

November 27, 2023

Cory Smith, C.Tech.
Director of Roads and Public Works
Municipality of Mississippi Mills

Re: Wastewater Treatment – Blower replacements

Dear Cory,

I trust this letter finds you well. I am writing to provide you with the latest developments regarding the ongoing challenges faced by the Mississippi Mills Wastewater Treatment plant (MMWWT) concerning the resiliency of the blower system performance.

Background

Since commissioning in 2012, the MMWWT has consistently faced challenges with the Turbo Blower system. The blower system, consisting of the now obsolete "K-Turbo" brand, comprises of three blowers arranged in a Lead/Lag/Standby configuration. These blowers play a crucial role in supplying air for the aeration process, which is vital for the efficient treatment of wastewater.

Early in its life cycle, the system required repairs, prompting a visit from a K-Turbo representative from Korea. Unfortunately, this visit marked the last instance of obtaining official Original Equipment Manufacturer (OEM) support. Despite subsequent efforts to address issues, including attempts to have the control boards repaired by an electronics repair shop, initial successes were short-lived, with recurring failures.

Recently, we managed to engage a K-Turbo expert from the US who demonstrated more success than previous attempts. However, challenges have arisen in sourcing essential parts, forcing us to resort to extracting components from the standby unit to facilitate repairs on the lead unit. This situation has led us to the realization that the only viable way forward is to replace these units entirely.

Actions taken

To tackle these challenges, the Ontario Clean Water Agency (OCWA) implemented several measures, initiating a comprehensive facility process and technology review. Collaborating with EVB Engineering, OCWA conducted an in-depth assessment to assure appropriate sizing of the new blowers for both present and future requirements. This effort culminated in the creation of the Technical Memo titled "Aeration Blower Replacement Design Criteria."

Following this, an examination of various blower technologies was undertaken, and the results were consolidated in the Technical Memo titled "Aeration Blower Replacement Options Review." From this Technical memo OCWA was able to put forth a recommendation to resolve the current blower issue.

Recommendation

Based on the summarized design criteria and the options review OCWA is recommending proceeding with APG Neuros.

Design Capacity

- The unit specified is NX 150S-C070 and has been confirmed to meet both current and future needs.

Application

- APG Neuros has a significant turndown ratio (60%) which is well suited for this application.

Vendor reputation

- APG Neuros is the predominant blower used across the province in OCWA facilities.

Maintenance Support

- APG Neuros has proven to be reliable and responsive to service needs. OEM service support and parts are based out of Ottawa.

Cost

- APG Neuros are not the most inexpensive model, however it is OCWA's opinion that they deliver the most value for money.

Schedule

- Due to the urgency of the situation this aspect is key. APG Neuros has indicated a 20-week delivery time, which aligns with some of the other options. That notwithstanding OCWA has a standing agreement with APG Neuros to allow sole source preselection procurement which will save 6-8 weeks.

Regarding the other vendors reviewed, AERZEN and ATLAS-COPCO, both utilize design aspects that are suboptimal for this facility, both in terms of application and efficiency. The purpose of this review was to explore alternative technologies to ensure that we were not overlooking modern advancements. While it is acknowledged that TURBOWIN is less costly and employs similar design aspects to the APG NEUROS, OCWA recommends the APG NEUROS for the reasons mentioned above.

Next steps

1. APG Neuros Proposal

OCWA has a standing agreement with APG Neuros, offering substantial cost savings to our clients and enabling sole-source procurement. Due to the urgency of the situation, we recommend moving forward with this recommendation. APG Neuros has conveyed their ability to commence the assembly of the units promptly and expresses confidence in delivering earlier than the estimated 20 weeks. The complete APG Neuros proposal is attached for reference.

2. Installation

The installation will necessitate custom modifications, particularly concerning the new piping transition spool pieces. Additionally, there will be a new electrical feed system (as outlined in the APG Neuros proposal), necessitating the involvement of an electrician. Services for the monitoring and controls system will also be required. Given the urgency of the situation, we request your approval to proceed with the proposal, initiating the delivery period, while concurrently working on a formal price proposal for the installation and commissioning. Preliminary estimates suggest installation costs within the range of \$40,000.

Project Proposal Summary

Scope

OCWA will oversee a comprehensive turnkey project to replace the current three K-Turbo blowers with APG Neuros units at the MMWWTF. The project will encompass all aspects, including the procurement of the new units, installation (involving custom retrofitting to existing piping), electrical work, controls, and commissioning.

