



Proposed Noise Abatement Procedures Transport Canada Submission

Oshawa Executive Airport
Final Report | February 18, 2022

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List of Acronyms

Acronym	Definition
AC	Advisory Circular
AGL	Above Ground Level
ASL	Above Sea Level
CAR	Canadian Aviation Regulation
CFA	Canadian Flight Academy
CFI	Certified Flight Instructor
CYOO	Oshawa Executive Airport
dB(A)	Decibels (A-Weighted)
DFC	Durham Flight Centre
ft.	Feet
FTU	Flight Training Unit
ICAO	International Civil Aviation Organization
km	Kilometre
kt	Knot (Nautical Mile per Hour)
m	Metre
NCAMS	NAV CANADA Aircraft Movement Statistics
µg	Microgram
VFR	Visual Flight Rules

Data Notes

Aircraft Movements

At various instances in this report, small variations occur in how annual aircraft movement data is reported. Historical activity from 1997 to 2020, as reported in Section 4.3, relies on Statistics Canada data (Statistics Canada Tables 23-10-0002-01 and 23-10-0018-01). Data from 1974 to 1996 is based on information made available by the City of Oshawa in the 2015-2019 Oshawa Executive Airport Business Plan. Detailed analyses of aircraft movements and the Proposed Noise Abatement Procedures (Section 7) utilize NAV CANADA Aircraft Movement Statistics (NCAMS) datasets for 2019 and 2020 provided by the Airport Operator.

Noise Complaints

January 2016 – July 2020 Data: Prior to July 2020, aircraft noise complaints were received via an online form, by telephone, or by email to the Airport Operator. Once received, noise complaints were manually logged in an electronic database. Information collected included the name, address, and contact information of the complainant and the month and year in which the complaint was logged. Data of this type is available from January 2016 to July 2020.

July 2020 – April 2021 Data: In July 2020, a change to the data collection process was implemented, with complaints being filed through Service Oshawa utilizing the City's Lagan Technologies record software (the "Lagan System"). The Airport Operator continues to be responsible for following up with complainants. The transition to using this system has allowed for increased granularity in the data collected, including the opportunity to include the date and time of the incident and to provide written comment.

For high-level analysis of trends over time, complaint data from January 1, 2016 to April 30, 2021 is used. For detailed quantitative analyses, this study utilizes the Lagan System noise complaint data collected between July 24, 2020 and April 30, 2021 – as noted above, this is the period during which complaints with additional detail and information are available. A total of 380 complaints were recorded in the Lagan System during that period. As not all fields are required to be populated in the form, some inputs including date and time were not available for all complaints. Of the 380 complaints recorded in the Lagan System, 21 had no address, 67 did not include the date of the incident, and 190 did not include the time of the incident. Where complaints lacked required fields, they were omitted from specific analyses as applicable (e.g., a complaint without a time was not used to inform a time-of-day analysis). A detailed review of written comments appended to the complaint records resulted in the generation of 27 additional complaints within the database. These complaints were not individually defined in the Lagan System, as some complaints referenced more than one incident.

1 INTRODUCTION

1.1 Background

Oshawa Executive Airport (the “Airport”) is owned by the City of Oshawa (the “City”) and operated by Total Aviation & Airport Solutions (the “Airport Operator”). The 2015-2019 Oshawa Executive Airport Business Plan included a commitment to ensure that the Airport is operated within the context of being a “Good Community Neighbour”. The 2015-2019 Business Plan also established the goal that the Airport shall be:

“A leader in environmental stewardship including noise mitigation, wildlife management and energy conservation.”

In recent years, the City has become increasingly aware of resident concerns regarding aircraft noise. Under the “Good Community Neighbour” direction and in acknowledgement of community concerns regarding aircraft noise, the City retained HM Aero Aviation Consulting (“HM Aero”) in 2021 to undertake the process specified by Transport Canada in Advisory Circular (AC) 302-002 – Implementation of New or Amended Noise Abatement Procedures.

Oshawa City Council received Report DS-21-190 at its October 25, 2021 meeting. Pursuant to Report DS-21-190, Council accepted the following recommendations:

1. *“That [...] Council approve, in principle, the Draft Proposed Procedures for the Oshawa Executive Airport as outlined in said Report for the purpose of obtaining public and stakeholder input on the proposed solution, as developed in accordance with Part 1 of the Transport Canada Advisory Circular 302-002; and,*
2. *That [...] Development Services staff and the City’s Airport Manager be authorized to hold a series of four (4) public workshops, two (2) for community members and two (2) for Airport users, which will be in virtual public engagement form owing to the COVID-19 pandemic for the purpose of presenting for public review and input the Draft Proposed Procedures as outlined in said Report, using the approach described in Section 5.2.4 of said Report; and,*
3. *That [...] Development Services staff and the City’s Airport Manager be authorized to undertake consultation in a virtual engagement form owing to the COVID-19 pandemic with all other affected stakeholder groups as identified in Section 5.2.4 of said Report for the purpose of presenting the Draft Proposed Procedures as outlined in said Report for review and input, using the approach described in Section 5.2.4 of said Report.”*

Pursuant to this direction, City Staff and HM Aero completed the stakeholder consultation program specified by Step 2 of AC 302-002 on the Draft Proposed Noise Abatement Procedures (the “Draft Proposed Procedures”), as documented in this report.

1.2 Purpose

This submission has been prepared to satisfy Steps 3 and 4 of the AC 302-002 process, which require that:

“3. The proponent:

- a. Fully and clearly explains the impacts to all parties, documenting this consultation and the information produced by this process such that it is clear what has been transmitted to whom and any reactions received.*
 - b. Where all parties agree with the proposal, the airport operator shall submit a description of the proposal and the consultation process. Included in the package will be a signoff indicating agreement of the participants*
 - c. The consultation process will include descriptions of what information was considered and an explicit indication of agreement to not consider particular items.*
- 4. Where there is no consensus, the proponent shall document the consultation in the same manner as b) above, include any dissenting views, and will forward this information to the airport operator for onward transmission to Transport Canada. Dissents should contain all reasons for the position taken.”*

Uniform consensus among all stakeholders was not achieved on each of the Draft Proposed Procedures. Accordingly, this submission has been prepared to document:

1. The stakeholder engagement program, including parties that were consulted, information that was provided, and findings gained through consultations;
2. The support for, and opposition against, each of the Draft Proposed Procedures among the various consulted stakeholder groups; and
3. Revisions to the Draft Proposed Procedures that have been made as a result of stakeholder feedback, resulting in the Proposed Noise Abatement Procedures as documented herein (the “Final Proposed Procedures”).

Following approval by Oshawa City Council, the intent is that this submission will be provided to Transport Canada for consideration per Steps 5 through 11 of the AC 302-002 process.

1.3 Structure

This submission is structured as follows:

1. **Introduction;**
2. **Draft Proposed Noise Abatement Procedures:** Outlines the Draft Proposed Procedures that were presented for stakeholder input pursuant to the AC 302-002 process; and
3. **Stakeholder Consultations:** Explains the outreach and engagement efforts that were undertaken for the Draft Proposed Procedures.

The subsequent sections, as documented below, were originally presented in the materials made available to stakeholders in reference to the Draft Proposed Procedures. These sections are presented again for reference by Transport Canada, including the identification of areas where changes were made based on stakeholder feedback:

4. **Airport Background:** Contextual information on the Airport, historical activity levels, and its land use context;
5. **Problem Description:** The current noise challenge being experienced at the Airport, based on historical community input and complaint data;
6. **Final Proposed Noise Abatement Procedures:** The procedures that have been prepared to address the Problem Description and are submitted to Transport Canada for consideration;
7. **Evaluation of Final Proposed Noise Abatement Procedures:** The analysis of the implications of each of the Final Proposed Procedures against the criteria established in AC 302-002; and
8. **Closing.**

2 DRAFT PROPOSED NOISE ABATEMENT PROCEDURES

2.1 Voluntary Noise Abatement Procedures

Voluntary Noise Abatement Procedures have been established for Oshawa Executive Airport separate from the AC 302-002 process, as summarized in Table 2.1. These procedures, summarized below, are published in the Canada Flight Supplement, Canada Air Pilot, and / or the Noise & Traffic Management Policy at CYOO (Revised January 2016). In addition, right-hand circuit procedures have been established for Runway 23 and Runway 30. It is understood that the intent of these right-hand circuit procedures, when implemented, was to limit overflights of built-up areas and resulting noise problems despite being enacted pursuant to CAR 602.96 as opposed to CAR 602.105.

Table 2.1 - Existing Voluntary Noise Abatement Procedures

No.	Existing Voluntary Procedure
Preferential Runways	
1	Controllers will designate runways to divert as many take-offs and landings as possible from flight over noise sensitive areas. When the Tower is closed, pilots are expected to select Runway 12 for arrivals and Runway 30 for departures consistent with safety of operations.
2	Aircraft will use Runway 30 when the winds are blowing from a heading of 210° to 030° at up to 5 knots (9.26 km/h).
Hours When Aircraft Operations are Prohibited or Restricted	
3	Flights are prohibited between 10:30 PM and 6:30 AM local unless approved by the Airport Manager. During this time, only police, medical and industrial emergency flights are permitted to land and take off. Airport tenants with aircraft based at the Oshawa Executive Airport are permitted to land between the hours above, but are not permitted to take off, independent from police, medical and industrial emergency flights.
Arrival Procedures	
4	Arrival turns to final approach will be made at or above 1,000 ft. Above Sea Level (ASL) (540 ft. (AGL)).
5	Approaches are to remain on or above an assumed 3° glide slope.
6	If weather conditions permit, circling procedures are to be conducted at 1,460 ft. ASL (1,000 ft. AGL).
Departure Procedures	
7	On departure, no turns below 1,000 ft. ASL (540 ft. AGL).
Prohibition or Restriction of Training Flights	
8	Training flights are prohibited at all times unless approved by the Airport Manager. Prior permission by the Airport Manager is required for all flight training, including initial and recurrent training.
9	A maximum of 12 aircraft are permitted in the circuit for training purposes on Runway 05/23 at any given time.
10	Flight training aircraft will not utilize a touch-and-go departure pattern on all runways after 4:00pm on any Saturday or Sunday.
11	During the holiday long weekends, circuit training is not permitted on the Sunday or Monday on all runways.
Minimum Aerodrome Operation Altitudes	
12	Pilots are requested to maintain 2,000 ft. ASL or above over the Toronto Zoo.

2.2 Draft Proposed Noise Abatement Procedures

An initial set of 14 Draft Proposed Procedures were developed for consideration through the stakeholder engagement program, as documented in Table 2.2. Noise abatement procedures established through the AC 302-002 process must be made pursuant to the authority of CAR 602.105:

“No person shall operate an aircraft at or in the vicinity of an aerodrome except in accordance with the applicable noise abatement procedures and noise control requirements specified by the Minister in the Canada Air Pilot or Canada Flight Supplement, including the procedures and requirements relating to

- (a) preferential runways;*
- (b) minimum noise routes;*
- (c) hours when aircraft operations are prohibited or restricted;*
- (d) arrival procedures;*
- (e) departure procedures;*
- (f) duration of flights;*
- (g) the prohibition or restriction of training flights;*
- (h) VFR or visual approaches;*
- (i) simulated approach procedures; and*
- (j) the minimum altitude for the operation of aircraft in the vicinity of the aerodrome.”*

Items (a) to (j) of CAR 602.105 outline the permissible forms of noise abatement procedures that may be developed – proposals beyond the ten in-scope items described cannot be considered. The Draft Proposed Procedures were developed as follows:

1. HM Aero reviewed the current Voluntary Noise Abatement Procedures to identify which procedures should be integrated in the AC 302-002 process, with or without revisions.
2. HM Aero undertook a review of voluntary and mandatory noise abatement procedures in place at other Canadian airports, as published in the Canada Flight Supplement. In total, noise abatement procedures at 27 Canadian airports were reviewed, with each procedure categorized into the 10 classifications of CAR 602.105. Reviewed airports included Abbotsford (CYXX), Airdrie (CEF4), Burlington (CZBA), Calgary / Springbank (CYBW), Cold Lake (CYOD), Cookstown (CCT2), Delta (CAK3), Duncan (CAM3), Edmonton (CYEG), Edmonton / Cooking Lake (CEZ3), Greenwood (CYZX), Hamilton (CYHM), Montreal / St. Hubert (CYHU), Ottawa (CYOW), Ottawa / Rockcliffe (CYRO), Peterborough (CYPQ), Pitt Meadows (CYPK), Qualicum Beach (CAT4), Regina (CYQR), Niagara District (CYSN), Billy Bishop Toronto City Airport (CYTZ), Toronto / Buttonville Airport (CYKZ), Vancouver / Boundary Bay (CZBB), Victoria (CYYJ), Waterloo (CYKF), Winnipeg (CYWG), and Winnipeg / Lyncrest (CJL5).
3. Supplementary research was completed to identify examples of noise abatement procedures that align with CAR 602.105, but that are not currently utilized at the above-noted reviewed airports.
4. Considering the Problem Description and existing procedures in place in Canada, HM Aero drafted preliminary noise abatement procedures for each of the 10 CAR 602.105 categories.

5. The preliminary noise abatement procedures were reviewed with representatives from the Airport Operator (Airport Manager, Airport Operations Manager) and the City of Oshawa (Chief Administrative Officer, Commissioner of Development Services, Director of Planning Services, and Principal Planner). The preliminary noise abatement procedures were refined based on the comments received from this staff-level review.

The preparation of the Draft Proposed Procedures culminated in two reports:

- HM Aero Inc. (2021, September 27). Oshawa Executive Airport – Proposed Noise Abatement Procedures: Public Consultation Materials (Final Report).
- HM Aero Inc. (2021, September 27). Oshawa Executive Airport – Proposed Noise Abatement Procedures: Public Consultation Materials (Executive Summary).

Table 2.2 - Draft Proposed Noise Abatement Procedures

No.	Draft Proposed Procedure
602.105(a) Preferential Runways	
1	Tower Closed Preferential Runways: When the Air Traffic Control Tower is closed, pilots shall use Runway 12 for arrivals and Runway 30 for departures consistent with safety of operations.
2	Tower Open Preferential Runways: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° at up to 10 kts (18.52 km/h) or from a heading of 031° (incrementally) to 209° at up to 5 kts (9.26 km/h).
602.105(c) Hours When Aircraft Operations are Prohibited or Restricted	
3	Overnight Restricted Hours: Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.
4	Overnight Engine Run-Ups: Engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.
602.105(d) Arrival Procedures	
5	Arrival Turns: Aircraft arriving at the Airport will remain at least 1,000 ft. ASL (540 ft. AGL) before making the turn for their final approach for landing.
6	Approach Angle: Approaches are to remain on or above an assumed 3° glide slope.
7	Circling Procedures: If weather conditions permit, circling procedures are to be conducted at 1,460 ft. ASL (1,000 ft. AGL).
602.105(e) Departure Procedures	
8	Departure Turns: Aircraft departing the Airport will continue to fly on the runway heading until they reach 1,000 ft. ASL (540 ft. AGL) before making any turns.
602.105(g) Prohibition or Restriction of Training Flights	
9	Prior Permission for Flight Training: Prior permission by the Airport Manager is required for all flight training, including private and commercial pilot recurrent training.
10	Time of Day Flight Training Restrictions: Flight training is not permitted Friday-Monday before 8:00 AM and after 4:00 PM May 1 – September 30; and Friday-Monday before 8:00 AM and after 8:00 PM October 1 – April 30.
11	Alternating Seasonal Weekend Flight Training Restrictions: Flight training is not permitted on the 1 st and 3 rd Sunday of the month and 2 nd and 4 th Saturday of the month from May 1 – September 30.
12	Statutory Holiday Flight Training Restrictions: Flight training is not permitted on the following federal statutory holidays: New Year's Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.

No.	Draft Proposed Procedure
13	Circuit Flight Training Restrictions: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.
602.105(j) Minimum Aerodrome Operation Altitudes	
14	Toronto Zoo: Pilots are to maintain 2000 ASL or above over Toronto Zoo (N43 49 05 W79 11 15).

3 STAKEHOLDER CONSULTATIONS

The requirements for stakeholder engagement are described in Step 2 of the AC 302-002 process, which states that proponents are to conduct consultation with all affected parties to include the following:

- Airport management/operator;
- Noise management committee (where applicable);
- Community representatives;
- NAV CANADA;
- Air Transport Association of Canada (ATAC);
- Canadian Business Aircraft Association (CBAA);
- Canadian Owners and Pilots Association (COPA);
- All scheduled Operators who operate at the airport;
- Transport Canada; and
- All Fixed Base Operators on the Airport.

The stakeholder engagement process has been completed in compliance with the above requirements. Per the requirements of Steps 3 and 4 of the AC 302-002 process, documented herein is:

- An overview of the materials provided to stakeholders to explain the impacts fully and clearly to all parties;
- The consultation process, including advertising and forms of engagement; and
- The information produced by the consultation process, including areas of consensus and dissent.

Please note that due to the significant volume of individual comments received, the findings recorded in Section 3 are intended to serve as a summary of the stakeholder consultation process. Where a shared viewpoint was articulated multiple times or with the same key theme, each individual comment has not been recorded. All comments submitted through the engagement process have been recorded by the City and HM Aero, reviewed by HM Aero, and preserved for future reference.

3.1 Consultation Materials and Information Sharing

The City of Oshawa launched and hosted a project webpage through Connect Oshawa (<https://connectoshawa.ca/airportfeedback>). The project webpage provided an overview of the project; dates and times of the virtual workshops; key dates in the process; a hyperlink to an online feedback form; and hyperlinks to the project background materials.

Background documents made available to stakeholders are listed as follows:

- HM Aero Inc. (2021, September 27). Oshawa Executive Airport – Proposed Noise Abatement Procedures: Public Consultation Materials (Final Report).
- HM Aero Inc. (2021, September 27). Oshawa Executive Airport – Proposed Noise Abatement Procedures: Public Consultation Materials (Executive Summary).
- City of Oshawa. (September 29, 2021). Public Report DS-21-190: Draft Proposed Noise Abatement Procedures for the Oshawa Executive Airport.
- City of Oshawa. (February 3, 2021). Public Report DS-21-23: Process to Establish a New Noise Abatement Procedure at the Oshawa Executive Airport.

In addition to these materials, at the beginning of all meetings and engagement sessions, a 10-to-20-minute presentation was provided by HM Aero. This presentation summarized the AC 302-002 process; stakeholder engagement opportunities; historical noise complaint levels; and the Draft Proposed Procedures.

3.2 Items Not Considered

Per Step 3 c., the following items were raised by stakeholders through the engagement process, but were not considered by HM Aero as they transcend the scope of the AC 302-002 process:

- **Justification for Proceeding:** A recurring view cited by individuals that do not support the implementation of mandatory noise abatement procedures was that such measures are being imposed based on the concerns of a subset of the broader population of Oshawa, unduly impact aviation users and businesses, and / or are unnecessary.

The decision to proceed with the AC 302-002 process was established by Oshawa City Council through a resolution made on February 3, 2021. Similarly, the decision to move forward with the submission of the Final Proposed Procedures will be made by Oshawa City Council through a voted motion. Comments received through the stakeholder engagement process opposing the implementation of, and justification for, noise abatement procedures are noted and recorded. Proceeding forward is at the discretion of Oshawa City Council as the Airport's governing body.

- **Alternative Paths Forward:** Numerous stakeholders suggested that the City consider implementing other strategies in addition to, or in substitution of, noise abatement procedures. Suggestions included noise reduction at the source through quieter aircraft, community education and outreach campaigns, and implementing restrictions on new development near the Airport. While these suggestions extend beyond the scope of the AC 302-002 process, they have been noted by City Staff. With respect to new residential development near the Airport, the importance of compatible land use planning is underscored to reduce the exposure of new dwellings to aircraft noise – Draft Proposed Procedure 3, for example, is predicated on increasing aircraft operations over less densely populated areas to the north of the Airport.
- **Landing Fees:** On January 1, 2022, the City of Oshawa implemented a revised minimum landing fee of \$15.00 for commercially registered aircraft with a Maximum Takeoff Weight of less than 2,000 kg. As described in subsequent sections, numerous aviation stakeholders noted that the cumulative impacts of the Draft Proposed Procedures with the revised landing fee structure may result in a decrease in flight training activity at the Airport. The question was also posed as to whether noise abatement procedures will be required if movements decrease on account of the revised landing fee.

The position taken by certain stakeholders that flight training activity will likely decrease on account of the revised landing fee structure is understood by HM Aero and, while the consideration of cumulative impacts transcends the scope of the AC 302-002 process, is noted in the context of the decision-making process.

- **Tenant Evictions:** Suggestions were made that one or both of the FTUs currently based at the Airport should have their lease agreements terminated to decrease activity levels. The eviction of tenants is not an eligible category of noise abatement per CAR 602.105. It is also noted that the City is in ongoing legal proceedings in relation to the lease agreement of one of the two FTUs based at the Airport at the time of this submission's preparation. Commentary on the status of that legal proceeding was not made available during stakeholder consultations or relied upon in the analysis of this submission.

- **Airport Closure or Relocation:** Suggestions of closing or relocating the Airport, as made by select stakeholders, are beyond the scope of noise abatement and are subject to Transport Canada's Operation & Options Agreement with the City of Oshawa. Specifically, this Agreement requires that the City operates the Airport until 2047. However, the facility may be closed by the City prior to 2047 but no sooner than 2033 if a new airport is developed on the federally owned Pickering Lands, located approximately 20 km northwest of the Airport.
- **Compensation:** Both aviation and non-aviation stakeholders at various points raised the matter of compensation as a result of disruptions to business activities for the former group and for noise disturbance for the latter group. This consideration transcends the scope of the AC 302-002 process, but such views have been recorded where they arise.

3.3 Advertising and Types of Engagement

The City of Oshawa executed a comprehensive communication and advertising plan as approved by City Council, including:

- **City Website:** The Draft Proposed Procedures and public consultation information was featured on the City's webpage (oshawa.ca), including the News and Alerts newsfeed, community calendar, and website homepage image. Notice was sent to website subscribers.
- **Connect Oshawa:** As noted previously, the Draft Proposed Procedures and public consultation information was hosted on Connect Oshawa and notice was emailed to registered users via the Connect Oshawa newsletter.
- **Social Media:** Social media posts were sent using the City's corporate and Airport channels.
- **Advertising:** Engagement opportunities with advertised through the local newspaper and social media advertisements.
- **Media Relations:** Public notice regarding the project and engagement opportunities was shared with local media outlets
- **Mailed Notices:** Mailed notices were distributed to the following groups:
 - Property owners located in proximity to the Airport (i.e., the area generally bounded by Conlin Road to the north, Ritson Road North to the east, Rossland Road to the south and the Oshawa-Whitby boundary to the west);
 - All individuals who have made an Airport noise submission in the last five (5) years that included a mailing address;
 - The Town of Whitby; and
 - All tenants at the Oshawa Executive Airport.
- **Virtual Notices:** Virtual notices were sent to all individuals that provided their contact information at the September 24, 2019 Airport Community Liaison Committee Town Hall meeting; the South Field Master Plan Public Open House; the two virtual workshops held on September 29, 2020 and October 1, 2020; and the May 10, 2021 Draft Proposed 2020-2021 Oshawa Executive Airport Action Plan.
- **Direct Outreach:** City Staff directly contacted the Airport Community Liaison Committee; Airport Business Plan Working Group; ATAC, COPA, and CBAA; the two based FTUs; on-Airport businesses; Durham Regional Police Service; NAV CANADA; and Transport Canada.

Stakeholder engagement was facilitated through four formats:

1. **Direct Engagement Sessions (Section 3.4):** Engagement sessions were convened in November and December 2021 with the Airport Community Liaison Committee; Airport Business Plan Working Group; ATAC, COPA, and CBAA; the two based FTUs; on-Airport businesses; Durham Regional Police Service; NAV CANADA; and Transport Canada;
2. **Public Meetings (Section 3.5):** A total of four public meetings were convened in November 2021, two of which were targeted at community members, and two of which were targeted at Airport users;
3. **Online Survey (Section 3.6):** An online survey was hosted on Connect Oshawa and was available from November 8, 2021 until November 29, 2021. A total of 376 survey responses were received during the three-week period of availability; and
4. **Written Submissions (Section 3.7):** Written submissions were received by City Staff and reviewed by HM Aero.

3.4 Stakeholder Findings – Direct Engagement Sessions

3.4.1 Airport Community Liaison Committee

A virtual workshop was convened with the Airport Community Liaison Committee on November 1, 2021. In attendance were Committee members Andy Armstrong, Diane Rapkoski-Mash, and Alice Keenan. In attendance on behalf of the City and Airport were Councillor Jane Hurst, Tom Goodeve (Director of Planning Services), Laura Moebs (Principal Planner), Stephen Wilcox (Airport Manager), and two representatives of HM Aero (Adam Martin and Ben Crooks).

General Comments and Questions (Draft Proposed Procedures)

- In general, the Draft Proposed Procedures are not balanced and disproportionately benefit the community versus aviation users.
- In general, the Draft Proposed Procedures are a positive step forward but are not yet enough from a community perspective.
- What authority does Transport Canada have to enable the establishment of mandatory noise abatement procedures?
- How will dissenting views be recorded through the AC 302-002 process?
- Concern was expressed that the process does not appear fair, in the view of the attendee.
- How will the Draft Proposed Procedures be enforced / compliance ensured?

Draft Proposed Procedure 3 – Overnight Restricted Hours

- What is defined as an Airport tenant for the application of Draft Proposed Procedure 3?
- How is “depart” defined for the application of Draft Proposed Procedure 3?

Draft Proposed Procedure 9 – Prior Permission for Flight Training

- Concern was expressed that a single person (Airport Manager) will have significant authority over flight training.

Draft Proposed Procedure 10 – Time of Day Flight Training Restrictions

- Support was given that Draft Proposed Procedure 10 will give residents reprieve during evening meals.

Draft Proposed Procedure 11 – Alternating Seasonal Weekend Flight Training Restrictions

- Support was given that Draft Proposed Procedure 11 will give residents prescheduled reprieve during which to enjoy their weekends.

Draft Proposed Procedure 12 – Statutory Holiday Flight Training Restrictions

- What if aviation users don't observe the noted statutory holidays?

Draft Proposed Procedure 13 – Circuit Flight Training Restrictions

- Concern was expressed that 4 aircraft in the circuit will result in overflights that are too frequent for residents.

General Comments and Questions (Other)

- A Noise Management Committee should be established for the Airport.

3.4.2 Airport Business Plan Working Group

A virtual workshop was convened with the Airport Business Plan Working Group on November 4, 2021. Working Group members Doug Thompson, Warren Hurren, and David Carr were in attendance. In attendance on behalf of the City and Airport were Councillor John Gray, Tom Goodeve (Director of Planning Services), Hailey Wright (Director of Economic Development), Laura Moebs (Principal Planner), Stephen Wilcox (Airport Manager), and two representatives of HM Aero (Adam Martin and Ben Crooks).

General Comments and Questions (Draft Proposed Procedures)

- The relief afforded to residents through the Draft Proposed Procedures may be beneficial.
- Additional analysis may be warranted on the financial impacts of the Draft Proposed Procedures, including with an emphasis on impacts to the two Flight Training Units based at the Airport.

3.4.3 ATAC, COPA, and CBAA

A virtual workshop was convened with representatives from the Air Transport Association of Canada (ATAC), Canadian Business Aviation Association (CBAA), and the Canadian Owners and Pilots Association (COPA) on November 22, 2021. In attendance were:

- ATAC: John McKenna, President and CEO;
- CBAA: Anthony Norejko, President and CEO; and
- COPA: Christine Gervais, President and CEO; and Fadi El Masry, Director of External Relations.

In attendance on behalf of the City and Airport were Laura Moebs (Principal Planner), Stephen Wilcox (Airport Manager), and two representatives of HM Aero (Adam Martin and Ben Crooks).

General Comments and Questions (Draft Proposed Procedures)

- The wording of the Draft Proposed Procedures should be simplified where possible to ensure that pilots will be able to understand and comply with the restrictions when adopted, and to mitigate potential safety issues that may arise from their misinterpretation.
- ATAC – More data should be presented in the study to ensure that the information relied upon is transparent, and clearly available to readers / stakeholders.

- ATAC – Part of the noise challenges being experienced are the result of individuals increasingly working from home and retiring, increasing their exposure to aircraft noise throughout the day. Individuals may also be more inclined to take issue with airport noise versus highways or other elements of public infrastructure.
- ATAC – Draft Proposed Procedures 10-13, are overly restrictive to flight training and may be prohibitory to the operations of the two Flight Training Units.
- ATAC – Potential reductions in activity at the Airport may result in the closure of the NAV CANADA Air Traffic Control Tower.
- ATAC / COPA – Certain elements may be missing from the evaluation of the impacts, such as impacts to on-Airport employment positions. The Flight Training Units and Airport as a whole contribute significantly to the local economy, and this is not mentioned. Further, the question is raised as to whether the economic impacts are justifiable in light of the complaints of approximately 200 residences in 2021. The community should be fully informed of the economic impacts of the Draft Proposed Procedures proceeding, before a decision is made.
- CBAA – Expectations need to be managed and a clear objective should be established – is it zero complaints, a reduction in complaints, etc.?
- CBAA – Consideration should be given to granting exemptions or incentivizing the use of quieter and more environmentally friendly aircraft, such as electric aircraft.
- COPA – How are residences that have filed repeated complaints addressed in the database?
- COPA – The Draft Proposed Procedures will dissuade pilots from operating at the Airport and cause them to fly elsewhere; accordingly, compensation should be considered.

Draft Proposed Procedure 1 – Tower Closed Preferential Runways

- Concerns were not noted by the three groups with respect to Draft Proposed Procedure 1.

