.6	0.0	0.0	20.7	0.0	0.0	7.4
46	449036.62	5027993.61	29.50	0	E	A	73.3	17.2	0.0	3.0	0.0	61.8	1.1	-0.6	0.0	0.0	20.7	0.0	0.0	10.4

vert. Area Source, ISO 9613, Name: "AHU North Wall", ID: "SS_Louvres_North"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
48	449036.62	5027993.61	29.50	1	D	A	73.3	17.2	0.0	3.0	0.0	62.0	1.1	-0.6	0.0	0.0	24.1	0.0	2.9	3.9
48	449036.62	5027993.61	29.50	1	N	A	73.3	17.2	-3.0	3.0	0.0	62.0	1.1	-0.6	0.0	0.0	24.1	0.0	2.9	0.9
48	449036.62	5027993.61	29.50	1	E	A	73.3	17.2	0.0	3.0	0.0	62.0	1.1	-0.6	0.0	0.0	24.1	0.0	2.9	3.9
64	449036.62	5027993.61	30.50	0	D	A	73.3	17.2	0.0	3.0	0.0	61.8	1.1	-0.6	0.0	0.0	20.7	0.0	0.0	10.4
64	449036.62	5027993.61	30.50	0	N	A	73.3	17.2	-3.0	3.0	0.0	61.8	1.1	-0.6	0.0	0.0	20.7	0.0	0.0	7.4
64	449036.62	5027993.61	30.50	0	E	A	73.3	17.2	0.0	3.0	0.0	61.8	1.1	-0.6	0.0	0.0	20.7	0.0	0.0	10.4
68	449036.62	5027993.61	30.50	1	D	A	73.3	17.2	0.0	3.0	0.0	62.0	1.1	-0.6	0.0	0.0	23.8	0.0	3.0	4.2
68	449036.62	5027993.61	30.50	1	N	A	73.3	17.2	-3.0	3.0	0.0	62.0	1.1	-0.6	0.0	0.0	23.8	0.0	3.0	1.1
68	449036.62	5027993.61	30.50	1	E	A	73.3	17.2	0.0	3.0	0.0	62.0	1.1	-0.6	0.0	0.0	23.8	0.0	3.0	4.2

Point Source, ISO 9613, Name: "LEF-2-4", ID: "SS_LEF-2-4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
82	449041.47	5027945.89	39.50	0	D	A	92.0	0.0	0.0	0.0	0.0	61.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.8
82	449041.47	5027945.89	39.50	0	N	A	92.0	0.0	0.0	0.0	0.0	61.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.8
82	449041.47	5027945.89	39.50	0	E	A	92.0	0.0	0.0	0.0	0.0	61.0	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.8
84	449041.47	5027945.89	39.50	1	D	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.6	0.0	0.0	0.0	0.0	2.4	27.1
84	449041.47	5027945.89	39.50	1	N	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.6	0.0	0.0	0.0	0.0	2.4	27.1
84	449041.47	5027945.89	39.50	1	E	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.6	0.0	0.0	0.0	0.0	2.4	27.1

Point Source, ISO 9613, Name: "LEF-2-4", ID: "SS_LEF-2-4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
87	449042.81	5027946.22	39.50	0	D	A	92.0	0.0	0.0	0.0	0.0	61.1	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.7
87	449042.81	5027946.22	39.50	0	N	A	92.0	0.0	0.0	0.0	0.0	61.1	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.7
87	449042.81	5027946.22	39.50	0	E	A	92.0	0.0	0.0	0.0	0.0	61.1	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.7
91	449042.81	5027946.22	39.50	1	D	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.6	0.0	0.0	0.0	0.0	2.4	27.1
91	449042.81	5027946.22	39.50	1	N	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.6	0.0	0.0	0.0	0.0	2.4	27.1
91	449042.81	5027946.22	39.50	1	E	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.6	0.0	0.0	0.0	0.0	2.4	27.1

Point Source, ISO 9613, Name: "LEF-2-4", ID: "SS_LEF-2-4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
94	449044.37	5027946.56	39.50	0	D	A	92.0	0.0	0.0	0.0	0.0	61.1	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.7
94	449044.37	5027946.56	39.50	0	N	A	92.0	0.0	0.0	0.0	0.0	61.1	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.7
94	449044.37	5027946.56	39.50	0	E	A	92.0	0.0	0.0	0.0	0.0	61.1	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.7
98	449044.37	5027946.56	39.50	1	D	A	92.0	0.0	0.0	0.0	0.0	61.4	1.8	-0.6	0.0	0.0	0.0	0.0	2.4	27.0
98	449044.37	5027946.56	39.50	1	N	A	92.0	0.0	0.0	0.0	0.0	61.4	1.8	-0.6	0.0	0.0	0.0	0.0	2.4	27.0
98	449044.37	5027946.56	39.50	1	E	A	92.0	0.0	0.0	0.0	0.0	61.4	1.8	-0.6	0.0	0.0	0.0	0.0	2.4	27.0

Point Source, ISO 9613, Name: "LEF-1-1", ID: "SS_LEF-1-1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
102	449018.41	5027980.01	40.06	0	D	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	29.6
102	449018.41	5027980.01	40.06	0	N	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	29.6
102	449018.41	5027980.01	40.06	0	E	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	29.6
105	449018.41	5027980.01	40.06	1	D	A	92.0	0.0	0.0	0.0	0.0	61.5	1.9	-0.7	0.0	0.0	0.0	0.0	2.4	27.0
105	449018.41	5027980.01	40.06	1	N	A	92.0	0.0	0.0	0.0	0.0	61.5	1.9	-0.7	0.0	0.0	0.0	0.0	2.4	27.0
105	449018.41	5027980.01	40.06	1	E	A	92.0	0.0	0.0	0.0	0.0	61.5	1.9	-0.7	0.0	0.0	0.0	0.0	2.4	27.0

Point Source, ISO 9613, Name: "LEF-1-1", ID: "SS_LEF-1-1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
112	449020.10	5027980.19	40.06	0	D	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	29.6
112	449020.10	5027980.19	40.06	0	N	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	29.6
112	449020.10	5027980.19	40.06	0	E	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	29.6
119	449020.10	5027980.19	40.06	1	D	A	92.0	0.0	0.0	0.0	0.0	61.5	1.9	-0.7	0.0	0.0	0.0	0.0	2.4	26.9
119	449020.10	5027980.19	40.06	1	N	A	92.0	0.0	0.0	0.0	0.0	61.5	1.9	-0.7	0.0	0.0	0.0	0.0	2.4	26.9
119	449020.10	5027980.19	40.06	1	E	A	92.0	0.0	0.0	0.0	0.0	61.5	1.9	-0.7	0.0	0.0	0.0	0.0	2.4	26.9

Point Source, ISO 9613, Name: "LEF-1-1", ID: "SS_LEF-1-1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
126	449021.58	5027980.33	40.06	0	D	A	92.0	0.0	0.0	0.0	0.0	61.3	1.9	-0.7	0.0	0.0	0.0	0.0	0.0	29.5

Point Source, ISO 9613, Name: "LEF-1-1", ID: "SS_LEF-1-1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
126	449021.58	5027980.33	40.06	0	N	A	92.0	0.0	0.0	0.0	0.0	61.3	1.9	-0.7	0.0	0.0	0.0	0.0	0.0	29.5
126	449021.58	5027980.33	40.06	0	E	A	92.0	0.0	0.0	0.0	0.0	61.3	1.9	-0.7	0.0	0.0	0.0	0.0	0.0	29.5
128	449021.58	5027980.33	40.06	1	D	A	92.0	0.0	0.0	0.0	0.0	61.5	1.9	-0.7	0.0	0.0	0.0	0.0	2.4	26.9
128	449021.58	5027980.33	40.06	1	N	A	92.0	0.0	0.0	0.0	0.0	61.5	1.9	-0.7	0.0	0.0	0.0	0.0	2.4	26.9
128	449021.58	5027980.33	40.06	1	E	A	92.0	0.0	0.0	0.0	0.0	61.5	1.9	-0.7	0.0	0.0	0.0	0.0	2.4	26.9

Point Source, ISO 9613, Name: "LEF-2-3", ID: "SS_LEF-2-3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
141	449051.61	5027948.21	39.50	0	D	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.5
141	449051.61	5027948.21	39.50	0	N	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.5
141	449051.61	5027948.21	39.50	0	E	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.5
145	449051.61	5027948.21	39.50	1	D	A	92.0	0.0	0.0	0.0	0.0	61.5	1.8	-0.6	0.0	0.0	0.0	0.0	2.4	26.8
145	449051.61	5027948.21	39.50	1	N	A	92.0	0.0	0.0	0.0	0.0	61.5	1.8	-0.6	0.0	0.0	0.0	0.0	2.4	26.8
145	449051.61	5027948.21	39.50	1	E	A	92.0	0.0	0.0	0.0	0.0	61.5	1.8	-0.6	0.0	0.0	0.0	0.0	2.4	26.8

Point Source, ISO 9613, Name: "LEF-2-3", ID: "SS_LEF-2-3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
148	449053.08	5027948.57	39.50	0	D	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.4
148	449053.08	5027948.57	39.50	0	N	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.4
148	449053.08	5027948.57	39.50	0	E	A	92.0	0.0	0.0	0.0	0.0	61.3	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.4
150	449053.08	5027948.57	39.50	1	D	A	92.0	0.0	0.0	0.0	0.0	61.6	1.9	-0.6	0.0	0.0	0.0	0.0	2.4	26.8
150	449053.08	5027948.57	39.50	1	N	A	92.0	0.0	0.0	0.0	0.0	61.6	1.9	-0.6	0.0	0.0	0.0	0.0	2.4	26.8
150	449053.08	5027948.57	39.50	1	E	A	92.0	0.0	0.0	0.0	0.0	61.6	1.9	-0.6	0.0	0.0	0.0	0.0	2.4	26.8

Point Source, ISO 9613, Name: "LEF-2-3", ID: "SS_LEF-2-3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
153	449054.51	5027948.96	39.50	0	D	A	92.0	0.0	0.0	0.0	0.0	61.4	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.4
153	449054.51	5027948.96	39.50	0	N	A	92.0	0.0	0.0	0.0	0.0	61.4	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.4
153	449054.51	5027948.96	39.50	0	E	A	92.0	0.0	0.0	0.0	0.0	61.4	1.8	-0.6	0.0	0.0	0.0	0.0	0.0	29.4
161	449054.51	5027948.96	39.50	1	D	A	92.0	0.0	0.0	0.0	0.0	61.6	1.9	-0.6	0.0	0.0	0.0	0.0	2.4	26.7
161	449054.51	5027948.96	39.50	1	N	A	92.0	0.0	0.0	0.0	0.0	61.6	1.9	-0.6	0.0	0.0	0.0	0.0	2.4	26.7
161	449054.51	5027948.96	39.50	1	E	A	92.0	0.0	0.0	0.0	0.0	61.6	1.9	-0.6	0.0	0.0	0.0	0.0	2.4	26.7

Point Source, ISO 9613, Name: "Cooling Towers", ID: "SS_CT3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
164	449016.19	5027938.93	40.65	0	D	A	91.9	0.0	0.0	0.0	0.0	60.4	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	31.0
164	449016.19	5027938.93	40.65	0	N	A	91.9	0.0	-3.0	0.0	0.0	60.4	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	28.0
164	449016.19	5027938.93	40.65	0	E	A	91.9	0.0	0.0	0.0	0.0	60.4	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	31.0
168	449016.19	5027938.93	40.65	1	D	A	91.9	0.0	0.0	0.0	0.0	60.6	1.1	-0.5	0.0	0.0	0.0	0.0	2.5	28.2
168	449016.19	5027938.93	40.65	1	N	A	91.9	0.0	-3.0	0.0	0.0	60.6	1.1	-0.5	0.0	0.0	0.0	0.0	2.5	25.2
168	449016.19	5027938.93	40.65	1	E	A	91.9	0.0	0.0	0.0	0.0	60.6	1.1	-0.5	0.0	0.0	0.0	0.0	2.5	28.2

Point Source, ISO 9613, Name: "BCEF-1-1/2", ID: "SS_BCEF-1-1/2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
172	449056.06	5027984.03	40.06	0	D	A	92.5	0.0	0.0	0.0	0.0	62.0	2.0	-0.7	0.0	0.0	4.8	0.0	0.0	24.3
172	449056.06	5027984.03	40.06	0	N	A	92.5	0.0	0.0	0.0	0.0	62.0	2.0	-0.7	0.0	0.0	4.8	0.0	0.0	24.3
172	449056.06	5027984.03	40.06	0	E	A	92.5	0.0	0.0	0.0	0.0	62.0	2.0	-0.7	0.0	0.0	4.8	0.0	0.0	24.3
175	449056.06	5027984.03	40.06	1	D	A	92.5	0.0	0.0	0.0	0.0	62.2	2.1	-0.7	0.0	0.0	4.8	0.0	2.4	21.7
175	449056.06	5027984.03	40.06	1	N	A	92.5	0.0	0.0	0.0	0.0	62.2	2.1	-0.7	0.0	0.0	4.8	0.0	2.4	21.7
175	449056.06	5027984.03	40.06	1	E	A	92.5	0.0	0.0	0.0	0.0	62.2	2.1	-0.7	0.0	0.0	4.8	0.0	2.4	21.7