Budget

Item	Cost
APG Neuros Proposal	410,250
Mechanical Installation*	40,000
Controls integration	5,000
<hr/>	
Project Subtotal	455,250
OCWA contract fee	25,763
OCWA Labour 20 hours	1,300
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Total Project (+hst)	482,313

*Mechanical installation is a budgetary estimate

Schedule

As mentioned, due to the urgency we are recommending approval of the blowers to start their assembly and expedite delivery. Using the conservative delivery window of 20 weeks after PO submittal the schedule outline will be:

ID	Task	Start Date	End Date	Duration Days
1	Proposal review and approval	Nov 29, 2023	Dec 06, 2023	6
2	PO submittal and acceptance	Dec 06, 2023	Dec 06, 2023	1
3	Assembly and delivery of blowers	Dec 06, 2023	Jun 18, 2024	140*
4	Award installation contracts	Jan 10, 2024	Jan 10, 2024	1
5	Blower Delivery/Installation start	Jun 17, 2024	Jul 04, 2024	14
6	Commissioning	Jul 01, 2024	Jul 16, 2024	12
7	Project close out	Jul 15, 2024	Jul 22, 2024	6

*APG Neuros has indicated they will likely be earlier than this date

We look forward to discussing this proposal in detail soon.

Sincerely:



Robert LeBlanc
Senior Operations Manager-Capital Projects
Ontario Clean Water Agency



PROJECT: Mississippi Mills WWTP
DATE: October 19, 2023
TO: Austin Mitchell, Sr. Operations Manager – Mississippi Cluster
 Robert Leblanc, Sr. Operations Manager - Capital Projects
FROM: Jamie Baker (EVB)
RE: Aeration Blower Replacement Design Criteria

1 INTRODUCTION

1.1 BACKGROUND

1.1.1 AERATION SYSTEM DESIGN BASIS

Table 1-1: Original Design Data

Parameter	Values	
Raw Sewage		
Average Daily Flow	4,700 m ³ /d	
Peak Daily Flow	14,100 m ³ /d	
Inf. BOD ₅	105 mg/L	494 kg/d
Inf. TKN	25 mg/L	118 kg/d
Septage Receiving		
Average Flow	35 m ³ /d	
BOD ₅	7,000 mg/L	245 kg/d
NH ₃ -N	150 mg/L	5.25 kg/d
Aeration System		
	Extended Aeration Facility	2 Tanks
Dimensions per tank	16.5 m x 33 m	
SWD	4.6 m	
Volume per tank	2,505 m ³	
Aeration Tank Mixing Air Required (fine bubble)	332 L/s per tank	0.61 L/(m ² ·s) MECP
Channel Mixing		
	2 x (16.5 x 1) @ (1.7m SWD)	
	2 x (7.5 x 1) @ (2.0m SWD)	
Air Required (fine bubble)	30 L/s	

Table 1-2: Aeration System Requirements

Demands	Air Flow
Extended Aeration (Process Requirements)	
Tank R-550	972.2 L/s
Tank R-560	972.2 L/s
Aerobic Digester	
Reactor R-810	61.4 L/s
Reactor R-820	61.4 L/s
Reactor R-910	91.9 L/s
Vortex Grit Air Lift	31 L/s
Channel Aeration	30 L/s
Total	2220 L/s (Peak) [8,000 Sm ³ /hr/ 133 m ³ /min]

Note: Discharge pressure is 48.75 kPa (7.1 psi(g)) at a site elevation of 132m ASL.

1.1.2 CURRENT AERATION BLOWERS

The existing aeration blowers consist of the following:

- KTurbo Model: TB150-0.85/1/V21
- 3 Units each with a Capacity of 80 m³/min at 11.6 psi(g)
- Arrangement: Lead/Lag/Standby

Currently the KTurbo Blowers are each sized for approximately 60% of the total peak demand, resulting in the peak design demand being met with two blowers turned down to approximately 80%. However, we understand that the system is currently over aerating the main process vessels to achieve the MECP mixing requirements.

The original units were placed in service in 2012, since that time OCWA has observed numerous electrical failures to the point where they are no longer able to secure replacement parts for the units.

2 OPERATIONS DATA

As a check of the 2009 design data, a review of the operational influent data for the period of 2021 to 2023 has been included. The loading data are calculated based on the average of the weekly grab samples collected each month, multiplied by the average daily flow recorded each month.