Draft Proposed Procedure 2 – Tower Open Preferential Runways

- ATAC – Concerns were not noted with respect to Draft Proposed Procedure 2.
- CBAA – Concerns were not noted with respect to Draft Proposed Procedure 2.
- COPA – Draft Proposed Procedure 2 may be supportable, but the safety implications of the increased crosswind and tailwind runway usage conditions must be considered, including accounting for the lower limits of student pilots.

Draft Proposed Procedure 3 – Overnight Restricted Hours

- ATAC – If noise complaints are analyzed by the time of day, would the 9:30 PM overnight restriction be justifiable / supported by the dataset?
- CBAA – Could overnight restricted hours during the summer months be tied to Transport Canada’s definition of “night” – for example, with restrictions commencing 1 hour after official night begins?
- COPA – Draft Proposed Procedure 3 will make it challenging for pilots to complete initial and recurrent nighttime training. In the summer months, could the overnight restricted period begin at 10:30 PM?

Draft Proposed Procedure 4 – Overnight Engine Run-Ups

- Concerns were not noted by the three groups with respect to Draft Proposed Procedure 4.

Draft Proposed Procedures 5-8 – Arrival and Departure Procedures

- Concerns were not noted by the three groups with respect to Draft Proposed Procedures 5 to 8.

Draft Proposed Procedure 9 – Prior Permission for Flight Training

- ATAC – Draft Proposed Procedure 9 is not supportable and grants too much discretionary authority to the Airport Manager, is another layer of approval to satisfy during pre-flight preparation, and is a safety concern.
- CBAA – Concerns were not noted with respect to Draft Proposed Procedure 9. A wording change may be considered to better articulate that this provision is intended for educational / awareness purposes.
- COPA – Draft Proposed Procedure 9 is not supportable based on the restrictions that it would impose on flight training.

Draft Proposed Procedure 10 – Time of Day Flight Training Restrictions

- ATAC – Draft Proposed Procedure 10 is not supportable. The Draft Proposed Procedures pertaining to flight training may also require renaming to be clearer in their intent and purpose.
- CBAA – The limitations being considered on flight training through Draft Proposed Procedures 10, 11, 12, and 13 are too restrictive. For the affected Flight Training Units, consideration should be given to implementing a tax incentive or compensation program that reflects the decreased revenues that will be experienced.
- CBAA – The restrictions on flight training considered through Draft Proposed Procedures 10, 11, 12, and 13 may negatively affected the Airport's long-term viability. If Flight Training Units are unable to operate and the revenues received by the Airport from flight training decreases, then the financial sustainability of the Airport may be challenged, and the facility could potentially not be available to meet the needs of the community and the businesses that it supports.
- COPA – Draft Proposed Procedure 10 is not supportable. Draft Proposed Procedure 10 would override Draft Proposed Procedure 3, making the latter irrelevant for flight training activity from Friday to Monday. This is overly restrictive and does not represent a balanced solution.

Draft Proposed Procedure 11 – Alternating Seasonal Weekend Flight Training Restrictions

- ATAC – Draft Proposed Procedure 11 is too restrictive for flight training and is not supportable.
- CBAA – Please refer to the views shared for Draft Proposed Procedure 10.
- COPA – Draft Proposed Procedure 11 is too restrictive for flight training and is not supportable.

Draft Proposed Procedure 12 – Statutory Holiday Flight Training Restrictions

- ATAC – Draft Proposed Procedure 12 is not supportable, as it is overly restrictive for flight training.
- CBAA – Please refer to the views shared for Draft Proposed Procedure 10.
- COPA – Arbitrarily choosing holidays that are not observed by all residents / users is overly restrictive. Draft Proposed Procedure 12 is not supportable.

Draft Proposed Procedure 13 – Circuit Flight Training Restrictions

- ATAC – Draft Proposed Procedure 13 is not supportable, as it is overly restrictive for flight training.

- CBAA – Please refer to the views shared for Draft Proposed Procedure 10.
- COPA – With respect to Draft Proposed Procedure 13, this is a significant reduction in the capacity of the circuit, vs. the practical capacity of 6 to 8 aircraft. 4 aircraft is unrealistically low, 8 aircraft may be more reasonable.

Draft Proposed Procedure 14 – Toronto Zoo

- Concerns were not noted by the three groups with respect to Draft Proposed Procedure 14.

General Comments and Questions (Other)

- The Airport should be conducting community outreach to improve relationships with its neighbours and demonstrate the economic and social value of the facility.

3.4.4 Flight Training Units

A virtual workshop with the two Flight Training Units based at the Airport was convened on November 24, 2021, including:

- Durham Flight Centre (DFC): Ken Ruffo, General Manager; Andrew Noonan, Director of Flight Operations; and Rob Thompson, Administration Manager; and
- Canadian Flight Academy (CFA): John Davis, President and David Lorbetskie, Operations Manager.

In attendance on behalf of the City and Airport were Tom Goodeve (Director of Planning Services), Laura Moebs (Principal Planner), Stephen Wilcox (Airport Manager), and two representatives of HM Aero (Adam Martin and Ben Crooks).

Supplementary written comments were also provided by DFC, as documented in Appendix A.

General Comments and Questions (Draft Proposed Procedures)

- CFA – Were there similar numbers of complaints in 1998 as there were in 2019, given the similar activity levels experienced?
- CFA – Flight training was not operating between March and July of 2020, yet noise complaints continued to be received. Therefore, flight training is not the sole cause of resident discontent.
- CFA – Clarification is requested on the exclusions applied to the aircraft movement datasets.
- CFA – Flight training is highly dependent on weather conditions. Over the last 4 years, an average of 162 days are usable in a given year based on their weather limitations. Additional limitations as identified in the Draft Proposed Procedures will further challenge the operational viability to conduct flight training.
- CFA – The aggregate impact of the Draft Proposed Procedures is a 57% decrease in their operational availability period, decreasing from 2,600 annual hours to 1,111 hours.
- CFA – For the financial impacts analysis, Certified Flight Instructors will have a reduced ability to generate revenue and they may take employment opportunities at other Flight Training Units. The proportion of hours assumed for Certified Flight Instructors should be increased from 50% to 75%.
- CFA – Can the financial impacts for each Flight Training Unit be separated?
- DFC – Continuing with the existing voluntary noise abatement procedures would be a more reasonable approach.
- DFC – Please show the number of aircraft movements prior to 1997 to contextualize the activity levels of 1997 to 2020.

- DFC – Homeowners located near the Airport had to acknowledge that noise will impact their property. How should these complaints be treated – significant impacts will be realized by the Flight Training Units based on the noise concerns of the nearby population.
- DFC – Can the list of airports for which noise abatement procedures were reviewed be published?
- CFA / DFC – Can the Airport's Noise Exposure Forecast contours be plotted against the location of the noise complaints in a report figure?
- CFA / DFC – The activity levels currently being experienced are aligned with the projections of the Airport Business Plan (approximately 102,000 annual movements anticipated). Please show forecast activity levels vs. actual activity levels.
- CFA / DFC – Additional detail is requested on the number of complaints per residential address.
- CFA / DFC – How many houses are in the affected area of the Airport and what is the population?
- CFA / DFC – Are all movements by aircraft registered to a Flight Training Unit recorded / analyzed as flight training? This does not account for private rentals and sightseeing flights. The definition of flight training must be clearly established.
- CFA / DFC – Additional data transparency is requested.

Draft Proposed Procedure 1 – Tower Closed Preferential Runways

- CFA / DFC – No comments or concerns.

Draft Proposed Procedure 2 – Tower Open Preferential Runways

- CFA – Students will not be dispatched with a 5 kt tailwind, and students and instructors will be advised not to accept such a clearance by the Air Traffic Control Tower.
- DFC – Dispatching students with tailwinds of 5 kts or less will depend on their individual abilities and safety.
- CFA / DFC – A 10 kt crosswind component may be too high for select students; their Transport Canada-approved crosswind limit is 12 kts, but some students have individual limits under 10 kts. Concern was also expressed that students may not be sufficiently confident to not accept a clearance that exceeds their skill level.

Draft Proposed Procedure 3 – Overnight Restricted Hours

- CFA / DFC – Of the opinion that the existing overnight restricted hours are more appropriate. CFA noted that this would reduce their ability to generate revenues by 13%.

Draft Proposed Procedure 4 – Overnight Engine Run-Ups

- CFA / DFC – No comments or concerns.

Draft Proposed Procedures 5-8 – Arrival and Departure Procedures

- CFA – No comments or concerns.
- DFC – No major concerns were voiced; however, what information will be available to support monitoring for compliance and enforcement activities?

Draft Proposed Procedure 9 – Prior Permission for Flight Training

- CFA / DFC – Both groups expressed concern from an implementation perspective, specifically with whether approval would be required prior to each flight. Refinements to the wording of the Draft Proposed Procedure are requested.

Draft Proposed Procedure 10 – Time of Day Flight Training Restrictions

- CFA – Between May 1 and September 30, Draft Proposed Procedure 10 would decrease their ability to generate revenue by 18%. The summer months are the best period for flight training, and the Draft Proposed Procedure may result in good weather days being lost. From October to April, this would decrease their ability to generate revenue by 9%.
- CFA – Will returning aircraft be permitted to arrive after the commencement of the evening restricted period?
- CFA – The last booking of each day may need to be scheduled approximately 2 hours earlier to ensure students don't contravene the restricted period.
- DFC – The 5 summer months account for 56% of their total annual activity; concern was voiced that limited daylight hours during prime flight training periods would be problematic.
- DFC – Notes that the additional restrictions will limit their ability to flexibly reschedule flights that need to be rebooked from bad weather days.

Draft Proposed Procedure 11 – Alternating Seasonal Weekend Flight Training Restrictions

- CFA – Draft Proposed Procedure 11 would remove a full day per week during their busiest period of operations, or a 6% decrease in their ability to generate revenue.
- DFC – Weekends aren't identified as the most problematic period for noise complaints; why are they being targeted with Draft Proposed Procedure 11?
- DFC – Alternating weekend schedules will be confusing for pilots and may result in increased levels of accidental noncompliance.

Draft Proposed Procedure 12 – Statutory Holiday Flight Training Restrictions

- CFA – This would result in a 4% reduction in their annual ability to generate revenues.
- DFC – Draft Proposed Procedure 12 may be acceptable.

Draft Proposed Procedure 13 – Circuit Flight Training Restrictions

- CFA – This would reduce their ability to generate revenue by 11%.
- DFC – It will be a significant challenge for both Flight Training Units to coordinate their operations and will require that the Airport establishes a slot system.

Draft Proposed Procedure 14 – Toronto Zoo

- CFA / DFC – No comments or concerns.

General Comments and Questions (Other)

- CFA / DFC – The City is focussing on noise abatement procedures without considering other elements of the ICAO Balanced Approach to Aircraft Noise Management, such as land use planning. Why is new development being permitted in noise sensitive areas?

3.4.5 Airport Businesses

A virtual workshop with businesses based at the Airport was convened on November 25, 2021, including:

- Enterprise Aviation Group of Companies: Ken Ruffo, General Manager; Andrew Noonan, Director of Flight Operations; and June Stevens, Accounting Manager;
- Aviation Unlimited: Mark Brooks and Isaac Capua;
- Ryan Terminal Holdings: Sol Prizant, President and Sharon Prizant, Director of Marketing; and
- Corporate Aircraft Restorations: Maurice Nesbitt.

In attendance on behalf of the City and Airport were Tom Goodeve (Director of Planning Services), Laura Moebs (Principal Planner), Stephen Wilcox (Airport Manager), and two representatives of HM Aero (Adam Martin and Ben Crooks).

Supplementary written comments were also provided by the Enterprise Aviation Group of Companies, as documented in Appendix A.

General Comments and Questions (Draft Proposed Procedures)

- An overarching theme was that the Draft Proposed Procedures are imbalanced in favour of a small subset of the population of Oshawa that files noise complaints, and concern was noted that the Draft Proposed Procedures may not result in a tangible impact in complaint levels. Alternative solutions, such as community outreach, should be implemented as opposed to noise abatement procedures.
- Businesses based at the Airport will be challenged with reduced activity and revenues and may result in spin-off economic impacts such as job reductions and reduced fuel sales. Concern was noted that sufficient attention has not been paid to the impacts to businesses other than the FTUs at the Airport.
- The complexity of the Draft Proposed Procedures is considerable and will make them challenging to implement and enforce. Education of pilots and users must also be considered.
- Safety is not considered to a sufficient degree within the evaluation of the Draft Proposed Procedures and select Procedures may constitute a liability for businesses from a risk perspective.
- Aircraft should be differentiated within the Draft Proposed Procedures according to their noise profiles, and allowances made for next-generation aircraft (e.g., electric aircraft).
- Questions were posed surrounding the cumulative impacts of the Draft Proposed Procedures and the new landing fees that came into effect in January 2022, which have not been analyzed.
- Compensation to Airport businesses should be considered.
- The historical noise complaint dataset is not sufficiently specific or granular to support the development of the Draft Proposed Procedures.
- The suggestion was made that businesses that are negatively impacted should be compensated by the City.

Draft Proposed Procedure 1 – Tower Closed Preferential Runways

- Corporation Aircraft Restorations indicated that Draft Proposed Procedure 1 may be supportable.
- Concern was noted over the safety implications of using a single corridor for arrivals and departures.
- The suggestion was made to tie the Draft Proposed Procedure to set times of day (e.g., aligning with the hours of Draft Proposed Procedure 3) as opposed to link it with the hours of operation of the Air Traffic Control Tower. In the future, the hours of the Tower could be reduced.
- Emergency aircraft should continue to have the ability to choose the most time-efficient runway for arrivals and departures.

Draft Proposed Procedure 2 – Tower Open Preferential Runways

- The tailwind component will constitute a safety and performance risk for aircraft arrivals and departures, especially for larger aircraft that require longer takeoff and landing distances. The suggestion was made to implement a wording change to emphasize using pilot discretion and safety.

Draft Proposed Procedure 3 – Overnight Restricted Hours

- Draft Proposed Procedure 3 was not supported by the Enterprise Aviation Group of Companies, Aviation Unlimited, or Corporate Aircraft Restorations.
- Additional analysis was requested to determine whether people complain at sufficient levels to justify the change contemplated in Draft Proposed Procedure 3.

Draft Proposed Procedure 4 – Overnight Engine Run-Ups

- The question was posed as to why the Draft Proposed Procedure would be considered if this has not been identified as a historical issue.

Draft Proposed Procedures 5-8 – Arrival and Departure Procedures

- The question was posed by the Enterprise Aviation Group of Companies as to how each of the Draft Proposed Procedures will be monitored and enforced.
- Corporate Aircraft Restorations indicated that Draft Proposed Procedures 5-8 may be supportable.

Draft Proposed Procedure 9 – Prior Permission for Flight Training

- Clarification was requested on whether blanket approvals would be included as part of Draft Proposed Procedure 9, and a wording change was suggested to clarify the intent of this procedure.

Draft Proposed Procedure 10 – Time of Day Flight Training Restrictions

- Draft Proposed Procedure 10 was not supported by the Enterprise Aviation Group of Companies, Aviation Unlimited, or Corporate Aircraft Restorations.
- Concern was noted on how the intent of the Draft Proposed Procedure (i.e., to provide periods of scheduled reprieve) was justifiable against the business impacts of such a restriction.

Draft Proposed Procedure 11 – Alternating Seasonal Weekend Flight Training Restrictions

- Draft Proposed Procedure 11 was not supported by the Enterprise Aviation Group of Companies, Aviation Unlimited, or Corporate Aircraft Restorations.

Draft Proposed Procedure 12 – Statutory Holiday Flight Training Restrictions

- The Enterprise Aviation Group of Companies and Aviation Unlimited were not in support of Draft Proposed Procedure 12.
- Corporate Aircraft Restorations indicated that Draft Proposed Procedure 12 may be supportable.

3.4.6 Durham Regional Police Service

A virtual meeting was convened with the Durham Regional Police Service, which bases its law enforcement helicopter at the Airport. The Durham Regional Police Service was represented by Robert Bryan and Lyndon Greene. In attendance on behalf of the City and Airport were Tom Goodeve (Director of Planning Services), Victoria White (Principal Planner), Stephen Wilcox (Airport Manager), and two representatives of HM Aero (Adam Martin and Ben Crooks).

General Comments and Questions (Draft Proposed Procedures)

- As law enforcement operations continue to be an exempted activity under the Draft Proposed Procedures, the Durham Regional Police Service did not identify any concerns.
- The question was posed as to how many complaints are attributable to law enforcement helicopter operations, and whether that had been accounted for in the analysis.

3.4.7 NAV CANADA

A virtual meeting was convened with NAV CANADA on November 25, 2021, as represented by Albert (Tyson) Morelli and David Purkis. In attendance on behalf of the City and Airport were Tom Goodeve (Director of Planning Services), Laura Moebs (Principal Planner), Stephen Wilcox (Airport Manager), and two representatives of HM Aero (Adam Martin and Ben Crooks).

General Comments and Questions (Draft Proposed Procedures)

- NAV CANADA noted that they will not be responsible for enforcement of the Draft Proposed Procedures.
- From a procedural standpoint, NAV CANADA will not be responsible for briefing aircraft on the Draft Proposed Procedures, and it is expected that the Airport Operator will be responsible for following up with noncompliant aircraft.
- NAV CANADA does not currently have plans to reduce its hours of operation to coincide with the times identified in Draft Proposed Procedure 3 (9:30 PM / 7:30 AM). An aeronautical study and business case would be required prior to such a change being made.

Draft Proposed Procedure 1 – Tower Closed Preferential Runways

- NAV CANADA did not have any comments with respect to Draft Proposed Procedure 1.

Draft Proposed Procedure 2 – Tower Open Preferential Runways

- The NAV CANADA Manual of Air Traffic Services defines calm winds as being less than 5 kts – not up to and including 5 kts.
- Concern was expressed that aircraft will not accept a clearance for Runway 30 with a tailwind component and will request an alternative runway. This will disrupt the airspace and increase the workload for controllers while the request for an alternative runway is accommodated.

Draft Proposed Procedure 3 – Overnight Restricted Hours

- NAV CANADA did not have any comments with respect to Draft Proposed Procedure 3.

Draft Proposed Procedure 4 – Overnight Engine Run-Ups

- NAV CANADA did not have any comments with respect to Draft Proposed Procedure 4.

Draft Proposed Procedures 5-8 – Arrival and Departure Procedures

- NAV CANADA's radar surveillance terminates at 2,000 ft. ASL and the ADS-B mandate likely won't be in place in Oshawa until approximately 2026. NAV CANADA does not have the systems available with the data granularity to monitor for compliance with Draft Proposed Procedures 5 through 8 and will not integrate third-party hardware / software solutions in their operations for this purpose.
- NAV CANADA does not typically issue clearances with altitude restrictions for VFR traffic, and the requirements of Draft Proposed Procedures 5 through 8 will not be included in aircraft clearances. While it may do so voluntarily, there is no obligation on NAV CANADA to do so.
- Consideration may be given to keeping Draft Proposed Procedures 5-8 as voluntary to address the enforcement challenges that may arise.

Draft Proposed Procedure 9-12 – Flight Training Restrictions

- NAV CANADA does not have the authority to deny a takeoff or taxi clearance to a flight training aircraft except in very rare circumstances; it is assumed that flight training aircraft will be individually responsible for operating in compliance with the Draft Proposed Procedures.
- NAV CANADA does not have the authority to reroute or redirect aircraft that intend to complete flight training at the Airport.

Draft Proposed Procedure 13 – Circuit Flight Training Restrictions

- The language of the Draft Proposed Procedures should be clarified in how it defines flight training.
- Concern was not voiced as to the limiting of traffic in the circuit - however, NAV CANADA will not be responsible for monitoring for compliance or restricting the number of aircraft in the circuit, nor will it participate in a slot system.

Draft Proposed Procedure 14 – Toronto Zoo

- NAV CANADA will not be able to monitor compliance, nor will it be responsible for enforcement.

3.4.8 Transport Canada

A virtual meeting was convened with Transport Canada on December 13, 2021. In attendance from Transport Canada were Paul Baldasaro, Technical Team Lead – Flight Operations; Paul Spiers, Civil Aviation Safety Inspector – Flight Operations; and Hanif Mawji, Associate Director – Operations. In attendance on behalf of the City and Airport were Laura Moebs (Principal Planner), Stephen Wilcox (Airport Manager), and two representatives of HM Aero (Adam Martin and Ben Crooks).

Please note that the meeting notes provided below represent the perspective shared by the above-noted attendees from a civil aviation safety perspective. These meeting notes should not be interpreted as representing the departmental position of Transport Canada as a whole.

General Comments and Questions (Draft Proposed Procedures)

- Clarification was provided by the Transport Canada attendees on the following questions:
 - All flying done by a student pilot while under the supervision of a Certified Flight Instructor (CFI), whether that CFI is employed by a Flight Training Unit or on a freelance basis, is defined as flight training.

- All flying done by a licensed pilot while under the supervision of a CFI while pursuing an additional endorsement or license is defined as flight training.
- Solo flying done by a student pilot or licensed pilot under the authorization of a CFI while pursuing an additional endorsement or license is defined as flight training, while building time for a license without the authorization or supervision of a CFI is not defined as flight training.
- The rental of an aircraft owned by a FTU by a licensed pilot for recreational purposes is not defined as flight training.
- Several notes provided below are focussed on enforcement actions. The Transport Canada attendees noted through subsequent correspondence that there are many consensus building items that have to be defined before enforcement can be further established. The intention of the Transport Canada attendees was to convey that, where necessary and where consensus is not reached either in developing the noise abatement procedures or acting on them at the local level, it could then be escalated to enforcement. Enforcement is not the initial step in addressing alleged noise violations. The Airport's noise management committee and the ability to respond and resolve issues of noise violations tie into the consensus built into developing the procedures, and the mechanism for addressing violations.
 - Once all other mechanisms at the Airport level have failed to achieve consensus in response to an alleged noise violation, the Transport Canada attendees noted that they follow principles of natural justice in enforcement. Individuals reporting alleged violations will have to provide supporting information (e.g., time of day, aircraft registration, etc.) that supports their claim. The matter will be investigated / decided considering the balance of probabilities.
- Concern was raised that the redistribution of activity from the Airport to others in the region (e.g., Peterborough, Lindsay) is not an effective approach to noise management and would shift the problem to other communities.
- The findings of the City's noise monitoring and air quality studies are requested to be included in the future Transport Canada submission.
- The Transport Canada attendees suggested that the traffic pattern altitude could be increased modestly to reduce noise exposure from overflying aircraft.
- It was emphasized that a noise management committee should also be in place (i.e., the Airport Community Liaison Committee).

Draft Proposed Procedure 1 – Tower Closed Preferential Runways

- Consideration should be given to remove the use of “shall”, and instead that “consideration should be given to... if conditions permit” or similar substitute wording to ensure that flight safety is emphasized. If this wording change is made, Draft Proposed Procedure 1 may be supportable.
- Pilots should not be expected to arrive / depart with a tailwind. Safety is paramount in all Draft Proposed Procedures, including proposed Procedure 1.

Draft Proposed Procedure 2 – Tower Open Preferential Runways

- The 5-knot tailwind component of Draft Proposed Procedure 2 is a flight safety concern and should be removed; doing so may make this procedure supportable.
- Wording should be integrated, such as “...operations on a non-preferential runway may be accommodated by request,” to ensure pilots are aware that they do not have to accept wind conditions that are beyond their skill levels.

- From a flight training perspective, a 10-knot crosswind component should be supportable. A CFI should not assign a crosswind component to a student pilot that is beyond their skill level, and an alternative runway may be used during unsupervised flights at lower experience levels (e.g., the first solo flight of a student pilot) to reduce the risk posed.
- The Transport Canada attendees noted that NAV CANADA will prioritize safety in issuing clearances to pilots, and pilots are authorized to not accept a clearance that is, in their opinion, unsafe.

Draft Proposed Procedure 3 – Overnight Restricted Hours

- The Transport Canada attendees noted that the City has the right to decide how to operate their Airport, including the consideration of restricted hours of operation, so long as it does not violate other Operational Agreements. With respect to noise abatement, the consideration of restricted hours must be done in consultation with all stakeholders and the process does not allow for decisions without consensus.
- Concern was raised that Draft Proposed Procedure 3 would restrict operations at the Airport and negatively impact users and businesses based at the facility. Specifically, night flight training will be limited.

Draft Proposed Procedure 4 – Overnight Engine Run-Ups

- Draft Proposed Procedure 4 was identified as being potentially supportable by the Transport Canada attendees.

Draft Proposed Procedures 5-8 – Arrival and Departure Procedures

- With respect to enforcement, external reports from individuals (e.g., community members) regarding alleged violations must provide credible / strong evidence to Transport Canada to prove that the aircraft in question did not comply with the Draft Proposed Procedure. The onus is on the individual reporting an alleged violation to substantiate their claim with sufficient evidence.
 - Transport Canada would be obligated to follow-up on a detection notice, but the time and resources required to investigate a subjective alleged violation would be substantial.
 - It is noted that community members may be reporting alleged violations as safety concerns as opposed to noise concerns.
 - Third-party hardware / software solutions, such as the NemoScout platform used at other airports, are not calibrated or certified and would not be relied upon by Transport Canada to support investigations.
- With respect to Draft Proposed Procedure 7 (Circling Procedures), the Transport Canada attendees noted that given the NAV CANADA Air Traffic Control Tower at the Airport and positive Air Traffic Control directions that will be applied with all maneuvering of traffic in the control zone, then visual maneuvering procedures would not apply. In addition, airspeed and altitude limits are already published in the applicable aeronautical publications.

Draft Proposed Procedure 9 – Prior Permission for Flight Training

- The level of effort borne by the Airport Manager in responding to numerous requests for prior permission per day will be significant, and consideration should be given to removing Draft Proposed Procedure 9.
- CFIs should be conversant in the Draft Proposed Procedures and be responsible for briefing their students, and licensed pilots should be expected to familiarize themselves with all procedures.

Draft Proposed Procedures 10-13 – Flight Training Restrictions

- The wording of Draft Proposed Procedures 10-13 should be reviewed based on Transport Canada's definitions of flight training as provided above.
- The Transport Canada attendees noted that it is within the purview of the City, as the Airport owner, to restrict activity at the facility. However, concern was noted that the cumulative impact of these Draft Proposed Procedures would most likely be the significant reduction in flight training activity and / or hindering the viability of FTUs based at the Airport.
- The Transport Canada attendees noted that if movements at the Airport decrease significantly as a result of Draft Proposed Procedures 10-13, NAV CANADA may re-evaluate the operational need for the Air Traffic Control Tower at Oshawa Airport.
- The enforcement of Draft Proposed Procedures 10-13 will be contingent on there being sufficient information to investigate an alleged violation, as noted previously.

Draft Proposed Procedure 14 – Toronto Zoo

- The Transport Canada attendees questioned the inclusion of Draft Proposed Procedure 14, as it transcends the noise concerns being addressed in the community by the Draft Proposed Procedures.

General Comments and Questions (Other)

- A general discussion occurred among the meeting attendees regarding noise abatement, and the Transport Canada attendees noted that additional development in the vicinity of the Airport will likely result in increased noise complaints. This factor should be accounted for when preparing new noise abatement procedures. The Transport Canada attendees noted that noise abatement procedures require consultation and consensus with all stakeholders, in line with the principles of AC 302-002.

3.5 Stakeholder Findings – Public Meetings

3.5.1 Airport Users

Two public meetings were convened with Airport users on November 23 and November 24, 2021. A combined total of 86 individuals registered for and attended the two workshops.

General Comments and Questions (Draft Proposed Procedures)

- Concerns were voiced that noise abatement procedures with wide-ranging impacts are being requested to address the concerns of a limited subset of the population of Oshawa.
- The Draft Proposed Procedures are overly restrictive and will detrimentally impact Airport users, Flight Training Units, and businesses.
- The Draft Proposed Procedures will make it significantly harder for individuals employed for standard work hours (i.e., “9 to 5”) to complete their flight training. The impacts analysis does not consider whether students will terminate their flight training at the Airport.
- The wording of the Draft Proposed Procedures should be simplified to assist pilots in understanding the regulations and achieving compliance. The number and complexity of the Draft Proposed Procedures may be difficult to navigate.
- The economic impacts analysis fails to consider decreased on-Airport employment as activity is reduced, including Aircraft Maintenance Engineers, support staff, etc. The loss of students altogether must also be considered if they can complete their training more expeditiously elsewhere.
- The basis for the Draft Proposed Procedures being considered (i.e., residents with noise concerns) was repeatedly called into question. Without a demonstration of the Airport’s economic and social benefits, the consultation process is based on incomplete information.
- Relying on complaint data to diagnose the problem underrepresents the wider support of residents that do not necessarily vocalize their opinions.
- Ambient noise from roads and other sources causes more noise than the Airport does – why is this process being initiated?
- Many community members see value in the Airport and enjoy its operation.
- The increased prevalence of individuals working from home during the COVID-19 pandemic skews the noise complaint dataset. Residences logging repeated complaints may be skewing the dataset, and this should be explained in greater detail in the report.
- The Draft Proposed Procedures are part of a broader push to shut down the Airport.
- The increase in aircraft activity and noise has occurred gradually and may be interpreted as a sign of Airport health and success.
- The shifting of activity to other uncontrolled airports (e.g., Peterborough, Lindsay, Toronto / Buttonville) will decrease safety at these facilities and potentially result in noise concerns in their respective communities.
- What happens if noise complaints continue to be filed or increase – will the AC 302-002 process be initiated anew? Will additional noise abatement procedures be introduced in the future?
- The combined impacts of the Draft Proposed Procedures and the revised landing fees being implemented in January 2022 should be considered.