Point Source, ISO 9613, Name: "BCEF-1-1/2", ID: "SS_BCEF-1-1/2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
179	449057.77	5027984.07	40.06	0	D	A	92.5	0.0	0.0	0.0	0.0	62.0	2.0	-0.7	0.0	0.0	4.9	0.0	0.0	24.2
179	449057.77	5027984.07	40.06	0	N	A	92.5	0.0	0.0	0.0	0.0	62.0	2.0	-0.7	0.0	0.0	4.9	0.0	0.0	24.2
179	449057.77	5027984.07	40.06	0	E	A	92.5	0.0	0.0	0.0	0.0	62.0	2.0	-0.7	0.0	0.0	4.9	0.0	0.0	24.2
183	449057.77	5027984.07	40.06	1	D	A	92.5	0.0	0.0	0.0	0.0	62.2	2.1	-0.7	0.0	0.0	4.8	0.0	2.4	21.6
183	449057.77	5027984.07	40.06	1	N	A	92.5	0.0	0.0	0.0	0.0	62.2	2.1	-0.7	0.0	0.0	4.8	0.0	2.4	21.6

Point Source, ISO 9613, Name: "BCEF-1-1/2", ID: "SS_BCEF-1-1/2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
183	449057.77	5027984.07	40.06	1	E	A	92.5	0.0	0.0	0.0	0.0	62.2	2.1	-0.7	0.0	0.0	4.8	0.0	2.4	21.6

Point Source, ISO 9613, Name: "LEF-2-1", ID: "SS_LEF-2-1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
187	449031.40	5027981.45	39.50	0	D	A	92.0	0.0	0.0	0.0	0.0	61.5	1.8	-0.6	0.0	0.0	1.8	0.0	0.0	27.4
187	449031.40	5027981.45	39.50	0	N	A	92.0	0.0	0.0	0.0	0.0	61.5	1.8	-0.6	0.0	0.0	1.8	0.0	0.0	27.4
187	449031.40	5027981.45	39.50	0	E	A	92.0	0.0	0.0	0.0	0.0	61.5	1.8	-0.6	0.0	0.0	1.8	0.0	0.0	27.4
189	449031.40	5027981.45	39.50	1	D	A	92.0	0.0	0.0	0.0	0.0	61.7	1.9	-0.6	0.0	0.0	0.0	0.0	2.4	26.6
189	449031.40	5027981.45	39.50	1	N	A	92.0	0.0	0.0	0.0	0.0	61.7	1.9	-0.6	0.0	0.0	0.0	0.0	2.4	26.6
189	449031.40	5027981.45	39.50	1	E	A	92.0	0.0	0.0	0.0	0.0	61.7	1.9	-0.6	0.0	0.0	0.0	0.0	2.4	26.6

Point Source, ISO 9613, Name: "LEF-2-1", ID: "SS_LEF-2-1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
193	449032.85	5027981.54	39.50	0	D	A	92.0	0.0	0.0	0.0	0.0	61.5	1.9	-0.6	0.0	0.0	2.3	0.0	0.0	26.9
193	449032.85	5027981.54	39.50	0	N	A	92.0	0.0	0.0	0.0	0.0	61.5	1.9	-0.6	0.0	0.0	2.3	0.0	0.0	26.9
193	449032.85	5027981.54	39.50	0	E	A	92.0	0.0	0.0	0.0	0.0	61.5	1.9	-0.6	0.0	0.0	2.3	0.0	0.0	26.9
196	449032.85	5027981.54	39.50	1	D	A	92.0	0.0	0.0	0.0	0.0	61.8	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.8
196	449032.85	5027981.54	39.50	1	N	A	92.0	0.0	0.0	0.0	0.0	61.8	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.8
196	449032.85	5027981.54	39.50	1	E	A	92.0	0.0	0.0	0.0	0.0	61.8	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.8

Point Source, ISO 9613, Name: "LEF-2-1", ID: "SS_LEF-2-1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
201	449034.34	5027981.72	39.50	0	D	A	92.0	0.0	0.0	0.0	0.0	61.6	1.9	-0.6	0.0	0.0	3.3	0.0	0.0	25.8
201	449034.34	5027981.72	39.50	0	N	A	92.0	0.0	0.0	0.0	0.0	61.6	1.9	-0.6	0.0	0.0	3.3	0.0	0.0	25.8
201	449034.34	5027981.72	39.50	0	E	A	92.0	0.0	0.0	0.0	0.0	61.6	1.9	-0.6	0.0	0.0	3.3	0.0	0.0	25.8
203	449034.34	5027981.72	39.50	1	D	A	92.0	0.0	0.0	0.0	0.0	61.8	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.8
203	449034.34	5027981.72	39.50	1	N	A	92.0	0.0	0.0	0.0	0.0	61.8	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.8
203	449034.34	5027981.72	39.50	1	E	A	92.0	0.0	0.0	0.0	0.0	61.8	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.8

Point Source, ISO 9613, Name: "Cooling Towers", ID: "SS_CT2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
207	449020.66	5027940.27	40.65	0	D	A	91.9	0.0	0.0	0.0	0.0	60.5	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	30.8
207	449020.66	5027940.27	40.65	0	N	A	91.9	0.0	-3.0	0.0	0.0	60.5	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	27.8
207	449020.66	5027940.27	40.65	0	E	A	91.9	0.0	0.0	0.0	0.0	60.5	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	30.8
212	449020.66	5027940.27	40.65	1	D	A	91.9	0.0	0.0	0.0	0.0	60.8	1.1	-0.5	0.0	0.0	0.0	0.0	2.5	28.1
212	449020.66	5027940.27	40.65	1	N	A	91.9	0.0	-3.0	0.0	0.0	60.8	1.1	-0.5	0.0	0.0	0.0	0.0	2.5	25.1
212	449020.66	5027940.27	40.65	1	E	A	91.9	0.0	0.0	0.0	0.0	60.8	1.1	-0.5	0.0	0.0	0.0	0.0	2.5	28.1

Point Source, ISO 9613, Name: "Cooling Towers", ID: "SS_CT1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
216	449024.95	5027941.10	40.65	0	D	A	91.9	0.0	0.0	0.0	0.0	60.6	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	30.7
216	449024.95	5027941.10	40.65	0	N	A	91.9	0.0	-3.0	0.0	0.0	60.6	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	27.7
216	449024.95	5027941.10	40.65	0	E	A	91.9	0.0	0.0	0.0	0.0	60.6	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	30.7
219	449024.95	5027941.10	40.65	1	D	A	91.9	0.0	0.0	0.0	0.0	60.9	1.1	-0.5	0.0	0.0	0.0	0.0	2.5	28.0
219	449024.95	5027941.10	40.65	1	N	A	91.9	0.0	-3.0	0.0	0.0	60.9	1.1	-0.5	0.0	0.0	0.0	0.0	2.5	25.0
219	449024.95	5027941.10	40.65	1	E	A	91.9	0.0	0.0	0.0	0.0	60.9	1.1	-0.5	0.0	0.0	0.0	0.0	2.5	28.0

Point Source, ISO 9613, Name: "LEF-2-2", ID: "SS_LEF-2-2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
223	449043.43	5027982.59	39.50	0	D	A	92.0	0.0	0.0	0.0	0.0	61.7	1.9	-0.6	0.0	0.0	4.6	0.0	0.0	24.4
223	449043.43	5027982.59	39.50	0	N	A	92.0	0.0	0.0	0.0	0.0	61.7	1.9	-0.6	0.0	0.0	4.6	0.0	0.0	24.4
223	449043.43	5027982.59	39.50	0	E	A	92.0	0.0	0.0	0.0	0.0	61.7	1.9	-0.6	0.0	0.0	4.6	0.0	0.0	24.4
233	449043.43	5027982.59	39.50	1	D	A	92.0	0.0	0.0	0.0	0.0	62.0	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.5
233	449043.43	5027982.59	39.50	1	N	A	92.0	0.0	0.0	0.0	0.0	62.0	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.5
233	449043.43	5027982.59	39.50	1	E	A	92.0	0.0	0.0	0.0	0.0	62.0	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.5

Point Source, ISO 9613, Name: "LEF-2-2", ID: "SS_LEF-2-2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
238	449044.92	5027982.67	39.50	0	D	A	92.0	0.0	0.0	0.0	0.0	61.8	1.9	-0.6	0.0	0.0	4.6	0.0	0.0	24.3
238	449044.92	5027982.67	39.50	0	N	A	92.0	0.0	0.0	0.0	0.0	61.8	1.9	-0.6	0.0	0.0	4.6	0.0	0.0	24.3
238	449044.92	5027982.67	39.50	0	E	A	92.0	0.0	0.0	0.0	0.0	61.8	1.9	-0.6	0.0	0.0	4.6	0.0	0.0	24.3
240	449044.92	5027982.67	39.50	1	D	A	92.0	0.0	0.0	0.0	0.0	62.0	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.5
240	449044.92	5027982.67	39.50	1	N	A	92.0	0.0	0.0	0.0	0.0	62.0	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.5
240	449044.92	5027982.67	39.50	1	E	A	92.0	0.0	0.0	0.0	0.0	62.0	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.5

Point Source, ISO 9613, Name: "LEF-2-2", ID: "SS_LEF-2-2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
244	449046.38	5027982.89	39.50	0	D	A	92.0	0.0	0.0	0.0	0.0	61.8	1.9	-0.6	0.0	0.0	4.8	0.0	0.0	24.1
244	449046.38	5027982.89	39.50	0	N	A	92.0	0.0	0.0	0.0	0.0	61.8	1.9	-0.6	0.0	0.0	4.8	0.0	0.0	24.1
244	449046.38	5027982.89	39.50	0	E	A	92.0	0.0	0.0	0.0	0.0	61.8	1.9	-0.6	0.0	0.0	4.8	0.0	0.0	24.1
246	449046.38	5027982.89	39.50	1	D	A	92.0	0.0	0.0	0.0	0.0	62.0	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.4
246	449046.38	5027982.89	39.50	1	N	A	92.0	0.0	0.0	0.0	0.0	62.0	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.4
246	449046.38	5027982.89	39.50	1	E	A	92.0	0.0	0.0	0.0	0.0	62.0	1.9	-0.6	0.0	0.0	4.7	0.0	2.5	21.4

Point Source, ISO 9613, Name: "Cooling Towers", ID: "SS_CT_Future"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
250	449029.66	5027942.29	40.65	0	D	A	91.9	0.0	0.0	0.0	0.0	60.7	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	30.6
250	449029.66	5027942.29	40.65	0	N	A	91.9	0.0	-3.0	0.0	0.0	60.7	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	27.6
250	449029.66	5027942.29	40.65	0	E	A	91.9	0.0	0.0	0.0	0.0	60.7	1.1	-0.5	0.0	0.0	0.0	0.0	0.0	30.6
252	449029.66	5027942.29	40.65	1	D	A	91.9	0.0	0.0	0.0	0.0	61.0	1.1	-0.5	0.0	0.0	0.0	0.0	2.5	27.8
252	449029.66	5027942.29	40.65	1	N	A	91.9	0.0	-3.0	0.0	0.0	61.0	1.1	-0.5	0.0	0.0	0.0	0.0	2.5	24.8
252	449029.66	5027942.29	40.65	1	E	A	91.9	0.0	0.0	0.0	0.0	61.0	1.1	-0.5	0.0	0.0	0.0	0.0	2.5	27.8

Point Source, ISO 9613, Name: "CWEF-1", ID: "SS_CWEF-1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
255	449061.74	5027950.05	39.50	0	D	A	85.7	0.0	0.0	0.0	0.0	61.5	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	23.1
255	449061.74	5027950.05	39.50	0	N	A	85.7	0.0	0.0	0.0	0.0	61.5	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	23.1
255	449061.74	5027950.05	39.50	0	E	A	85.7	0.0	0.0	0.0	0.0	61.5	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	23.1
258	449061.74	5027950.05	39.50	1	D	A	85.7	0.0	0.0	0.0	0.0	61.8	1.9	-0.7	0.0	0.0	0.0	0.0	2.3	20.5
258	449061.74	5027950.05	39.50	1	N	A	85.7	0.0	0.0	0.0	0.0	61.8	1.9	-0.7	0.0	0.0	0.0	0.0	2.3	20.5
258	449061.74	5027950.05	39.50	1	E	A	85.7	0.0	0.0	0.0	0.0	61.8	1.9	-0.7	0.0	0.0	0.0	0.0	2.3	20.5