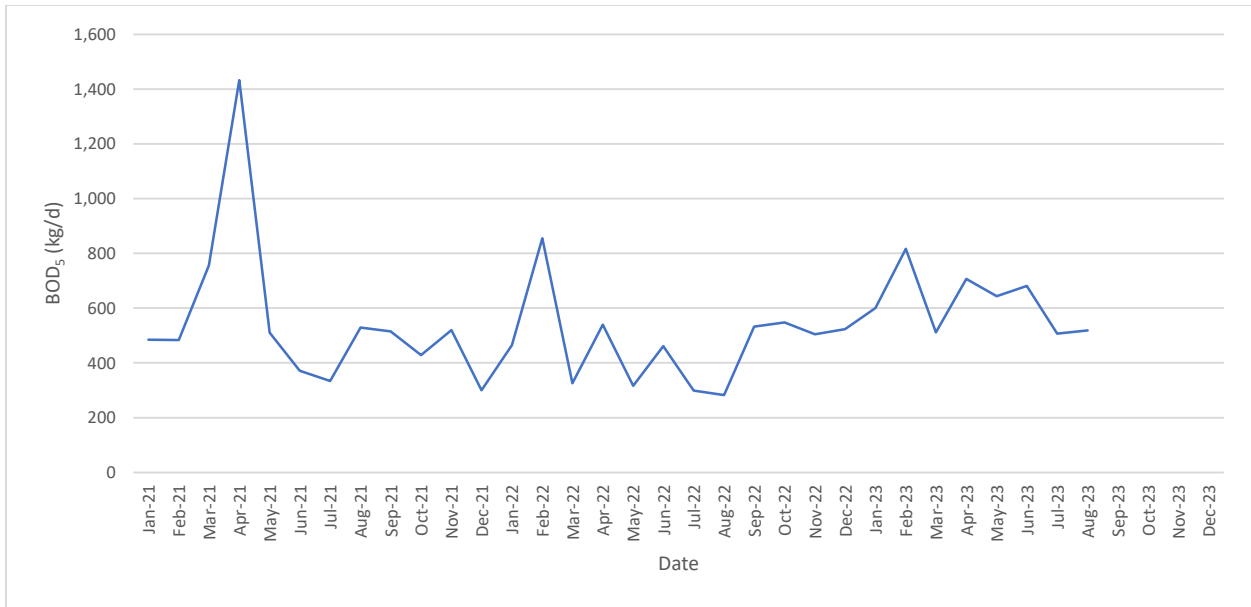


Figure 2-1: Average Weekly BOD₅ Loadings

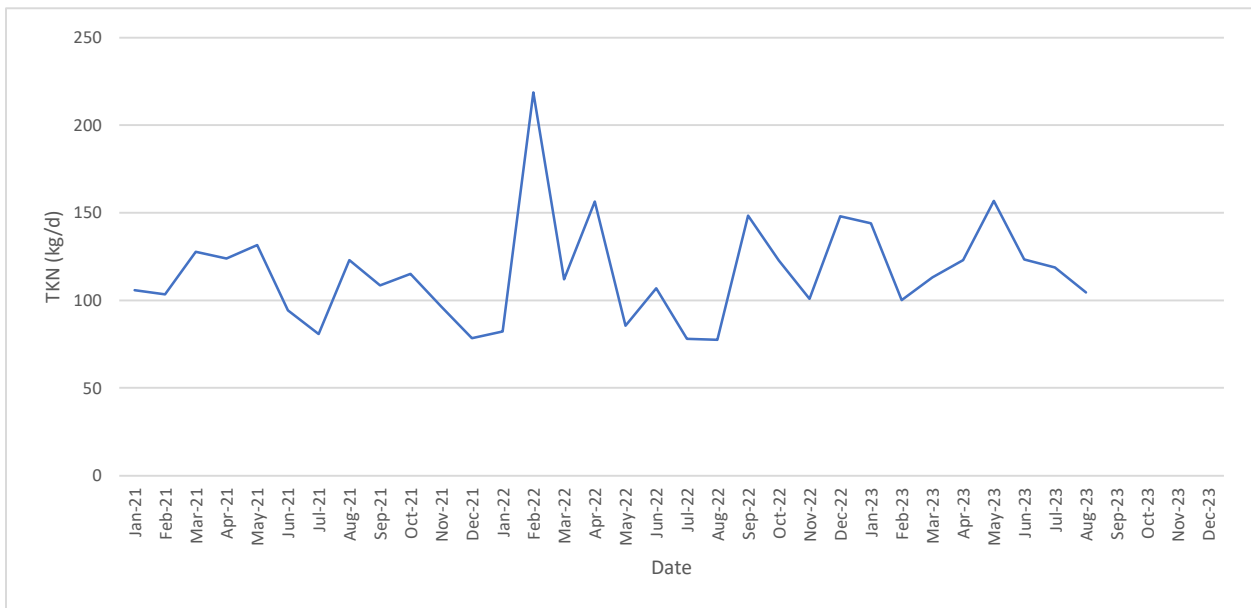


Figure 2-2: Average Weekly TKN Loadings

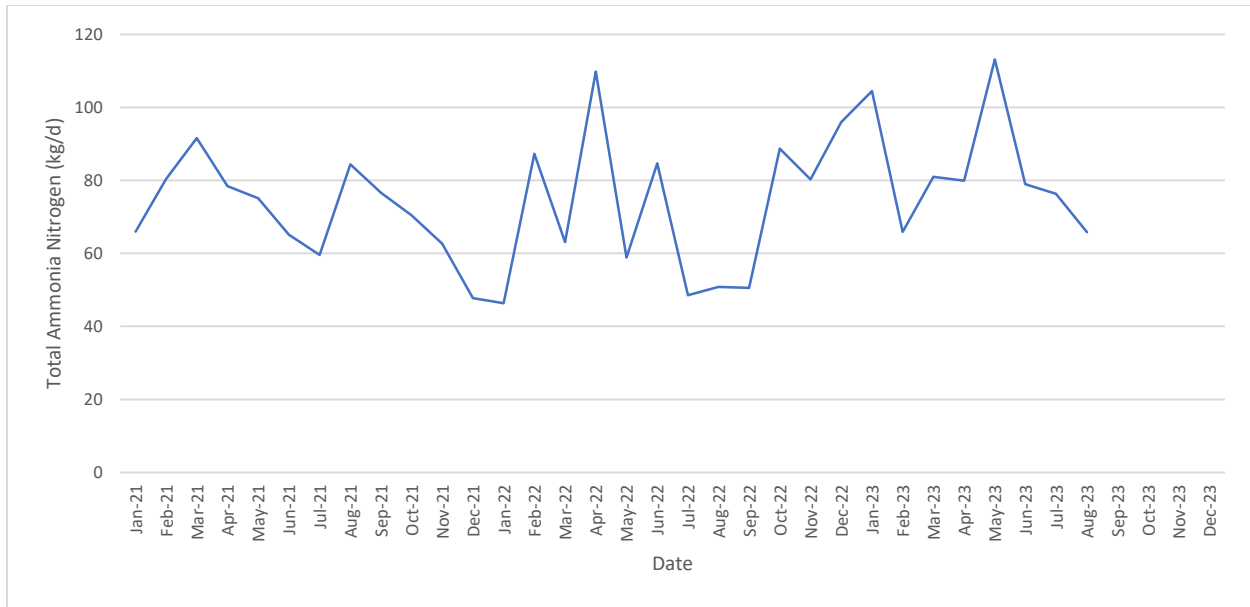


Figure 2-3: Average Weekly Total Ammonia Nitrogen (NH₃ + NH₄) Loadings

Table 2-1: Descriptive Statistics (January 2021 to August 2023)

	Flow	BOD ₅		TAN		TKN	
	m ³ /d	mg/L	kg/d	mg/L	kg/d	mg/L	kg/d
Mean	3,602	165	541	22.7	74.6	35.3	115.9
Median	3,196	149	513	21.6	76.4	34.3	112.5
Std. Dev	1,540	69	218	6.9	17.5	11.0	29.4
Minimum	1,838	39	283	7.5	46.4	13.3	77.5
Maximum	8,440	401	1,433	37.3	113.2	63.8	218.8

As indicated in the analysis, the influent quality is greater than the original design values by about 60 mg/L BOD₅ and about 10 mg/L TKN.

3 CONCLUSIONS AND RECOMMENDATIONS

Currently the Mississippi Mills WWTP is operating at approximately 76% of its hydraulic rated capacity and is operating above the design loading rates; however, based on the operator observations the system is able to address the secondary treatment oxygen requirements with only one unit in operation.

Based on the original blower sizing and the operating conditions of the facility we recommend replacing the existing KTurbo blowers with similarly sized blowers, each with a capacity of approximately 80 Sm³/min at 11.2 kPa (11.6 psi).