- Not all aircraft have the same noise profiles. Less noisy aircraft should be exempted from the Draft Proposed Procedures.
- What role will NAV CANADA have in enforcing the Draft Proposed Procedures?
- Will the Automated Terminal Information Service frequency advise pilots of the Draft Proposed Procedures?
- How can this project be independent if the consultant is retained by the City?
- If aircraft movements decrease as a result of the Draft Proposed Procedures, will the NAV CANADA Air Traffic Control Tower be closed? What are the safety implications associated with that potential development?
- The definition of flight training should be clarified within Draft Proposed Procedures 9-13.
- Aircraft sizes, types, and noise profiles should be treated differently within the Draft Proposed Procedures.
- The safety implications of the concentration of traffic during unrestricted hours should be noted.
- Shifting traffic from the Airport to others in the region will increase flight times for aircraft transiting to these facilities, increasing emissions counter to climate change goals.
- The cumulative impacts of the Draft Proposed Procedures and the landing fees being implemented in January 2022 should be considered.

Draft Proposed Procedure 1 – Tower Closed Preferential Runways

- Draft Proposed Procedure 1 is atypical of procedures established at other Canadian airports and will introduce a safety risk with aircraft operators arriving and departing on converging tracks.

Draft Proposed Procedure 2 – Tower Open Preferential Runways

- Increased crosswind and tailwind limits are a safety risk and may exceed the skill levels of certain pilots.
- Tailwind operations will decrease aircraft takeoff and landing performance at Maximum Takeoff Weight.

Draft Proposed Procedure 3 – Overnight Restricted Hours

- Draft Proposed Procedure 3 unduly impacts businesses based at the Airport based on a small proportion of the total population of Oshawa.
- The Draft Proposed Procedure is unreasonably restrictive for private pilots and users of the Airport.
- Maintaining nighttime currency during the summer months will be challenging, in combination with Draft Proposed Procedures 9-13.
- Changing the hours of operation by one hour on each end may not result in a material impact for residents.
- One respondent noted that Draft Proposed Procedure 3 may be supportable.

Draft Proposed Procedure 4 – Overnight Engine Run-Ups

- The Draft Proposed Procedure may be reworded to clearly identify that it is addressing extended duration maintenance run-ups, as opposed to pre-flight checks.

- Consideration should be given to exempting run-ups for aircraft that have had a maintenance issue, and instead only limiting scheduled maintenance run-ups
- One respondent noted that Draft Proposed Procedure 4 may be supportable.

Draft Proposed Procedure 5 – Arrival Turns

- One respondent noted that Draft Proposed Procedure 5 may be supportable.
- Would lower arrival turns closer to the Airport be of more benefit versus extended duration final approach legs?

Draft Proposed Procedure 6 – Approach Angle

- One respondent noted that Draft Proposed Procedure 6 may be supportable.
- How will engine-out landings / low approaches be practiced without violating Draft Proposed Procedure 6?

Draft Proposed Procedure 7 – Circling Procedures

- One respondent noted that Draft Proposed Procedure 7 may be supportable.

Draft Proposed Procedure 8 – Departure Turns

- One respondent noted that Draft Proposed Procedure 8 may be supportable.

Draft Proposed Procedure 9 – Prior Permission for Flight Training

- How will the City / Airport Operator know if a flight is actually for flight training purposes, as opposed to a flight training aircraft being used for recreational or sightseeing purposes?
- Draft Proposed Procedure 9 should be reworded to clarify that prior contact is required, as opposed to prior permission.

Draft Proposed Procedure 10 – Time of Day Flight Training Restrictions

- The 4:00 PM restriction will increase the difficulty experienced by individuals working traditional 8:00-4:00 / 9:00-5:00 hours in scheduling their flight training.

Draft Proposed Procedure 13 – Circuit Flight Training Restrictions

- The proposed limit may be excessive, as the Airport typically operates with a maximum of 5 to 8 aircraft in the circuit.
- Limiting the circuit capacity may result in aircraft holding over residential neighbourhoods while waiting to enter the circuit.
- How will Draft Proposed Procedure 13 be implemented and enforced?

Draft Proposed Procedure 14 – Toronto Zoo

- The question was posed as to why Draft Proposed Procedure 14 is being included in the Airport-specific noise abatement procedures.

General Comments and Questions (Other)

- Increased community outreach should occur in the future to better connect residents with the Airport.
- Why are land use planning measures not also being considered to address resident noise concerns?
- Real estate agents are allegedly trying to downplay the noise impacts of the Airport to prospective buyers.

3.5.2 Community Members

Two public meetings were convened with community members on November 23 and November 24, 2021. A total of 109 individuals registered for the two workshops, and the combined attendance of the two workshops was 86 individuals.

General Comments and Questions (Draft Proposed Procedures)

- The Draft Proposed Procedures should be tailored to provide sufficient reprieve for residents of Whitby.
- Low flying aircraft are a source of concern and should be addressed through the Draft Proposed Procedures.
- How will monitoring and enforcement occur, how will repeat offenders be tracked, and what reprimands will exist? Will residents be able to report alleged deviations?
- Will the noise abatement procedures, when enacted, be reviewed on a regular (e.g., annual) basis? Can they be revisited if improvements are not experienced?
- Will activity continue to grow at the Airport in the future regardless of the Draft Proposed Procedures?
- All noise abatement procedures should be mandatory, with no voluntary procedures to remain.
- NAV CANADA should be consulted to determine whether increased separation can be provided between departures.
- Will the total number of aircraft movements be reduced, or will traffic be reallocated to nonrestricted periods?
- The Draft Proposed Procedures may negatively impact the viability of the businesses located at the Airport.
- The flight training restrictions proposed may be overly onerous for the based Flight Training Units, especially during the summer months.
- Was consideration given to capping the annual number of flight training movements?
- Was consideration given to mandating the use of less noisy aircraft, or establishing procedures specific to turbofan / turboprop aircraft?
- Was consideration given to establishing “no fly zones” near the Airport?
- Will flight training restrictions address touch-and-go’s and stop-and-go’s?
- With respect to the AC 302-002 process, do all community members need to reach consensus regarding the proposal?
- With respect to the AC 302-002 process, will residents be informed of substantive changes to the Draft Proposed Procedures?

Draft Proposed Procedure 2 – Tower Open Preferential Runways

- The preferential runway usage criteria may result in more frequent overflights lands northwest of the Airport.
- Runway 05 seems to be very busy; will this be addressed by Draft Proposed Procedure 3?

Draft Proposed Procedure 3 – Overnight Restricted Hours

- Why are industrial emergency flights exempted in the same manner as air ambulance and law enforcement operations? Who determines what constitutes an industrial emergency flight?

- How will Draft Proposed Procedure 3 address turbofan / turboprop operations overnight?

Draft Proposed Procedures 5-7 – Arrival Procedures

- Could arrival procedures specific to turbofan aircraft be created?

Draft Proposed Procedure 8 – Departure Turns

- One respondent indicated that aircraft commonly turn to the south early when departing from Runway 12. Should the minimum altitude for the departure turn be increased to 2,000 ft. ASL when they are within radar coverage?
- How will compliance with Draft Proposed Procedure 8 be tracked and enforced?
- Can turbofan aircraft be assigned a different altitude for their enroute turns?

Draft Proposed Procedure 12 – Statutory Holiday Flight Training Restrictions

- The August civic holiday should be added to the list, despite not being a federal statutory holiday.

Draft Proposed Procedure 13 – Circuit Flight Training Restrictions

- Reducing the frequency of aircraft overflights would be a welcome reprieve.
- Clarity is requested between the current voluntary maximum of 12 aircraft and the realistic practical capacity of 8 aircraft.

General Comments and Questions (Other)

- A perception was voiced that activity levels have increased significantly over the past 18 to 24 months.
- The online noise complaint tool does not allow for the input of Whitby addresses.
- Can only one Flight Training Unit be permitted at the Airport, as opposed to two?
- The Airport is unsuited for high volume flight training given its urban residential land use context. Can the Airport be moved?
- Concern was voiced that aircraft were modifying their flight paths to avoid noise monitoring units.
- One respondent noted that regardless of fluctuations in activity levels, residents may be discontent but not voicing their concerns.
- Can Runway 23 be switched from a right-hand circuit to a left-hand circuit?
- Was consideration given to closing the Flight Training Units or moving them to a more rural airport?
- When are the results of the City's noise and air quality monitoring study to be released?
- What landing fees are charged at the Airport?

3.6 Stakeholder Findings – Online Survey

3.6.1 Respondent Profile and Overall Support

The online engagement survey was available from November 8, 2021 until November 29, 2021. A total of 376 responses were received during the three-week period of availability from 373 unique contributors, including registered, unregistered, and anonymous respondents. Please note that the sum of all responses to each question may not equal 376, as certain questions were not answered by all respondents.

Of the 376 responses received, 240 respondents (64%) self-identified as being a user of the Airport in some capacity, including aircraft owners, business owners, mechanics, pilots, and regular airport users / flyers. 136 respondents (36%) did not identify as being a user of the Airport (“I am not an Airport user”).

Among respondents that provided place of residence information, 168 (53%) identified as being an Oshawa resident, business owner, or property owner, while 193 respondents (47%) did not identify as being an Oshawa resident, business owner, or property owner (Table 3.1). The majority of respondents from Oshawa (75%) live in the area bounded by Conlin Road, Ritson Road, Rossland Road, and Thickson Road – i.e., within approximately 3 km of the Airport.

Table 3.1 - Survey Findings: Respondent Place of Residence

Place of Residence		Respondents	
Oshawa	Within the area bounded by Conlin Road, Ritson Road, Rossland Road, and Thickson Road	139	39%
	Outside of the above-noted boundary	47	13%
Durham Region		63	18%
Greater Toronto Area		59	16%
Ontario		52	14%
Total		360	100%

At the outset of the survey, respondents were asked whether they support the introduction of mandatory noise abatement procedures at the Airport. Among individuals that did not identify as being users of the Airport, 74% were in favour such procedures being implemented (Table 3.2). Support decreased significantly among Airport users, with only 16% of respondents in this category favouring the implementation of mandatory noise abatement procedures.

As shown in Table 3.3, support for mandatory noise abatement procedures also varies based on the respondents place of residence. Support was highest among respondents living within the area bounded by Conlin Road, Ritson Road, Rossland Road, and Thickson Road, with 63% of respondents in this area in support. Support incrementally decreased by distance among respondents elsewhere in Oshawa (36% in support), Durham Region (25% in support), the Greater Toronto Area (12% in support), and in Ontario (14% in support).

Table 3.2 - Survey Findings: Support of Noise Abatement Procedures by User Category

Response	Non-Airport Users	Airport Users
Number of Responses	133	239
Not Supportive	26%	84%
Supportive	74%	16%

Table 3.3 - Survey Findings: Support of Noise Abatement Procedures by Place of Residence

Place of Residence		Number of Responses	Not Supportive	Supportive
Oshawa	Within the area bounded by Conlin Road, Ritson Road, Rossland Road, and Thicksen Road	137	37%	63%
	Outside of the above-noted boundary	47	64%	36%
Durham Region		63	75%	25%
Greater Toronto Area		59	88%	12%
Ontario		51	86%	14%

3.6.2 Draft Proposed Procedure 1, Tower Closed Preferential Runways

A total of 361 responses were received with respect to Draft Proposed Procedure 1. Among individuals who did not identify as being users of the Airport, 64% were supportive of the Draft Proposed Procedure. Recurrent concerns and themes among the 36% of respondents in this category that did not support Draft Proposed Procedure 1 are as follows:

- The respondent’s neighbourhood will experience additional overflights;
- Aviation safety will be negatively impacted; and
- Overall aircraft noise will not be significantly impacted.

Among respondents that self-identified as being a user in some capacity of the Airport, 42% were supportive of Draft Proposed Procedure 1. Comments expressed by the 58% of respondents that did not support Draft Proposed Procedure 1 primarily followed the below-noted key themes, with concerns around aviation safety being expressed in most cases:

- The language should be changed to remove the use of “shall”;
- Identifying preferred runways infringes upon a pilot’s decision-making authority;
- Aviation safety will be negatively impacted through aircraft operating in crosswind and tailwind conditions;
- Aviation safety will be negatively impact by aircraft operating on converging flight paths;
- The Draft Proposed Procedure is unnecessarily complex; and
- Overall aircraft noise will not be significantly impacted.

Table 3.4 - Survey Findings: Draft Proposed Procedure 1, Tower Closed Preferential Runways

Response	Non-Airport Users	Airport Users
Number of Responses	123	238
Not Supportive	36%	58%
Supportive	64%	42%

Explanation Provided: When the Air Traffic Control Tower is closed, pilots shall use Runway 12 for arrivals and Runway 30 for departures consistent with safety of operations.

3.6.3 Draft Proposed Procedure 2, Tower Open Preferential Runways

A total of 349 responses were received with respect to Draft Proposed Procedure 2. Among individuals who did not identify as being users of the Airport, 68% were supportive of the Draft Proposed Procedure. Recurrent concerns and themes among the 32% of respondents in this category that did not support Draft Proposed Procedure 3 are as follows:

- Overall aircraft noise will not be significantly impacted and residential overflights will continue;
- Concern that aviation safety and pilot decision-making authority will be negatively impacted; and
- Concern that the Draft Proposed Procedure is too restrictive.

Additionally, a recurrent theme was that individuals without aviation expertise struggled to interpret the text of the Draft Proposed Procedure or understand its impacts.

Among respondents that self-identified as being a user in some capacity of the Airport, 47% were supportive of Draft Proposed Procedure 2. Comments expressed by the 53% of respondents that did not support Draft Proposed Procedure 2 primarily followed the below-noted key themes, with concerns around aviation safety again being expressed in the majority of comments received, similar to Draft Proposed Procedure 1:

- Aviation safety will be negatively impacted with crosswind and tailwind components, especially for less experienced pilots;
- Tailwind operations will result in reduced aircraft performance and increase the likelihood for runway excursions;
- Missed approaches and go-arounds as a result of tailwind operations may result in additional overflights and aircraft noise;
- Pilot decision-making authority will be infringed upon by the Draft Proposed Procedure; and
- The Draft Proposed Procedure is complex and difficult to interpret.

Table 3.5 – Survey Findings: Draft Proposed Procedure 2, Tower Open Preferential Runways

Response	Non-Airport Users	Airport Users
Number of Responses	119	230
Not Supportive	32%	53%
Supportive	68%	47%
Explanation Provided: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° at up to 10 knots (18.52 km/h) or from a heading of 031° (incrementally) to 209° at up to 5 knots (9.26 km/h).		

3.6.4 Draft Proposed Procedure 3, Overnight Restricted Hours

A total of 372 responses were received with respect to Draft Proposed Procedure 3. Among individuals who did not identify as being users of the Airport, 70% were supportive of the Draft Proposed Procedure. Recurrent concerns and themes among the 30% of respondents in this category that did not support Draft Proposed Procedure 3 are as follows:

- The Draft Proposed Procedure unnecessarily restricts aircraft operators and aviation businesses;
- The nighttime restriction is not restrictive enough and should begin earlier in the evening (e.g., 8:00 PM);
- The nighttime restriction is too restrictive and should begin later in the evening (e.g., 11:00 PM);
- The current restricted hours are adequate;
- Industrial emergency flights should not be an exempted category; and
- Flight training will be negatively impacted, especially in the summer months.

Among respondents that self-identified as being a user in some capacity of the Airport, 25% were supportive of Draft Proposed Procedure 2. Comments expressed by the majority (75%) of respondents that did not support Draft Proposed Procedure 3 primarily were centred around the following key themes, the most prevalent of which was concern that night ratings and recurrency training would be difficult to complete:

- Flight training activities, including night ratings and night recurrency flights, will be significantly restricted;
- Making the Draft Proposed Procedure mandatory would incentivize pilots to rush their pre-departure preparations;
- The Draft Proposed Procedure will negatively affect the competitiveness and value proposition of the Airport;
- The restricted hours may be appropriate in the winter but are too restrictive in the summer months;
- The existing restricted hours are more appropriate, or would be appropriate with more modest revisions or a realignment to be consistent with the municipal noise bylaw;
- Concern that arriving aircraft will not be able to return to the Airport; and
- The Draft Proposed Procedure will not have a significant impact on aviation noise, as limited operations occur during the proposed hours.

Table 3.6 - Survey Findings: Draft Proposed Procedure 3, Overnight Restricted Hours

Response	Non-Airport Users	Airport Users
Number of Responses	135	237
Not Supportive	30%	75%
Supportive	70%	25%

Explanation Provided: Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.

3.6.5 Draft Proposed Procedure 4, Overnight Engine Run-ups

A total of 371 responses were received with respect to Draft Proposed Procedure 4. For respondents that self-identified as not being users of the Airport, 83% indicated their support for this Draft Proposed Procedure. Among the remaining 17% that did not provide support, recurring concerns were as follows:

- The proposed hours are not sufficiently restrictive and should be extended;
- The restriction on run-ups should be based on the type and / or size of aircraft;
- If a run-up is required because of emergency maintenance, it should be permitted; and
- The proposed hours are overly restrictive and should be reduced or eliminated.

For self-identified users of the Airport, 57% were supportive of Draft Proposed Procedure 3, while 43% did not support the restriction. Reasons cited for respondents that opposed the procedure were as follows:

- The restriction will negatively impact aviation safety and force Aircraft Maintenance Engineers to rush their repair activities;
- The proposed hours are overly restrictive and should be reduced or eliminated;
- Concerns as to the effectiveness or defined need for such a restriction;
- Interpretations that the restriction would affect pre-flight run-ups;
- Operations will be disrupted if aircraft cannot be readied for early morning flights;
- Idle power run-ups should be differentiated from high-power run-ups;
- The Draft Proposed Procedure should be discarded and a noise mitigating run-up enclosure should instead be installed; and
- If the other restrictions on flight training being considered are approved, overnight maintenance on these flights will be increasingly important to improve their utilization during unrestricted hours.

Table 3.7 - Survey Findings: Draft Proposed Procedure 4, Overnight Engine Run-Ups

Response	Non-Airport Users	Airport Users
Number of Responses	135	236
Not Supportive	17%	43%
Supportive	83%	57%
Explanation Provided: Engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.		

3.6.6 Draft Proposed Procedure 5, Arrival Turns

A total of 366 respondents shared their views on Draft Proposed Procedure 5. Among individuals that did not identify as being Airport users, 80% were in support; among the remaining 20%, key themes included:

- Suggestions that the minimum altitude should be increased (e.g., 1,000 ft. AGL or 2,000 ft. ASL);
- Concerns that the Draft Proposed Procedure is overly restrictive or complex;
- Suggestions that the Draft Proposed Procedure should not apply to all runways; and
- Concerns that this procedure, which is currently in effect, does not substantially address aircraft noise.

Among self-identified Airport users, 69% were in support of Draft Proposed Procedure 5. Among the 31% of respondents that did not support this restriction, comments generally centred around:

- The Draft Proposed Procedure will negatively impact pilots practicing engine-out landings and tight circuits;
- Concern that the turning altitude will result in pilots practicing non-standard circuits or conducting an unstable approach;
- Suggestions that this should remain a voluntary procedure;
- Concern that the restriction will not have a material impact on resident noise exposure; and
- Concern that this procedure will extend the length of the final approach leg, exposing additional residents to aircraft overflights and potentially limiting the ability of an aircraft to glide to the Airport following an engine failure.

Table 3.8 - Survey Findings: Draft Proposed Procedure 5, Arrival Turns

Response	Non-Airport Users	Airport Users
Number of Responses	128	238
Not Supportive	20%	31%
Supportive	80%	69%
Explanation Provided: Aircraft arriving at the Airport will remain at least 1,000 ft. ASL (540 ft. AGL) before making the turn for their final approach for landing.		

3.6.7 Draft Proposed Procedure 6, Approach Angle

A total of 361 responses were received with respect to Draft Proposed Procedure 6. Among respondents that did not self-identify as being Airport users, 88% were in support. Concerns articulated by individuals not in support included:

- Challenges with interpreting the wording of the procedure or lack of clarity on its impacts;
- Suggestions that a steeper approach angle should be used; and
- Concern that aviation safety should be prioritized.

73% of respondents who identified as Airport users supported Draft Proposed Procedure 6; concerns noted by individuals not in support included:

- Concerns about making the glide slope a mandatory procedure, acknowledging that variability should be expected based on pilot technique and experience, weather conditions, etc.;
- Questions about monitoring and enforcement;
- Concerns that this will negatively impact flight training and will be challenging for ab initio student pilots (e.g., demonstrating varying approach paths); and
- Concerns that Draft Proposed Procedures 5 and 6 are not compatible with one another.

Table 3.9 - Survey Findings: Draft Proposed Procedure 6, Approach Angle

Response	Non-Airport Users	Airport Users
Number of Responses	126	235
Not Supportive	12%	27%
Supportive	88%	73%
Explanation Provided: Approaches are to remain on or above an assumed 3° glide slope.		

3.6.8 Draft Proposed Procedure 7, Circling Procedures

For Draft Proposed Procedure 7, 363 responses were received. Among respondents that did not self-identify as being Airport users, 81% were in support. Comments included:

- Suggestions that a higher altitude should be used (e.g., 2,000 ft. ASL);
- Concern that aviation safety should be prioritized; and
- Challenges with interpreting the wording of the procedure or lack of clarity on its impacts.

Among Airport users, 81% supported Draft Proposed Procedure 6. Comments submitted by respondents not in support included:

- Concerns about the safety implications if a pilot is unable to maintain visual contact with the runway;
- Suggestions to keep this restriction as a voluntary procedure;
- Comments indicating that circling procedures should be removed altogether on account of aviation safety;
- Suggestions that such altitude limitations are standard and that a procedure is not required for pilots to operate as such; and
- The recommendation that training should not be limited.

Table 3.10 - Survey Findings: Draft Proposed Procedure 7, Circling Procedures

Response	Non-Airport Users	Airport Users
Number of Responses	129	234
Not Supportive	19%	19%
Supportive	81%	81%
Explanation Provided: If weather conditions permit, circling procedures are to be conducted at 1,460 ft. ASL (1,000 ft. AGL).		

3.6.9 Draft Proposed Procedure 8, Departure Turns

A total of 361 responses were received in relation to Draft Proposed Procedure 8. Among individuals that did not identify as being Airport users, 75% were in support while 25% did not support the procedure. Comments shared by respondents that did not support Draft Proposed Procedure 8 included:

- Suggestions that a higher turning altitude should be used and concerns about the effectiveness of a 1,000 ft. ASL restriction;
- Questions about the interpretation of the Draft Proposed Procedure; and
- Suggestions that the safest procedures should prevail.

Among Airport users, 84% were in support of Draft Proposed Procedure 8. Comments submitted where respondents had concerns centred around:

- Suggestions that the proposal be maintained as a voluntary or safety-dependent procedure;
- Concerns that pilot decision-making would be overly limited;
- Notes that the Draft Proposed Procedure is currently in effect on a voluntary basis; and
- Concerns that this will extend the length of time that it takes for an aircraft to fly the circuit and enlarge the circuit, potentially increasing the gliding distance to the Airport.

Table 3.11 - Survey Findings: Draft Proposed Procedure 8, Departure Turns

Response	Non-Airport Users	Airport Users
Number of Responses	126	235
Not Supportive	25%	16%
Supportive	75%	84%
Explanation Provided: Aircraft departing the Airport will continue to fly on the same heading/alignment as the departure runway until they reach 1,000 ft. ASL (540 ft. AGL) before making any turns.		

3.6.10 Draft Proposed Procedure 9, Prior Permission for Flight Training

A total of 369 survey responses were received for Draft Proposed Procedure 9. Among non-Airport users, 76% were supportive of the procedure, while 24% did not indicate their support. Reasons cited among individuals not in support of the procedure included:

- Concerns on restricting flight training activity and impacts to business operations;
- Opposition to flight training at the Airport as a whole;
- Questions regarding implementation, including the level of effort that would be required by the Airport Manager and the discretion afforded to the Airport Manager – i.e., whether training can be unreasonably withheld; and
- Concerns as to the additional level of effort required by student pilots and CFIs during pre-flight planning.

Among Airport users, 75% of respondents indicated that they are not supportive of Draft Proposed Procedure 9. The primary reasons cited included:

- Recurring concerns that this provision will result in the restriction of flight training activities at the Airport and make the facility a less conducive environment for such operations, and opposition to such reductions in activity fundamentally;
- Concerns regarding the level of effort that would be borne by the Airport Manager (i.e., the process would be too onerous), the discretion afforded to the Airport Manager, and what criteria will be considered in approving or denying flight training permission;
- Potential implementation challenges, including whether unaware pilots arriving from other airports will accidentally violate the Draft Proposed Procedure and how approvals will be coordinated between the two FTUs and other training operations; and
- Concerns that this requirement will delay pre-flight planning and flexibility.

Table 3.12 - Survey Findings: Draft Proposed Procedure 9, Prior Permission for Flight Training

Response	Non-Airport Users	Airport Users
Number of Responses	133	236
Not Supportive	24%	75%
Supportive	76%	25%
Explanation Provided: Prior permission by the Airport Manager is required for all flight training, including private and commercial pilot recurrent training.		

3.6.11 Draft Proposed Procedure 10, Time of Day Flight Training Restrictions

For Draft Proposed Procedure 10, 366 survey responses were received. This procedure was supported by 60% of respondents who did not identify as being Airport users; among the 40% that did not support the proposal, comments included:

- Concerns that flight training activity is being overly restricted and will be negatively impacted;
- Suggestions that the hours of the day and / or days of the week should be reduced to increase the restricted period;
- Concerns that flight training activity should not be permitted at the Airport more broadly; and
- Suggestions that hours of operation should be expanded to be less restrictive on flight training.

Among Airport users, 91% opposed Draft Proposed Procedure 9. Comments from this group of respondents included:

- Overarching concern that flight training activity at the Airport will be significantly limited and the based FTUs will be at a competitive disadvantage vs. other FTUs, with associated revenue, employment, student progress, and economic impacts;
- Suggesting later evening cut-offs;
- Concern that nighttime training will especially be impacted during the summer months;
- Concern that the summer months which typically have weather more favourable for flight training will be overly restricted;
- Concern that pilots may be pressured to fly during unrestricted hours / days, even if the weather is not favourable for such operations;
- Concern that individuals working during typical business hours (“9 to 5”) will not be limited in advancing their training;
- Concern that flight training activity will be concentrated in unrestricted hours, increasing activity levels during these times;
- Questions as to the effectiveness of the Draft Proposed Procedure in resolving noise concerns; and
- Concerns as to the complexity of the wording of the procedure.

Table 3.13 - Survey Findings: Draft Proposed Procedure 10, Time of Day Flight Training Restrictions

Response	Non-Airport Users	Airport Users
Number of Responses	129	237
Not Supportive	40%	91%
Supportive	60%	9%

Explanation Provided: Flight training is not permitted Friday-Monday before 8:00 AM and after 4:00 PM from May 1 to September 30 of any calendar year; and Friday-Monday before 8:00 AM and after 8:00 PM from October 1 to April 30 of any calendar year.

3.6.12 Draft Proposed Procedure 11, Alternating Seasonal Weekend Flight Training Restrictions

A total of 365 respondents provided their perspectives on the Draft Proposed Procedure 11. For respondents not identifying as Airport users, 60% were supportive of this proposal, while 40% were not in support. Among individuals in the latter category, comments included:

- Suggestions that flight training should not be permitted at all on weekends;
- Suggestions that this procedure should be applied to alternating weekends year-round;
- Questions as to how the Draft Proposed Procedure would apply in months with more than 4 Saturdays or Sundays;
- Concerns that the restrictions contemplated are arbitrary and / or overly complex for pilots to adhere to; and
- Concerns that flight training activity is being overly restricted and will be negatively impacted, with impacts especially experienced by student pilots working standard workweeks.

For Airport users, 91% were in opposition to Draft Proposed Procedure 11 for reasons that included:

- Concern that FTUs at the Airport will be significantly negatively impacted, as the summer weekends represent peak periods for flight training;
- Concerns that pilots that are only able to fly / train on weekends will be significantly impacted by the restrictions being considered, especially when considering weekends that are lost due to poor weather;
- Suggestions that the proposed restriction on flight training should only apply to circuit training during the periods contemplated, but other activities (e.g., cross-countries) could continue;
- Concern that restricting the days available for flight training will lead to pilots choosing to fly on suboptimal nonrestricted days and that activity levels will increase significantly on nonrestricted days;
- Concerns regarding the complexity of the wording and potential for pilot error in interpretation;
- Concern that Draft Proposed Procedures 10 and 11 could be reasonable individually, but are overly burdensome when combined;
- Concern that the dates prescribed are arbitrary and may be ineffective in addressing resident concerns;
- Suggestions that the type of training that can occur on weekends (e.g., commercial vs. private) be differentiated; and
- Suggestions that provisions be implemented to address bad weather that would limit training on an otherwise unrestricted day.

Table 3.14 - Survey Findings: Draft Proposed Procedure 11, Alternating Seasonal Weekend Flight Training Restrictions

Response	Non-Airport Users	Airport Users
Number of Responses	129	236
Not Supportive	40%	91%
Supportive	60%	9%
Explanation Provided: Flight training is not permitted on the 1st and 3rd Sundays of any given month and the 2nd and 4th Saturdays of the month from May 1 to September 30.		

3.6.13 Draft Proposed Procedure 12, Statutory Holiday Flight Training Restrictions

A total of 369 responses were received for Draft Proposed Procedure 12. Among non-Airport users, 75% were in support of the proposal. Comments made by respondents not in support of the proposal included:

- Questions as to the rationale behind the proposed restriction and its effectiveness;
- Comments indicating that the restrictions are onerous and would disrupt student training;
- Suggestions to add civic holidays to the restricted list; and
- Concerns that flight training at the Airport in its entirety should be terminated.