Line Source, ISO 9613, Name: "Loading Bay Truck Movement", ID: "SS_LoadingBayTruckMovement"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
263	449037.00	5027882.02	1.80	0	D	A	67.1	8.6	0.0	0.0	0.0	59.7	6.2	-1.0	0.0	0.0	8.4	0.0	0.0	2.4
263	449037.00	5027882.02	1.80	0	E	A	67.1	8.6	0.0	0.0	0.0	59.7	6.2	-1.0	0.0	0.0	8.4	0.0	0.0	2.4
266	449024.99	5027871.96	1.80	0	D	A	67.1	13.8	0.0	0.0	0.0	59.2	6.0	-1.0	0.0	0.0	9.1	0.0	0.0	7.6
266	449024.99	5027871.96	1.80	0	E	A	67.1	13.8	0.0	0.0	0.0	59.2	6.0	-1.0	0.0	0.0	9.1	0.0	0.0	7.6
268	449027.79	5027874.31	1.80	1	D	A	67.1	15.0	0.0	0.0	0.0	60.7	6.7	-1.1	0.0	0.0	23.3	0.0	2.5	-10.0
268	449027.79	5027874.31	1.80	1	E	A	67.1	15.0	0.0	0.0	0.0	60.7	6.7	-1.1	0.0	0.0	23.3	0.0	2.5	-10.0
272	449027.79	5027874.31	1.80	1	D	A	67.1	15.0	0.0	0.0	0.0	59.7	6.2	-1.0	0.0	0.0	8.8	0.0	2.0	6.4
272	449027.79	5027874.31	1.80	1	E	A	67.1	15.0	0.0	0.0	0.0	59.7	6.2	-1.0	0.0	0.0	8.8	0.0	2.0	6.4
282	449030.26	5027876.37	1.80	1	D	A	67.1	9.6	0.0	0.0	0.0	60.5	6.5	-1.1	0.0	0.0	8.0	0.0	2.5	0.3
282	449030.26	5027876.37	1.80	1	E	A	67.1	9.6	0.0	0.0	0.0	60.5	6.5	-1.1	0.0	0.0	8.0	0.0	2.5	0.3
285	449025.47	5027872.37	1.80	1	D	A	67.1	5.3	0.0	0.0	0.0	60.6	6.6	-1.1	0.0	0.0	7.7	0.0	3.8	-5.2
285	449025.47	5027872.37	1.80	1	E	A	67.1	5.3	0.0	0.0	0.0	60.6	6.6	-1.1	0.0	0.0	7.7	0.0	3.8	-5.2
289	449037.04	5027882.06	1.80	1	D	A	67.1	8.6	0.0	0.0	0.0	60.0	6.3	-1.0	0.0	0.0	8.4	0.0	2.1	-0.2
289	449037.04	5027882.06	1.80	1	E	A	67.1	8.6	0.0	0.0	0.0	60.0	6.3	-1.0	0.0	0.0	8.4	0.0	2.1	-0.2
293	449027.79	5027874.31	1.80	1	D	A	67.1	15.0	0.0	0.0	0.0	60.8	6.7	-1.1	0.0	0.0	14.6	0.0	2.0	-1.0
293	449027.79	5027874.31	1.80	1	E	A	67.1	15.0	0.0	0.0	0.0	60.8	6.7	-1.1	0.0	0.0	14.6	0.0	2.0	-1.0
297	449011.70	5027892.70	1.80	0	D	A	67.1	8.9	0.0	0.0	0.0	59.3	6.0	-1.0	0.0	0.0	10.5	0.0	0.0	1.2
297	449011.70	5027892.70	1.80	0	E	A	67.1	8.9	0.0	0.0	0.0	59.3	6.0	-1.0	0.0	0.0	10.5	0.0	0.0	1.2
300	449027.59	5027887.99	1.80	0	D	A	67.1	14.1	0.0	0.0	0.0	59.6	6.1	-1.0	0.0	0.0	9.6	0.0	0.0	6.9
300	449027.59	5027887.99	1.80	0	E	A	67.1	14.1	0.0	0.0	0.0	59.6	6.1	-1.0	0.0	0.0	9.6	0.0	0.0	6.9
305	449024.83	5027888.81	1.80	1	D	A	67.1	14.9	0.0	0.0	0.0	60.8	6.7	-1.1	0.0	0.0	23.2	0.0	2.5	-10.1
305	449024.83	5027888.81	1.80	1	E	A	67.1	14.9	0.0	0.0	0.0	60.8	6.7	-1.1	0.0	0.0	23.2	0.0	2.5	-10.1
308	449011.04	5027892.90	1.80	1	D	A	67.1	8.0	0.0	0.0	0.0	59.6	6.1	-1.0	0.0	0.0	10.0	0.0	2.1	-1.6

Line Source, ISO 9613, Name: "Loading Bay Truck Movement", ID: "SS_LoadingBayTruckMovement"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
308	449011.04	5027892.90	1.80	1	E	A	67.1	8.0	0.0	0.0	0.0	59.6	6.1	-1.0	0.0	0.0	10.0	0.0	2.1	-1.6
310	449015.63	5027891.53	1.80	1	D	A	67.1	5.1	0.0	0.0	0.0	59.7	6.2	-1.0	0.0	0.0	10.0	0.0	2.1	-4.7
310	449015.63	5027891.53	1.80	1	E	A	67.1	5.1	0.0	0.0	0.0	59.7	6.2	-1.0	0.0	0.0	10.0	0.0	2.1	-4.7
314	449028.50	5027887.72	1.80	1	D	A	67.1	13.7	0.0	0.0	0.0	59.9	6.3	-1.0	0.0	0.0	9.5	0.0	2.1	4.1
314	449028.50	5027887.72	1.80	1	E	A	67.1	13.7	0.0	0.0	0.0	59.9	6.3	-1.0	0.0	0.0	9.5	0.0	2.1	4.1
320	449012.93	5027892.34	1.80	1	D	A	67.1	8.4	0.0	0.0	0.0	59.5	6.1	-1.0	0.0	0.0	8.7	0.0	3.9	-1.6
320	449012.93	5027892.34	1.80	1	E	A	67.1	8.4	0.0	0.0	0.0	59.5	6.1	-1.0	0.0	0.0	8.7	0.0	3.9	-1.6
333	449009.14	5027893.46	1.80	1	D	A	67.1	3.7	0.0	0.0	0.0	60.5	6.6	-1.1	0.0	0.0	7.7	0.0	2.5	-5.3
333	449009.14	5027893.46	1.80	1	E	A	67.1	3.7	0.0	0.0	0.0	60.5	6.6	-1.1	0.0	0.0	7.7	0.0	2.5	-5.3
335	449024.99	5027888.76	1.80	1	D	A	67.1	4.2	0.0	0.0	0.0	60.1	6.4	-1.0	0.0	0.0	8.8	0.0	2.1	-5.0
335	449024.99	5027888.76	1.80	1	E	A	67.1	4.2	0.0	0.0	0.0	60.1	6.4	-1.0	0.0	0.0	8.8	0.0	2.1	-5.0
338	449029.80	5027887.33	1.80	1	D	A	67.1	8.7	0.0	0.0	0.0	60.1	6.4	-1.0	0.0	0.0	8.7	0.0	2.1	-0.5
338	449029.80	5027887.33	1.80	1	E	A	67.1	8.7	0.0	0.0	0.0	60.1	6.4	-1.0	0.0	0.0	8.7	0.0	2.1	-0.5
340	449035.89	5027885.52	1.80	1	D	A	67.1	9.1	0.0	0.0	0.0	59.9	6.3	-1.0	0.0	0.0	8.7	0.0	2.1	0.4
340	449035.89	5027885.52	1.80	1	E	A	67.1	9.1	0.0	0.0	0.0	59.9	6.3	-1.0	0.0	0.0	8.7	0.0	2.1	0.4
350	449023.86	5027884.70	1.80	0	D	A	67.1	11.3	0.0	0.0	0.0	59.4	6.1	-1.0	0.0	0.0	9.8	0.0	0.0	4.1
350	449023.86	5027884.70	1.80	0	E	A	67.1	11.3	0.0	0.0	0.0	59.4	6.1	-1.0	0.0	0.0	9.8	0.0	0.0	4.1
356	449023.86	5027884.70	1.80	1	D	A	67.1	11.3	0.0	0.0	0.0	59.7	6.2	-1.0	0.0	0.0	10.0	0.0	2.1	1.5
356	449023.86	5027884.70	1.80	1	E	A	67.1	11.3	0.0	0.0	0.0	59.7	6.2	-1.0	0.0	0.0	10.0	0.0	2.1	1.5
365	449027.63	5027881.13	1.80	1	D	A	67.1	5.0	0.0	0.0	0.0	60.3	6.5	-1.0	0.0	0.0	8.3	0.0	2.5	-4.3
365	449027.63	5027881.13	1.80	1	E	A	67.1	5.0	0.0	0.0	0.0	60.3	6.5	-1.0	0.0	0.0	8.3	0.0	2.5	-4.3
368	449025.15	5027883.47	1.80	1	D	A	67.1	5.6	0.0	0.0	0.0	60.3	6.4	-1.0	0.0	0.0	8.4	0.0	2.5	-3.8
368	449025.15	5027883.47	1.80	1	E	A	67.1	5.6	0.0	0.0	0.0	60.3	6.4	-1.0	0.0	0.0	8.4	0.0	2.5	-3.8
372	449023.65	5027884.90	1.80	1	D	A	67.1	6.8	0.0	0.0	0.0	60.6	6.6	-1.1	0.0	0.0	16.1	0.0	2.0	-10.3
372	449023.65	5027884.90	1.80	1	E	A	67.1	6.8	0.0	0.0	0.0	60.6	6.6	-1.1	0.0	0.0	16.1	0.0	2.0	-10.3
376	449014.73	5027867.08	1.80	0	D	A	67.1	3.1	0.0	0.0	0.0	58.8	5.8	-1.0	0.0	0.0	10.0	0.0	0.0	-3.5
376	449014.73	5027867.08	1.80	0	E	A	67.1	3.1	0.0	0.0	0.0	58.8	5.8	-1.0	0.0	0.0	10.0	0.0	0.0	-3.5
379	449019.14	5027870.71	1.80	0	D	A	67.1	9.7	0.0	0.0	0.0	59.0	5.9	-1.0	0.0	0.0	9.9	0.0	0.0	3.0
379	449019.14	5027870.71	1.80	0	E	A	67.1	9.7	0.0	0.0	0.0	59.0	5.9	-1.0	0.0	0.0	9.9	0.0	0.0	3.0
383	449018.36	5027870.07	1.80	1	D	A	67.1	10.6	0.0	0.0	0.0	59.3	6.0	-1.0	0.0	0.0	9.6	0.0	2.1	1.7
383	449018.36	5027870.07	1.80	1	E	A	67.1	10.6	0.0	0.0	0.0	59.3	6.0	-1.0	0.0	0.0	9.6	0.0	2.1	1.7
397	449018.36	5027870.07	1.80	1	D	A	67.1	10.6	0.0	0.0	0.0	61.1	6.8	-1.1	0.0	0.0	12.8	0.0	2.0	-3.9
397	449018.36	5027870.07	1.80	1	E	A	67.1	10.6	0.0	0.0	0.0	61.1	6.8	-1.1	0.0	0.0	12.8	0.0	2.0	-3.9
401	449016.82	5027890.23	1.80	0	D	A	67.1	6.6	0.0	0.0	0.0	59.4	6.0	-1.0	0.0	0.0	10.5	0.0	0.0	-1.1
401	449016.82	5027890.23	1.80	0	E	A	67.1	6.6	0.0	0.0	0.0	59.4	6.0	-1.0	0.0	0.0	10.5	0.0	0.0	-1.1
404	449011.35	5027892.44	1.80	0	D	A	67.1	8.6	0.0	0.0	0.0	59.2	6.0	-1.0	0.0	0.0	10.6	0.0	0.0	0.9
404	449011.35	5027892.44	1.80	0	E	A	67.1	8.6	0.0	0.0	0.0	59.2	6.0	-1.0	0.0	0.0	10.6	0.0	0.0	0.9
409	449017.62	5027889.90	1.80	1	D	A	67.1	4.5	0.0	0.0	0.0	59.7	6.2	-1.0	0.0	0.0	10.1	0.0	2.1	-5.4
409	449017.62	5027889.90	1.80	1	E	A	67.1	4.5	0.0	0.0	0.0	59.7	6.2	-1.0	0.0	0.0	10.1	0.0	2.1	-5.4
410	449014.90	5027891.01	1.80	1	D	A	67.1	4.8	0.0	0.0	0.0	59.6	6.1	-1.0	0.0	0.0	10.1	0.0	2.1	-5.0
410	449014.90	5027891.01	1.80	1	E	A	67.1	4.8	0.0	0.0	0.0	59.6	6.1	-1.0	0.0	0.0	10.1	0.0	2.1	-5.0
411	449010.75	5027892.69	1.80	1	D	A	67.1	7.7	0.0	0.0	0.0	59.6	6.1	-1.0	0.0	0.0	10.0	0.0	2.1	-1.9
411	449010.75	5027892.69	1.80	1	E	A	67.1	7.7	0.0	0.0	0.0	59.6	6.1	-1.0	0.0	0.0	10.0	0.0	2.1	-1.9
415	449012.64	5027891.92	1.80	1	D	A	67.1	8.3	0.0	0.0	0.0	59.4	6.1	-1.0	0.0	0.0	8.7	0.0	3.9	-1.7
415	449012.64	5027891.92	1.80	1	E	A	67.1	8.3	0.0	0.0	0.0	59.4	6.1	-1.0	0.0	0.0	8.7	0.0	3.9	-1.7
419	449009.04	5027893.38	1.80	1	D	A	67.1	3.4	0.0	0.0	0.0	60.5	6.6	-1.1	0.0	0.0	7.7	0.0	2.4	-5.6
419	449009.04	5027893.38	1.80	1	E	A	67.1	3.4	0.0	0.0	0.0	60.5	6.6	-1.1	0.0	0.0	7.7	0.0	2.4	-5.6
421	449025.78	5027876.86	1.80	0	D	A	67.1	9.4	0.0	0.0	0.0	59.3	6.0	-1.0	0.0	0.0	9.2	0.0	0.0	2.9
421	449025.78	5027876.86	1.80	0	E	A	67.1	9.4	0.0	0.0	0.0	59.3	6.0	-1.0	0.0	0.0	9.2	0.0	0.0	2.9
424	449025.78	5027876.86	1.80	1	D	A	67.1	9.4	0.0	0.0	0.0	59.7	6.2	-1.0	0.0	0.0	9.0	0.0	2.1	0.6
424	449025.78	5027876.86	1.80	1	E	A	67.1	9.4	0.0	0.0	0.0	59.7	6.2	-1.0	0.0	0.0	9.0	0.0	2.1	0.6
426	449025.35	5027876.40	1.80	1	D	A	67.1	5.7	0.0	0.0	0.0	60.5	6.5	-1.1	0.0	0.0	8.0	0.0	2.5	-3.6
426	449025.35	5027876.40	1.80	1	E	A	67.1	5.7	0.0	0.0	0.0	60.5	6.5	-1.1	0.0	0.0	8.0	0.0	2.5	-3.6
428	449027.70	5027878.89	1.80	1	D	A	67.1	5.0	0.0	0.0	0.0	60.4	6.5	-1.0	0.0	0.0	8.1	0.0	2.5	-4.4
428	449027.70	5027878.89	1.80	1	E	A	67.1	5.0	0.0	0.0	0.0	60.4	6.5	-1.0	0.0	0.0	8.1	0.0	2.5	-4.4
431	449025.78	5027876.86	1.80	1	D	A	67.1	9.4	0.0	0.0	0.0	60.8	6.7	-1.1	0.0	0.0	15.3	0.0	2.0	-7.1
431	449025.78	5027876.86	1.80	1	E	A	67.1	9.4	0.0	0.0	0.0	60.8	6.7	-1.1	0.0	0.0	15.3	0.0	2.0	-7.1

APPENDIX

D MANUFACTURERS DATA

Baltimore Aircoil Company

Cooling Tower Selection Report

Version: 8.11.19 NA
Product data correct as of: May 17, 2023

Project Name:
Selection Name:
Project State/Province: Quebec
Project Country/Region: Canada
Date: September 06, 2023

Model Information

Product Line:	Series 1500
Model:	XES15E-1218-10JN
Number of Units:	1
Fan Type:	Whisper Quiet Fan
Fan Motor:	(3) 7.50 = 22.50 HP/Unit
Total Standard Fan Power:	Full Speed, 22.50 BHP/Unit
Intake Option:	None
Internal Option:	None
Discharge Option:	None

Design Conditions

Flow Rate:	1,693.00	USGPM
Hot Water Temp.:	95.00	°F
Cold Water Temp.:	85.00	°F
Wet Bulb Temp.:	76.00	°F
Heat Rejection:	8,461,614	BTUH
Tower Pumping Head:	6.87	psi
Tower Heat Rejection:	8,629,088	BTUH
Reserve Capability:	1.97	%

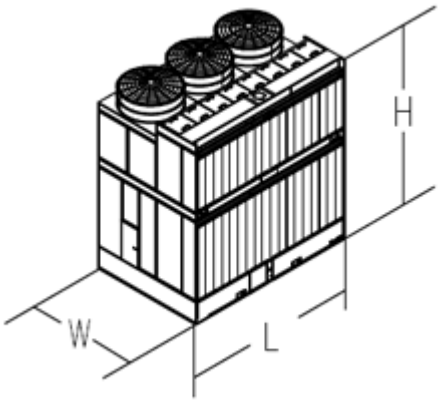
Thermal performance at design conditions and standard total fan motor power is certified by the Cooling Technology Institute (CTI).