Aside from the air delivery capacity, the operating conditions of the blowers are variable with respect to the oxygen requirements of the secondary process but also the variability in demand on the air system. This variability is associated with the on/off requirements of both the vortex grit air lift/mixing as well as the Digester reactor requirements. Each of those systems (Vortex and ATAD) demand air based on their particular operating conditions; Vortex requirements are associated with grit fluidization and removal where as the ATAD system is based on the ORP conditions within each vessel and cycling the air to optimize

treatment. The demands of this type of operation needs to be addressed by the Blower provider; it is our understanding that Turbo blowers are not well adapted to this type of operation and there has been a re-occurrence of blower failures associated with on/off operation of side streams from a common header arrangement.



PROJECT: Mississippi Mills WWTP
DATE: November 20, 2023
TO: Austin Mitchell, Sr. Operations Manager – Mississippi Cluster
Robert Leblanc, Sr. Operations Manager - Capital Projects
FROM: Jamie Baker (EVB)
RE: Aeration Blower Replacement Options Review

1 INTRODUCTION

1.1 BACKGROUND

Based on the aeration system design basis circulated (October 2023), blower suppliers were solicited to provide blower equipment offerings that meet the design criteria as well as to highlight their specific installation requirements, benefits, energy efficiency, turn-down as well as costing. The following is a summary of their equipment submittals.