Among Airport users, 66% of respondents did not support Draft Proposed Procedure 12. Comments made by respondents in this category included:

- Concern as to the business impacts of FTUs and disruptions to flight training progress by students, including individuals that work full-time jobs;
- The suggestion that this restriction should be limited to circuit training as opposed to all flight training, or that the existing voluntary restriction should be maintained as is;
- Restricting activity on statutory holidays may result in displaced activity being concentrated on other unrestricted days;
- Concern that not all individuals celebrate the noted statutory holidays; and
- Questions as to the effectiveness or rationale behind the proposed restriction given the limited operations that currently occur on these days.

Table 3.15 - Survey Findings: Draft Proposed Procedure 12, Statutory Holiday Flight Training Restrictions

Response	Non-Airport Users	Airport Users
Number of Responses	133	236
Not Supportive	25%	66%
Supportive	75%	34%
Explanation Provided: Flight training is not permitted on the following federal statutory holidays: New Year's Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.		

3.6.14 Draft Proposed Procedure 13, Circuit Flight Training Restrictions

For Draft Proposed Procedure 13, 365 survey responses were received. For individuals that self-identified as not being users of the Airport, 63% were supportive of the proposal, while 37% did not support the restriction. Among respondents that identified a reason for not supporting Draft Proposed Procedure 13, key themes included:

- Opposition to circuit training as a whole due to the frequency of overflights;
- Concern that a limit of four aircraft will permit overflights on a basis that continues to be too frequent (i.e., the procedure is not sufficiently restrictive);
- Conversely, concern that a limit of four aircraft is too restrictive;
- Flight training will be unable to effectively occur at the Airport; and
- Concern that displaced circuit traffic will be redistributed throughout the day, lengthening the daytime noise problem.

Among self-identified Airport users, 77% were not in support of Draft Proposed Procedure 13. Recurrent concerns for this position were as follows:

- The maximum number of aircraft will be prohibitively restrictive, negatively impact the viability of Flight Training Units based at the Airport, and hinder the training programs of student pilots and increase the costs borne by these individuals;
- Training effectiveness will decrease without operations in a high-volume operational environment;
- Rescheduled circuit traffic will be redistributed throughout the day, lengthening the daytime noise problem;
- Aircraft will be required to wait prior to departure on a taxiway or holding bay, or entering a holding pattern near the Airport, until a slot becomes available in the circuit;
- Questions as to the effectiveness of the Draft Proposed Procedure in reducing noise exposure and the net difference in impact vs. other limits (e.g., eight aircraft);
- Questions as to how this will be coordinated between the two FTUs;
- The Air Traffic Control Tower already does an effective job at controlling circuit capacity; and
- Concerns that the restriction will be unenforceable and difficult to implement.

Table 3.16 - Survey Findings: Draft Proposed Procedure 13, Circuit Flight Training Restrictions

Response	Non-Airport Users	Airport Users
Number of Responses	130	235
Not Supportive	37%	77%
Supportive	63%	23%

Explanation Provided: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.

3.6.15 Draft Proposed Procedure 14, Toronto Zoo

A total of 369 responses were received with respect to Draft Proposed Procedure 14. Among individuals who did not identify as being users of the Airport, 86% were supportive of the Draft Proposed Procedure. Among the 14% of respondents in this category that did not support Draft Proposed Procedure 14, recurrent themes included:

- Questions as to why higher minimum altitudes apply over zoos but not over residential areas;
- Concern that the minimum altitude should be higher; and
- Concern that the Draft Proposed Procedure is unnecessary or beyond the scope of the Airport’s noise concerns

Similarly, among respondents that self-identified as being a user in some capacity of the Airport, 87% were supportive of Draft Proposed Procedure 14. For respondents that did not support the Draft Proposed Procedure, the primary comments addressed the fact that a limitation for overflights of the Toronto Zoo is currently published in the Canada Flight Supplement, and concerns that the Draft Proposed Procedure extends beyond the jurisdiction of the Airport and the purpose of the noise abatement study.

Table 3.17 - Survey Findings: Draft Proposed Procedure 14, Toronto Zoo

Response	Non-Airport Users	Airport Users
Number of Responses	132	237
Not Supportive	14%	13%
Supportive	86%	87%
Explanation Provided: Pilots are to maintain 2000 ASL or above over Toronto Zoo (N43 49 05 W79 11 15).		

3.7 Stakeholder Findings – Written Submissions

A total of 15 written submissions were received by City Staff from 11 private individuals, in addition to submissions received by the following businesses or organizations: Durham Flight Centre, the Enterprise Aviation Group of Companies, Canadian Owners and Pilots Association – Flight 70, and Ban Urban Flight Schools. Accordingly, a total of 19 written submissions were received from 15 individuals, businesses, or organizations, as documented in Appendix A.

Of the 19 submissions, 10 were characterized as generally being opposed to, or having concerns with, the Draft Proposed Procedures or efforts to restrict operations at the Airport. Among submissions that were opposed to the Draft Proposed Procedures or against measures to limit activity at the Airport more generally, key themes included:

- Questions as to why noise abatement procedures are being considered given the size of the population that is filing complaints, the level of movements vs. historical peaks in the 1970s and 1980s, whether the level of complaints are comparable to other airports, and concerns that justifying the Draft Proposed Procedures on account of increasing complaint levels in 2020-2021 is due to residents increasingly working from home during the COVID-19 pandemic;
- Concerns regarding the impacts to Airport businesses, users, and the viability of the Airport facility. Specifically, a recurring theme is that the Airport's usability for flight training will be significantly hindered;
- Concerns about the effectiveness of the Draft Proposed Procedures and implementation matters, such as NAV CANADA staffing;
- Concerns that noise challenges are primarily a result of residential development in the vicinity of the Airport;
- Concerns that Draft Proposed Procedure 3 will limit the periods of the year during which pilots can complete their nighttime recurrency requirements;
- Suggestions that abatement procedures may not be required with the increased adoption of aircraft with lower noise profiles, or that such aircraft should be exempted from the Draft Proposed Procedures;
- Concerns regarding the safety of Draft Proposed Procedure 1;
- Questions regarding the implementation of Draft Proposed Procedure 13, including how aircraft operating in the circuit that are not conducting training are addressed;
- Concerns that the Draft Proposed Procedures are overly complex; and
- Concerns that the Draft Proposed Procedures will increase noise exposure at other airports (e.g., Peterborough, Kawartha Lakes), potentially creating challenges in these communities.

A total of 9 submissions were characterized as being in favour of the Draft Proposed Procedures or of broader measures to restrict activity at the Airport. For submissions in this category, findings included:

- Points made that elaborate on resident concerns, including the frequency of overflights, aviation safety, and environmental impacts;
- The suggestion that community members that may otherwise be concerned about Airport-related noise are not filing complaints, thus underrepresenting the extent of the issue;
- Concerns that resident noise issues have not been heard or that the Draft Proposed Procedures may not cause meaningful change;
- Concerns that substantial change will not occur through the Draft Proposed Procedures and that implementation will be a challenge for the City and Airport Operator;
- Suggestions for additional restrictions, such as implementing a cap on annual movements; and
- With respect to the stakeholder engagement program, views were also shared that the engagement opportunities were overly technical in nature, that certain attendees of the open houses were unable to share their views, and that an open town hall meeting is requested.

Suggestions or comments that were made that transcend the scope of the AC 302-002 process through the written submissions included:

- Investigating the use of electric powered aircraft or restricting aircraft with higher noise profiles;
- Closing or relocating the Airport;
- Ceasing flight training at the facility and / or relocating this activity to other airports, given the urban land use context of the Airport and noise, safety, and environmental impact concerns;
- Implementing increased landing fees, as well as the consideration of the impacts of the recently increased landing fees;
- Concerns that the NAV CANADA Air Traffic Control Tower may close; and
- Further restricting development in the vicinity of the Airport.

4 AIRPORT BACKGROUND

The development of noise abatement procedures for the Airport is contextualized by several background factors. These include the Airport's operations, historical activity levels, land use context, and the regulatory environment surrounding aircraft noise.

4.1 Summary of Changes

Based on feedback received during the stakeholder consultation program, the following changes have been made to the Airport Background section within this report:

- Aircraft movement levels from 1974 to 1996 have been added to the previously provided 1997 to 2020 dataset;
- Commentary is provided on historical activity levels vs. the forecast movements included in the 2015-2019 Airport Business Plan;
- Addition of information on the Airport's current (2014) Noise Planning Contours; and
- Information added on the number of residences near the Airport.

4.2 Airport Overview

Oshawa Executive Airport is maintained by the City's contracted Airport Operator as a Transport Canada-certified airport. The City of Oshawa has an operating and options agreement in place with the Government of Canada that requires the City to operate the Airport until 2047. However, the facility may be closed by the City prior to 2047 but no sooner than 2033 if a new airport is developed on the federally owned Pickering Lands, located approximately 20 km northwest of the Airport.

Aircraft operations are supported on the Airport's two runways, as shown in Figure 4.1: Runway 12-30 (4,250 ft. x 100 ft.) and Runway 05-23 (2,654 ft. x 100 ft.). Both runways have lighting to support nighttime operations and Instrument Flight Procedures to support aircraft activity in inclement weather conditions (Instrument Meteorological Conditions).

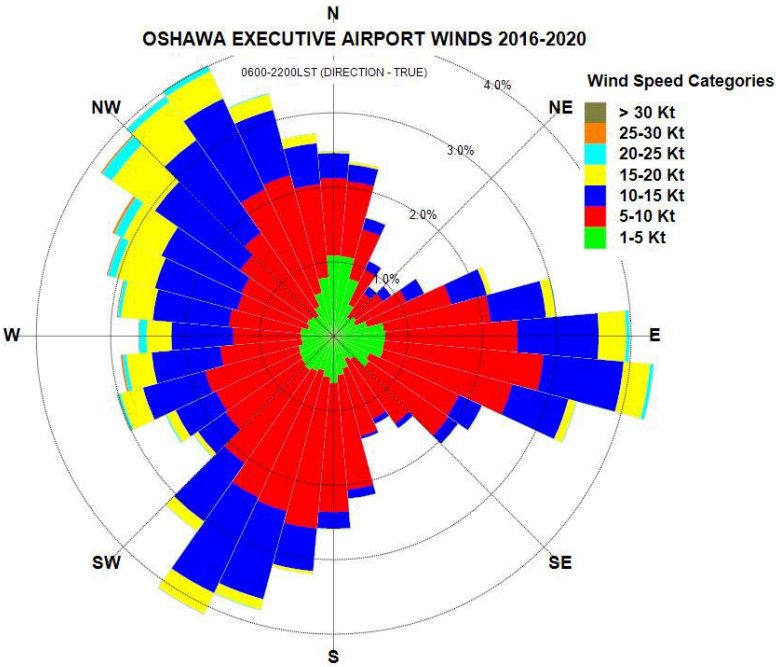
During most normal aircraft operations, arrivals and departures are conducted using the runway that is best aligned with the current wind conditions for improved aircraft performance. A windrose analysis was completed for the five-year period of 2016 to 2020 using data recorded at the Airport from 6:00 AM to 10:00 PM¹. Considering an aircraft crosswind limitation of 15 kts, Runway 12-30 is identified as the favoured runway based on historical prevailing winds for 99.4% of the year. For the 28,144 hours of data analyzed, only 158 hours were recorded whereby wind conditions would favour Runway 05-23 based on prevailing wind conditions and applying the 15 kt crosswind limit, or where this limit would be exceeded on all runways. The windrose analysis is visually depicted in Figure 4.2.

¹ An analysis of winds over a 24-hour basis was not completed given the existing and proposed overnight operational restrictions in place for the Airport.

Figure 4.1 - Oshawa Executive Airport Overview



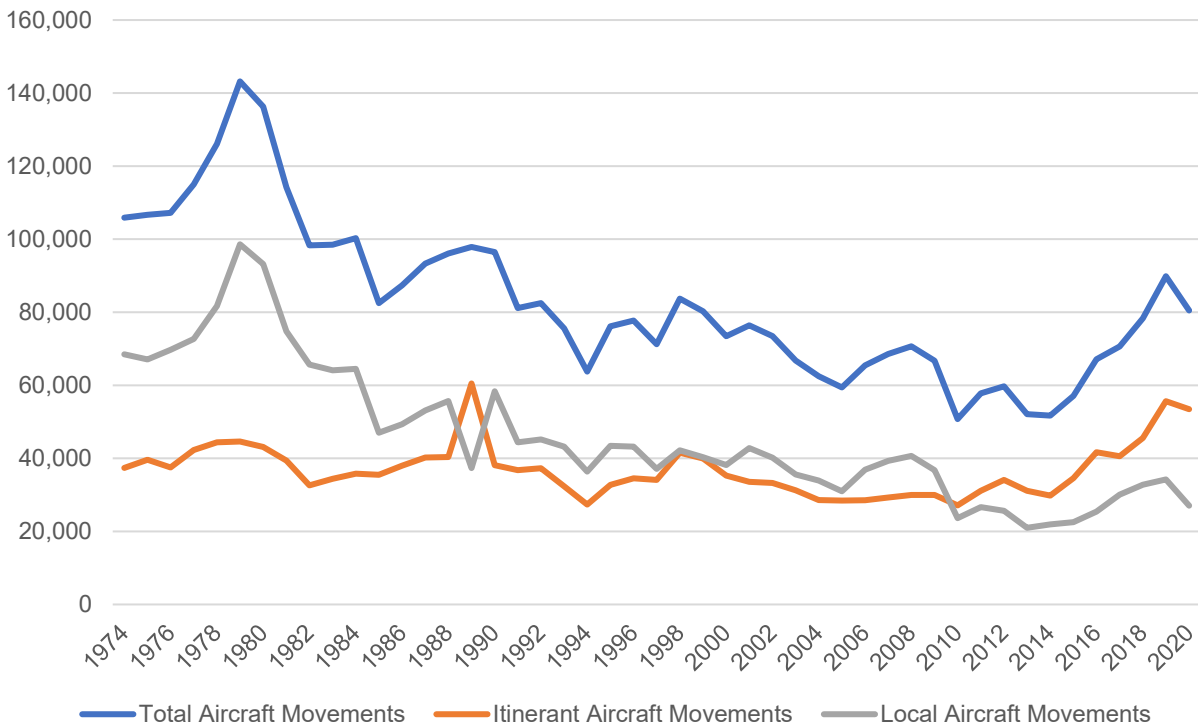
Figure 4.2 - Oshawa Executive Airport Windrose



4.3 Airport Activity Levels

An aircraft movement is a single landing, take-off, or touch-and-go². Full-year historical aircraft movement data is available from 1974 to 2020. As shown in Figure 4.3, variability is exhibited in the number of total aircraft movements that have occurred on an annual basis during this period. Activity reached a maximum of approximately 143,000 total movements in 1979 before declining to between 50,000 and 60,000 movements between 2010 and 2015. Activity subsequently increased from 57,000 movements in 2015 to approximately 90,000 movements in 2019, before decreasing to approximately 80,000 movements in 2020 partially due to the restrictions implemented to address the COVID-19 pandemic. Between 2015 and 2019, activity increased by 57% or an average of 14% per year.

Figure 4.3 - Oshawa Executive Airport Historical Aircraft Movements (1974-2020)



Data Source: Statistics Canada Tables 23-10-0002-01 and 23-10-0018-01, Oshawa Executive Airport 2015-2019 Business Plan

Aircraft movements can be further classified as:

- Local, where an aircraft remains in the airport traffic pattern; and
- Itinerant, where an aircraft proceeds to, or arrives from, another location (airport to airport), or an aircraft leaves the traffic pattern and returns without landing at another airport.

The number of local movements has exhibited a gradual negative trend from a peak of approximately 99,000 in 1979. From 2010 until 2016, an annual average of approximately 24,000 local movements was recorded. For the period of 2017 to 2019, local movements increased to a maximum of roughly 34,000 in 2019 and an annual average of approximately 32,000.

² Within NAV CANADA's records, a touch-and-go is recorded as two local movements,

Itinerant movement levels were typically eclipsed by local movements until 2010, when approximately 27,000 itinerant movements were recorded at the Airport. Activity in this category subsequently increased to approximately 56,000 movements in 2019 before declining slightly in 2020. Between 2010 and 2019, 105% overall growth was experienced in this category, or an average of 12% per year.

The 2015-2019 Oshawa Executive Airport Business Plan recommended a collaborative and measured approach to growth and included an activity forecast of approximately 102,000 aircraft movements at an indeterminate year in the future. As shown in Table 4.1, total activity in 2019 (prior to the COVID-19 pandemic) approached the level foreseen in the Airport Business Plan forecast. Specifically, total aircraft movements were at 88% of the forecast level, local movements were at 86% of the forecast level, and itinerant movements were at 89% of the forecast level.

Table 4.1 - Historical vs. Forecast Airport Activity Levels

	2015	2019	Business Plan Forecast
Total Movements	57,103	89,863	102,345
Local Movements	22,516	34,208	40,000
Itinerant Movements	34,587	55,655	62,345
Data Source: Statistics Canada Tables 23-10-0002-01 and 23-10-0018-01, Oshawa Executive Airport 2015-2019 Business Plan			

4.4 Airport Land Use Context

The Airport is located within the municipal boundaries of the City of Oshawa and is defined by a primarily urban residential land use context, as shown in Figure 4.4. Extensive residential areas exist to the west, south, east, and northeast. The proximity of numerous residential neighbourhoods to the Airport, which has occurred as the result of several decades of development, is now associated with compatibility conflicts with aircraft operations as described in Section 5.

Northern Context

The Airport is bounded by Taunton Road West along its northern edge; further to the north is the Northwood neighbourhood. Within Northwood, existing land uses include several areas of light industrial, commercial, residential, and institutional activity. A significant proportion of the lands to the north of the Airport are in an undeveloped, natural state and are designated “Open Space and Recreation” in the City of Oshawa’s Official Plan, including the Cedar Valley Conservation Area. Larger residential subdivisions are located between 500 m and 1,000 m to the northeast of the Airport, within the Samac neighbourhood, as well as Durham College and commercial uses.

Eastern Context

The Airport abuts a significant wooded area and the Oshawa Creek ravine along the length of its eastern boundary, which is also part of Somerset Park. Further to the east, beyond the ravine, is the Centennial neighbourhood which is primarily defined by low-rise residential and institutional uses, as well as commercial developments along Simcoe Street North.

Southern Context

Adjacent to the Airport exists a military museum, indoor athletics facility, park, and a woodlot. The area between the Airport and Rossland Road is defined by low-rise residential subdivisions, parks and open space, a secondary school, and a commercial plaza. The lands further to the south, across Rossland Road, exhibit similar land use characteristics and are primarily defined by low-rise residential neighbourhoods, as well as a large golf course.

Western Context

Contiguous to the Airport, between its western boundary and Thornton Road North, is a golf course, a large area of open space, and several woodlots. The lands further to the west, across Thornton Road, are primarily defined by low-rise residential subdivisions, as well as the Thornton Cemetery and a golf course. While the land use context is largely similar, the City of Oshawa's municipal boundary ends at Garrard Road, after which point the lands are located within the Town of Whitby (approximately 700 m from the Airport).

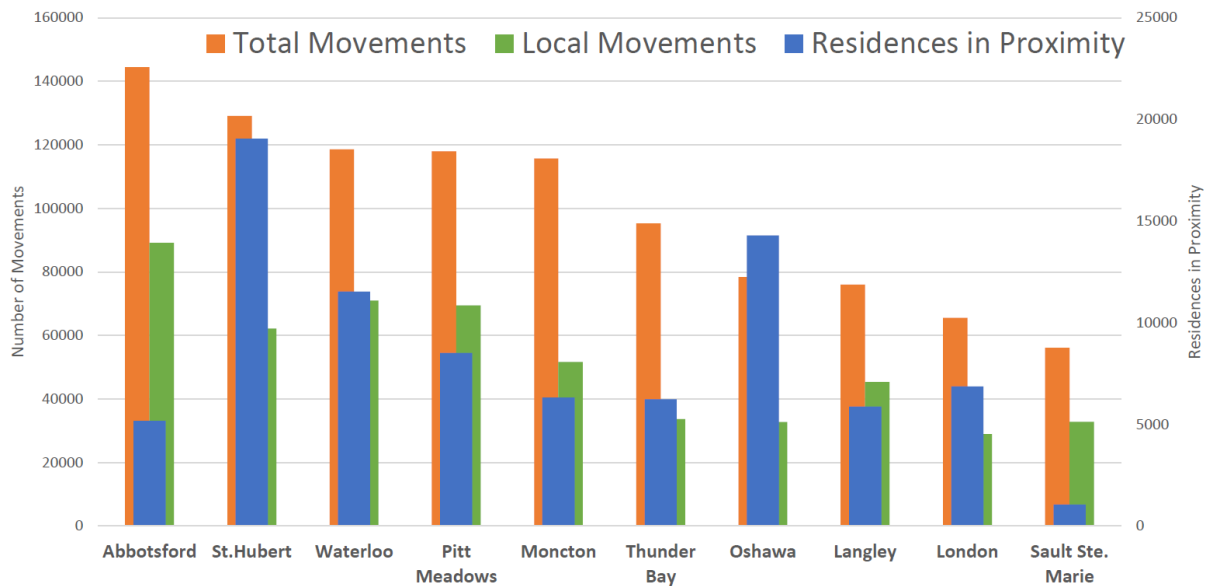
Figure 4.4 - Oshawa Executive Airport Residential Land Use Context



Comparable Airports

The City of Oshawa previously analyzed the 2019 aircraft movement levels and number of residences in proximity to several comparable Canadian airports, as shown in Figure 4.5. The City found that approximately 14,000 residences are located within 2 km of the Airport. Among the nine airports reviewed by the City in this exercise, only Montreal / St. Hubert Airport had a higher concentration of residences in proximity to the site.

Figure 4.5 - Comparable Airport Land Use Contexts



Data Source: City of Oshawa

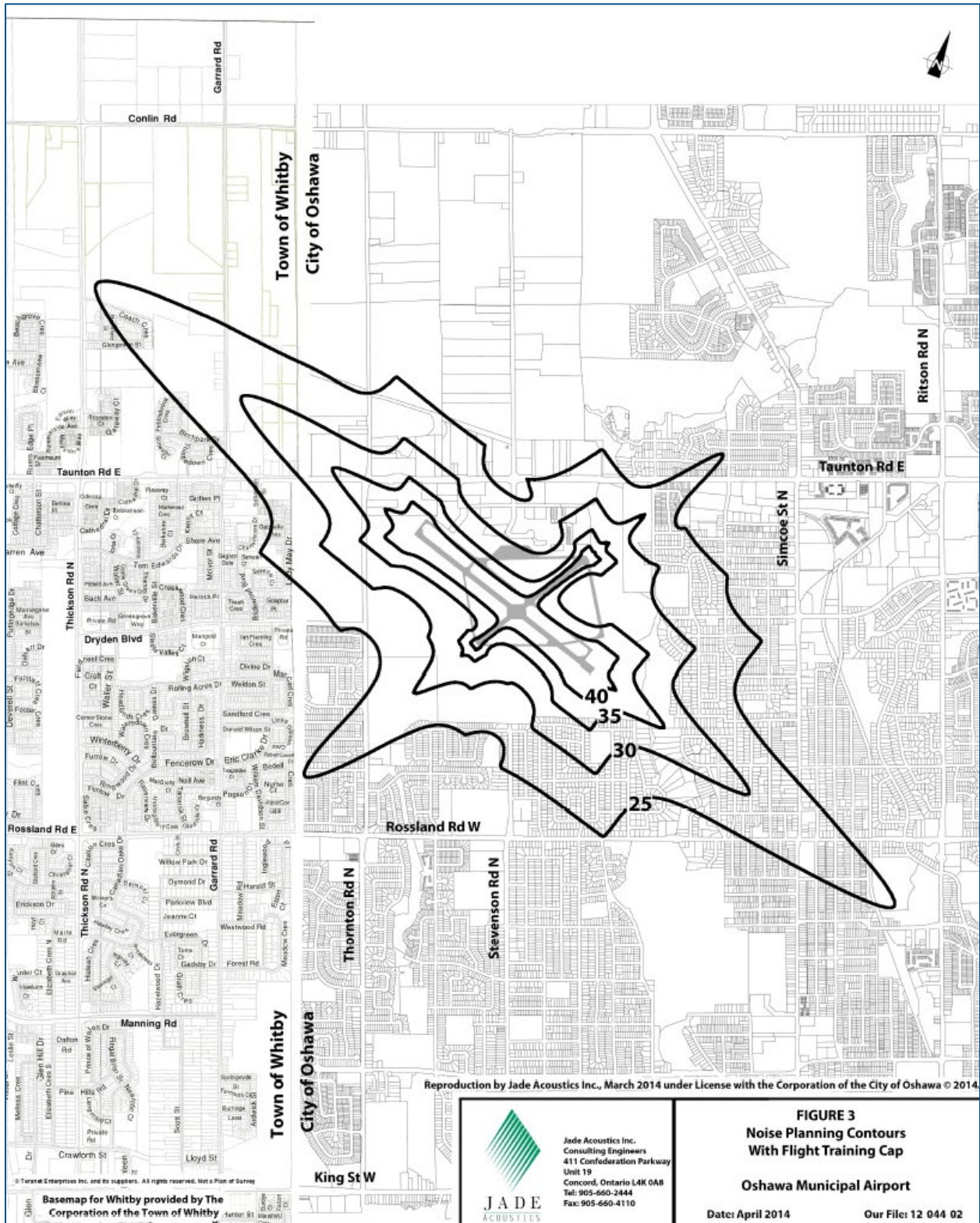
Land Use Planning

Land use planning in the vicinity of the Airport is the responsibility of the City of Oshawa and the Town of Whitby. Both municipalities maintain key planning documents, including Official Plans and Zoning Bylaws, and are responsible for evaluating new development applications against provincial, regional, and municipal plans and policies. To guide effective land use planning in the vicinity of the Airport in combination with resources such as Transport Canada's TP1247 – Land Use in the Vicinity of Aerodromes, the City of Oshawa commissioned the preparation of Noise Planning Contours in 2014 based on activity levels similar to those forecast in the 2015-2019 Airport Business Plan³. The Airport's Noise Planning Contours are shown in Figure 4.6.

While the Airport's Noise Planning Contours are provided based on stakeholder requests, HM Aero is unable to comment on what land use planning controls were available to the City of Oshawa and Town of Whitby at the time that nearby residential areas were developed.

³ Jade Acoustics Inc. (2014, April 22). Noise Planning Contour Study: Oshawa Municipal Airport (File No. 12-044-02).

Figure 4.6 - 2014 Airport Noise Planning Contours



4.5 Airport and Aircraft Noise Management

Aircraft noise is an externality of Airport operations that has the potential to cause significant ongoing disturbance to sensitive land uses in the vicinity of the Airport (e.g., residences, schools, retirement centres). The International Civil Aviation Organization (ICAO) adopted the Balanced Approach to Aircraft Noise Management that includes four principal elements:

1. **Reduction of Source Noise:** Limits on the noise of aircraft have been in place since the 1970s through Annex 16 to the Convention of International Civil Aviation. Transport Canada ensures compliance with applicable noise limits as part of the certification process for new aircraft.
2. **Land Use Planning:** Compatible land use planning involves appropriately separating noise-sensitive land uses, such as residential areas, from airports and associated aircraft noise. This involves delineating areas associated with current and anticipated future noise levels and enacting planning legislation that considers the sensitivity of each permitted use. In Canada, the Noise Exposure Forecast System is the primary means through which this planning is accomplished, supporting by municipal plans and bylaws.
3. **Noise Abatement Operational Procedures:** Changes that address the way aircraft are operated through the use of standardized and published procedures. Examples include noise preferential runways and avoiding overflights of noise-sensitive areas.
4. **Aircraft Type Operating Restrictions:** Prohibitions on the operation of select aircraft with high noise profiles.

The City of Oshawa has requested that noise abatement procedures be established for Oshawa Executive Airport, in alignment with the third pillar of the Balanced Approach to Aircraft Noise Management. Noise abatement procedures can be established in two ways:

1. **Voluntary procedures** can be established by an airport operator, distributed to airport tenants and aircraft operators, and / or published in the Canada Flight Supplement and Canada Air Pilot. Compliance is voluntary on the part of the pilot, and enforcement / penalties will not be implemented by Transport Canada; or
2. **Mandatory procedures** can be proposed by an airport operator to Transport Canada for adoption under the authority of Canadian Aviation Regulation (CAR) 602.105. Procedures will be published in the Canada Flight Supplement and Canada Air Pilot. Enforcement is the responsibility of Transport Canada, typically with support from the airport operator. Penalties for violating these procedures can be as high as \$5,000 for an individual and \$25,000 for a company. The process for the establishment of mandatory noise abatement procedures is outlined in AC 302-002.

The City of Oshawa has implemented Voluntary Noise Abatement Procedures for the Airport as described in Section 2.1. The City does not have the authority to unilaterally implement mandatory noise abatement procedures, as such authority is held by Transport Canada. Accordingly, at the February 8, 2021 meeting of the Oshawa Development Services Committee, it was resolved that City Staff be directed to undertake the AC 302-002 process for the establishment of mandatory noise abatement procedures for the Airport. It is also noted that earthen berms have been constructed at three locations at the Airport to mitigate ground-generated noise:

- At the northeast edge of the Airport, to mitigate noise associated with aircraft ground operations in the hangar area;
- At the southeast edge of the Airport, to mitigate noise associated with aircraft ground operations to residences in the vicinity of Jane Street; and
- At the southern limit of the Airport to mitigate noise associated with aircraft ground operations to residences in the vicinity of Stevenson Road.

5 PROBLEM DESCRIPTION

Section 5 addresses Step 1.a. of the AC 302-002 process – Description of the Problem. The description of the problem includes the analysis of historical noise complaints submitted to the City of Oshawa, as well as qualitative findings arising from historical stakeholder engagement activities. Together, data from these sources is incorporated within the problem description.