Engineering Data, per Unit

Unit Length:	17' 11.75"	
Unit Width:	11' 10.00"	
Unit Height:	16' 10.75"	
Air Flow:	117,290	CFM
Approximate Shipping Weight:	13,130	pounds
Heaviest Section:	7,460	pounds
Approximate Operating Weight:	29,010	pounds

Heater kW Data (Optional)

0°F (-17.8°C) Ambient Heaters:	(2) 10	kW
-20°F (-28.9°C) Ambient Heaters:	(2) 12	kW



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

From Solid Wall:	8 ft.
From 50% Open Wall:	3 ft.

Energy Rating:

80.83 USGPM/HP per ASHRAE 90.1, ASHRAE 189 and CA Title 24.
This XE model is an extremely efficient model, with a base energy rating that meets or exceeds 2x the minimum ASHRAE 90.1 energy rating.

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: 8.11.19 NA
Product data correct as of: May 17, 2023

Project Name:
Selection Name:
Project State/Province: Quebec
Project Country/Region: Canada
Date: September 06, 2023

Model & Fan Motor

Product Line:	Series 1500
Model:	XES15E-1218-10JN
Number of Units:	1
Fan Motor:	(3) 7.50 = 22.50 HP/Unit
Total Standard Fan Power:	Full Speed, 22.50 BHP/Unit

Model Accessories

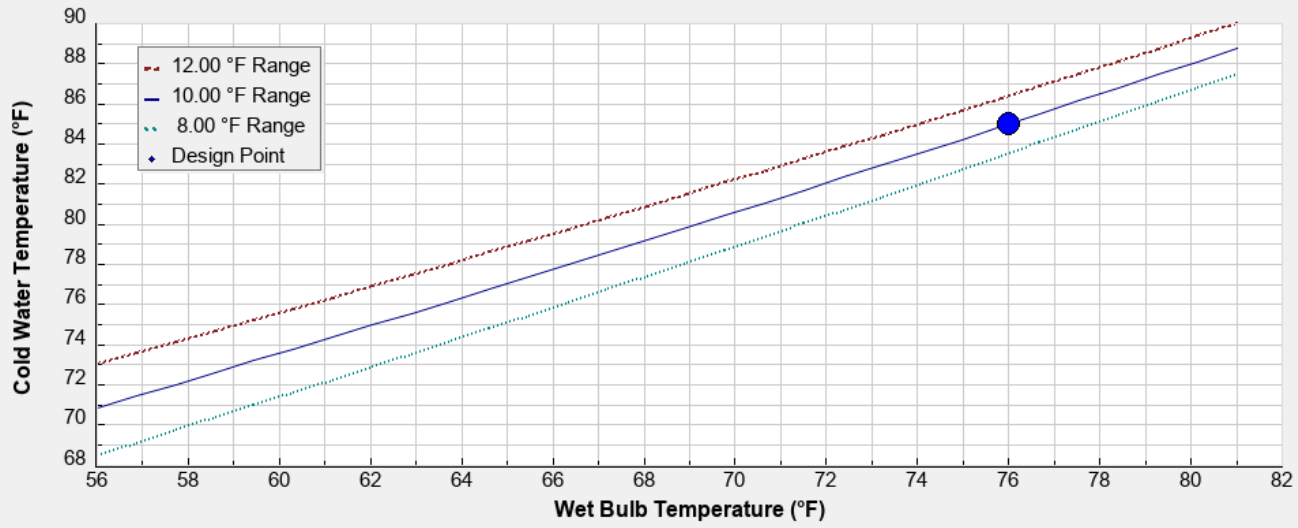
Intake Option:	None
Internal Option:	None
Discharge Option:	None
Fan Type:	Whisper Quiet Fan

Design Conditions @ Standard Total Fan Motor Power per Unit (22.50 HP)

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

Flow Rate:	1,693.00	USGPM
Hot Water Temp.:	95.00	°F
Cold Water Temp.:	85.00	°F
Wet Bulb Temp.:	76.00	°F
Heat Rejection:	8,461,614	BTUH

Predicted Performance
Fan Motor Alternative = Full Speed, 22.50 BHP
Flow Rate = 1693.00 USGPM (100.00% of Design)



These performance curves are based on constant fan power.

Baltimore Aircoil Company

Cooling Tower Selection Report

Version: 8.11.19 NA
Product data correct as of: May 17, 2023

Project Name:
Selection Name:
Project State/Province: Quebec
Project Country/Region: Canada
Date: September 06, 2023

Model Information

Product Line: Series 1500
Model: XES15E-1218-10JN
Number of Units: 1
Fan Type: Whisper Quiet Fan
Fan Motor: (3) 7.50 = 22.50 HP/Unit
Total Standard Fan Power: Full Speed, 22.50 BHP/Unit

Intake Option: None
Internal Option: None
Discharge Option: None

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)

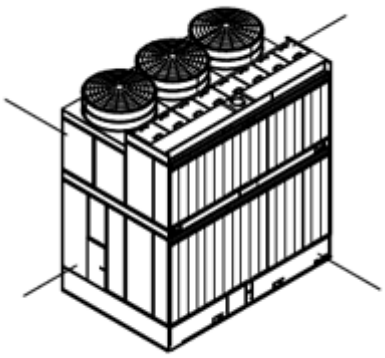
Octave Band	Distance 5 ft.	Distance 50 ft.
1	77	65
2	78	65
3	73	61
4	68	55
5	68	56
6	61	49
7	58	45
8	54	40
A-wgtd	**72**	**60**

Back
Sound Pressure (dB)

Octave Band	Distance 5 ft.	Distance 50 ft.
1	68	65
2	72	63
3	63	56
4	56	51
5	53	49
6	41	41
7	36	35
8	32	31
A-wgtd	**60**	**54**

End
Sound Pressure (dB)

Octave Band	Distance 5 ft.	Distance 50 ft.
1	70	64
2	71	62
3	63	55
4	55	50
5	52	49
6	43	40
7	38	34
8	33	30
A-wgtd	**60**	**54**



End
Sound Pressure (dB)

Octave Band	Distance 5 ft.	Distance 50 ft.
1	70	64
2	71	62
3	63	55
4	55	50
5	52	49
6	43	40
7	38	34
8	33	30
A-wgtd	**60**	**54**

Air Inlet
Sound Pressure (dB)

Octave Band	Distance 5 ft.	Distance 50 ft.
1	76	67
2	79	67
3	75	60
4	68	57
5	66	54
6	58	47
7	55	42
8	52	37
A-wgtd	**72**	**59**

Total Sound Power (dB)

Octave Band	Center Frequency (Hertz)	Lw
1	63	98
2	125	98
3	250	93
4	500	87
5	1000	88
6	2000	81
7	4000	77
8	8000	72
A-wgtd		**92**

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

Configuration

Model: NRB2200XF°A°J800

Code	NRB
Size	2200
Working fields	X - Electronic thermostatic valve (outlet water temperature from 39.2 °F)
Model	F - Free-Cooling
Heat recovery	° - Without heat recovery
Version	A - High efficiency
Coils	° - Aluminium (microchannel)
Fans	J - Inverter
Power supply	8 - 575V/3/60Hz with circuit breakers
Hydronic kit	00 - No

Images are for reference purposes only and may not represent exactly the configured model in this document.

Certifications

Certified in accordance with the AHRI Air-Cooled Water-Chilling Packages Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Notes

Data shown is calculated without soft-starter and/or power factor correction devices.
The pressure drops refer to the exchanger only.

Part load calculation

Load percentage [%]	Air temperature [°F]	Weight coefficients [%]	EER [Btu/W]
100	95.0	1	9.588
75	80.0	42	12.66
50	65.0	45	17.67
25	55.0	12	19.04

Selection data

Cooling

Capacity	ton	179.0
Input power	kW	154.5
Input current	A	174
EER	Btu/W	13.91
IPLV.IP	Btu/W	15.66
Dry bulb air inlet temperature	°F	60.0
Inlet water temperature	°F	53.00
Outlet water temperature	°F	41.00
Propylene glycol	%	35
Water flow rate	gpm	385.7
Pressure drops	ft H2O	33.8
Fouling factor	(h ft² °F)/Btu	0.000100

IPLV.IP calculated as per AHRI standard 550/590.
IPLV.SI calculated as per AHRI standard 551/591.

Free-Cooling

Capacity	ton	171.1
Input power	kW	24.09
Input current	A	27
EER	Btu/W	85.21
Dry bulb air inlet temperature	°F	17.0
Inlet water temperature	°F	53.00
Outlet water temperature	°F	41.48
Propylene glycol	%	35
Water flow rate	gpm	385.7
Pressure drops	ft H2O	62.2

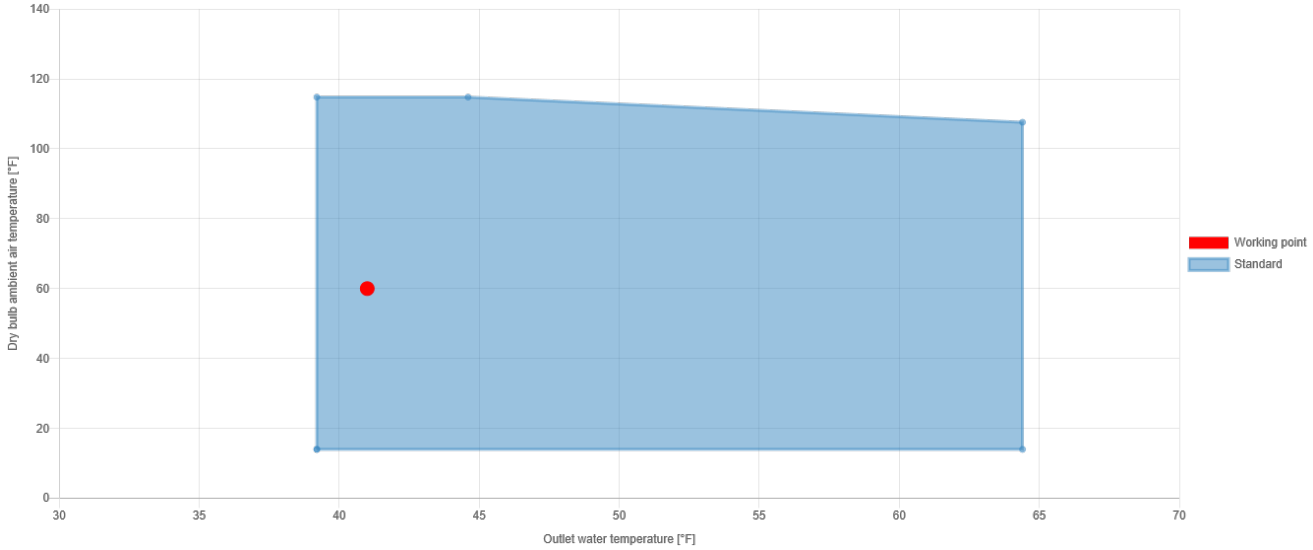
Energy analysis

At [°F]	Pf [ton]	Pm [ton]	Pa [kW]	Ef [Btu/W]
17.0	129.0	50.02	27.11	79.25
23.0	129.3	49.77	27.23	78.89
32.0	99.80	79.24	47.57	45.16
41.0	57.03	122.0	78.94	27.22
50.0	14.26	164.8	114.8	18.71
59.0	0.0000	179.0	134.3	15.99

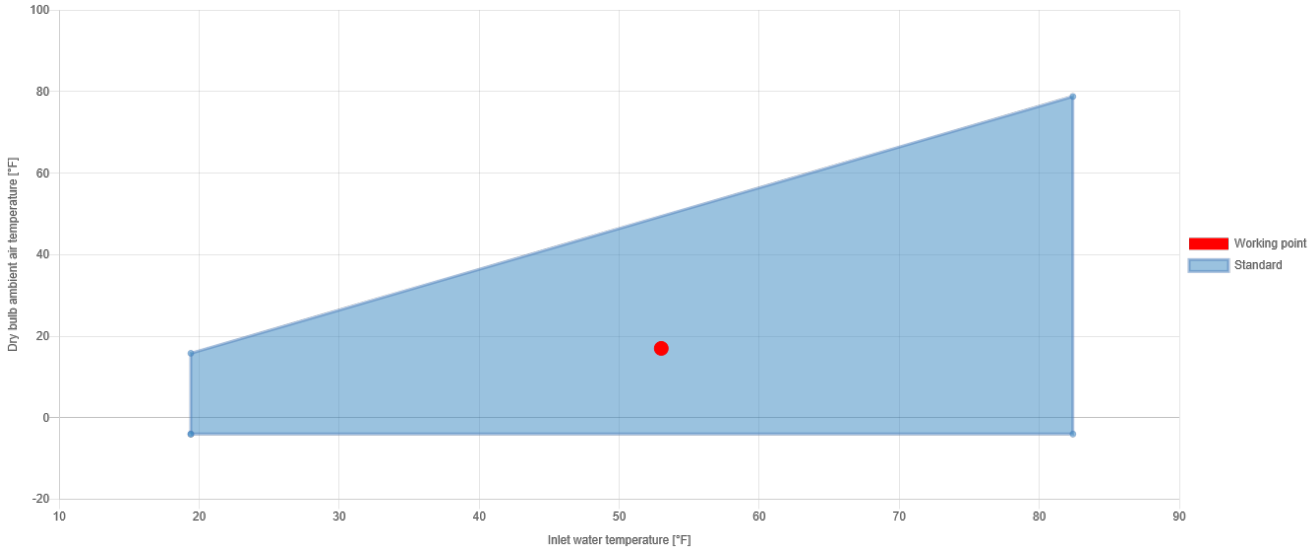
At: Dry bulb ambient air temperature; Pf: Capacity (Free-Cooling); Pm: Capacity (Cooling); Pa: Input power; Ef: EER.