2 EQUIPMENT SUBMITTALS

Blower equipment submittals were solicited from four (4) blower suppliers including the following:

- APG Neuros (Turbo Blower)
- TurboWin (Turbo Blower)
- Aerzen (Hybrid Positive Displacement Blower)
- Atlas Copco (Screw Compressor)

These manufacturers were selected due to their manufacturing and parts availability proximity to Almonte, Ontario, their type of blower technology and reputation within the industry.

2.1 APG NEUROS

The APG Neuros submission included the supply of three (3) turbo blowers (air foil bearings) with appurtenances as well as three (3) transformer/harmonic filter assemblies. The equipment offering includes:

- Proposed Blower: NX 150S-C070
Power at Design Point: 104 kW @ 30°C
- Duty Discharge Pressure 67 kPa (9.7 psi(g))
- Flow Rate per Blower: 80 Nm³/min

- Maximum Air Flow per blower: 87 Nm³/min
- Minimum Air Flow per blower: 34 Nm³/min
- Turn-down: 60%
- Number of Blowers: 3
- Wire-to-Air Power @ Design Conditions: 104 kW @ 30°C
- Max. noise level at 1 m: 80 dBA
- Input Power Requirements: 480V/3/60Hz
- Full load amperage: 162 A
- 12-month warranty after blowers have been commissioned

2.1.1 INSTALLATION REQUIREMENTS

The unit physical properties are:

- Length/Width/Height: 2,062 mm x 770 mm x 1,490 [TBC]mm
- Inlet Flange Size: 300 mm (12")
- Discharge Flange Size: 250 mm (10")

The APG Neuros blowers operating voltage is 480 V, which requires the installation of a transformer+harmonic filter assembly which is included in their quotation. The installation will require the removal of the line reactor, installation of the trans/filter and wiring the units.

EQUIPMENT COST: \$402,000 + TAXES

Terms: 15% upon issuance of shop drawings

75% at delivery of jobsite or offer to ship based on agreed upon schedule.

10% upon Start-up, no later than 90 days after delivery to jobsite

2.1.2 SCHEDULE

APG Neuros has indicated that shipment will be made 20 weeks after acceptance of the purchase order or 16 weeks after approval of Submittals, whichever occurs last. Their submittal package shall be provided within 2-3 weeks after acceptance of the PO.

2.2 TURBOWIN

The TurboWin submission included the supply of three (3) turbo blowers with appurtenances as well as three (3) transformer/harmonic filter assemblies. The TurboWin blowers feature permanent magnet synchronous motor, bump-type air foil bearings and integral cooling fans.

- Proposed Blower: WL 150-080
 - Power at Design Point: 104 kW @ 30°C
- Duty Discharge Pressure 67 kPa (9.7 psi(g))
- Flow Rate per Blower: 80 Nm³/min
 - Maximum Air Flow per blower: 80 Nm³/min

- Minimum Air Flow per blower: 26 Nm³/min
- Turn-down: >60%
- Number of Blowers: 3
- Max. noise level at 1 m: 85 dBA
- Input Power Requirements: 460V/3/60Hz
- 24-month Warranty after blowers have been commissioned
- Parts storage facility located in Mississauga, ON.

2.2.1 INSTALLATION REQUIREMENTS

The unit physical properties are:

- Length/Width/Height: 2,050 mm x 900 mm x 1,650 mm
- Inlet Flange Size: 300 mm (12")
- Discharge Flange Size: 250 mm (10")
- Motor and Bearing cooling air discharge: 125 mm (5")
- VFD Cooling fan: 200 mm (8")

The TurboWin blowers operating voltage is 400 V, which requires the installation of a transformer+harmonic filter assembly which is included in their quotation. There are multiple cooling air discharges from the unit which will need to be assessed to determine whether they should be vented within the room or ducted outside.

2.2.2 SCHEDULE

The schedule submitted by TurboWin indicates that their shop drawing submittals will be provided within four (4) weeks of the issuance of a purchase order. Equipment delivery shall be delivered to the site within nineteen (19) weeks after shop drawing approval.

EQUIPMENT COST: \$340,000 + TAXES

Terms: 20% upon approval of shop drawings

70% at delivery of jobsite or offer to ship based on agreed upon schedule.

10% after commissioning

2.3 AERZEN

The Aerzen submission included has provided two options: Option 1 – Aerzen 5th Generator Positive Displacement Blowers; Option 2 – Aerzen Generation 5 Hybrid Blower. Both scopes of supply include three (3) blowers with appurtenances. Their blower options are all provided at a voltage of 575V, which do not require the transformer/harmonic filter assemblies included in both Turbo blower options.