5.1 Summary of Changes

Based on feedback received through the stakeholder consultation program, the following changes have been made to the Problem Description:

- Addition of commentary and data analysis on the potential impacts of the COVID-19 pandemic and associated public health measures;
- Revision of historical noise complaint datasets based on data underreporting;
- Addition of data on the number of complaints per household; and
- Commentary is provided on the link between flight training and noise complaints and the justification for flight training-specific noise abatement procedures.

5.2 Qualitative Analysis

In the preceding years prior to the commencement of the AC 302-002 process, the City of Oshawa consulted with the public on a variety of Airport-related matters. During these consultations, matters of Airport noise were frequently identified by attendees – therefore, consultation records are a valuable source of qualitative feedback on resident concerns surrounding the Airport. HM Aero reviewed the following three records of stakeholder input collected in 2018, 2019, and 2021 as a representative qualitative sample of resident inputs regarding Airport noise:

1. *Oshawa Executive Airport Community Liaison Committee Town Hall – June 13, 2018 – Meeting Summary.*

This document was prepared by Lura Consulting, the neutral, third-party facilitator for Oshawa Executive Airport. The document provides a summary of the Town Hall meeting that took place on June 13, 2018. This document is not a verbatim account of events, but rather an account of the key points made during the open house, presentation, and question and answer session. The June 2018 Town Hall was publicized through leaflets distributed to over 11,000 residences in the area of Oshawa Executive Airport and was attended by approximately 75 individuals.

2. *Oshawa Executive Airport Community Town Hall – September 24, 2019 – Meeting Summary.*

As with the previous report, this document was prepared by Lura Consulting and documented the key points of the September 24, 2019 Town Hall meeting. The meeting was publicized through leaflets to over 11,000 residences within 2 km of the Airport and was attended by 178 individuals.

3. *City of Oshawa Development Services Committee – May 5, 2021 Special Meeting.*

Representatives from HM Aero attended the above-noted meeting in an observatory role, to further understand community concerns regarding Airport noise. The intent of this meeting was for the City to review its Draft Proposed 2021-2022 Oshawa Executive Airport Action Plan. Airport noise was a recurring theme identified during the public comment period of the meeting. As this was a publicly viewable digital event, attendance numbers could not be recorded.

Through the review of the sources noted above, numerous key themes were identified regarding community noise concerns, including:

- A perception that aircraft movement levels are increasing, and the problem is worsening;
- A significant number of records that identify flight training and aircraft circuit activity as being their primary source of concern;
- The frequency and total volume of aircraft movements. A commonly reported metric was that an aircraft overflies every “X” minutes (e.g., 1.5 minutes) above a place of residence;
- The hours of the day during which aircraft operations occur, including the early morning and late evening;
- A perceived lack of enforcement for assumed noise violations; and
- A concern that select residential neighbourhoods are disproportionately impacted, especially on days where only one runway is in use.

Within the scope of this project, the focus is on identifying concerns related to aircraft noise. However, an important finding from the review of historical engagement materials is that community noise concerns are often intertwined with concerns regarding:

- Air quality, including aircraft emissions and lead;
- Vibrations from aircraft operations;
- Safety, with respondents believing that aircraft operate too low near the Airport; and
- Climate change, with select respondents seeing the Airport’s operations as being incompatible with environmental sustainability goals.

5.3 Quantitative Analysis

5.3.1 Noise Complaint Dataset

The City of Oshawa records aircraft noise complaints submitted by the public to identify root causes and inform mitigation and abatement strategies. Prior to July 2020, aircraft noise complaints were received via an online form, by telephone, or by email to the Airport Operator. Once received, noise complaints were manually logged in an electronic database. Information collected included the name, address, and contact information of the complainant and the month and year in which the complaint was logged. The Airport Operator was responsible for following up with individual complainants.

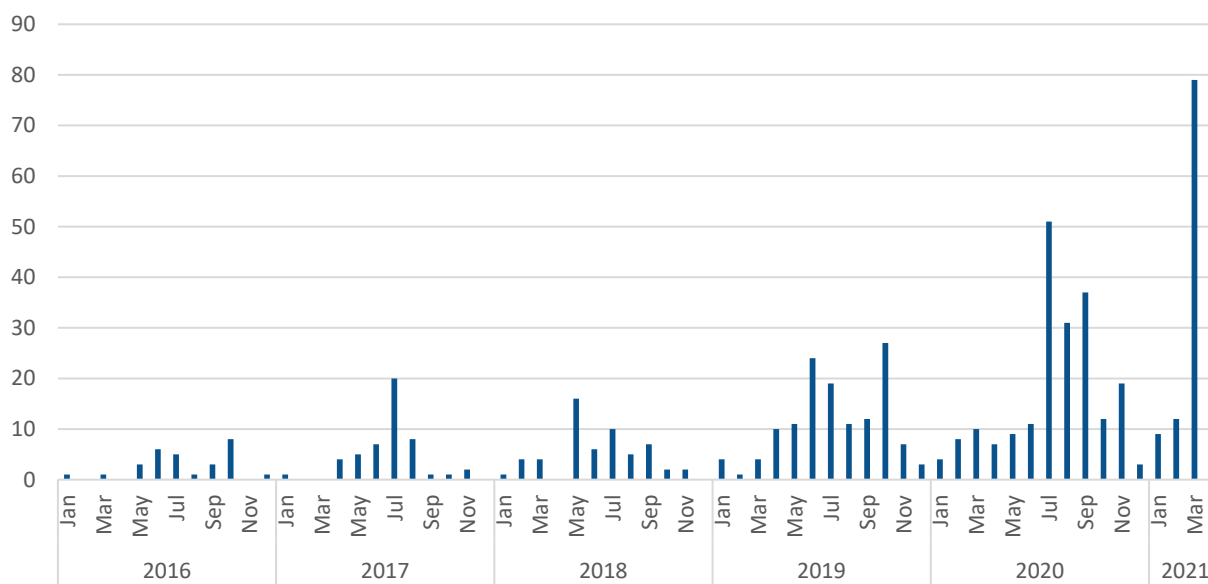
In July 2020, a change to the complaint collection process was implemented with complaints being filed through Service Oshawa utilizing the City’s Lagan Technologies record software (the “Lagan System”). The Airport Operator continues to be responsible for following up with complainants. The transition to using this system has allowed for increased granularity in the data collected, including the opportunity to include the date and time of the incident and to provide written comment.

For high-level analysis of trends over time, complaint data from January 2016 to April 2021 is used. For detailed quantitative analysis, this study utilizes the noise complaint data collected between July 24, 2020 and April 30, 2021 – as noted above, this is the period during which complaints with additional detail and information are available. A total of 380 complaints were recorded in the Lagan System during that period. As not all fields are required be populated in the form, some inputs including date and time were not available for all complaints. Of the 380 complaints recorded in the Lagan System, 21 had no address, 67 did not include the date of the incident, and 190 did not include the time of the incident. Where complaints lacked required fields, they were omitted from specific analyses as applicable (e.g., a complaint without a time was not used to inform a time-of-day analysis). A detailed review of written comments appended to the complaint records resulted in the generation of 27 additional complaints within the database. These complaints were not individually defined in the Lagan System, as some complaints referenced more than one incident.

5.3.2 Complaint Frequency and Distribution

A review of the past five years of records indicates that there has been a significant increase in complaints starting in 2019 and continuing through April 2021. As presented in Figure 5.1, the distribution of complaints throughout the year has remained relatively consistent, with most objections to aircraft noise recorded in the spring, summer, and fall. However, the number of complaints per month is generally increasing. For example, in March 2020, there were 10 complaints recorded compared to 79 in March 2021.

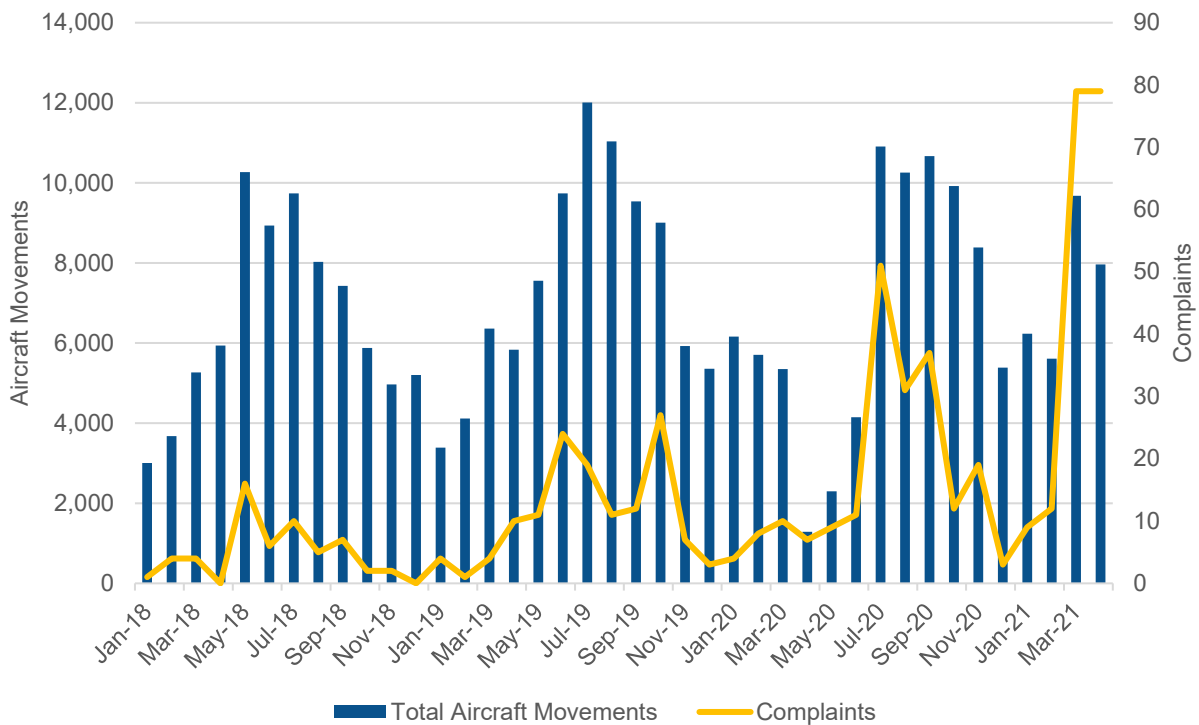
Figure 5.1 - Complaint Count by Month (January 2016 – April 2021)



Data Source: City of Oshawa Noise Complaint Records

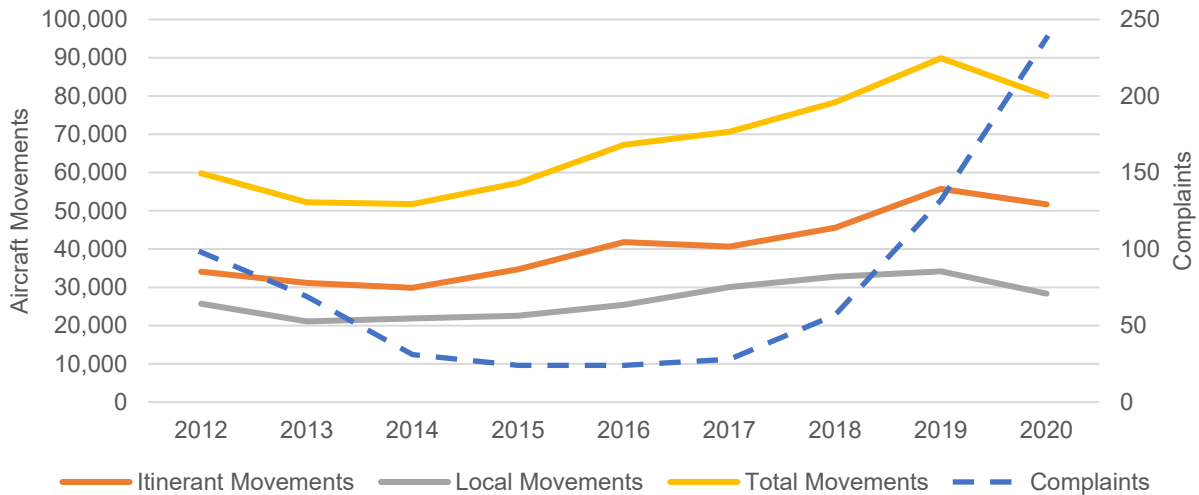
A recurring comment made during stakeholder consultations was the potential impacts of individuals being increasingly exposed to aircraft noise throughout the day during the COVID-19 pandemic. For residents that shifted to working from home, conducting school at home, or otherwise increasing the time spent in their residences and outdoor amenity spaces due to public health measures. Monthly complaints were plotted against aircraft movements for the period of January 2018 to April 2021. As shown in Figure 5.2, aircraft movements in April 2020 and May 2020 decreased significantly with pandemic-related public health restrictions. During this time, noise complaints continued to be received despite the significant decrease in activity. Further, although activity in July 2020 (10,910 movements) returned to levels similar to those of July 2019 (12,007 movements) and July 2018 (9,737 movements), the number of complaints recorded in July 2020 (51) reached levels not previously seen in the dataset shown.

Figure 5.2 – Complaints vs. Aircraft Movements by Month (January 2018 – April 2021)



When total annual complaints between 2012 and 2020 were compared to aircraft movements recorded at the Airport for the same period, the percent increase in complaints between 2017 and 2019 is observed to outpace the percent increase in movements (Figure 5.3). This suggests that the type of operations and the frequency and duration of flights influence the volume of complaints filed, in addition to annual aircraft movements.

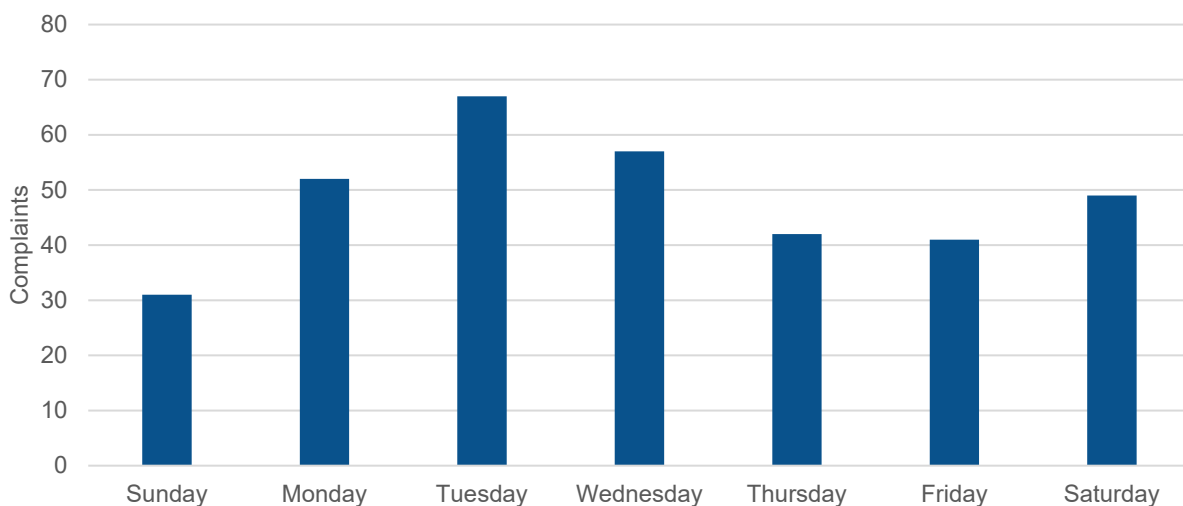
Figure 5.3 - Complaints vs. Aircraft Movements (2012-2020)



Data Source: City of Oshawa Noise Complaint Records, Statistics Canada Tables 23-10-0002-01 and 23-10-0018-01

A review of the comments recorded through the two town hall meetings (Section 5.2) as well as those included in the Lagan System data suggests that some residents believe that solutions targeting weekend operations will yield the greatest reprieve from aircraft noise. However, the data presented in Figure 5.4 for July 2020 through April 2021 indicates that complaint incidents occur most frequently on Mondays, Tuesdays, and Wednesdays, suggesting that abatement procedures that are only weekend-specific are unlikely to generate desired noise reduction results.

Figure 5.4 - Complaint Count by Day of Week (July 2020 – April 2021)



Data Source: City of Oshawa Noise Complaint Records

An additional consideration is the relationship between the number of complaints received and the number of individuals submitting complaints. As shown in Table 5.1, in 2018 an average of 1.30 complaints were received per complainant. In 2019, an additional 39 individuals submitted complaints, while the average number of complaints per individual increased to 1.59. In 2020, an additional 28 individuals submitted complaints compared to 2019; however, the number of complaints per individual also increased to an average of 2.14. Taken together, this data shows that between 2018 and 2020, both the number of complainants and the number of complaints per person increased.

Table 5.1 - Complaints vs. Complainants (2018-2020)

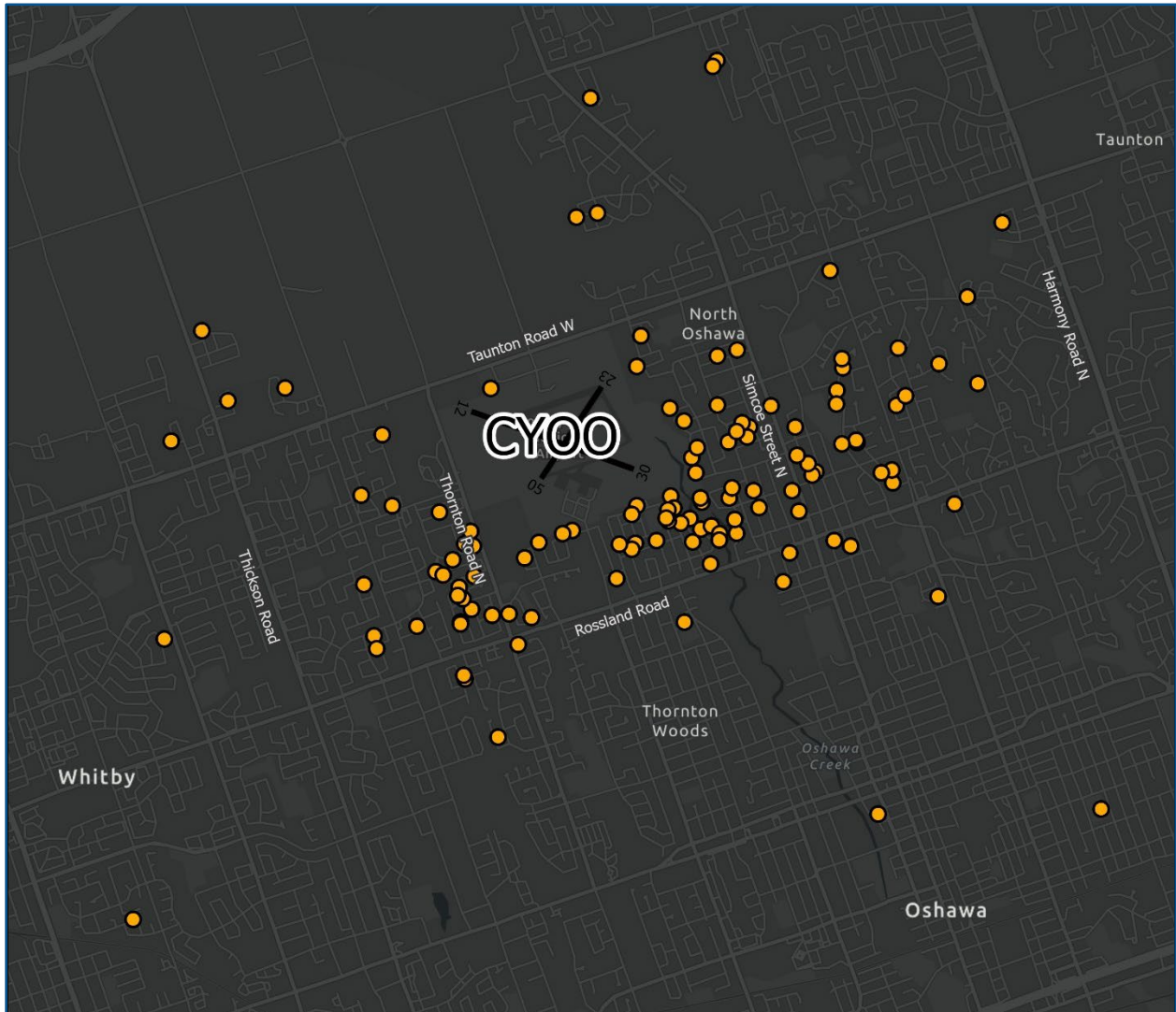
Year	Unique Complainants	Complaints	Complaints per Complainant
2018	44	57	1.30
2019	83	132	1.59
2020	111	238	2.14

5.3.3 Complaint Locations and Concentrations

HM Aero geocoded the 2020-2021 complaint data from the Lagan System to better understand the proximity of complainants to the Airport as well as the distribution of complaints relative to the Airport's four runway thresholds (Runways 05, 23, 12, and 30)⁴. Addresses where one or more complaints have been filed are primarily north of Rossland Road, east of Thickson Road, and west of Harmony Road. Complaints were primarily associated with addresses in Oshawa and Whitby, with a small number from communities outside of those two municipalities (e.g., Ajax, Courtice, and Port Perry).

⁴ Given the minimal information available for each complaint record in preceding years that is required to support subsequent analysis, such records were not geocoded.

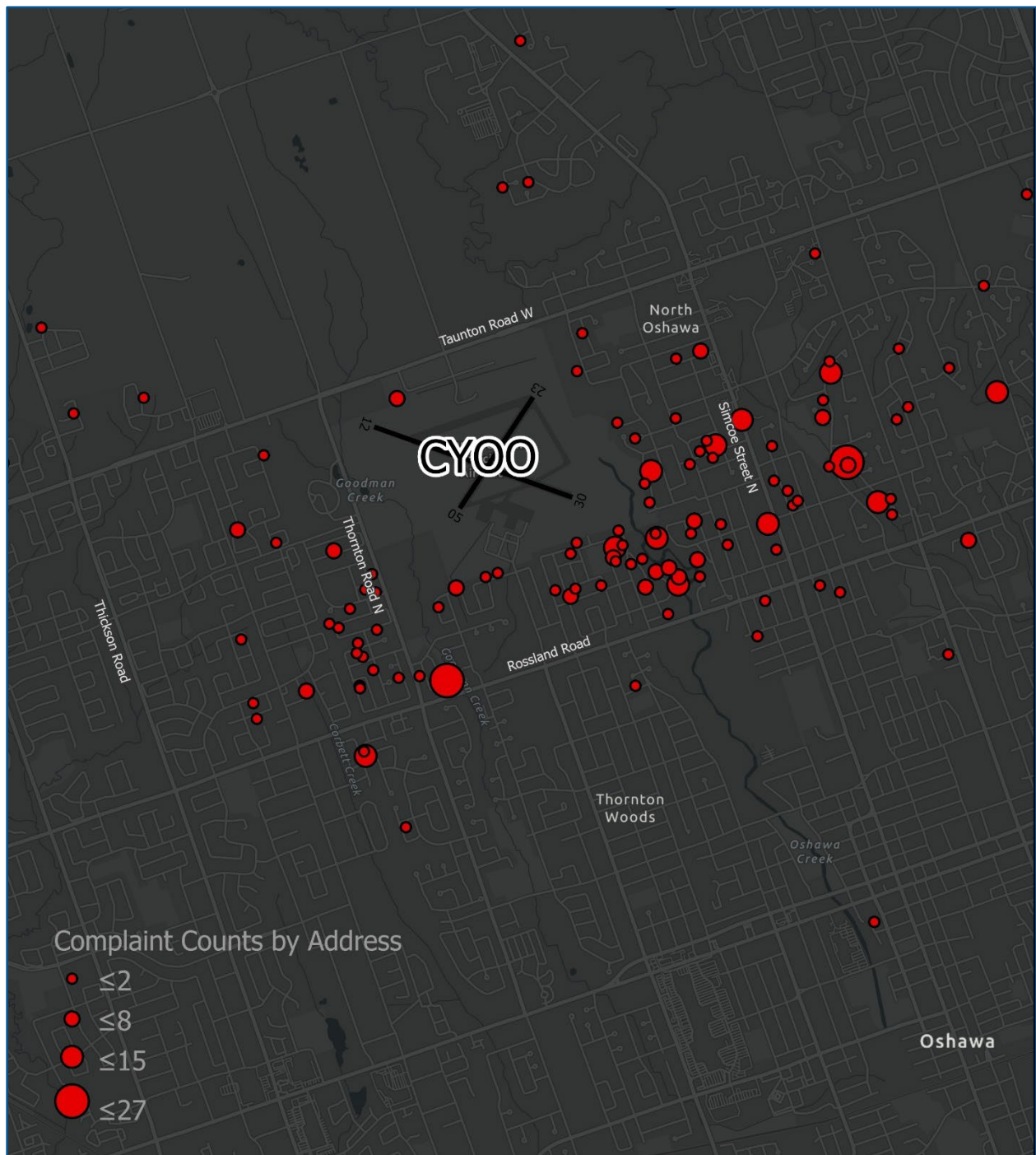
Figure 5.5 - Complaint Locations (July 2020 – April 2021)



Data Source: City of Oshawa Noise Complaint Records

Figure 5.6 presents the complaints using gradient symbols, with the smallest circles representing 1-2 complaints filed per address and the largest representing between 15 and 27 complaints filed per address. This map, when viewed with Figure 5.5, indicates a high concentration of complaints south and east of the Airport.

Figure 5.6 - Complaint Count by Address (July 2020 – April 2021)

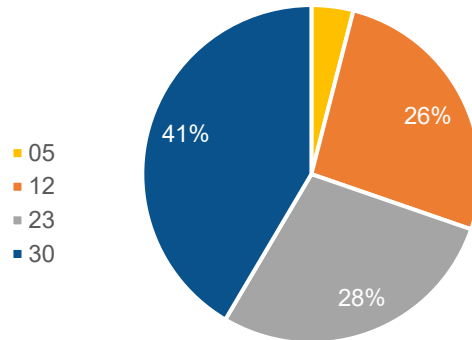


Data Source: City of Oshawa Noise Complaint Records

5.3.4 Complaints vs. Runway Utilization

Figure 5.7 presents the utilization of each of the four runways as a percentage of the total movements for 2020, sourced from NCAMS data. Runway 30 had the highest utilization (41% of total annual movements), with Runways 23 and 12 approximately equal in their utilization at 28% and 26%, respectively. Runway 05 is the least utilized runway, representing 4% of total annual movements in 2020.

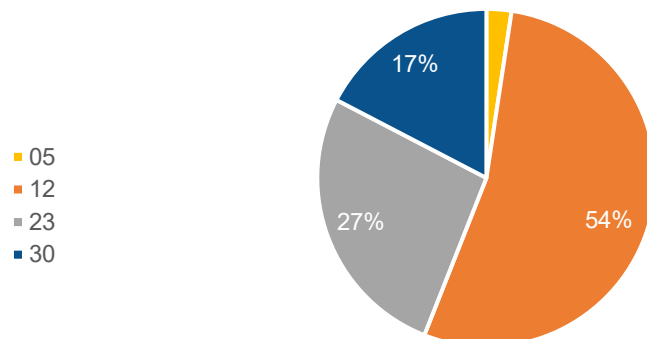
Figure 5.7 - Proportional Runway Utilization (2020)



Data Source: 2020 NAV CANADA Aircraft Movement Statistics

Because the time of each incident was not consistently included for many of the complaint records, HM Aero was unable to assign each movement reliably and consistently to one of the four runways. Instead, using NCAMS data, HM Aero determined which runway was most frequently used for each complaint day between July 2020 and April 2021. Figure 5.8 shows the proportion of total complaints associated with each runway in greatest use on the day of the complaint. For example, while Runway 12 was used for 26% of movements in 2020, it was associated with 54% of complaints in the reviewed period. Conversely, while Runway 30 was used for 41% of movements in 2020, it was associated with 17% of complaints in the reviewed period.