Working field

Cooling



Free-Cooling



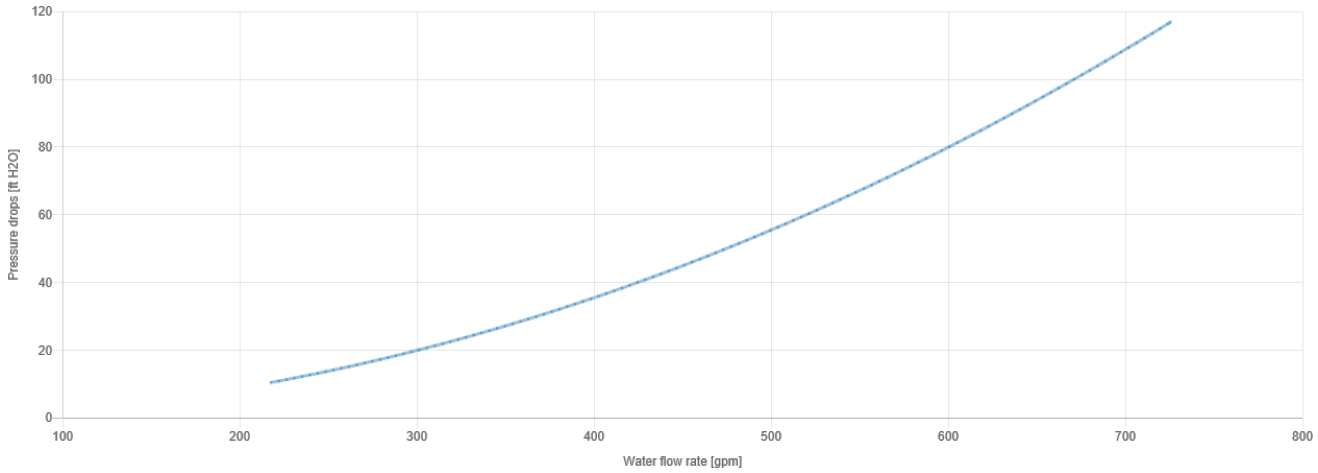
General data

Refrigerant circuit data		
Refrigerant		R410A
Driver		On-Off
Compressor type		Scroll
Number of compressors	n.	5
Number of cooling circuits	n.	2

Refrigerant gas charge	C1	lb	79.37
	C2	lb	94.8
Oil charge	C1	US gal	3
	C2	US gal	5

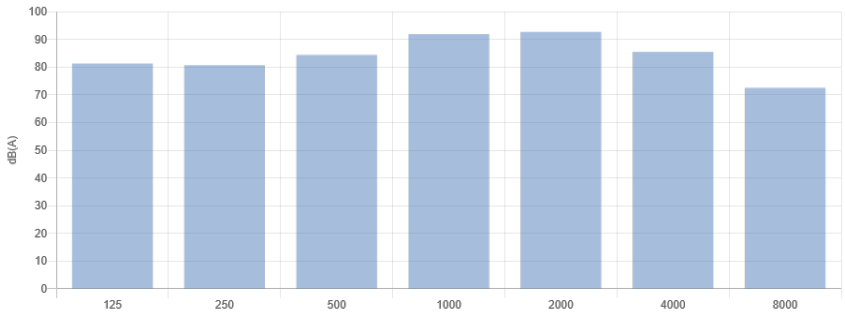
Fan group data			
Driver			Inverter modulation
Fan type			Axial
Number of fans		n.	10
Air flow rate		cfm	99,200.7

Water circuit data			
Exchanger type			Plate
Number of exchangers		n.	1
Water content		US gal	18
Connections type			Grooved joints
Water connections	inlet	Ø	3"
	outlet	Ø	3"



Sound data (nominal cooling data)		
Sound power - Lw	dB(A)	96.3
Sound pressure at 32.81 ft	dB(A)	63.8

Hz	Lw [dB]	Lw [dB(A)]
125	97.4	81.3
250	89.3	80.7
500	87.6	84.4
1000	91.9	91.9
2000	91.5	92.7
4000	84.5	85.5
8000	73.6	72.5

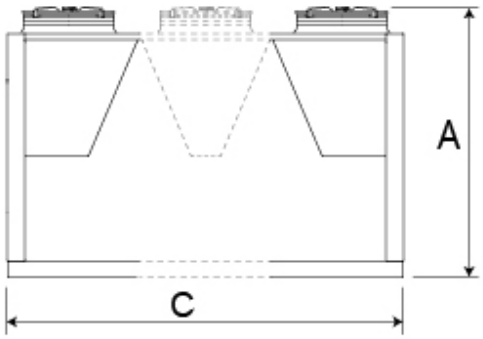


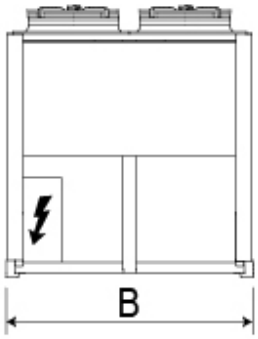
The sound levels are given at full load, without pumps (if available) and at nominal conditions (air temperature: 95.0 °F, water temperature (in/out): 54.01/44.01 °F).

Electric data		
Locked Rotor Amps (LRA)	A	600.50
Minimum Circuit Ampacity (MCA)	A	298.22
Maximum Overcurrent Protection (MOP)	A	350.08
Power supply		575V/3/60Hz with circuit breakers

Dimensions and weights		
A - Height	in	96.46
B - Width	in	86.61
C - Length	in	250

The dimensions and weight refer to the unit without packaging. For these data, consult the installation manual.





MK PLASTICS CORPORATION

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AXIJET-FSW 4025

US Patent No.5439349
CANADA Patent No.2,140,163
EUROPE Patent No.EP0713011
M.K. 2021 Version 5.2

Representative
The Master Group
.

Customer	**WSP**
Project	**University of Ottawa - AMRC**
Engineer	**WSP**
P.O. #	**N/A** **JOB #** .

Date	10/17/2023
Sys. No.	BCEF-1/2/3
	.
	.
Drawing	. A
Revision	.

FEI_T Based on
Default Motor Efficiencies ☑
Regulated Motor Efficiencies ☐

Model	**AXIJET**
Fan Size	**4025**
Dia.[in]	**40.25**
CFM	**21508**
SP	**6**
BHP	**30.22**
RPM	**1125**

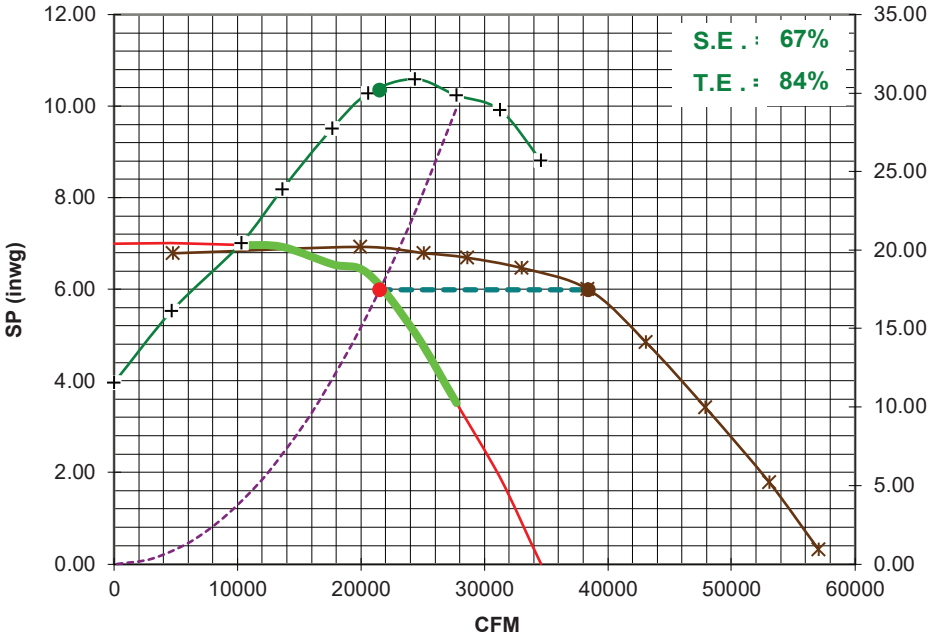
	10	[mph]
EH =	**51.5**	[feet]
PH =	**36.5**	[feet]
NV =	**4899**	[fpm]
WV =	**2351**	[fpm]
TF =	**38386**	[cfm]
TS =	**11855**	[fpm]
T =	**70**	[°F]
ALT =	**0**	[feet]

CLASS II WHEEL

Air performance

FEI_T = 1.35

TF=Total Flow; NV=Nozzle Velocity; WV=Windband Velocity; TS=Tip Speed
EH: Effective Plume Height. (Plume Height + Fan Height)
Plume Height is calculated using ASHRAE Laboratory Design Guide, Equation 9-2



Density : 0.075 lb/ft³

CFM-SP
System Curve
CFM-BHP
Total Flow-SP
15% Peak T.E.

FEG85

M.K. Plastics Corporation certifies that the models shown here in are licensed to bear the AMCA Seals. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and 311 and comply with the requirements of the AMCA Certified Ratings Program.

Performance shown is for installation type C: Ducted inlet, Free outlet. Power rating (BHP) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). Performance ratings do not include the effects of crosswinds. FEI values are calculated in accordance with AMCA 208 and are based on default motor efficiencies. FEI values for fans with specific motors will vary slightly from those shown.

Sound power level

The sound power level ratings shown are in decibels, referred to 10^{-12} Watts calculated per AMCA standard 301. Values shown are for (outlet Lwo and LwoA) sound power levels for installation type C: Ducted inlet, Free outlet. Ratings do not include the effects of duct end correction. The A-weighted sound ratings have been calculated per AMCA Standard 301.

RPM	Hz								LwA
	63	125	250	500	1000	2000	4000	8000	
1125	98	96	91	86	87	87	80	71	92

Sound pressure level variation

Values shown are calculated based on a free-field over reflecting plane conditions. (ASHRAE Fundamentals Handbook). dBA levels are not licensed by AMCA international.

Feet	1	3	5	10	15	50	100	150
dB(A)	95	85	81	75	71	61	55	51

Comments :

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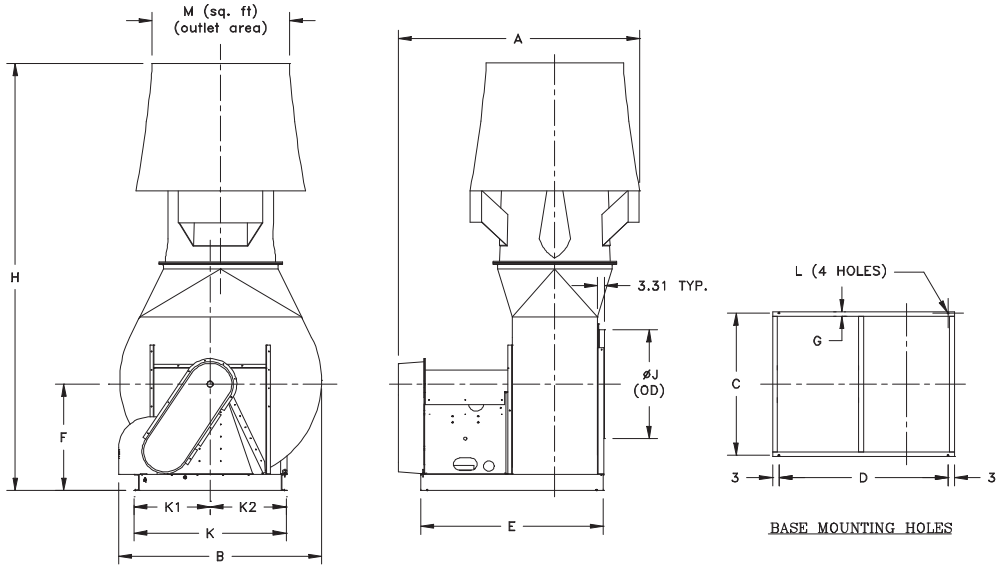
US Patent No.5439349
CANADA Patent No.2,140,163
EUROPE Patent No.EP0713011

AXIJET-FSW 4025

Technical Data

M.K. 2021 Version 5.2

Customer	**WSP**				
Project	**University of Ottawa - AMRC**				
Drawing	. B	**Engineer**	**WSP**		
Revision	.	**P.O. #**	**N/A**	**JOB #**	.