AERZEN 5TH GEN. POSITIVE DISPLACEMENT BLOWER

- Proposed Blower: GM 90S DN 250
- Belt Driven Blower
- Drive Motor: 125 hp, 1800 rpm, TEFC

- Duty Discharge Pressure 49 kPa (7.1 psi(g))
- Flow Rate per Blower: 80 Nm³/min
 - Maximum Air Flow per blower: 80 Nm³/min
 - Minimum Air Flow per blower: 13 Nm³/min
 - Turn-down: >60%
- Number of Blowers: 3
- Wire-to-Air Power @ Design Conditions: 92.3 kW @ 30°C
- Max. noise level at 1 m: 77 dBA
- Input Power Requirements: 575V/3/60Hz
- 12-month Warranty after blowers have been commissioned or 18 months after delivery and after provisional acceptance of the work against defects in workmanship and design.

AERZEN GENERATION 5 HYBRID BLOWER

The Hybrid Blower is an Aerzen D 98S Rotary-Lobed Compressor complete with mechanical oil pump and oil demister.

- Proposed Blower: D 98S DN 250
- Belt Driven Blower
- Drive Motor: 125 hp, 6600 rpm, TEFC
- Duty Discharge Pressure 49 kPa (7.1 psi(g))
- Flow Rate per Blower: 80 Nm³/min
 - Maximum Air Flow per blower: 80 Nm³/min
 - Minimum Air Flow per blower: 27.9 Nm³/min
 - Turn-down: >60%
- Number of Blowers: 3
- Wire-to-Air Power @ Design Conditions: 85 kW @ 30°C
- Max. noise level at 1 m: 79 dBA
- Input Power Requirements: 575V/3/60Hz
- 12-month Warranty after blowers have been commissioned or 18 months after delivery and after provisional acceptance of the work against defects in workmanship and design.
- Refer to the attached energy savings assessment provided by Aerzen for the two options.

2.3.1 INSTALLATION REQUIREMENTS

The unit physical properties are:

OPTION 1

- Length/Width/Height: 2,200 mm x 1,900 mm x 2,345 mm
- Inlet Flange Size: 250 mm (10")
- Discharge Flange Size: 250 mm (10")

OPTION 2

- Length/Width/Height: 2,200 mm x 1,900 mm x 2,345 mm
- Inlet Flange Size: 300 mm (12")
- Discharge Flange Size: 250 mm (10")

The Aerzen Hybrid blowers operating voltage is 460 V, which requires the installation of a transformer+harmonic filter assembly which is included in their quotation. The Hybrid option requires a more extensive set of control panels which are not included with the on-board monitoring equipment that is part of the other submissions. The VFD's for the Aerzen units are not included within the equipment shell and as such will require additional wall/floor space.

2.3.2 SCHEDULE

The schedule submitted by Aerzen indicates that equipment delivery shall be delivered to site within 38 – 42 weeks after shop drawing approval.

EQUIPMENT COST: \$299,910 + TAXES (OPTION 1)
\$386,466 + TAXES (OPTION 2)

Terms: 15% upon submittal of shop drawings
85% on readiness to ship – Aerzen Canada

Of note, is the location of the Aerzen Canada manufacturing facility at Vaudreuil-Dorion, Que, approximately 220 km from Almonte.

2.4 ATLAS-COPCO

The Atlas-Copco submission included the supply of three (3) screw compressors with appurtenances. The compressors are all provided at a voltage of 575V, which do not require the transformer/harmonic filter assemblies.

- Proposed Blower: ZS 5 VSD 90kW J-0.8-60
Power at Design Point: 101.3 kW @ 30°C
Power at Min Flow Point: 37.7 kW
- Duty Discharge Pressure 67 kPa (9.7 psi(g))
- Flow Rate per Blower: 80 Nm³/min
 - Maximum Air Flow per blower: 80 Nm³/min
 - Minimum Air Flow per blower: 28.36 Nm³/min
 - Turn-down: 68% maintaining the same efficiency throughout the range.
- Number of Blowers: 3
- Wire-to-Air Power @ Design Conditions: 104 kW @ 30°C
- Max. noise level at 1 m: 80 dBA
- Input Power Requirements: 575V/3/60Hz
- 12-month warranty after blowers have been commissioned
- Parts storage facility located in Montreal, Que; the service location needs to be confirmed.

2.4.1 INSTALLATION REQUIREMENTS

The unit physical properties are:

- Length/Width/Height: 2,300 mm x 1,760 mm x 2,100 mm
- Inlet Flange Size: 300 mm (12")
- Discharge Flange Size: 250 mm (10")
- Unit cooling air is through on-board filters.

2.4.2 SCHEDULE

The schedule submitted by Atlas Copco indicates that their shop drawing submittals will be provided within **four (4) weeks** of the issuance of a purchase order. Equipment delivery shall be delivered to the site within **sixteen (16)** [TBC] weeks after shop drawing approval.