Figure 5.8 - Percent of Complaints by Predominant Runway (July 2020 - April 2021)

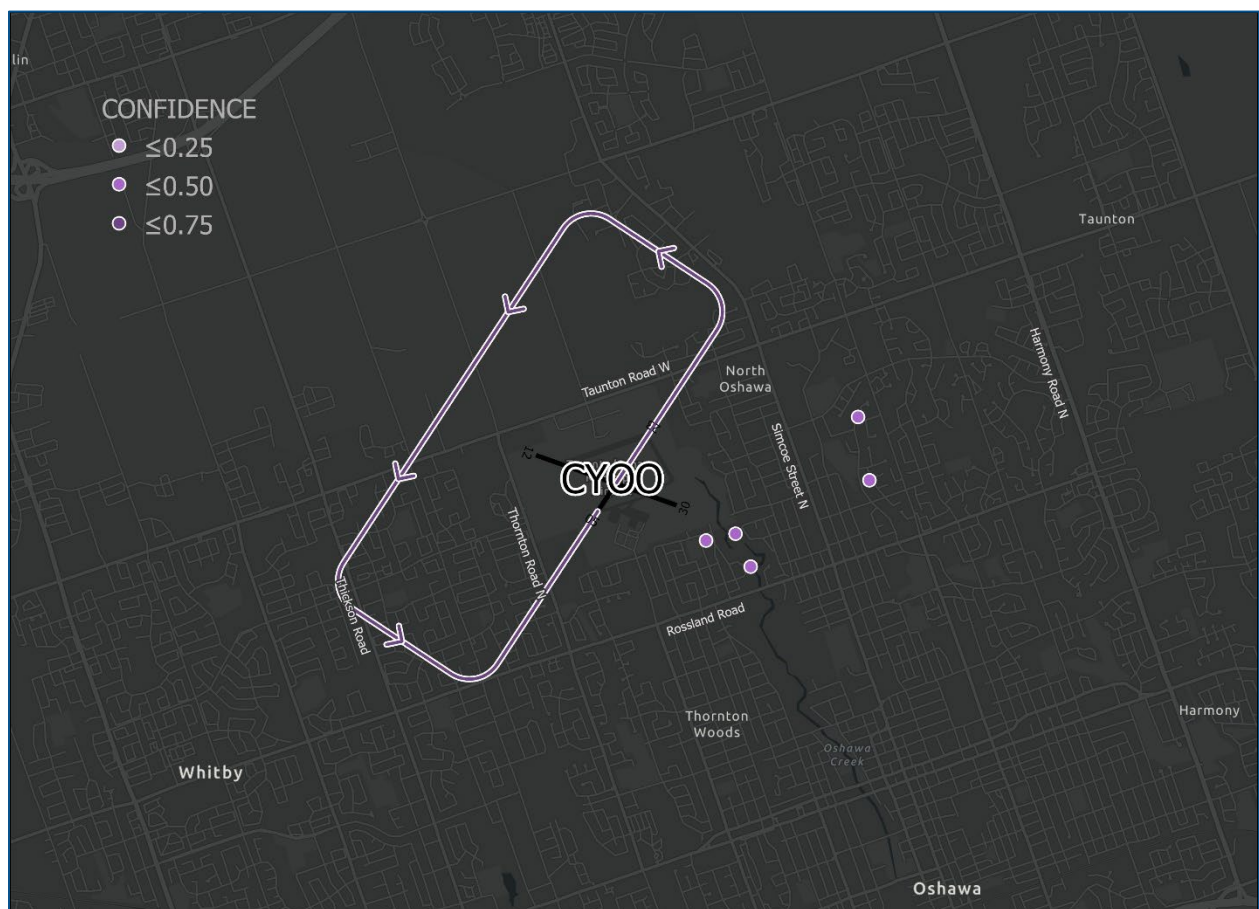


Data Source: 2020-2021 NAV CANADA Aircraft Movement Statistics, City of Oshawa Noise Complaint Records

In addition to identifying the predominant runway for each day, HM Aero also calculated the confidence that the predominant runway was the runway used on the day in question. For example, if Runway 05 was used for 45% of movements on a given day and none of the remaining runways were used more than 45%, then it assumed that Runway 05 was used for that day with 45% (0.45) confidence and is therefore associated with all complaints on that day.

Figure 5.9 shows the complaints associated with Runway 05 between July 2020 and April 2021, with the diagram overlaid with the Runway 05 left-hand traffic circuit pattern. The relatively few complaints attributed to Runway 05 corresponds with the low overall utilization of the runway relative the remaining three. The confidence that these complaints were linked to aircraft operating on Runway 05 are 50% or lower, indicating that other runways were used in addition to Runway 05 on the day in question. The complaint locations identified in Figure 5.9 are in proximity to the departure leg of the circuit where engine power settings are highest, and aircraft produce the most noise.

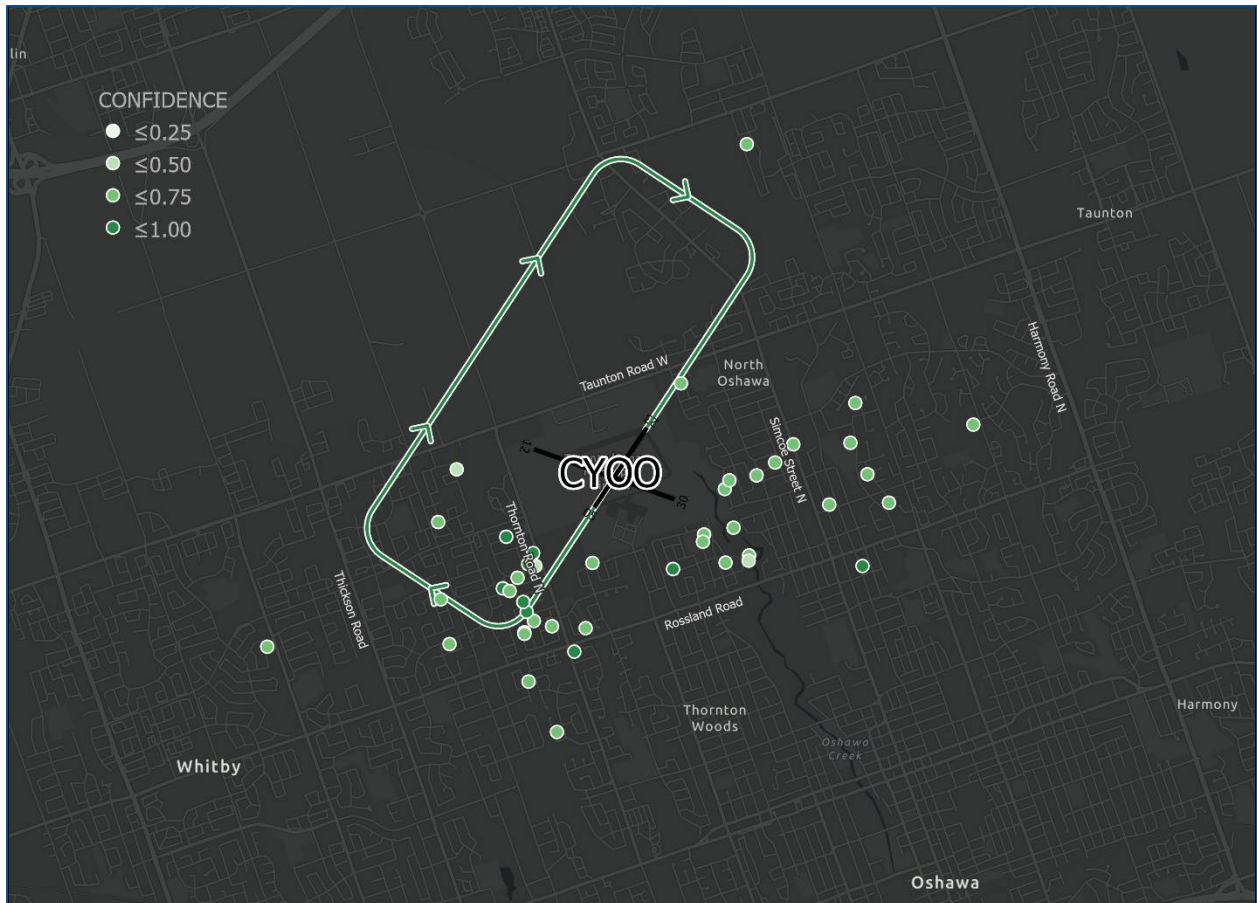
Figure 5.9 - Complaints Associated with Runway 05 (July 2020 - April 2021)



Data Source: 2020-2021 NAV CANADA Aircraft Movement Statistics, City of Oshawa Noise Complaint Records

For Runway 23, the highest concentration of complaints as well as the complaints with the highest runway utilization confidence are located below the departure and crosswind legs of the right-hand traffic circuit (Figure 5.10). Fewer complaints were registered near the downwind, base, and final legs of the circuit pattern where power settings are lower.

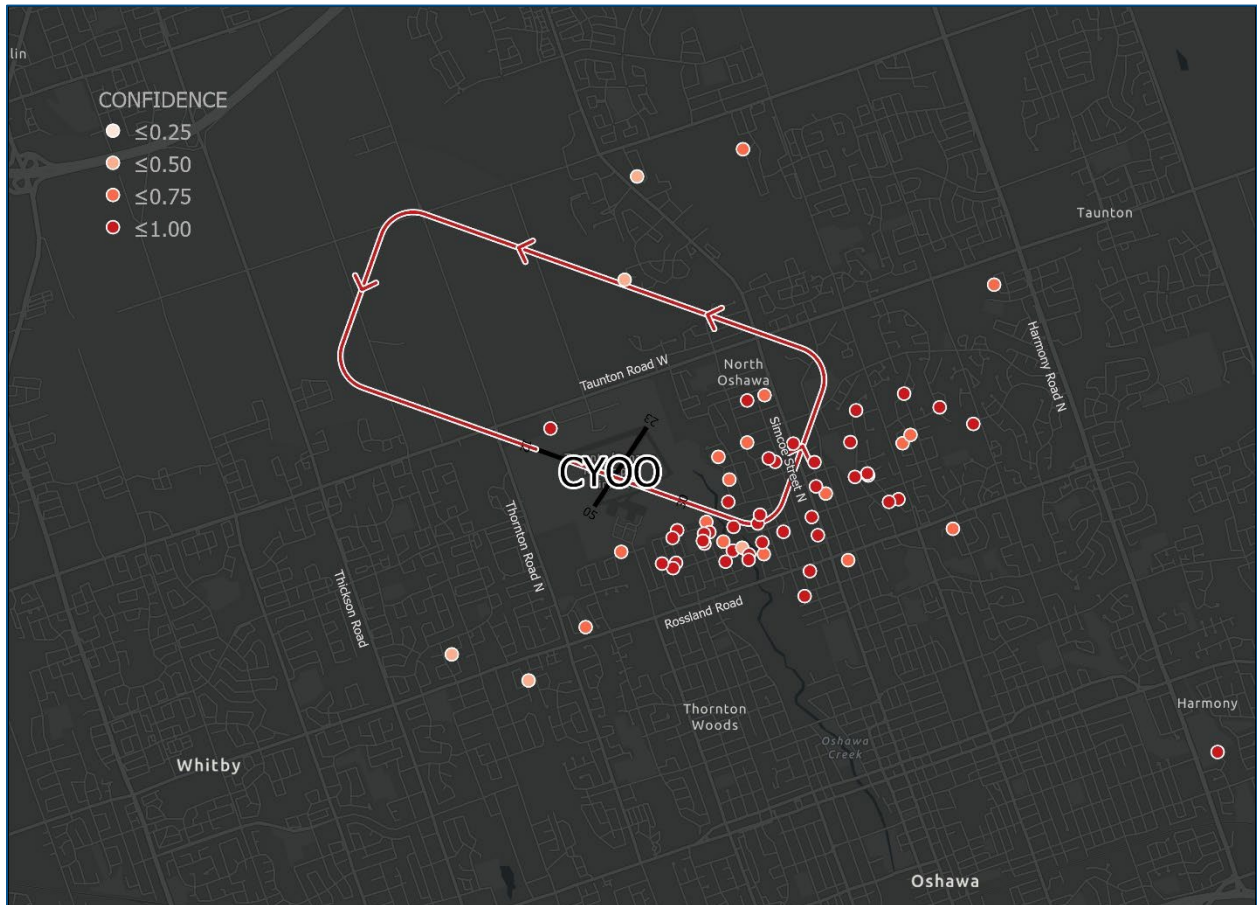
Figure 5.10 - Complaints Associated with Runway 23 (July 2020 - April 2021)



Data Source: 2020-2021 NAV CANADA Aircraft Movement Statistics, City of Oshawa Noise Complaint Records

Runway 12 supported 26% of total movements in 2020 but disproportionately accounts for 54% of recorded complaints. Figure 5.11 illustrates the concentration of complaints and runway utilization confidence – complaints are primarily located under the departure and crosswind legs of the Runway 12 traffic circuit. Fewer complaints outside of these areas may be attributed to lower engine power settings and lower population densities. The high confidence of association between noise complaints and runway usage shown in Figure 5.11 further supports findings as to the importance of Runway 12 operations in relation to community concerns.

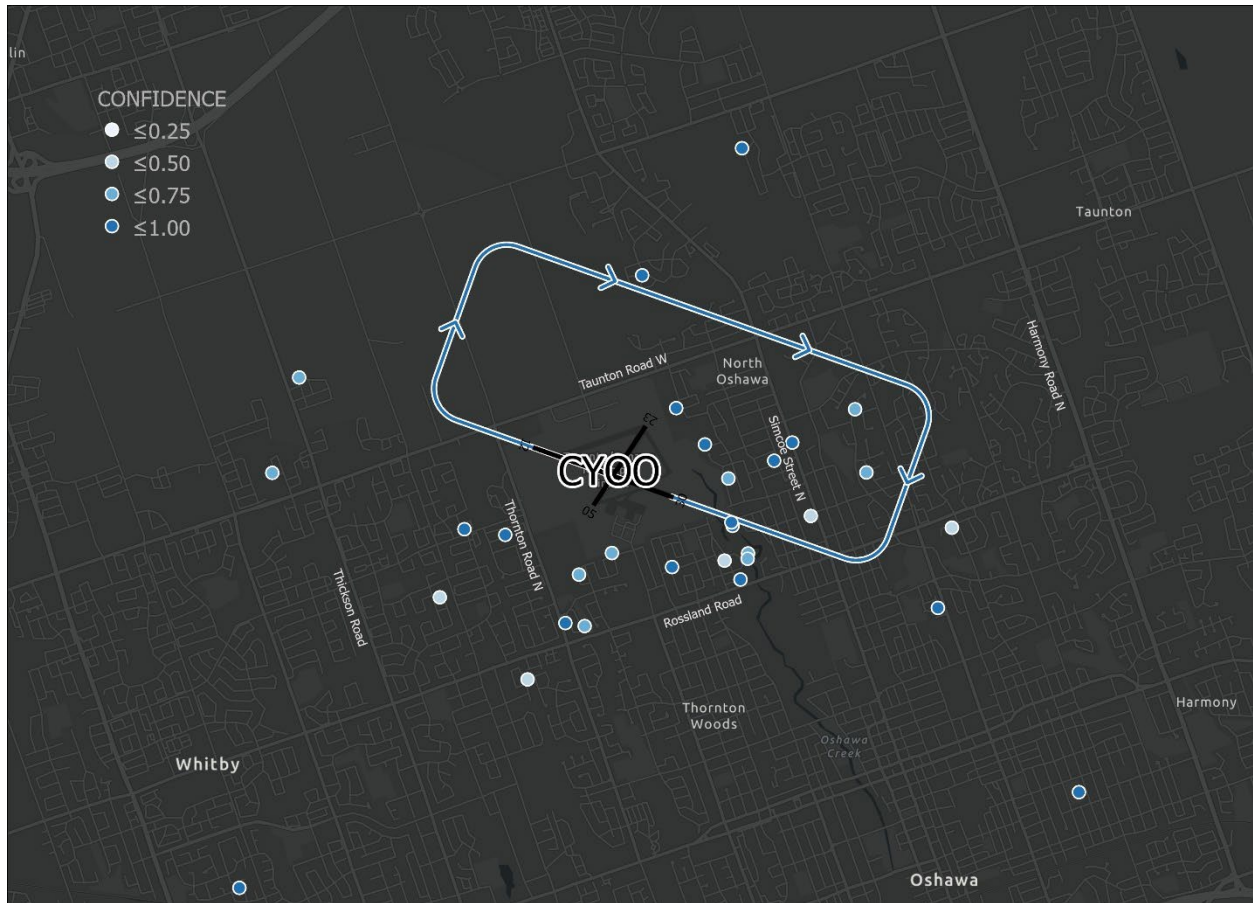
Figure 5.11 - Complaints Associated with Runway 12 (July 2020 - April 2021)



Data Source: 2020-2021 NAV CANADA Aircraft Movement Statistics, City of Oshawa Noise Complaint Records

Runway 30 has relatively few complaints under the departure and crosswind legs of the traffic circuit, as these areas have limited residential land uses. Also, the complaints with high runway utilization confidence are more dispersed when compared to Runway 12 and Runway 23. It has been noted that regardless of the runway in use, complaints are consistently submitted by addresses north of Rossland Road and near Oshawa Creek.

Figure 5.12 - Complaints Associated with Runway 30 (July 2020 - April 2021)



Data Source: 2020-2021 NAV CANADA Aircraft Movement Statistics, City of Oshawa Noise Complaint Records

5.3.5 Flight Training Operations

There are two Flight Training Units (FTUs) based at the Airport: Durham Flight Centre (DFC) and Canadian Flight Academy (CFA). A review conducted of the NCAMS data for 2019 and 2020, presented as Table 5.2, revealed that the two operators accounted for between 72% and 75% of all movements at the Airport over the two years. In addition to DFC and CFA, flight training is conducted using privately registered aircraft and by FTUs not based at Oshawa Executive Airport – however, records of such activity are not easily discernible in the NCAMS data, and subsequent analyses of flight training activity solely consider operations by DFC and CFA.

An analysis of local aircraft movements was also completed. As defined by Statistics Canada, local movements at airports with control towers or flight service stations are considered as movements in which the aircraft remains in the circuit. In 2019, DFC and CFA accounted for 79% of local movements and 73% in 2020.

A recurring question raised during stakeholder consultations was how causation is established between noise complaints and the operations of the FTUs based at the Airport. Within the noise complaint dataset maintained by the City of Oshawa, sufficient detail is not available in most records to determine whether a single movement that caused a complaint was operated by a FTU, or further, whether that FTU aircraft was being used for flight training as defined by Transport Canada. However, the two FTUs and their aircraft are responsible for most of the movements at the Airport. Through the review of the historical quantitative noise complaint resources, records from past public meetings⁵, and findings from the consultation program completed as part of the AC 302-002 process, operations by aircraft used by the two FTUs emerged as a recurring theme. Procedures for flight training are an eligible category pursuant to CAR 602.105 and, taking the considerations identified above together, specific consideration was given to this category of users.

Table 5.2 - Airport-Based Flight Training Unit Total Movements (2019-2020)

Year	2019		2020	
	Movements	Percent of Total	Movements	Percent of Total
Annual Based FTU Movements	67,382	75%	56,600	72%
Annual Non-FTU Movements	22,998	25%	22,247	28%
Total	90,380	100%	78,847	100%
Data Source: 2019-2020 NAV CANADA Aircraft Movement Statistics, excluding 66, 70, 77, 88, 88A and 88B movement codes				

Table 5.3 - Airport-Based Flight Training Unit Local Movements (2019-2020)

Year	2019		2020	
	Movements	Percent of Total	Movements	Percent of Total
Annual Based FTU Movements	27,197	79%	19,569	73%
Annual Non-FTU Movements	7,139	21%	7,389	27%
Total	34,336	100%	26,958	100%
Data Source: 2019-2020 NAV CANADA Aircraft Movement Statistics, excluding 66, 70, 77, 88, 88A, and 88B				

⁵ Not all movements operated by aircraft registered to the two FTUs necessarily constitute flight training as defined by Transport Canada. For example, FTU aircraft can be used for familiarization flights, sightseeing, and private rentals to licensed pilots.

5.4 Problem Description

The qualitative and quantitative analyses of historical data were critical in the identification of the problem. The following six points generally summarize the key elements of the community / aircraft noise problem at the Airport:

1. Complaints have increased substantially in recent years – A review of the previous 5 years of complaints identified a sharp increase in noise complaints recently. In 2018, 57 noise complaints were filed while 2019 and 2020 witnessed 132 and 238 complaints, respectively. The complaints recorded by the Lagan System total 380 between July 2020 to April 2021.
2. Aircraft movements are continuing to increase – Total aircraft movements at Oshawa Executive Airport have been increasing steadily from approximately 52,000 in 2014 to approximately 90,000 in 2019. The modest decline in movements observed in 2020 is attributed to the COVID-19 pandemic with aircraft movements anticipated to rebound and grow through 2021 and onward. While there is not a direct correlation, an increase in aircraft movements in the coming years is expected to result in an additional increase in noise complaints.
3. Complaints are not limited to specific days of the week – The data collected in the Lagan System between July 2020 and April 2021 shows that noise complaints are filed for incidents consistently throughout the week, with Monday, Tuesday, and Wednesday having the highest complaint counts. This suggests that procedures and restrictions proposed through this process must address the entire week, and not be limited to weekends and holidays.
4. Complaints by runway are disproportionate to runway use – runways closest to and aligned with dense residential areas experience a larger number of complaints than those aligned with unpopulated areas. For example, aircraft operations on Runway 12 were associated with 54% of complaints between July 2020 and April 2021, but this runway was utilized for only 26% of aircraft movements. Conversely, Runway 30 supported 41% of total aircraft movements, but was associated with 17% of complaints in the same period.
5. Flight training operations account for most aircraft movements at the Airport – in 2019 and 2020, the two Oshawa-based FTUs were responsible for between 72% and 75% of annual aircraft movements and between 73% and 79% of local (circuit) movements in the same period.

Residents have little reprieve from aircraft noise – under the current procedures and restrictions, individuals may be exposed to continuous aircraft noise during daylight hours with few prescribed pauses in activity that can be anticipated and relied upon.

6 FINAL PROPOSED NOISE ABATEMENT PROCEDURES

Based on the information received through the stakeholder engagement process and the direction provided by the City of Oshawa, nine Final Proposed Procedures are requested to be advanced to Transport Canada for consideration as mandatory procedures pursuant to the authority of Canadian Aviation Regulation 602.105 and the process established through AC 302-002. Table 6.1 identifies the limited changes between the Draft Proposed Procedures and Final Proposed Procedures, which were deemed by the City to be non-material in nature and therefore not initiating the requirement for additional stakeholder engagement.

Table 6.2 enumerates the finalized version of each of the Proposed Procedures being put forth to Transport Canada by the City of Oshawa. All existing Voluntary Noise Abatement Procedures would be removed with the acceptance of the Final Proposed Noise Abatement Procedures by Transport Canada.

With respect to Final Proposed Procedures 6-8 and the authority of CAR 602.105(g) – Prohibition or Restriction of Training Flights, clarification was sought from Transport Canada on the definition of flight training. From consultations with Transport Canada, Final Proposed Procedures 6-8 would apply to:

- All flying activities by a student pilot while under the supervision of a CFI;
- All flying activities by a licensed pilot while under the supervision of a CFI while pursuing an additional endorsement or license; and
- Solo flying by a student pilot or licensed pilot under the authorization of a CFI while pursuing an additional endorsement or license.

The proposed restrictions on flight training (Final Proposed Procedures 6-8) would not affect:

- Flying done while building time for a license without the authorization or supervision of a CFI;
- Recurrent training (e.g., six-month recurrency) by licensed pilots not under the supervision or authorization of a CFI;
- The rental of an FTU aircraft by a licensed pilot for recreational purposes; and
- The use of a FTU aircraft for non-flight training purposes, such as sight seeing, familiarization flights, and other similar activities.

Table 6.1 - Comparison of Draft Proposed Procedures and Final Proposed Procedures

No.	Draft Proposed Procedure	Final Proposed Procedure for Transport Canada Consideration
<p>Underlining denotes text added or modified in the Final Proposed Procedures Strikethroughs denote text removed from the Draft Proposed Procedures</p>		
602.105(a) Preferential Runways		
1	<p>Tower Closed Preferential Runways: When the Air Traffic Control Tower is closed, pilots shall use Runway 12 for arrivals and Runway 30 for departures, consistent with safety of operations.</p>	<p>Overnight Preferential Runways: <u>Between the hours of 9:30 PM and 7:30 AM, consideration should be given to using</u> Runway 12 for arrivals and Runway 30 for departures, consistent with safety of operations.</p>
2	<p>Tower Open Preferential Runways: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° at up to 10 kts (18.52 km/h) or from a heading of 031° (incrementally) to 209° at up to 5 kts (9.26 km/h).</p>	<p>Tower Open Preferential Runways: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° <u>at up to 5 kts.</u></p>
602.105(c) Hours When Aircraft Operations are Prohibited or Restricted		
3	<p>Overnight Restricted Hours: Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.</p>	
4	<p>Overnight Engine Run-Ups: Engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.</p>	<p>Overnight Engine Run-Ups: <u>Scheduled</u> engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.</p>
602.105(d) Arrival Procedures		
5	<p>Arrival Turns: Aircraft arriving at the Airport will remain at least 1,000 ft. ASL (540 ft. AGL) before making the turn for their final approach for landing.</p>	Draft Proposed Procedure removed
6	<p>Approach Angle: Approaches are to remain on or above an assumed 3° glide slope.</p>	Draft Proposed Procedure removed
7	<p>Circling Procedures: If weather conditions permit, circling procedures are to be conducted at 1,460 ft. ASL (1,000 ft. AGL).</p>	Draft Proposed Procedure removed
602.105(e) Departure Procedures		
8	<p>Departure Turns: Aircraft departing the Airport will continue to fly on the runway heading until they reach 1,000 ft. ASL (540 ft. AGL) before making any turns.</p>	<p>Departure Turns: <u>Departing aircraft</u> will continue to fly on the runway heading until they reach 1,000 ft. ASL (540 ft. AGL) before making any turns.</p>
602.105(g) Prohibition or Restriction of Training Flights		
9	<p>Prior Permission for Flight Training: Prior permission by the Airport Manager is required for all flight training, including private and commercial pilot recurrent training.</p>	Draft Proposed Procedure removed
10	<p>Time of Day Flight Training Restrictions: Flight training is not permitted Friday-Monday before 8:00 AM and after 4:00 PM May 1 – September 30; and Friday-Monday before 8:00 AM and after 8:00 PM October 1 – April 30.</p>	<p>Time of Day Flight Training Restrictions: Flight training aircraft are not permitted <u>to depart</u> Friday-Monday before 8:00 AM and after 4:00 PM May 1 – September 30; and Friday-Monday before 8:00 AM and after 8:00 PM October 1 – April 30.</p>

No.	Draft Proposed Procedure	Final Proposed Procedure for Transport Canada Consideration
11	Alternating Seasonal Weekend Flight Training Restrictions: Flight training is not permitted on the 1 st and 3 rd Sunday of the month and 2 nd and 4 th Saturday of the month from May 1 – September 30.	
12	Statutory Holiday Flight Training Restrictions: Flight training is not permitted on the following federal statutory holidays: New Year's Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.	
13	Circuit Flight Training Restrictions: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.	Circuit Restrictions: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.
602.105(j) Minimum Aerodrome Operation Altitudes		
14	Toronto Zoo: Pilots are to maintain 2000 ASL or above over Toronto Zoo (N43 49 05 W79 11 15).	Draft Proposed Procedure removed

Table 6.2 - Final Proposed Noise Abatement Procedures

1	Overnight Preferential Runways: Between the hours of 9:30 PM and 7:30 AM, consideration should be given to using Runway 12 for arrivals and Runway 30 for departures, consistent with safety of operations.
2	Tower Open Preferential Runways: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° at up to 5 kts.
3	Overnight Restricted Hours: Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.
4	Overnight Engine Run-Ups: Scheduled engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.
5	Departure Turns: Departing aircraft will continue to fly on the runway heading until they reach 1,000 ft. ASL before making any turns.
6	Time of Day Flight Training Restrictions: Flight training aircraft are not permitted to depart Friday-Monday before 8:00 AM and after 4:00 PM May 1 – September 30; and Friday-Monday before 8:00 AM and after 8:00 PM October 1 – April 30.
7	Alternating Seasonal Weekend Flight Training Restrictions: Flight training is not permitted on the 1st and 3rd Sunday of the month and 2nd and 4th Saturday of the month from May 1 – September 30.
8	Statutory Holiday Flight Training Restrictions: Flight training is not permitted on the following federal statutory holidays: New Year's Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.
9	Circuit Restrictions: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.

7 EVALUATION OF FINAL PROPOSED NOISE ABATEMENT PROCEDURES

Per Step 1 of the AC 302-002 process, a fulsome evaluation of the Final Proposed Procedures must be completed that considers the following:

- The implications of not proceeding with the Final Proposed Procedures, as documented in Section 7.1. For analysis purposes, it is assumed that the existing Voluntary Noise Abatement Procedures would continue to be in effect; and
- The implications of proceeding with the Final Proposed Procedures, considering the nine criteria established in the AC 302-002 process: noise, costs, aircraft emissions, airport capacity, implementation, aviation system, air traffic management, safety, and fleet. These criteria are evaluated, respectively, in Sections 7.2 to 7.10.

The evaluation process was previously completed in support of the Draft Proposed Procedures. Through the feedback received during the stakeholder engagement program and based on the publication of additional reports commissioned by the City of Oshawa, this evaluation framework has been updated in support of the submission to Transport Canada. While the previous evaluation framework was based on the independent analysis of HM Aero, updates have been identified in select areas where stakeholders have provided more accurate inputs that were not previously available.

Where applicable, data sources and assumptions have been documented. 2019 and 2020 NCAMS data was filtered where applicable to exclude 66, 70, 77, 88, 88A and 88B movement codes, which generally include landings and takeoffs outside of the Airport boundary and aircraft operating in the control zone but not landing or taking off at the Airport. In the previous submission, code 99 movements were excluded from the evaluation – however, these movements have been reintegrated into the dataset to account for simulated approaches for which a runway is not recorded.

7.1 Implications of Not Proceeding

7.1.1 Summary of Changes

No changes were made to this section based on the stakeholder engagement program.

7.1.2 Evaluation

Voluntary Noise Abatement Procedures are currently in effect for the Airport that address preferential runway usage, hours where aircraft operations are restricted, arrival procedures, departure procedures, training flights, and overflights of the Toronto Zoo. Despite these procedures, a noise problem has been identified as described in Section 5. Failing to address the ongoing noise concerns at the Airport through the Final Proposed Procedures may result in one or more of the following potential outcomes:

- Noise complaints are unlikely to decline unless aircraft movements significantly decrease. With status quo or increased levels of aircraft movements, the number of noise complaints may reasonably be expected to increase over time. Prolonged and increasing exposure to aircraft noise may result in residences that have historically not recorded complaints doing so, and existing individuals that have submitted complaints doing so at an increasing rate. As noted previously in Section 5.3, the number of recorded noise complaints has increased significantly in recent years;

- If new mandatory noise abatement procedures are not implemented, it may result in heightened public discontent, pressure to local decision-makers (i.e., Councillors and the Mayor) for change, and decreased local support for the Airport. Furthermore, resident perceptions of the City and Airport Operator's ability to enforce current procedures could also be negatively impacted to a higher degree;
- If the current AC 302-002 process is completed without the implementation of the Final Proposed Procedures, the City may decide in the future to initiate the AC 302-002 process again, with additional costs incurred in consulting fees and staff time;
- The City's existing Voluntary Noise Abatement Procedures and Noise & Traffic Management Policy could be refined to include one or more of the abatement procedures recommended herein. However, the efficacy of such changes may be hindered by the reliance on voluntary compliance, as such procedures cannot be enforced by the City or Transport Canada unless enacted pursuant to CAR 602.105; and
- Conversely, aircraft movement levels at the Airport may continue to increase with minimal restriction, representing a positive trend from an aviation activity and revenue generation perspective. However, such growth would be subject to the caveats described above.