Dimensions	[in]
A	97.50
B	81.66
C	59.52
D	72.06
E	78.06
F	48.63
G	1.89
H	179.68
J	44.00
K	60.77
K1	32.64
K2	28.14
L	0.69
Stack ext.	0.00

Compact Arrangement 1 Z

Outlet Area	[sq. ft]
M	16.33

Notes: Maximum motor frame 444T

Quantity	3
Sys. No.	BCEF-1/2/3
	.
	.

Materials

Casing	FRP
Stack	FRP
Windband	FRP
Impeller	4-6 mils polyester coated steel
Stand	4-6 mils polyester coated steel
Shaft	C-1045 Carbon steel
Hardware	304 Stainless steel
Stack ext.	

Motor

Type	HIEFF
Enclosure	TEFC
HP	40.00
V/Ph/Hz	575/3/60
RPM :	1800

Weight	**[Lb]**
Fan :	**2450**
Motor :	**462**
Total :	**2912**

Accessories

- ☑ Belt drive
- ☑ Shaft seal
- ☑ Weather cover
- ☑ Access door
- ☑ 0.75 " Drain & plug
- ☐ Stack extension*
- ☑ Vibration isolators*
  - ☑ Spring
  - ☐ RIS
- ☑ Inlet plenum*
  - ☑ Single
  - ☑ Multiple
- ☑ Dampers*
  - ☑ Isolation
  - ☑ Bypass
- ☑ Damper control*
- ☑ Lifting lugs
- ☐ Sound attenuator*
- ☑ Flex. Connector
- ☑ Disconnect switch (unwired)*
- ☑ Graphite Liner
- ☐ Fan rails
- ☑ Plenum curb
- ☐ Other

Note: * Drawings required

Additional information

Revisions

No.	Description	Date	Approved by

	Released by	Checked by	Approved by
Initial			
Date			

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K-KORE Plenum 4025

Technical Data

M.K. 2021 Version 5.2

Representative

The Master Group
.

Customer	**WSP**		
Project	**University of Ottawa - AMRC**		
Engineer	**WSP**		
P.O. #	**N/A**	**JOB #**	**.**

Date 10/17/2023

Drawing . P
Revision .

Sys. No. BCEF-1/2/3
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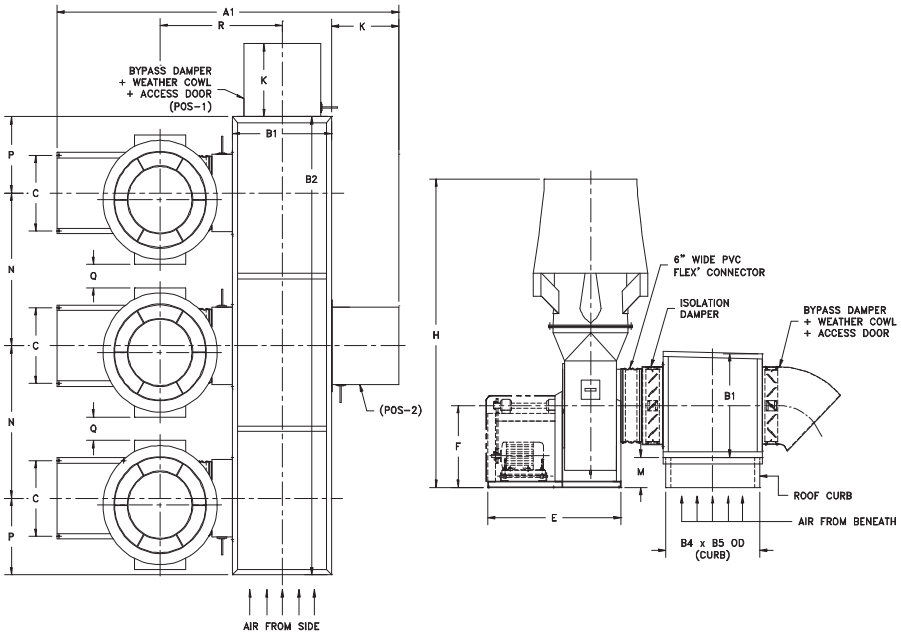

Dimensions	[in]
A1	195.83
Q	16.25
B1	57.39
B2	274.39
B4	56.00
B5	273.00
C	59.52
E	78.06
F	48.65
H	179.68
M	19.71
R	64.58
K	42.97
P	43.20
N	94.00

Plenum

Qty.	1.00
Material	K-KORE
*Weight [lb]	1898

***: Weight includes isolation and bypass dampers**

Damper

☐ Position 1

☐ Position 2

Dimensions are subject to change. Certified prints are available.

Dampers	Qty.	Operator	Weather cowl	Louver
Isolation	3	☑		
Bypass	2	☑	☑	☐

Comments :

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AXIJET-FSW 3650

US Patent No.5439349
CANADA Patent No.2,140,163
EUROPE Patent No.EP0713011
M.K. 2021 Version 5.2

Representative
The Master Group
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Customer	**WSP**
Project	**University of Ottawa - AMRC**
Engineer	**WSP**
P.O. #	**N/A** **JOB #** .

Date 10/17/1023

Sys. No. CWEF-1 & 2
.
.

Drawing . A
Revision .

FEI_T **Based on**
Default Motor Efficiencies ☑
Regulated Motor Efficiencies ☐

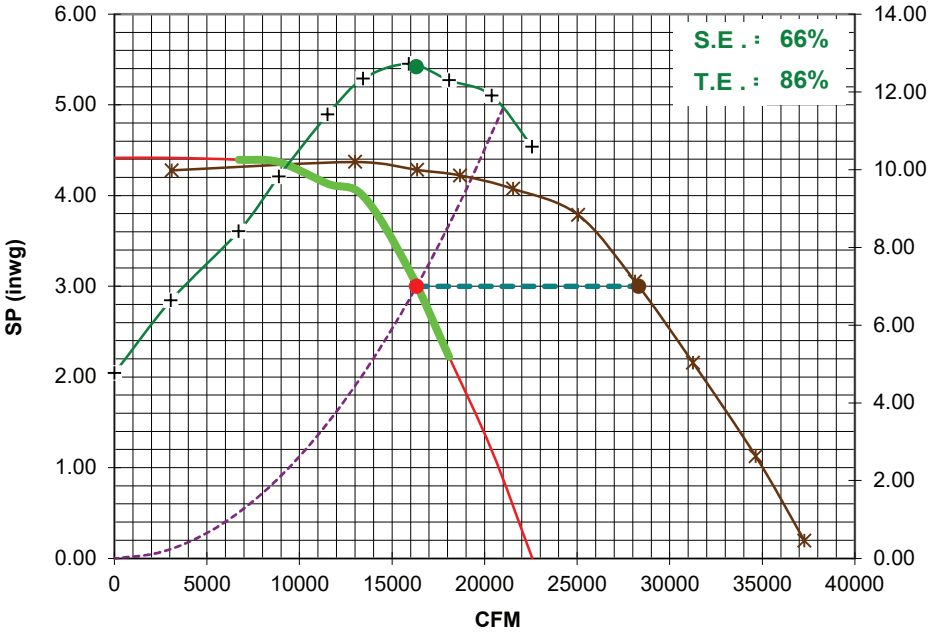
Model	**AXIJET**
Fan Size	**3650**
Dia.[in]	**36.50**
CFM	**16316**
SP	**3**
BHP	**12.64**
RPM	**985**

	10	[mph]
EH =	**43.0**	[feet]
PH =	**29.7**	[feet]
NV =	**4520**	[fpm]
WV =	**2105**	[fpm]
TF =	**28307**	[cfm]
TS =	**9412**	[fpm]
T =	**70**	[°F]
ALT =	**0**	[feet]

CLASS II WHEEL

Air performance FEI_T = 1.45

TF=Total Flow; NV=Nozzle Velocity; WV=Windband Velocity; TS=Tip Speed
EH: Effective Plume Height. (Plume Height + Fan Height)
Plume Height is calculated using ASHRAE Laboratory Design Guide, Equation 9-2



Density : 0.075 lb/ft³

CFM-SP
System Curve
CFM-BHP
Total Flow-SP
15% Peak T.E.

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RPM	Hz								LwA
	63	125	250	500	1000	2000	4000	8000	
985	89	89	83	80	81	80	72	62	86

Sound pressure level variation

Values shown are calculated based on a free-field over reflecting plane conditions. (ASHRAE Fundamentals Handbook). dBA levels are not licensed by AMCA international.

Feet	1	3	5	10	15	50	100	150
dB(A)	88	79	74	68	65	54	48	45

Comments :

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Technical Data

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CANADA Patent No.2,140,163
EUROPE Patent No.EP0713011

M.K. 2021 Version 5.2

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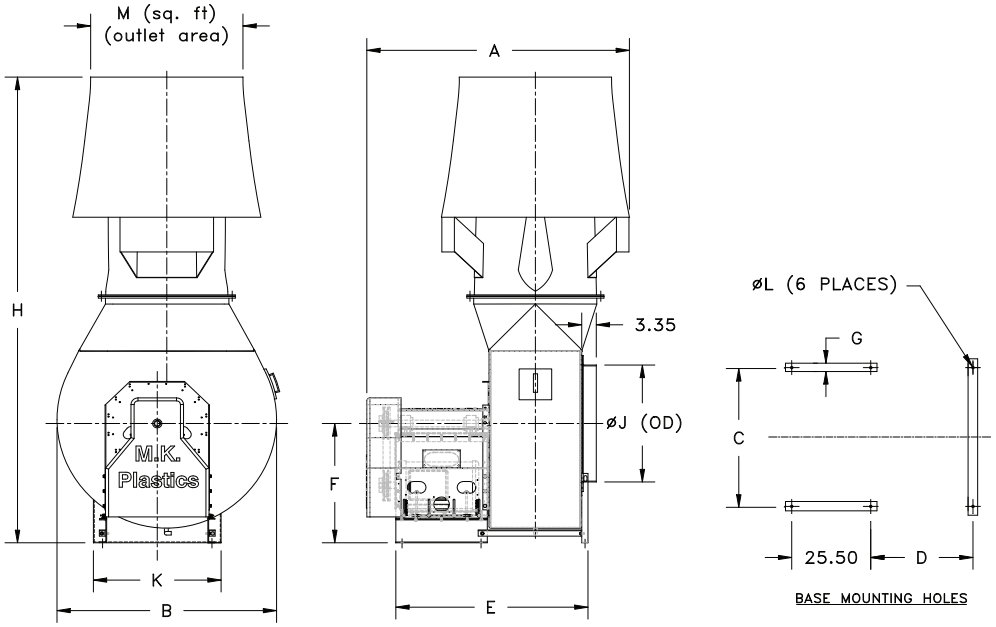
Project	**University of Ottawa - AMRC**		
Engineer	**WSP**		
P.O. #	**N/A**	**JOB #**	**.**

Drawing	.	B
Revision	.	



Arrangement 10

Dimensions	[in]
A	84.88
B	70.50
C	34.75
D	33.50
E	59.00
F	40.40
G	2.34
H	159.38
J	40.00
K	41.00
L	0.63
Stack ext.	0.00

Outlet Area	[sq. ft]
M	13.45

Quantity	**2**
Sys. No.	CWEF-1 & 2
	.
	.

Materials

Casing	FRP
Stack	FRP
Windband	FRP
Impeller	4-6 mils polyester coated steel
Stand	4-6 mils polyester coated steel
Shaft	C-1045 Carbon steel
Hardware	304 Stainless steel
Stack ext.	

Motor

Type	HIEFF
Enclosure	TEFC
HP	15.00
V/Ph/Hz	575/3/60
RPM :	1800

Weight	**[Lb]**
Fan :	**1675**
Motor :	**266**
Total :	**1941**

Notes: Maximum motor frame 326T

Accessories

- ☑ Belt drive
- ☑ Shaft seal
- ☑ Weather cover
- ☑ Access door
- ☑ 0.75 " Drain & plug
- ☐ Stack extension*
- ☑ Vibration isolators*
  - ☑ Spring
  - ☐ RIS
- ☑ Inlet plenum*
  - ☐ Single
  - ☑ Multiple
- ☑ Dampers*
  - ☑ Isolation
  - ☑ Bypass
- ☑ Damper control*
- ☑ Lifting lugs
- ☐ Sound attenuator*
- ☑ Flex. Connector
- ☑ Disconnect switch (unwired)*
- ☑ Graphite Liner
- ☐ Fan rails
- ☑ Plenum curb
- ☐ Other

Note: * Drawings required

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Representative

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Project	**University of Ottawa - AMRC**		
Engineer	**WSP**		
P.O. #	**N/A**	**JOB #**	**.**

Date	10/17/1023	
Drawing	.	P
Revision	.	