3 SUMMARY

Table 3-1 presents a summary of the blower options, types, and equipment value. In addition to the unit costs, there will be installation costs specific to each unit.

Table 3-1: Blower Comparison Table

Manufacturer	Type	Operating Voltage	Cost
APG Neuros	Turbo	480 V	\$402,000
TurboWin	Turbo	460 V	\$340,000
Aerzen			
GM 90S DN 250	Positive Displacement	575 V	\$299,910
D 98S DN 250	Hybrid PD	460 V	\$386,466
Atlas Copco	Screw Compressor	575 V	\$315,000

DIMENSIONAL RESTRICTIONS – PROCESS AND CIVIL

The existing KTurbo blowers have the following dimensions:

- Length/Width/Height: 1,257 mm x 1,092 mm x 1,732 mm

All the units have a larger footprint than the existing units which will result in both layout changes requiring modifications to the housekeeping pads, process piping connections and electrical supply. In general, all the units presented include top discharge flanges and back mounting inlet flanges of the same size as the KTurbo units. In all cases there will be some piping modifications required to fit-up the replacement units. Additionally, each unit includes individual blow-off and cooling exhaust streams that will need to be vented accordingly.

ELECTRICAL RESTRICTIONS

Each of the Turbo blowers as well as the Aerzen Hybrid option requires a step-down transformer to reduce the incoming voltage from 575 V (600 V) to their specific operating voltage. The Aerzen PD and Atlas Copco units both operate on 575 V, as such no transformer is required.



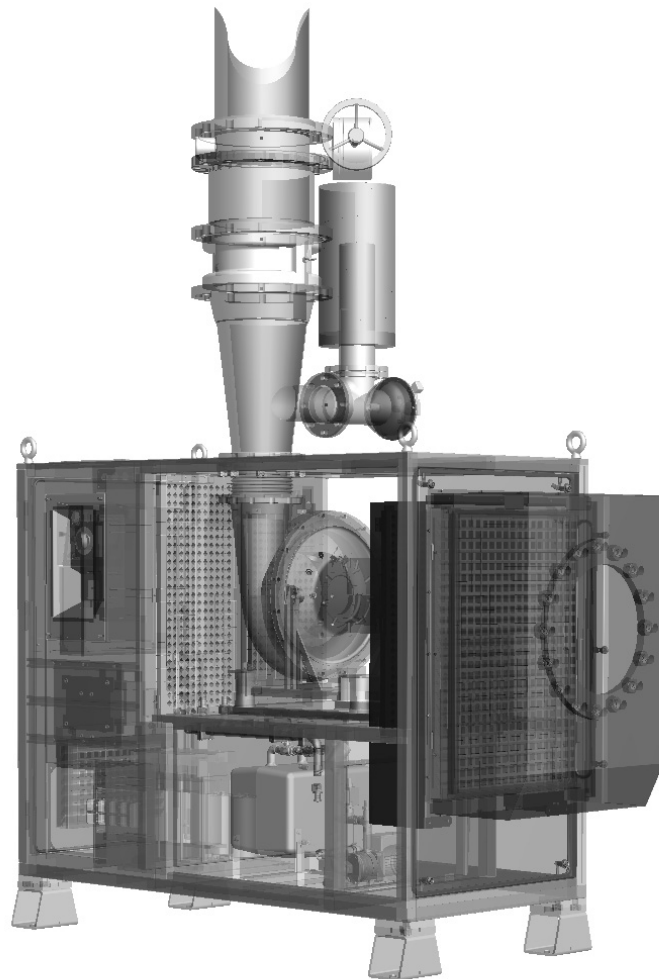
Mississippi Mills, ON

High Speed Turbo Blower

Bid Scope of Supply
Proposal # 01514-3780

Submitted by:

APGN Inc. *dba* APG – Neuros



APGN Inc. *dba* APG-Neuros
1270 Michèle-Bohec, Blainville, Québec J7C 5S4, Canada, Tel : (450) 939-0799

November 27, 2023

Robert (Bob) LeBlanc | Sr. Operations Manager-Capital Projects

Ontario Clean Water Agency, Eastern Region Hub
31 Bridge St, Almonte, ON K0A 1A0

Reference: 23-901 Mississippi Mills Blower Replacements - Proposal Request

Subject: Request for Proposal – Supply of Process Aeration Equipment

Dear Sir / Madame,

APG-Neuros is pleased to submit the following proposal in response to the above referenced inquiry.