In summary, continuing with the status quo whereby only the existing Voluntary Noise Abatement Procedures remain in effect is highly unlikely to address the noise issue documented previously. Increasing discontent among residents in the vicinity of the Airport may reasonably be expected if new mandatory noise abatement procedures are not enacted at the Airport.

7.2 Noise Implications

7.2.1 Summary of Changes

Based on feedback received through the stakeholder engagement program and updated materials made available by the City of Oshawa, the following changes have been made with respect to the evaluation of noise impacts:

- Updated information is provided for the 2021 noise monitoring study;
- Analyses now include Code 99 movements where applicable;
- The impact estimates of Final Proposed Procedures 2, 6, 7, 8, and 9 have been updated;
- Comparisons between the estimated annual circuit capacity and historical movements recorded for the two FTUS have been removed in the analysis for Final Proposed Procedure 9; and
- References to discarded Draft Proposed Procedures have been removed.

7.2.2 Evaluation

The Final Proposed Procedures have been developed specifically for Oshawa Executive Airport to make incremental progress. Background information on past noise monitoring studies prepared by the City of Oshawa is also provided to contextualize the following discussion.

Table 7.1 - Final Proposed Noise Abatement Procedures, Noise Implications

No.	Final Proposed Noise Abatement Procedure	Noise Implications?
1	Overnight Preferential Runways: Between the hours of 9:30 PM and 7:30 AM, consideration should be given to using Runway 12 for arrivals and Runway 30 for departures, consistent with safety of operations.	Yes
2	Tower Open Preferential Runways: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° at up to 5 kts.	Yes
3	Overnight Restricted Hours: Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.	Yes
4	Overnight Engine Run-Ups: Scheduled engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.	Yes
5	Departure Turns: Departing aircraft will continue to fly on the runway heading until they reach 1,000 ft. ASL before making any turns.	Yes
6	Time of Day Flight Training Restrictions: Flight training aircraft are not permitted to depart Friday-Monday before 8:00 AM and after 4:00 PM May 1 – September 30; and Friday-Monday before 8:00 AM and after 8:00 PM October 1 – April 30.	Yes
7	Alternating Seasonal Weekend Flight Training Restrictions: Flight training is not permitted on the 1st and 3rd Sunday of the month and 2nd and 4th Saturday of the month from May 1 – September 30.	Yes
8	Statutory Holiday Flight Training Restrictions: Flight training is not permitted on the following federal statutory holidays: New Year's Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.	Yes
9	Circuit Restrictions: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.	Yes

Background – Noise Monitoring Studies

The City of Oshawa commissioned a noise monitoring study in 2019, which was the first of two phases. The 2019 noise monitoring study⁶ was completed using measuring units installed near each of the Airport's four runway thresholds from July 4, 2019 until September 22, 2019. The 2019 study made several findings related to Airport noise:

- When comparing noise data from monitoring stations for an active (in use) and inactive runway, the difference was approximately 10 decibels (dBA), or an order of magnitude difference. This confirms resident concerns that aircraft operations significantly increase noise levels versus those associated with the ambient urban environment; and

⁶ RWDI Consulting Engineers and Scientists. (2020, October 28). Oshawa Executive Airport Noise Monitoring, Oshawa, Ontario – Noise Study (RWDI #1903663).

- The differences between the takeoff end of the runway and the landing end of the runway were typically between 2 and 4 dBA, or approximately double the sound pressure level. This supports the assumption that residents exposed to aircraft on takeoff experience a higher level of noise versus the level that would be experienced with a landing aircraft.

Data collection for the second phase of the noise monitoring study occurred between July 6, 2021 and September 13, 2021. In response to community input, five noise monitoring units were installed in residential areas near the Airport under the Runway 12-30 and Runway 05-23 arrival and departure paths: Barbados Street, Bessborough Drive, Juniper Street, Revelstoke Court, and Woodlea Crescent. As opposed to the placement of monitoring units on the Airport property in the 2019 study, the 2021 sites were all backyards which were intended to demonstrate actual impacts in the community. Key findings of the 2021 study were that⁷:

- There were noise impacts from aircraft identified at each of the five locations, but impacts were not definitively obvious from the measured data given high levels of ambient noise from mechanical systems and the urban environment;
- On high activity days at the Airport (e.g., August 5, 2021 and August 6, 2021), aircraft volumes added approximately 3 to 5 dBA at receptors on the flight path, or roughly a doubling of the sound pressure level;
- The Noise Exposure Factor – 35 level that is noted by the consultant to commonly be used as a development restriction, which is comparable to a 24-hour LEQ limit of 67 dBA, was not exceeded at the five locations on a 24-hour basis; and
- While World Bank materials for noise levels near new infrastructure and industrial projects are not standards and were included for comparative purposes only, numerous occurrences were identified where noise levels exceeded these guidelines.

The 2021 noise study is included as Appendix B.

Final Proposed Noise Abatement Procedure 1 – Overnight Preferential Runways

During overnight hours when the NAV CANADA Air Traffic Control Tower is closed, a Voluntary Noise Abatement Procedure is currently published whereby pilots are requested to utilize Runway 12 for arrivals and Runway 30 for departures, except where such operations would otherwise be precluded (e.g., due to winds that favour another runway). This procedure is intended to route arrivals and departures over less densely populated areas to the northwest, as shown in Figure 7.1. Through Final Proposed Procedure 1, this practice would continue to be requested with a minor modification of being retimed to align with the proposed commencement (9:30 PM) and termination (7:30 AM) of the overnight restriction period.

A total of 33 movements were recorded in the 2019 and 2020 NCAMS datasets during the current overnight restricted period (10:30 PM to 6:30 AM), although 8 were discarded from the analysis as the runway used was entered incorrectly and the actual runway used could not be verified. From 10:30 PM to 6:30 AM, 22% of arrivals used the recommended Runway 12, while 66% of departures utilized the recommended Runway 30. Arrivals and departures that did not use the respective overnight preferred runway likely did so based on wind conditions or other operational considerations (e.g., expedited arrivals for air ambulance aircraft). The inclusion of Final Proposed Procedure 1 will continue to signify to aircraft operators that Runway 12 is the noise-preferred runway for overnight arrivals and Runway 30 is preferred for overnight departures, consistent with safety of operations and prevailing winds favouring the recommended runway.

⁷ RWDI Consulting Engineers and Scientists. (2022, January 2). Oshawa Executive Airport, Oshawa, Ontario – Noise Study (RWDI #2104007).

Figure 7.1 - Overnight Preferential Runway Arrival and Departure Routes



Final Proposed Noise Abatement Procedure 2 – Tower Open Preferential Runways

By implementing a maximum 90° crosswind component for Runway 30 operations of up to 5 kts, the intent of this Final Proposed Procedure is to increase the utilization of Runway 30 for aircraft arrivals and departures. Aircraft on the departure and crosswind legs operate at or near their highest power setting as they climb away from the Airport, thereby increasing noise exposure to residences in the area. The Runway 30 departure path and right-hand crosswind legs are established over non-residential and less densely populated residential areas of Oshawa and Whitby – accordingly, by increasing Runway 30 utilization, the goal is to redirect traffic so fewer residences are exposed to aircraft overflights when they operate at their highest power settings.

A windrose analysis was completed using data recorded at the Airport from 2016 to 2020 for the hours of 6:00 AM to 10:00 PM⁸. Under the current runway utilization criteria, Runway 30 was the preferred runway for 44% of the analyzed hours (Table 7.2). Based on the analyzed historical wind dataset, implementing the revised utilization criteria of the Final Proposed Procedure would increase the time during which Runway 30 is wind-favoured by 210 hours per year, and would increase the preferred utilization of Runway 30 from 44% of operating hours to 47% of operating hours (Table 7.2). For comparison, the Draft Proposed Procedure would have permitted operations in a maximum 90° crosswind component of up to 10 kts and with a tailwind of up to 5 kts.

⁸ As overnight operations are currently restricted, data from 10:00 PM to 6:00 AM was not integrated in the analysis.

Through the same analysis methodology, the Draft Proposed Procedure would have increased the time during which Runway 30 is wind-favoured from 44% of operating hours to 70% of operating hours

It is noted that dwellings to the south and east of the Airport that are impacted by the Runway 12 departure and left-hand crosswind legs will continue to be impacted by the Runway 30 right-hand base and final approach legs. However, increasing the utilization of Runway 30 will decrease the frequency at which these residences are overflowed by aircraft operating at their highest power settings, and instead will result in an increased prevalence of overflights at reduced power as aircraft configure for landing.

Table 7.2 - Runway Utilization Criteria Impacts (2016-2020 Wind Data)

Runway	Existing Runway Utilization Criteria		Proposed Runway Utilization Criteria	
	Proportion of Analyzed Hours	Average Hours per Year	Proportion of Analyzed Hours	Average Hours per Year
Runway 30	44%	2,719	47%	2,929
Runway 12	23%	1,438	23%	1,439
Runway 05	11%	678	11%	659
Runway 23	22%	1,368	19%	1,176
Total	100%	6,203	100%	6,203

Data Source: 2016-2020 historical weather data
Note: All analysis performed using wind data recorded at Oshawa Executive Airport from 2016 to 2020, from 6:00 AM to 10:00 PM local

The wind preferred runway that would have been assigned for each hour in 2019 and 2020 based on the Final Proposed Procedure has been compared to the actual utilization of each runway using the 2019 and 2020 NCAMS data, as shown in Table 7.3 and Table 7.4. As noted previously, the Runway 30 utilization criteria recommended through Final Proposed Procedure 2 is comparable to the status quo assignment of wind-favoured runways, contributing to the limited differences in utilization between historical activity levels and utilization with the adoption of the Final Proposed Procedure. With respect to Runway 05-23, while the analysis contemplates an increased usage of this facility with the Final Proposed Procedure versus historical levels, this only contemplates wind conditions. Other utilization factors, such as runway length requirements, are not accounted for in the estimated reallocation of aircraft movements and may overrepresent this shift to Runway 05-23.

Table 7.3 - Runway Utilization Criteria Impacts, 2019 and 2020 Movements

Runway	2019		2020	
	Movements (Historical)	Movements (With Proposed Runway Assignment Criteria)	Movements (Historical)	Movements (With Proposed Runway Assignment Criteria)
Runway 30	35,750	35,060	32,705	30,405
Runway 12	29,950	26,545	20,721	14,862
Runway 05	3,176	7,382	3,157	6,603
Runway 23	16,011	19,083	22,236	22,144

Data Source: 2016-2020 historical weather data, 2019 and 2020 NAV CANADA Aircraft Movement Statistics
Note: Total aircraft movements may not sum to the levels reported elsewhere in this report due to the exclusion of records for which wind data was not available and datapoints for which a runway was improperly labelled.

Table 7.4 - Runway Utilization Criteria Impacts, 2019 and 2020 Proportional Movements

Runway	2019		2020	
	Proportion of Movements (Historical)	Proportion of Movements (With Proposed Runway Assignment Criteria)	Proportion of Movements (Historical)	Proportion of Movements (With Proposed Runway Assignment Criteria)
Runway 30	42%	40%	41%	41%
Runway 12	35%	30%	26%	20%
Runway 05	4%	8%	4%	9%
Runway 23	19%	22%	28%	30%

Data Source: 2016-2020 historical weather data, 2019 and 2020 NAV CANADA Aircraft Movement Statistics
Note: Proportions for may not sum to 100% due to rounding. Analysis does not consider the reallocation of movements where no historical wind data was available.

Final Proposed Noise Abatement Procedure 3 – Overnight Restricted Hours

As noted previously, a Voluntary Noise Abatement Procedure is currently in effect whereby flights are prohibited between 10:30 PM and 6:30 AM, with the exception of police, medical, and industrial emergency flights that are permitted to arrive and depart, and aircraft based at the Airport that are permitted to arrive. In 2019, 14 movements were recorded between 10:30 PM and 6:30 AM, or 0.02% of the total of 90,380 movements in that year. In 2020, 19 movements were recorded in this period (0.02% of total annual movements). These values were sourced from the NCAMS datasets and do not include other movements that potentially were not recorded in these sources.

The Final Proposed Procedure would expand the restricted overnight period to 9:30 PM to 7:30 AM. Therefore, residents would experience an additional two hours per day with restricted aircraft operations, with the Airport’s daily hours of operation decreasing from 16 hours to 14 hours. On an annual basis, the Airport’s total non-restricted hours would decrease from 5,840 hours to 5,110 hours (a 12.5% decrease).

The expanded overnight restricted hours are expected to measurably reduce Airport activity during periods of heightened resident sensitivity to noise in the late evening and early morning. In 2019, 2,689 additional movements occurred during the two-hour expanded period of operational restrictions. Activity between 9:30 PM and 7:30 AM comprised 3.0% of the 90,380 movements recorded in 2019. Similarly, 1,266 additional movements were recorded during the two-hour expanded period of operational restrictions in 2020, or 1.6% of total annual movements. Of the movements that currently occur during the proposed expanded restricted period, there are three possible outcomes:

1. Movements of an exempted category continue (police, medical, industrial emergency, returning based aircraft);
2. Non-exempted movements are cancelled altogether (a movement is eliminated due to the Final Proposed Procedure); or
3. Non-exempted movements shift to an unrestricted time of the day (a movement is not eliminated altogether but is shifted).

Table 7.5 - Noise Implications, Modified Overnight Operational Restrictions

	Existing: 10:30 PM to 6:30 AM		Proposed: 9:30 PM to 7:30 AM	
	2019	2020	2019	2020
Movements Outside of Restricted Hours	90,366	78,828	87,677	77,562
Movements Within Restricted Hours	14	19	2,703	1,285
Total Annual Movements	90,380	78,847	90,380	78,847
Data Source: 2019 and 2020 NAV CANADA Aircraft Movement Statistics, excluding 66, 70, 77, 88, 88A and 88B movement codes				

Final Proposed Noise Abatement Procedure 4 – Overnight Engine Run-Ups

Data is not available on the number of historical scheduled overnight engine run-ups associated with aircraft maintenance and testing. The proposed restriction of scheduled engine run-ups during the new overnight restricted period (9:30 PM to 7:30 AM) will limit future instances of prolonged noise exposure at high power settings, thereby ensuring that potential noise problems do not develop associated with this activity.

Final Proposed Noise Abatement Procedure 5 – Departure Turns

Final Proposed Procedure 5 involves the formalization of the existing Voluntary Noise Abatement Procedure, whereby aircraft are requested to climb to 1,000 ft. ASL (540 ft. AGL) before initiating their crosswind or departure turn. This procedure is intended to reduce low-level turns that expose residences to prolonged periods of high-power settings.

Final Proposed Noise Abatement Procedure 6 – Time of Day Flight Training Restrictions

The intent of this Final Proposed Procedure is to limit flight training departures on Fridays, Saturdays, Sundays, and Mondays to the period of 8:00 AM to 4:00 PM from May 1 to September 30, and to the period of 8:00 AM to 8:00 PM from October 1 to April 30. Outside of these hours (before 8:00 AM year-round and after 4:00 PM / 8:00 PM as seasonally applicable), flight training aircraft would not be permitted to depart. The intent of this procedure is to provide predictable periods of year-round reduced operations and reprieve from high frequency aircraft noise exposure for residents.

NCAMS data was analyzed for 2019 and 2020 to determine the scale of flight training operations, per Transport Canada’s definition, during these periods. Operations by the two FTUs based at the Airport comprised an average of 61% of the movements that occurred during the October to April proposed restricted hours, and 71% of movements that occurred during the May to September proposed restricted hours. As noted previously, not all movements of aircraft registered to the two FTUs are necessarily completing flight training activities. Both businesses provide aerial sightseeing and familiarization flights, rent their aircraft to licensed pilots for personal use, and rent their fleets to students pursuing additional licenses or ratings while not under the supervision or authorization of a CFI. None of these types of movements would be subject to the restriction contemplated in Final Proposed Procedure 6. For analysis purposes, it is estimated that 90% of movements attributed to aircraft registered to DFC and CFA constitute “flight training” per the definition provided by Transport Canada through consultations.

For flight training movements that currently occur during the proposed restricted periods, there are two possible outcomes:

1. Flight training movements are cancelled altogether, representing the elimination of a given movement’s period of aircraft noise; or
2. The flight training activity is shifted to an unrestricted hour or day (i.e., noise is further concentrated during another time). FTU movements are subject to numerous factors that hinder the ability to predict or quantify the degree to which their shifting can occur. These factors include, but are not limited to, aircraft availability and maintenance downtime, instructor and student availability, and adequate meteorological conditions for the intended flight.

Restricting flight training departures before 8:00 AM and after 8:00 PM in the fall, winter, and spring months (October 1 to April 30) would have resulted in an estimated reduction or shifting of between 626 and 791 aircraft movements in 2019 and 2020, as demonstrated in Table 7.6. Implementing restrictions before 8:00 AM and after 4:00 PM from May 1 to September 30 would similarly have resulted in the shifting and / or reduction of between 4,432 and 6,496 movements in 2019 and 2020. A proportion of these affected movements would have been permitted to occur if they were flight training aircraft that departed prior to the commencement of the restricted period returning to the Airport.

Table 7.6 - Noise Implications, Seasonal Flight Training Time of Day Restrictions

	October 1 to April 30, Before 8:00 AM, After 8:00 PM		May 1 to September 30, Before 8:00 AM, After 4:00 PM	
	2019	2020	2019	2020
Movements Not Operated by Flight Training Units	598	418	2,722	2,191
Flight Training Unit Movements, Assumed Non-Flight Training	88	70	722	492
Flight Training Unit Movements, Assumed Flight Training	791	626	6,496	4,432
Total Annual Movements Within Restricted Hours	1,477	1,114	9,940	7,115
Data Source: 2019 and 2020 NAV CANADA Aircraft Movement Statistics, excluding 66, 70, 77, 88, 88A, and 88B movement codes				
Note: For movements by aircraft registered to Flight Training Units based at the Airport, 90% are assumed to be flight training movements per the definition provided by Transport Canada, while 10% are assumed to be other aircraft operations				

A degree of the activity identified in 2019 and 2020 that would be affected by these restrictions may have been shifted to other days or hours, and it is anticipated that the FTUs may proactively work to increase the utilization of their aircraft fleets during restricted hours through unaffected business lines, including sightseeing sights, familiarization flights, and aircraft rentals. However, residents are expected to benefit from predictable periods of reduced noise exposure in the mornings, late afternoons, and evenings on Fridays to Mondays throughout the year.

Final Proposed Noise Abatement Procedure 7 – Alternating Seasonal Weekend Flight Training Restrictions

Final Proposed Procedure 7 would prohibit flight training on the first and third Sunday and second and fourth Saturday of each month between May 1 and September 30. NCAMS data was used to analyze the number of flight training movements that would have been impacted by the restricted weekend days in 2019 and 2020. Table 7.7 shows that in 2019, a total of 6,673 aircraft movements were recorded on affected weekend days, or an average of 303 aircraft movements per affected day. Of this total, 4,231 movements (63%) were operated by the two FTUs and assumed to be flight training, or an average of 192 movements per weekend day. Similarly, 3,199 movements on restricted weekends in 2020 were assumed to be flight training, or 56% of total movements.

By implementing alternating seasonal weekend restrictions, flight training activity on alternating Saturdays and Sundays would have been reduced by an estimated average of 145 to 192 daily movements based on historical activity in 2019 and 2020 (Table 7.7). For affected flight training movements:

1. Movements on affected days may be cancelled altogether, resulting in a net decrease in aircraft noise;
2. Training flights may be rebooked to non-affected days, subject to the FTU capacity factors noted above in reference to Final Proposed Procedure 6; and / or
3. The utilization of the FTU aircraft fleets may be maximized despite flight training being restricted through sightseeing and familiarization flights, and by private rentals.

The implementation of alternating weekend flight training restrictions in the summer months would provide predictable and scheduled periods around which FTUs can plan their operations, and residents can plan their outdoor weekend activities with reprieve from high volumes of aircraft activity.

Table 7.7 - Aircraft Movements on Alternating Restricted Weekend Days

	2019	2020
Movements Not Operated by Flight Training Units	1,972	2,116
Flight Training Unit Movements, Assumed Non-Flight Training	470	355
Flight Training Unit Movements, Assumed Flight Training	4,231	3,199
Total Movements on Restricted Weekend Days	6,673	5,670
Average Daily Movements Not Operated by Flight Training Units	90	96
Average Daily Flight Training Unit Movements, Assumed Non-Flight Training	21	116
Average Daily Flight Training Unit Movements, Assumed Flight Training	192	145
Average Daily Movements on Restricted Weekend Days	303	258
Data Source: 2019 and 2020 NAV CANADA Aircraft Movement Statistics, excluding 66, 70, 77, 88, 88A, and 88B movement codes		
Note: For movements by aircraft registered to Flight Training Units based at the Airport, 90% are assumed to be flight training movements per the definition provided by Transport Canada, while 10% are assumed to be other aircraft operations		

Final Proposed Noise Abatement Procedure 8 – Statutory Holiday Flight Training Restrictions

Operations by the two FTUs based at the Airport were analyzed for 2019 and 2020 to determine the total number of movements that occurred on the following proposed statutory holidays as listed in the Canada Labour Code: New Year’s Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.

As shown in Table 7.8, a total of 967 and 596 aircraft movements were recorded on all statutory holidays in 2019 and 2020, respectively⁹. Of these movements, between 48% and 59% were operated by FTUs for the assumed purpose of flight training. While statutory holidays have historically been days with lower levels of Airport activity, limiting flight training is expected to further decrease aircraft movement levels and result in less noise exposure for residents by an estimated average of 29 to 59 movements per statutory holiday (Table 7.8).

Table 7.8 - Aircraft Movements on Statutory Holidays (2019 and 2020)

	2019	2020
Movements Not Operated by Flight Training Units	330	275
Flight Training Unit Movements, Assumed Non-Flight Training	64	32
Flight Training Unit Movements, Assumed Flight Training	573	289
Total Movements on Statutory Holidays	967	596
Average Daily Movements Not Operated by Flight Training Units	33	28
Average Daily Flight Training Unit Movements, Assumed Non-Flight Training	6	3
Average Daily Flight Training Unit Movements, Assumed Flight Training	57	29
Average Daily Movements on Statutory Holidays	97	60
Data Source: 2019 and 2020 NAV CANADA Aircraft Movement Statistics, excluding 66, 70, 77, 88, 88A, and 88B movement codes		
Note: For movements by aircraft registered to Flight Training Units based at the Airport, 90% are assumed to be flight training movements per the definition provided by Transport Canada, while 10% are assumed to be other aircraft operations		

Final Proposed Noise Abatement Procedure 9 – Circuit Restrictions

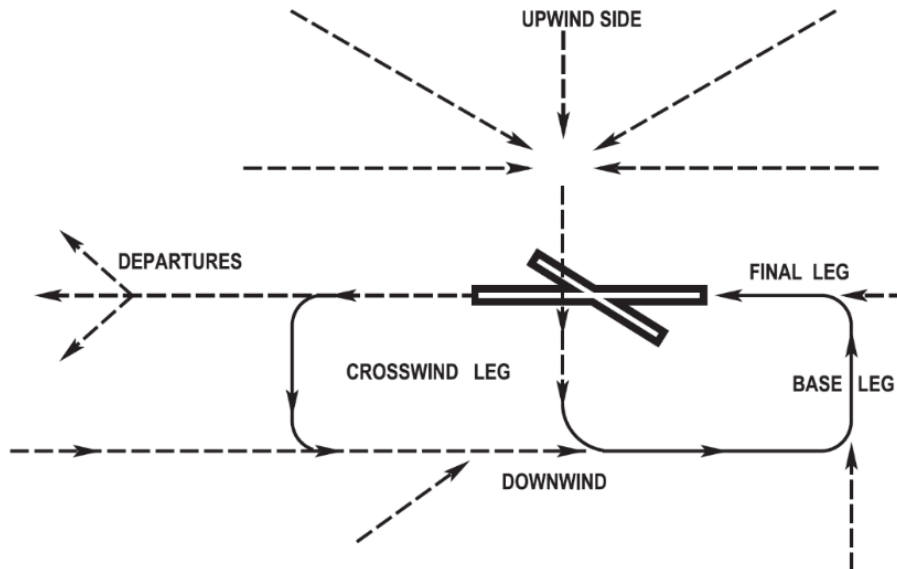
A core element of flight training per Transport Canada’s required curriculum for various licenses and ratings is practicing take-offs, landings, and missed approaches. Training for these maneuvers typically occurs through the use of continuous circuits of the Airport, whereby aircraft take-off, fly a rectangular pattern (Figure 7.2), and land. After landing, aircraft may:

- Vacate the runway and complete the flight;
- Vacate the runway and taxi back for departure again;
- Stop on the runway and take-off again, without vacating (a stop-and-go); or
- Take-off again without stopping (a touch-and-go).

⁹ The National Day for Truth and Reconciliation, which occurs on September 30th, began in 2021. Accordingly, aircraft movements on September 30 in 2019 and 2020 are higher than levels typically seen on other statutory holidays, on account of its previously unrestricted nature.

In a typical one-hour training flight, a given aircraft will complete numerous take-offs and landings, which can result in a high frequency of overflights for residents located under the traffic circuit. Currently, a voluntary procedure exists whereby a maximum of 12 aircraft are permitted in the circuit for training purposes on Runway 05-23; no such limitation is currently in effect for Runway 12-30.

Figure 7.2 - Standard Left-Hand Traffic Circuit (Transport Canada)



Final Proposed Procedure 9 would introduce a limit of 4 aircraft operating in the circuit for training purposes for all runways with the goal of limiting the frequency of overflights that result from continuous circuit training. It is important to note that the wording “training purposes” has been proposed within Final Proposed Procedure 9 to include recurrent training by pilots that are not under the direction supervision of a flight instructor – more inclusive than the definition of flight training that applies to proposed Procedures 6,7 and 8. Noise impacts are estimated based on the number of overflights that a given residence directly under the circuit would experience based on varying numbers of aircraft in the circuit, as shown in Table 7.9 and summarized as follows:

- With 12 aircraft conducting training flights and performing continuous circuits, a residence would experience an estimated 1.7 overflights per minute or 36 seconds between overflights. 12 aircraft is the current maximum established for Runway 05-23 in the Voluntary Noise Abatement Procedures;
- Typical operations have approximately 8 flight training flights performing continuous circuits. In this instance, an estimated 1.4 overflights would occur per minute, or an overflight every 42 seconds; and
- The proposed limitation would be to limit the number within the circuit to a maximum of 4 aircraft performing continuous circuits for the purposes of a training flight. The project team estimates that the frequency of overflights per minute would decrease to 0.7, and that an overflight would occur approximately every 1 minute 24 seconds.

A maximum of 4 aircraft using the circuit for flight training purposes is a marked decrease from the current limitation of 12 for Runway 05-23 and also a decrease from the common occurrence of 8 flight training aircraft within the traffic circuit. This restriction is anticipated to result in a decrease in the frequency of overflights from flight training experienced by residents living in the vicinity of the traffic circuit.

It is noted that given the prevalence of circuit training in Transport Canada’s prescribed curricula, the reduction of the capacity of the traffic circuit will not change the need for FTUs to conduct student circuit training, and for private and commercial pilots to complete recurrent training in the circuit as part of their ongoing proficiency.

Therefore, while peak activity in the traffic circuit would decrease with this Final Proposed Procedure, the redistribution of circuit training activity throughout the day and week (subject to other restrictions applicable to FTUs) should be anticipated, as well as the redistribution of activity to other airports in the area (Section 7.7).

Table 7.9 - Noise Implications, Flight Training Traffic Circuit Restrictions

	Estimated Circuit Duration	Flight Training Overflights Per Minute	Minutes Between Flight Training Overflights	Flight Training Overflights Per Hour
Current Restriction – 12 Flight Training Aircraft in Circuit	7.2 min. (7 min. 12 sec.)	1.7	0.6 min. (36 sec.)	100
Typical Operations – 8 Flight Training Aircraft in Circuit	5.8 min. (5 min. 48 sec.)	1.4	0.7 min. (42 sec.)	83
Proposed Restriction – 4 Flight Training Aircraft in Circuit	5.8 min. (5 min. 48 sec.)	0.7	1.4 min. (1 min. 24 sec.)	41
Notes:				
<ul style="list-style-type: none"> • Representative circuit duration values calculated based on the performance of a 1979 Cessna 172N. The size of the circuit is increased for the 12 aircraft calculation based on the additional distance required to maintain adequate spacing. • Calculations assume that all aircraft are uniformly spaced and do not vary in their performance. • Impacts of non-flight training aircraft in the circuit, including arrivals, are not modelled. 				

The cumulative impact of the flight training restrictions included in Final Proposed Procedures 3, 6, 7, and 8 is that a total of 90 hours of flight training can be accommodated per typical week from October 1 to April 30, and 66 hours of flight training per typical week from May 1 to September 30. Based on these values and the assumptions documented in Table 7.10, it is estimated that approximately 9,300 flight training lessons in the traffic circuit could take place in a typical year under the terms of Final Proposed Procedure 9. Several factors will influence the degree to which this capacity can be utilized by the two FTUs (and other parties) including peak period demand, daytime vs. nighttime conditions, and instructor and student variability. The redistribution of traffic from peak demand periods for the circuit will likely be required for flight training activities to continue if Final Proposed Procedure 9 is adopted.