Sys. No.	CWEF-1 & 2
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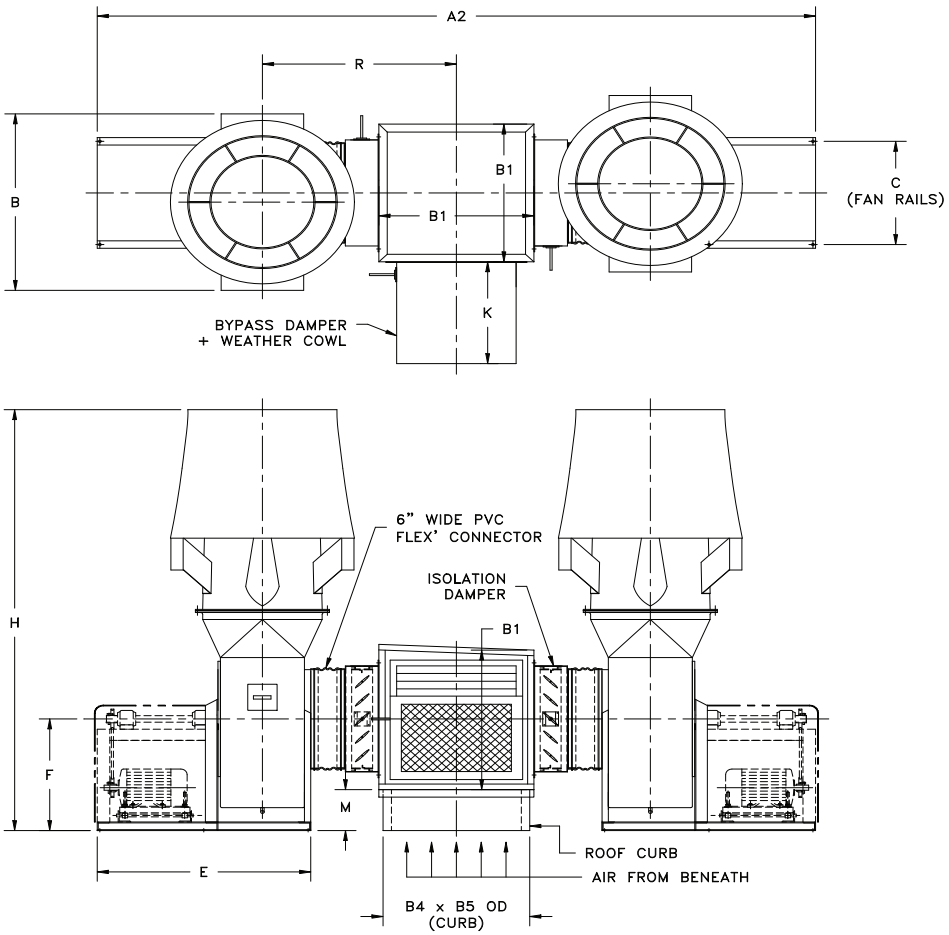

Dimensions	[in]
A2	226.28
B	70.50
B1	53.39
B4	52.00
B5	52.00
C	34.75
E	59.00
F	40.40
H	159.38
M	13.46
R	60.96
K	40.13

Plenum

Qty.	1.00
Material	K-KORE
*Weight [lb]	705

***: Weight includes isolation and bypass dampers**

Dimensions are subject to change. Certified prints are available.

Note : One fan in operation and one standby.

Dampers	Qty.	Operator	Weather cowl	Louver
Isolation	2	☑		
Bypass	1	☑	☑	☐

Comments :

MK PLASTICS CORPORATION
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AXIJET-FSW 4025

US Patent No.5439349
CANADA Patent No.2,140,163
EUROPE Patent No.EP0713011
M.K. 2021 Version 5.2

Representative
The Master Group
.

Customer	WSP
Project	University of Ottawa - AMRC
Engineer	WSP
P.O. #	N/A
JOB #	.

Date	10/17/2023
Sys. No.	LEF-1-1-1/2/3
	.
	.
Drawing	. A
Revision	.

FEI_T Based on
Default Motor Efficiencies ☑
Regulated Motor Efficiencies ☐

Model	AXIJET
Fan Size	4025
Dia.[in]	40.25
CFM	21084
SP	6
BHP	29.29
RPM	1114

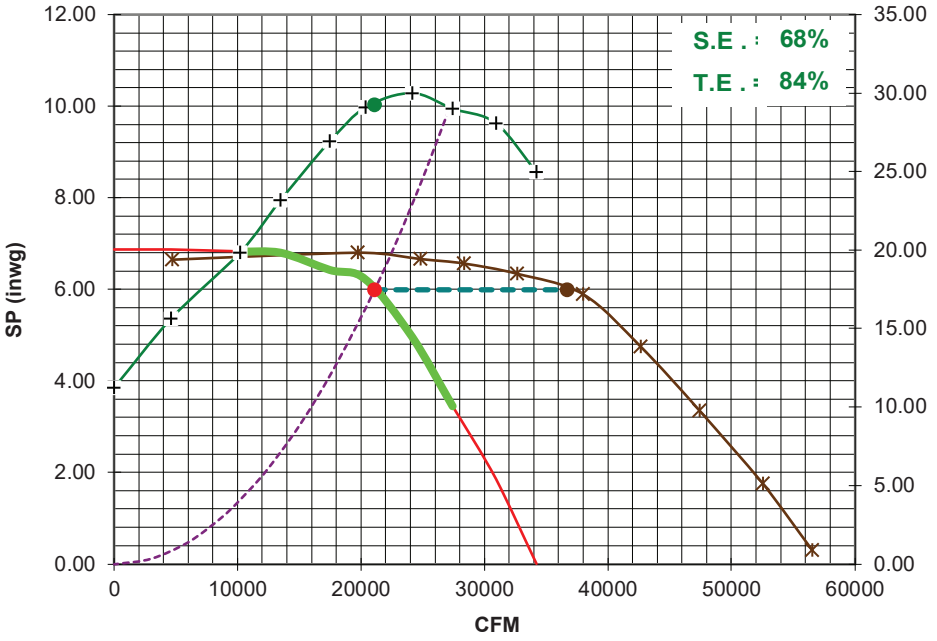
	10	[mph]
EH =	49.9	[feet]
PH =	34.9	[feet]
NV =	4803	[fpm]
WV =	2247	[fpm]
TF =	36688	[cfm]
TS =	11739	[fpm]
T =	70	[°F]
ALT =	0	[feet]

CLASS II WHEEL

Air performance

FEI_T = 1.36

TF=Total Flow; NV=Nozzle Velocity; WV=Windband Velocity; TS=Tip Speed
EH: Effective Plume Height. (Plume Height + Fan Height)
Plume Height is calculated using ASHRAE Laboratory Design Guide, Equation 9-2



Density : 0.075 lb/ft³

CFM-SP
System Curve
CFM-BHP
Total Flow-SP
15% Peak T.E.

FEG85

M.K. Plastics Corporation certifies that the models shown here in are licensed to bear the AMCA Seals. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and 311 and comply with the requirements of the AMCA Certified Ratings Program.

Performance shown is for installation type C: Ducted inlet, Free outlet. Power rating (BHP) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). Performance ratings do not include the effects of crosswinds. FEI values are calculated in accordance with AMCA 208 and are based on default motor efficiencies. FEI values for fans with specific motors will vary slightly from those shown.

Sound power level

The sound power level ratings shown are in decibels, referred to 10^{-12} Watts calculated per AMCA standard 301. Values shown are for (outlet Lwo and LwoA) sound power levels for installation type C: Ducted inlet, Free outlet. Ratings do not include the effects of duct end correction. The A-weighted sound ratings have been calculated per AMCA Standard 301.

RPM	Hz								LwA
	63	125	250	500	1000	2000	4000	8000	
1114	98	96	90	86	87	86	80	70	92

Sound pressure level variation

Values shown are calculated based on a free-field over reflecting plane conditions. (ASHRAE Fundamentals Handbook). dBA levels are not licensed by AMCA international.

Feet	1	3	5	10	15	50	100	150
dB(A)	95	85	81	75	71	61	55	51

Comments :

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URL www.mkplastics.com

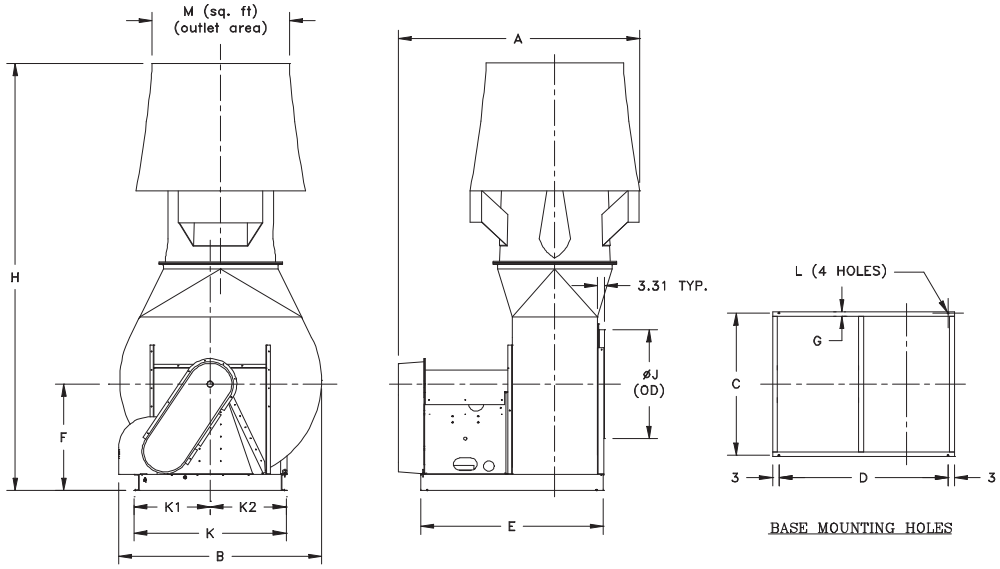
US Patent No.5439349
CANADA Patent No.2,140,163
EUROPE Patent No.EP0713011

AXIJET-FSW 4025

Technical Data

M.K. 2021 Version 5.2

Customer	**WSP**				
Project	**University of Ottawa - AMRC**				
Drawing	.	B	**Engineer**	**WSP**	
Revision	.		**P.O. #**	**N/A**	**JOB #** .



Dimensions	[in]
A	97.50
B	81.66
C	59.52
D	72.06
E	78.06
F	48.63
G	1.89
H	179.68
J	44.00
K	60.77
K1	32.64
K2	28.14
L	0.69
Stack ext.	0.00

Compact Arrangement 1 Z

Outlet Area	[sq. ft]
M	16.33

Notes: Maximum motor frame 444T

Quantity	3
Sys. No.	LEF-1-1-1/2/3
	.
	.

Materials

Casing	FRP
Stack	FRP
Windband	FRP
Impeller	4-6 mils polyester coated steel
Stand	4-6 mils polyester coated steel
Shaft	C-1045 Carbon steel
Hardware	304 Stainless steel
Stack ext.	

Motor

Type	HIEFF
Enclosure	TEFC
HP	40.00
V/Ph/Hz	575/3/60
RPM :	1800

Weight	**[Lb]**
Fan :	**2450**
Motor :	**462**
Total :	**2912**

Accessories

- ☑ Belt drive
- ☑ Shaft seal
- ☑ Weather cover
- ☑ Access door
- ☑ 0.75 " Drain & plug
- ☐ Stack extension*
- ☑ Vibration isolators*
  - ☑ Spring
  - ☐ RIS
- ☑ Inlet plenum*
  - ☑ Single
  - ☑ Multiple
- ☑ Dampers*
  - ☑ Isolation
  - ☑ Bypass
- ☑ Damper control*
- ☑ Lifting lugs
- ☐ Sound attenuator*
- ☑ Flex. Connector
- ☑ Disconnect switch (unwired)*
- ☑ Graphite Liner
- ☐ Fan rails
- ☑ Plenum curb
- ☐ Other

Note: * Drawings required

Additional information

Revisions

No.	Description	Date	Approved by

	Released by	Checked by	Approved by
Initial			
Date			

MK PLASTICS CORPORATION

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URL www.mkplastics.com

K-KORE Plenum 4025

Technical Data

M.K. 2021 Version 5.2

Representative

The Master Group
.

Customer	**WSP**		
Project	**University of Ottawa - AMRC**		
Engineer	**WSP**		
P.O. #	**N/A**	**JOB #**	.

Date 10/18/2023

Sys. No. LEF-1-1-1/2/3
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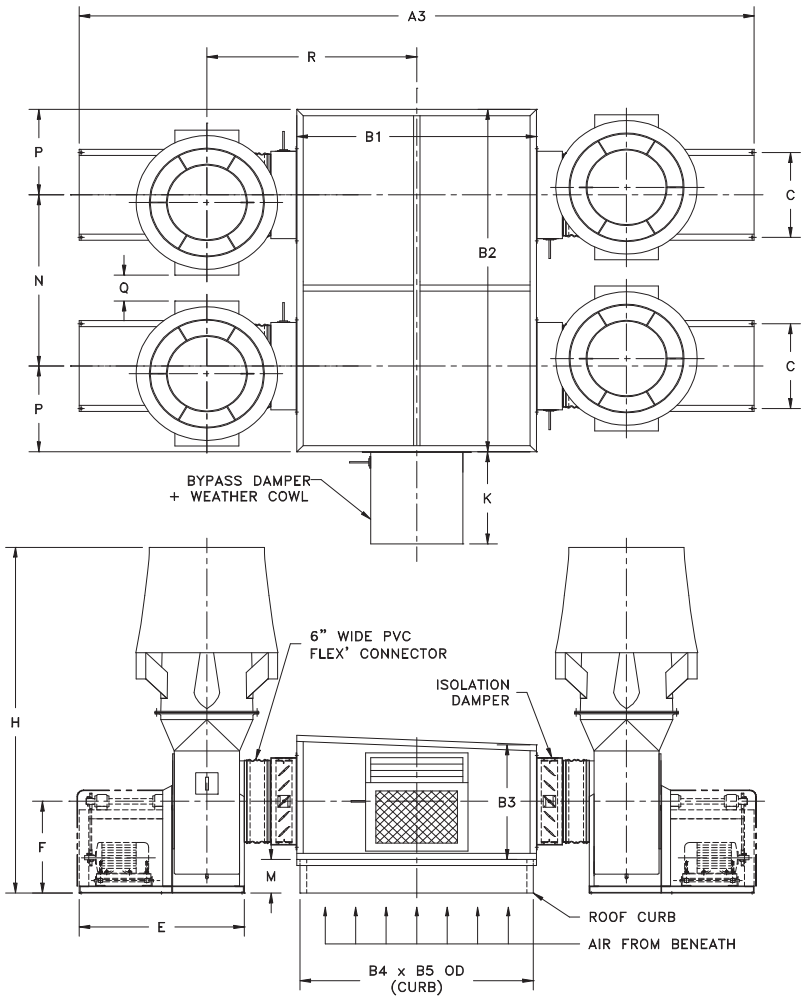
Drawing . P
Revision .