APG-Neuros Turbo Blower Scope of Supply:

A. Three (3) NX150S-C070 APG-Neuros High Speed Turbo Blowers system packages, to be installed *indoors*, rated for conditions as shown on the specification, complete with integrated components as follows:

- Blower Core;
 - High Efficiency Forged Aluminum Impeller
 - Permanent Magnet Synchronous Motor
 - Dual Layer Bump-foil Air Bearings
 - Titanium Shaft
 - Sine-wave filter for cooler running motor
 - Internal vibration and dynamic effect Absorption Mounts
 - Internal Expansion Joint
- Blower Local Control Panel;
 - Allen Bradley HMI Touch Screen
 - Allen Bradley PLC
 - Voltage Surge Protection
 - Uninterruptible Power Supply for PLC - Industrial grade – (10 minutes)
 - Provisions for Remote Control capability via Ethernet, LAN or Hard wiring
- KEB Variable Frequency Drive and Inverter
 - UL, CE & CSA certified
 - Input Line Reactor to minimize harmonics
 - Built in Speed measurement
 - Voltage Surge Protection
 - 3ph/60Hz/480 Volts
- Equipment Sensors & Instruments;
 - Temperature sensors for motor, bearing, inlet and discharge air flow
 - Rotor vibration sensor
 - Pressure sensors for Ambient pressure, inlet and discharge conditions
 - Pressure sensor and alert for air filter condition

APG-Neuros Proprietary Information Provided in Strict Confidence

- All above components within a sound attenuating NEMA 3R enclosure with;
 - 12" *Horizontal Flanged* Inlet
 - 10" Discharge Expansion Cone
 - Coarse pre-filter Merv 8 rated
 - Integrated inlet air filters

B. Each blower is complete with following ship-loose items:

- One (1) Blow-off bypass valve to blow off air flow during start/shutdown sequence
- One (1) Blow-off silencer to silence air flow during start/shutdown sequence
- One (1) Wafer style discharge Check Valve, 10"
- One (1) Lugged type discharge Butterfly valve with manual Operator, 10"
- One (1) EPDM flexible connector for discharge, 10"
- One (1) Stand-Alone Auto TransLineator 600V-480V (Includes Transformer 600-480V and Harmonic Filter)

C. Submittal Information: Copies as required

- Qualifications of APG-Neuros
- Quality of construction
- Power Guarantee
- Product Data
- Detailed Drawings
- Quality Control
- Certified Blower test
- Operation and Maintenance Manuals

D. Payment Terms:

- 15% on issuance of Shop drawings
- 75% on delivery of equipment to site or offer to ship based on agreed upon schedule
- 10% upon Start-up, no later than 90 days after Delivery
- All invoices are to be paid Net 30 days
- APG-Neuros will bill if delivery does not occur within 30 days after completion of production and will store the equipment at no extra charge.
- 1.5% Interest charge per month will be added to past due accounts of 45 days and over
- Payment shall not be dependent on the buyer being paid by any third parties or equipment acceptance by owner.

E. Proposal Validity and Seller Terms and Conditions

- Unless otherwise specified elsewhere in the Sales Agreements, the prices in this proposal are valid for sixty (60) days from the issue date on the cover page.
- This proposal, unless otherwise specified herein this document, is subject to the Seller's General Terms and Conditions of Sales available upon request.
- Final price is subject to change contingent on final conformed specification review, if applicable.

F. Factory Inspection and Tests

- Standard Blower Package Functional Acceptance Test.

G. Warranty

- Blowers and appurtenances (parts and labor) will be warranted for a period of One (1) year from the date of start- up not to exceed eighteen (18) months from delivery, whichever occurs first.

H. Technical Support

- APG-Neuros will provide services of a qualified technician on site for start-up, field testing and operator training for a total of up to six (6) days, performed in up to three (3) trips to site.

I. Spare parts

- One (1) sets of inlet air filters per blower
- One (1) tool box and tool kits

J. Quality Assurance / Certifications

- APG-Neuros Turbo Blower is UL1450/CSA & CE certified
- APG-Neuros production system is certified to ISO 9001

K. Price..... **CAD \$ 410,250**

- Price is Net F.O.B. shipping destination, and Excludes Taxes.
- Price covers Items A through J above.

L. Delivery Lead time

- Submittals shall be issued two (2) weeks from manufacturers acceptance of PO.
- Blowers shall be shipped sixteen to twenty (16-20) weeks from approval of submittals.

M. Exclusions

The following items are not included in this scope of supply and shall be the responsibility of others.

- Blower Installation
- Piping for suction, discharge, gauge, vent, seal, inlet expansion joint, and miscellaneous fittings
- Master Control Panel
- Harmonic Mitigation testing on site

APG-Neuros Proprietary Information Provided in Strict Confidence

We appreciate the opportunity to quote APG-Neuros Turbo Blowers and look forward to a successful project.

For any questions regarding Sales, Procurement, Service and Warranty information, please contact:

APG-Neuros Sales Department
1270 Michèle-Bohec
Blainville, Québec J7C 5S4
Phone 450-939-0799
Fax 450-939-2115
sales@apg-neuros.com

APG-Neuros Proprietary Information Provided in Strict Confidence