Dimensions	[in]
A3	305.72
Q	16.25
B1	114.39
B2	180.39
B3	57.39
B4	113.00
B5	179.00
C	59.52
E	78.06
F	48.65
H	179.68
M	19.71
R	93.27
K	42.97
P	43.20
N	94.00

Plenum

Qty.	1.00
Material	K-KORE
*Weight [lb]	2574

***: Weight includes isolation and bypass dampers**

Dimensions are subject to change. Certified prints are available.

Dampers	Qty.	Operator	Weather cowl	Louver
Isolation	4	☑		
Bypass	1	☑	☑	☐

Comments :

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URL www.mkplastics.com

AXIJET-FSW 3650

US Patent No.5439349
CANADA Patent No.2,140,163
EUROPE Patent No.EP0713011
M.K. 2021 Version 5.2

Customer	WSP
Project	University of Ottawa - AMRC
Engineer	WSP
P.O. #	N/A
JOB #	.

Representative
The Master Group
.

Date 10/17/2023

Sys. No. LEF-2-1-1/2/3/4
.
.

Drawing . A
Revision .

FEI_T Based on
Default Motor Efficiencies ☑
Regulated Motor Efficiencies ☐

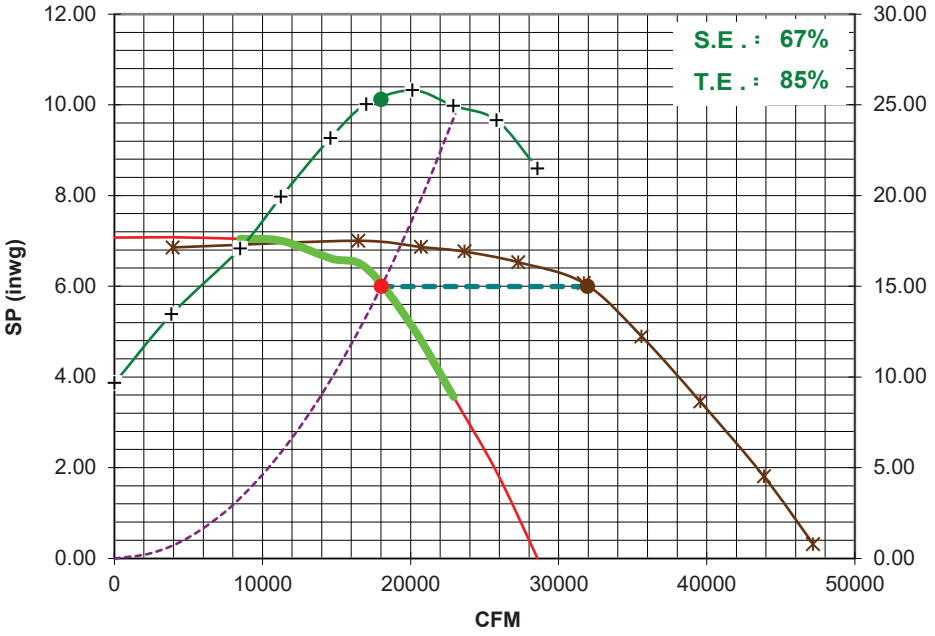
Model	AXIJET
Fan Size	3650
Dia.[in]	36.50
CFM	18012
SP	6
BHP	25.29
RPM	1247

	10	[mph]
EH =	46.8	[feet]
PH =	33.5	[feet]
NV =	4989	[fpm]
WV =	2374	[fpm]
TF =	31936	[cfm]
TS =	11916	[fpm]
T =	70	[°F]
ALT =	0	[feet]

CLASS II WHEEL

Air performance FEI_T = 1.36

TF=Total Flow; NV=Nozzle Velocity; WV=Windband Velocity; TS=Tip Speed
EH: Effective Plume Height. (Plume Height + Fan Height)
Plume Height is calculated using ASHRAE Laboratory Design Guide, Equation 9-2



Density : 0.075 lb/ft³

CFM-SP
System Curve
CFM-BHP
Total Flow-SP
15% Peak T.E.

Performance shown is for installation type C: Ducted inlet, Free outlet. Power rating (BHP) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). Performance ratings do not include the effects of crosswinds. FEI values are calculated in accordance with AMCA 208 and are based on default motor efficiencies. FEI values for fans with specific motors will vary slightly from those shown.

FEG85

M.K. Plastics Corporation certifies that the models shown here in are licensed to bear the AMCA Seals. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and 311 and comply with the requirements of the AMCA Certified Ratings

Sound power level

The sound power level ratings shown are in decibels, referred to 10^{-12} Watts calculated per AMCA standard 301. Values shown are for (outlet Lwo and LwoA) sound power levels for installation type C: Ducted inlet, Free outlet. Ratings do not include the effects of duct end correction. The A-weighted sound ratings have been calculated per AMCA Standard 301.

RPM	Hz								LwA
	63	125	250	500	1000	2000	4000	8000	
1247	97	96	92	86	86	86	80	71	92

Sound pressure level variation

Values shown are calculated based on a free-field over reflecting plane conditions. (ASHRAE Fundamentals Handbook). dBA levels are not licensed by AMCA international.

Feet	1	3	5	10	15	50	100	150
dB(A)	95	85	81	75	71	61	55	51

Comments :

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URL www.mkplastics.com

AXIJET-FSW 3650

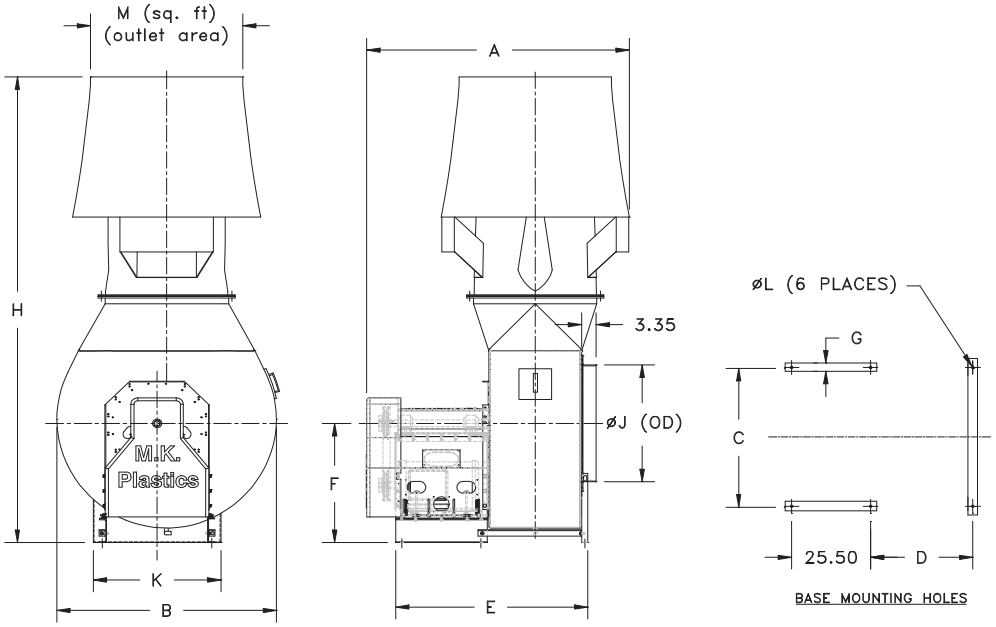
Technical Data

US Patent No.5439349
CANADA Patent No.2,140,163
EUROPE Patent No.EP0713011

M.K. 2021 Version 5.2

Customer	**WSP**		
Project	**University of Ottawa - AMRC**		
Engineer	**WSP**		
P.O. #	**N/A**	**JOB #**	**.**

Drawing	.	B
Revision	.	



Arrangement 10

Dimensions	[in]
A	84.88
B	70.50
C	34.75
D	33.50
E	59.00
F	40.40
G	2.34
H	159.38
J	40.00
K	41.00
L	0.63
Stack ext.	0.00

Outlet Area	[sq. ft]
M	13.45

Quantity	**4**
Sys. No.	LEF-2-1-1/2/3/4
	.
	.

Materials	
Casing	FRP
Stack	FRP
Windband	FRP
Impeller	4-6 mils polyester coated steel
Stand	4-6 mils polyester coated steel
Shaft	C-1045 Carbon steel
Hardware	304 Stainless steel
Stack ext.	
Motor	
Type	HIEFF
Enclosure	TEFC
HP	30.00
V/Ph/Hz	575/3/60
RPM :	1800

Weight	**[Lb]**
Fan :	**1675**
Motor :	**422**
Total :	**2097**

Notes: Maximum motor frame 326T

Accessories

- ☑ Belt drive
- ☑ Shaft seal
- ☑ Weather cover
- ☑ Access door
- ☑ 0.75 " Drain & plug
- ☐ Stack extension*
- ☑ Vibration isolators*
  - ☑ Spring
  - ☐ RIS
- ☑ Inlet plenum*
  - ☐ Single
  - ☑ Multiple
- ☑ Dampers*
  - ☑ Isolation
  - ☑ Bypass
- ☑ Damper control*
- ☑ Lifting lugs
- ☐ Sound attenuator*
- ☑ Flex. Connector
- ☑ Disconnect switch (unwired)*
- ☑ Graphite Liner
- ☐ Fan rails
- ☑ Plenum curb
- ☐ Other

Note: * Drawings required

Additional information

Revisions

No.	Description	Date	Approved by

	Released by	Checked by	Approved by
Initial			
Date			

MK PLASTICS CORPORATION

CANADA Tel. 514 871 9999 / Fax 514 871 1753
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SWITZERLAND Tel./ Fax 4133 654 9763
URL www.mkplastics.com

Steel Plenum 3650

Technical Data

M.K. 2021 Version 5.2

Representative

The Master Group
.

Customer	**WSP**		
Project	**University of Ottawa - AMRC**		
Engineer	**WSP**		
P.O. #	**N/A**	**JOB #**	**.**

Date 10/17/2023

Sys. No. LEF-2-1-1/2/3/4
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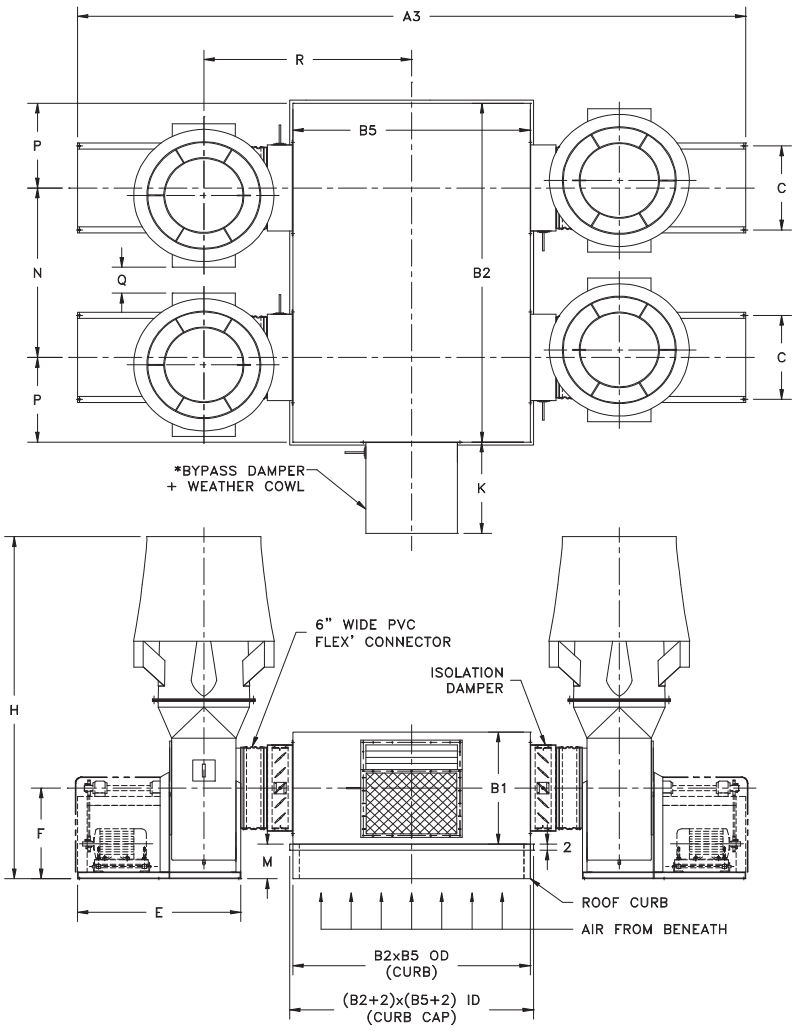
Drawing . P
Revision .



Dimensions	[in]
A3	237.89
B1	47.50
B2	160.00
B5	104.00
C	34.75
E	59.00
F	40.40
H	159.38
M	16.65
N	80.00
P	40.00
Q	17.75
R	86.62
K	40.13

Plenum

Qty.	1.00
Material	11 Ga. Steel
Coating	Polyester
*Weight [lb]	2627

***: Weight includes isolation and bypass dampers**

Dimensions are subject to change. Certified prints are available.

Dampers	Qty.	Operator	Weather cowl	Louver
Isolation	4	☑		
Bypass	1	☑	☑	☐

Comments :