Table 7.10 - Traffic Circuit Capacity Estimates

	Proposed Restriction Period	
	October 1 to April 30	May 1 to September 30
Assumed Number of Circuit Training Lessons per Hour	4	
Maximum Circuit Training Hours Per Week	90	66
Estimated Number of Circuit Training Hours	51	42
Estimated Number of Circuit Training Lessons per Week	205	169
Total Weeks in Proposed Restricted Period	30	22
Estimated Number of Circuit Training Lessons per Year	9,313	
Estimated Number of Local Movements per Circuit Training Lesson	10	
Estimated Number of Circuit Training Local Movements per Year	93,131	
<p>Notes:</p> <ul style="list-style-type: none"> • The estimated number of circuit training lessons per year is adjusted to remove the statutory holidays. • Between October 1 and April 30, the maximum number of circuit training hours per week is reduced by 43% based on data provided by DFC stating that 30% of days are unflyable on account of weather, and 25% of days are only flyable for part of the day (assumed at 50% of the day). • Between May 1 and September 30, the maximum number of circuit training hours per week is reduced by 36% based on data provided by DFC stating that 23% of days are unflyable on account of weather, and 27% of days are only flyable for part of the day (assumed at 50% of the day). • 10 local movements are assumed per 1 hour training flight in the circuit, based on the preceding assumption that a circuit can be completed approximately every 6 minutes and that each touch-and-go results in 2 local movements (i.e., a total of 5 touch-and-go's per 1 hour flight). 		

Summarized Noise Implications

As shown in Table 7.11, Figure 7.3, and Figure 7.4, in a typical week in 2021, overnight operational restrictions are in effect for approximately 56 hours – under the Final Proposed Procedures, this is recommended to increase to 70 hours year-round. Time of day flight training restrictions are also proposed to be introduced, which would further restrict such operations by an additional 8 hours per week between October 1 and April 30, and by 32 an additional hours per week between May 1 and September 30. Accordingly, normal (unrestricted) operations would comprise 54% of weekly hours between October and April, and 39% of weekly hours between May and September (Table 7.11). Despite the foregoing, actual hours available for flight training will vary based meteorological conditions and daytime vs. nighttime requirements, as considered further in Section 7.3.

Table 7.11 - Summarized Noise Implications, Typical Weekly Restrictions

	Status Quo (2021)		Proposed – October 1 to April 30		Proposed – May 1 to September 30	
	Typical Weekly Hours	% of Weekly Hours	Typical Weekly Hours	% of Weekly Hours	Typical Weekly Hours	% of Weekly Hours
Overnight Operational Restrictions	56	33%	70	42%	70	42%
Friday-Monday Morning and Evening Flight Training Restrictions	0	0%	8	5%	32	19%
Normal Operations	112	67%	90	54%	66	39%
Total	168	100%	168	100%	168	100%

Figure 7.3 - Proposed Airport Noise Restrictions (October 1 - April 30)

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1:00 AM	Overnight operational restrictions in effect Engine run-ups associated with aircraft maintenance not permitted						
2:00 AM							
3:00 AM							
4:00 AM							
5:00 AM							
6:00 AM							
7:00 AM	Flight training dep. not permitted					Flight training dep. not permitted	
8:00 AM							
9:00 AM							
10:00 AM							
11:00 AM							
12:00 PM							
1:00 PM							
2:00 PM							
3:00 PM							
4:00 PM							
5:00 PM							
6:00 PM							
7:00 PM							
8:00 PM	Flight training departures not permitted					Flight training departures not permitted	
9:00 PM	Overnight operational restrictions in effect Engine run-ups associated with aircraft maintenance not permitted						
10:00 PM							
11:00 PM							
12:00 AM							

Notes:

- Preferential runway criteria in effect at all times
- Departure procedures in effect at all times
- Maximum of 4 aircraft are permitted in the circuit for training purposes at all times
- Federal statutory holidays are also subject to flight training restrictions

Figure 7.4 - Proposed Airport Noise Restrictions (May 1 – September 30)

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1:00 AM	Overnight operational restrictions in effect until 7:30 AM Engine run-ups associated with aircraft maintenance not permitted						
2:00 AM							
3:00 AM							
4:00 AM							
5:00 AM							
6:00 AM							
7:00 AM	Flight training dep. not permitted					Flight training dep. not permitted	
8:00 AM	Flight training not permitted on alternating weekends						Flight training not permitted on alternating weekends
9:00 AM							
10:00 AM							
11:00 AM							
12:00 PM							
1:00 PM	Flight training departures not permitted	Flight training departures not permitted				Flight training departures not permitted	Flight training departures not permitted
2:00 PM							
3:00 PM							
4:00 PM							
5:00 PM							
6:00 PM	Overnight operational restrictions in effect after 9:30 PM Engine run-ups associated with aircraft maintenance not permitted						
7:00 PM							
8:00 PM							
9:00 PM							
10:00 PM							
11:00 PM							
12:00 AM							

Notes:

- Preferential runway criteria in effect at all times
- Departure procedures in effect at all times
- Maximum of 4 aircraft are permitted in the circuit for training purposes at all times
- Federal statutory holidays are also subject to flight training restrictions

Table 7.12 shows the total number of movements that would have been impacted in 2019 by the time of day or day of week restrictions considered through Final Proposed Procedures 3, 6, 7, and 8, which have the most direct noise impacts in terms of the shifting or reduction of aircraft activity. In 2019, 14% of recorded aircraft movements would have been impacted by one of the above-noted Final Proposed Procedures (as applicable given the operator type), or 12,398 of the 90,380 movements recorded in that year. Given the additional criteria established for flight training, 17% of annual movements in this category would have experienced one or more restrictions established through the Final Proposed Procedures.

Table 7.12 - Summarized Noise Implications, 2019 Aircraft Movements

	Not Impacted by Hour or Day Restrictions		Impacted by Hour or Day Restrictions		Total Annual Movements
	Annual Movements	% of Annual Movements	Annual Movements	% of Annual Movements	
Movements Not Operated by Flight Training Units	22,080	96%	918	4%	22,998
Movements Operated by Flight Training Units	55,902	83%	9,645	17%	67,382
Total	76,905	86%	13,475	14%	90,380
<p>Data Source: 2019 NAV CANADA Aircraft Movement Statistics, excluding 66, 70, 77, 88, 88A and 88B movement codes</p> <p>Note: Only movements impacted by the following Final Proposed Procedures are counted:</p> <ul style="list-style-type: none"> • 3 – Overnight Operational Restrictions • 6 – Friday-Monday Morning and Afternoon Flight Training Restrictions • 7 – Alternating Summer Seasonal Weekend Flight Restrictions • 8 – Statutory Holiday Flight Training Restrictions <p>Note: For FTU movements that would be impacted by Final Proposed Procedures 6, 7, or 8, it is assumed that 10% of movements would have continued to occur as an exempted activity (e.g., sightseeing, familiarization flights, private rentals)</p>					

Table 7.13 identifies the total number of movements that would have been impacted in 2020 by Final Proposed Procedures 3, 6, 7, and 8. 12% of recorded aircraft movements would have been impacted by one or more of the above-noted Final Proposed Procedures as applicable, or 9,184 of the 78,847 movements recorded in that year. 15% of movements attributed to the two FTUs based at the Airport would be impacted by the noted procedures, or a total of 8,528 of the 56,600 movements that occurred in this category. Of note, the aircraft movements not impacted by the four Final Proposed Procedures (e.g., air ambulances, law enforcement, non-flight training activities during certain hours) that address the days and hours of operations would continue to be covered by the remaining five procedures, addressing matters such as departures, runway utilization, and traffic circuit use.

Table 7.13 - Summarized Noise Implications, 2020 Aircraft Movements

	Not Impacted by Hour or Day Restrictions		Impacted by Hour or Day Restrictions		Total Annual Movements
	Annual Movements	% of Annual Movements	Annual Movements	% of Annual Movements	
Movements Not Operated by Flight Training Units	21,591	97%	656	3%	22,247
Movements Operated by Flight Training Units	48,072	85%	8,528	15%	56,600
Total	69,663	88%	9,184	12%	78,847
<p>Data Source: 2019 NAV CANADA Aircraft Movement Statistics, excluding 66, 70, 77, 88, 88A and 88B movement codes</p> <p>Note: Only movements impacted by the following Final Proposed Procedures are counted:</p> <ul style="list-style-type: none"> • 3 – Overnight Operational Restrictions • 6 – Friday-Monday Morning and Afternoon Flight Training Restrictions • 7 – Alternating Summer Seasonal Weekend Flight Restrictions • 8 – Statutory Holiday Flight Training Restrictions 					

7.3 Cost Implications

7.3.1 Summary of Changes

Based on feedback received through the stakeholder engagement program and supplementary submissions provided by Airport-based businesses, the following revisions have been made in the evaluation of the cost and economic impacts:

- Commentary has been added on impacts to aeronautical revenues, fuel sales, on-site businesses, and the Airport's role in the regional economy;
- Final Proposed Procedure 4 has been reclassified and commentary provided;
- Cost impacts have been separated between the two FTUs and assumptions updated based on feedback received; and
- Additional commentary is provided on other business impacts to the FTUs; and
- References to discarded procedures have been removed.

7.3.2 Evaluation

As part of the proposal to implement new mandatory noise abatement procedures at the Airport, cost implications of the Final Proposed Procedures have been analyzed. Table 7.14 identifies each of the Final Proposed Procedures and those that have cost implications that require analysis as per AC 302-002.

Table 7.14 - Final Proposed Noise Abatement Procedures, Cost Implications

No.	Final Proposed Noise Abatement Procedure	Cost Implications?
1	Overnight Preferential Runways: Between the hours of 9:30 PM and 7:30 AM, consideration should be given to using Runway 12 for arrivals and Runway 30 for departures, consistent with safety of operations.	No
2	Tower Open Preferential Runways: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° at up to 5 kts.	No
3	Overnight Restricted Hours: Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.	Yes
4	Overnight Engine Run-Ups: Scheduled engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.	Yes
5	Departure Turns: Departing aircraft will continue to fly on the runway heading until they reach 1,000 ft. ASL before making any turns.	No
6	Time of Day Flight Training Restrictions: Flight training aircraft are not permitted to depart Friday-Monday before 8:00 AM and after 4:00 PM May 1 – September 30; and Friday-Monday before 8:00 AM and after 8:00 PM October 1 – April 30.	Yes
7	Alternating Seasonal Weekend Flight Training Restrictions: Flight training is not permitted on the 1st and 3rd Sunday of the month and 2nd and 4th Saturday of the month from May 1 – September 30.	Yes
8	Statutory Holiday Flight Training Restrictions: Flight training is not permitted on the following federal statutory holidays: New Year's Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.	Yes
9	Circuit Restrictions: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.	Yes

Final Proposed Noise Abatement Procedures 1, 2, and 5

The above-noted Final Proposed Procedures address operational matters including runway usage and aircraft procedures. Significant cost implications are not expected to result from aircraft operators complying with these procedures.

Final Proposed Noise Abatement Procedure 3 – Overnight Restricted Hours

Final Proposed Procedure 3 would expand the overnight period of restricted operations by two hours. As shown in Table 7.15, approximately 2,700 movements in 2019 and 1,300 movements in 2020 would have been impacted by expanding the overnight restricted period to 9:30 PM – 7:30 AM. Arrivals by aircraft based at the Airport are permitted to continue during the proposed restricted period; therefore, cost implications are not anticipated within this category.

Table 7.15 - Total Movements During Proposed Overnight Restriction Hours

Movements Within Proposed Restricted Hours	2019	2020
Arrival Movements	748	400
Departure Movements	745	373
Local Movements	1,210	512
Total	2,703	1,285
Date Source: 2019-2020 NAV CANADA Aircraft Movement Statistics, excluding 66, 70, 77, 88, 88A, 88B, and 99 movement codes		

Of the departures and local movements in 2019 and 2020 that would be affected by the proposed restricted hours, 66% occurred within 30 minutes of the beginning or end of the proposed restricted period (i.e., between 7:00 AM and 7:30 AM, or between 9:30 PM and 10:00 PM). The remaining movements occurred within 60 minutes of the beginning or end of the proposed restricted period. It is anticipated that aircraft operators that must depart the Airport or conduct local movements will be able to shift their flight time accordingly to comply with the proposed restricted periods, with minimal cost impacts expected.

Table 7.16 - Movements During Proposed Overnight Operating Restrictions, Time of Flight

Departures and Local Movements Within Proposed Restricted Hours	2019		2020	
	Movements	Proportion	Movements	Proportion
1h00m – 0h30m from End of Restrictions (6:30 AM – 7:00 AM)	79	4%	71	8%
< 0h30m from End of Restrictions (7:00 AM – 7:30 AM)	339	18%	196	22%
< 0h30m from Commencement of Restrictions (9:30 PM – 10:00 PM)	910	48%	386	44%
0h30m – 1h00m from Commencement of Restrictions (10:00 PM – 10:30 PM)	555	29%	221	25%
Total	1,883	100%	874	100%
Date Source: 2019-2020 NAV CANADA Aircraft Movement Statistics, excluding 66, 70, 77, 88, 88A, 88B, and 99 movement codes				

NCAMS data for 2019 and 2020 was analyzed to estimate the revenue impacts to DFC of Final Proposed Procedure 3. As shown in Table 7.17, an estimated total of 498 and 239 revenue generating hours would have been impacted by the expanded overnight restricted period in 2019 and 2020, respectively. Assuming that none of the affected flights were moved to a non-restricted hour of the day, this would have resulted in lost revenues of approximately \$57,000 in 2019 and \$27,000 in 2020.

With respect to CFA, an estimated total of 464 and 82 revenue generating hours would have been impacted by the expanded overnight restricted period in 2019 and 2020, respectively. Assuming that none of the affected flights were moved to a non-restricted hour of the day, this would have resulted in lost revenues of approximately \$64,000 in 2019 and \$11,000 in 2020.

Table 7.17 - Final Proposed Procedure 3 Estimated Revenue Impacts (Flight Training Units)

Revenue Category	Hourly Revenue	2019		2020	
		Estimated Revenue Hours	Estimated Affected Revenues	Estimated Revenue Hours	Estimated Affected Revenues
Durham Flight Centre					
Aircraft Rental: Cessna 150 / 152	\$135.00	51	\$6,885	18	\$2,430
Aircraft Rental: Cessna 172	\$155.00	197	\$30,535	106	\$16,430
Aircraft Rental: Piper PA-28R	\$190.00	5	\$950	1	\$190
Aircraft Rental: Piper PA-27	\$324.00	9	\$2,916	1	\$324
Certified Flight Instructor	\$65.00	236	\$15,327	113	\$7,371
Total – Durham Flight Centre		498	\$56,613	239	\$26,745
Canadian Flight Academy					
Aircraft Rental: Cessna 152	\$145.00	4	\$580	-	\$0
Aircraft Rental: Cessna 172	\$185.00	240	\$44,400	43	\$7,955
Aircraft Rental: Piper PA-44	\$330.00	-	\$0	-	\$0
Certified Flight Instructor	\$85.00	220	\$18,666	39	\$3,290
Total – Canadian Flight Academy		464	\$63,646	82	\$11,245
<p>Date Source: 2019-2020 NAV CANADA Aircraft Movement Statistics, hourly rates per DFC and CFA websites as of August 2021</p> <p>Notes:</p> <ul style="list-style-type: none"> • Instructor revenue hours are assumed to be 90% of aircraft rental hours • NCAMS arrivals are used to estimate the number of flights • All flights are assumed to have a duration of 1h00m • Analysis is prepared in isolation of the potential impacts of Final Proposed Procedures 6, 7, and 8 					

Final Proposed Noise Abatement Procedure 4 – Overnight Engine Run-Ups

The prohibition on scheduled engine run-ups between 9:30 PM and 7:30 AM has the potential to disrupt the maintenance processes of businesses that typically complete such activities overnight to support daytime operations, with a specific emphasis on morning departures. Rescheduling overnight engine run-ups to the daytime (i.e., 7:30 AM to 9:30 PM) would reduce the period during which aircraft can be used for revenue-generating functions. While the scale of cost implications that may result from the adoption of Final Proposed Procedure 4 cannot be quantified, this consideration is noted as a potential factor.

Final Proposed Noise Abatement Procedure 6 – Time of Day Flight Training Restrictions

The restrictions contemplated in Final Proposed Procedure 6 would limit flight training departures between Friday and Monday at varying hours depending on the time of year; flight training aircraft that depart prior to the commencement of the evening restricted period would be permitted to return.

Table 7.18 outlines the estimated revenue impacts of Final Proposed Procedure 6 to DFC. Based on an estimated impact to 2,398 revenue hours in 2019, annual revenues would be assumed to decrease by approximately \$261,000. In 2020, the estimated decrease in revenue would be approximately \$184,000 based on an impact to an estimated total of 1,669 revenue generating hours. With respect to CFA, assuming that 2,092 revenue hours are impacted in 2019, revenue impacts are estimated at approximately \$283,000. For 2020, revenue impacts are estimated at approximately \$245,000 based on an assumed impact to 1,814 revenue generating hours.

Table 7.18 - Final Proposed Procedure 6 Estimated Revenue Impacts (Flight Training Units)

Revenue Category	Hourly Revenue	2019		2020	
		Estimated Revenue Hours	Estimated Affected Revenues	Estimated Revenue Hours	Estimated Affected Revenues
Durham Flight Centre					
Aircraft Rental: Cessna 150 / 152	\$135.00	386	\$52,124	212	\$28,674
Aircraft Rental: Cessna 172	\$155.00	759	\$117,599	586	\$90,815
Aircraft Rental: Piper PA-28R	\$190.00	34	\$6,498	13	\$2,394
Aircraft Rental: Piper PA-27	\$324.00	20	\$6,415	23	\$7,582
Certified Flight Instructor	\$65.00	1,199	\$77,922	834	\$54,230
Total – Durham Flight Centre		2,398	\$260,557	1,669	\$183,694
Canadian Flight Academy					
Aircraft Rental: Cessna 152	\$145.00	25	\$3,654	3	\$392
Aircraft Rental: Cessna 172	\$185.00	1,013	\$187,313	905	\$167,333
Aircraft Rental: Piper PA-44	\$330.00	8	\$2,673	0	\$0
Certified Flight Instructor	\$85.00	1,046	\$88,893	907	\$77,112
Total – Canadian Flight Academy		2,092	\$282,533	1,814	\$244,836
Date Source: 2019-2020 NAV CANADA Aircraft Movement Statistics, hourly rates per DFC and CFA websites as of August 2021					
Notes:					
<ul style="list-style-type: none"> • Flight training aircraft revenue hours are assumed to be 90% of all aircraft revenue hours, and CFI hours are assumed to be the sum of all flight training aircraft revenue hours • NCAMS arrivals are used to estimate the number of flights • All flights are assumed to have a duration of 1h00m • Analysis is prepared in isolation of the potential impacts of Final Proposed Procedures 3, 7, and 8 					

Final Proposed Noise Abatement Procedure 7 – Alternating Seasonal Weekend Flight Training Restrictions

Table 7.19 demonstrates the estimated revenue impacts to DFC from Final Proposed Procedure 7 in 2019 and 2020, through the outright restriction on flight training on alternating weekend days from May 1 until September 30. An estimated total of 1,258 and 979 revenue generating hours, respectively, would have been impacted in 2019 and 2020. Assuming that none of the affected flights were moved to a non-restricted day, this would have resulted in lost revenues of approximately \$135,000 in 2019 and \$109,000 in 2020.

Based on an estimated impact to 1,330 revenue generating hours in 2019, CFA would have experienced a decrease in revenue of approximately \$179,000. In 2020, the estimated impact would have been \$158,000 in lost revenue, assuming that no activity that would have been affected by Final Proposed Procedure 7 was reallocated to a different day.

Table 7.19 - Final Proposed Procedure 7 Estimated Revenue Impacts (Flight Training Units)

Revenue Category	Hourly Revenue	2019		2020	
		Estimated Revenue Hours	Estimated Affected Revenues	Estimated Revenue Hours	Estimated Affected Revenues
Durham Flight Centre					
Aircraft Rental: Cessna 150 / 152	\$135.00	223	\$30,132	132	\$17,861
Aircraft Rental: Cessna 172	\$155.00	380	\$58,869	326	\$50,499
Aircraft Rental: Piper PA-28R	\$190.00	23	\$4,446	8	\$1,539
Aircraft Rental: Piper PA-27	\$324.00	3	\$875	23	\$7,582
Certified Flight Instructor	\$65.00	629	\$40,892	490	\$31,824
Total – Durham Flight Centre		1,258	\$135,213	979	\$109,304
Canadian Flight Academy					
Aircraft Rental: Cessna 152	\$145.00	31	\$4,437	2	\$261
Aircraft Rental: Cessna 172	\$185.00	627	\$116,051	583	\$107,892
Aircraft Rental: Piper PA-44	\$330.00	7	\$2,376	-	\$0
Certified Flight Instructor	\$85.00	665	\$56,534	585	\$49,725
Total – Canadian Flight Academy		1,330	\$179,397	1,170	\$157,878
Date Source: 2019-2020 NAV CANADA Aircraft Movement Statistics, hourly rates per DFC and CFA websites as of August 2021					
Notes:					
<ul style="list-style-type: none"> • Flight training aircraft revenue hours are assumed to be 90% of all aircraft revenue hours, and CFI hours are assumed to be the sum of all flight training aircraft revenue hours • NCAMS arrivals are used to estimate the number of flights • All flights are assumed to have a duration of 1h00m • Analysis is prepared in isolation of the potential impacts of Final Proposed Procedures 3, 6, and 8 					

Final Proposed Noise Abatement Procedure 8 – Statutory Holiday Flight Training Restrictions

On statutory holidays as identified in the Canada Labour Code, flight training would not be permitted to occur. However, other services provided by the two FTUs outside of the definition of flight training (e.g., sightseeing, familiarization flights, private rentals) could continue to occur.

The estimated revenue impacts to DFC are provided in Table 7.20. In 2019 and 2020, an estimated total of 205 and 131 revenue generating hours, respectively, would have been impacted by the restriction on flight training on statutory holidays. Assuming that none of the affected flights were moved to a non-restricted day, this would have resulted in lost revenues of approximately \$23,000 in 2019 and \$15,000 in 2020. For CFA, assuming that 238 revenue generating hours would be affected in 2019, revenues would have decreased by an estimated \$33,000. In 2020, revenues would have decreased by an estimated \$14,000.

Table 7.20 - Final Proposed Procedure 8 Estimated Revenue Impacts (Flight Training Units)

Revenue Category	Hourly Revenue	2019		2020	
		Estimated Revenue Hours	Estimated Affected Revenues	Estimated Revenue Hours	Estimated Affected Revenues
Durham Flight Centre					
Aircraft Rental: Cessna 150 / 152	\$135.00	32	\$4,253	16	\$2,187
Aircraft Rental: Cessna 172	\$155.00	65	\$10,044	47	\$7,254
Aircraft Rental: Piper PA-28R	\$190.00	4	\$684	-	-
Aircraft Rental: Piper PA-27	\$324.00	3	\$875	3	\$875
Certified Flight Instructor	\$65.00	103	\$6,669	66	\$4,271
Total – Durham Flight Centre		205	\$22,524	131	\$14,586
Canadian Flight Academy					
Aircraft Rental: Cessna 152	\$145.00	1	\$131	0	\$0
Aircraft Rental: Cessna 172	\$185.00	113	\$20,979	53	\$9,824
Aircraft Rental: Piper PA-44	\$330.00	5	\$1,485		\$0
Certified Flight Instructor	\$85.00	119	\$10,098	53	\$4,514
Total – Canadian Flight Academy		238	\$32,693	106	\$14,337
Date Source: 2019-2020 NAV CANADA Aircraft Movement Statistics, hourly rates per DFC and CFA websites as of August 2021					
Notes:					
<ul style="list-style-type: none"> • Flight training aircraft revenue hours are assumed to be 90% of all aircraft revenue hours, and CFI hours are assumed to be the sum of all flight training aircraft revenue hours • NCAMS arrivals are used to estimate the number of flights • All flights are assumed to have a duration of 1h00m • Analysis is prepared in isolation of the potential impacts of Final Proposed Procedures 3, 6, and 7 					

Final Proposed Noise Abatement Procedure 9 – Circuit Restrictions

The circuit training restriction of four aircraft at a given time will also influence the manner in which the FTUs based at the Airport conduct their operations. Based on the previously identified estimates in Section 7.2, approximately 9,300 circuit flight training lessons could be conducted annually. Using FTU arrivals identified in the 2019 and 2020 NCAMS as a proxy for the total number of training flights, the two FTUs jointly completed approximately 20,000 training flights in 2019 and approximately 18,000 flights in 2020 – these totals also include training flights out of the traffic circuit in the practice area, cross-country flights between airports, and the use of FTU aircraft for purposes other than flight training.

Sufficient information is not available to make a quantitative estimate of the direct revenue impacts of implementing Final Proposed Procedure 9. However, it is recognized that demand for the traffic circuit can result in peak periods where capacity is reached. In these instances, flight training movements may either be cancelled, representing a revenue loss to the FTU; shifted to an alternative time with no revenue loss; or performed at another airport to complete the training with no revenue loss. In the third scenario, a cost will be borne by the student paying for the additional transit time to and from the alternative airport from Oshawa.

Summarized Flight Training Unit Implications

In the preceding discussions, analysis was provided for the revenue impacts of Final Proposed Procedures 3, 6, 7, and 8 individually to DFC and CFA. Table 7.21 presents the estimated cumulative revenue impacts to each of the FTUs in 2019 and 2020 in a worst case scenario whereby all affected movements are cancelled altogether, as opposed to being rescheduled. In 2019 and 2020, the cumulative revenue impacts to DFC from the adoption of Final Proposed Procedures 3, 6, 7, and 8 are estimated at approximately \$378,000 and \$273,000, respectively. For CFA, cumulative revenue impacts are estimated at approximately \$457,000 in 2019 and \$367,000 in 2020. Accordingly, the total revenue impacts between the two FTUs are estimated at approximately \$835,000 in 2019 and \$640,000 in 2020.

The values presented in the table will be lower than the sum of each of the estimates completed previously for Final Proposed Procedures 3, 6, 7, and 8, as the revenue implications of a given movement that is affected by one procedure (e.g., a statutory holiday) would be double counted if it was also affected by another procedure (e.g., an alternating seasonal weekend restriction). While the actual revenue impacts of the Final Proposed Procedures in 2019 and 2020 would likely vary from the estimates provided based on the assumptions documented in this submission, this is intended to provide a high-level estimate to assist in understanding the scale of the impacts. It must also be noted that these estimates have been prepared independently by HM Aero with limited input from DFC and CFA; however, comments and feedback were received through the stakeholder engagement process and incorporated herein.

Table 7.21 - Final Proposed Procedures Cumulative Estimated Revenue Impacts (Flight Training Units)

Revenue Category	Hourly Revenue	2019		2020	
		Estimated Revenue Hours	Estimated Affected Revenues	Estimated Revenue Hours	Estimated Affected Revenues
Durham Flight Centre					
Aircraft Rental: Cessna 150 / 152	\$135.00	555	\$74,966	329	\$44,348
Aircraft Rental: Cessna 172	\$155.00	1,112	\$172,422	842	\$130,572
Aircraft Rental: Piper PA-28R	\$190.00	51	\$9,747	20	\$3,762
Aircraft Rental: Piper PA-27	\$324.00	23	\$7,582	43	\$13,997
Certified Flight Instructor	\$65.00	1,742	\$113,256	1,234	\$80,204
Total – Durham Flight Centre		3,485	\$377,972	2,468	\$272,882
Canadian Flight Academy					
Aircraft Rental: Cessna 152	\$145.00	51	\$7,439	5	\$653
Aircraft Rental: Cessna 172	\$185.00	1,626	\$300,866	1,346	\$248,918
Aircraft Rental: Piper PA-44	\$330.00	15	\$5,049	7	\$2,376
Certified Flight Instructor	\$85.00	1,693	\$143,897	1,357	\$115,362
Total – Canadian Flight Academy		3,386	\$457,250	2,714	\$367,308
<p>Date Source: 2019-2020 NAV CANADA Aircraft Movement Statistics, hourly rates per DFC and CFA websites as of August 2021</p> <p>Notes:</p> <ul style="list-style-type: none"> • The cumulative impacts include Final Proposed Procedures 3, 6, 7, and 8 • For aircraft arrivals recorded in the NCAMS dataset, it is assumed that 90% of records would have been impacted by a revenue-generating restriction, all impacted records are assumed to be cancelled • CFI hours are estimated as the cumulative total of the impacted aircraft hours • NCAMS arrivals are used to estimate the number of flights • All flights are assumed to have a duration of 1h00m • Columns may not sum exactly due to rounding 					

In addition to the estimated revenue impacts that the two FTUs would have experienced in 2019 and 2020, consideration is also given to the degree to which the Final Proposed Procedures reduce the operational window during which both businesses can conduct their operations without restriction. A significant proportion of flight training is conducted during daytime hours; DFC, when consulted, noted that approximately 90% of all training flights completed by the company occurred during daytime hours.

Figure 7.5 plots the number of booking slots available per month based on the current overnight restricted period of 10:30 PM to 6:30 AM against the number of booking slots that could be accommodated during daytime hours¹⁰. During the fall and winter months, the number of booking slots available per the Voluntary Noise Abatement Procedures is significantly less than the number of slots that can be accommodated during daytime hours.

¹⁰ A booking slot is a typical two-hour period allocated for the use of an aircraft for one hour. Daytime hours are calculated as the time between the beginning of morning civil twilight and the end of evening civil twilight.

Figure 7.5 - Booking Slots vs. Daytime Hours (2021)

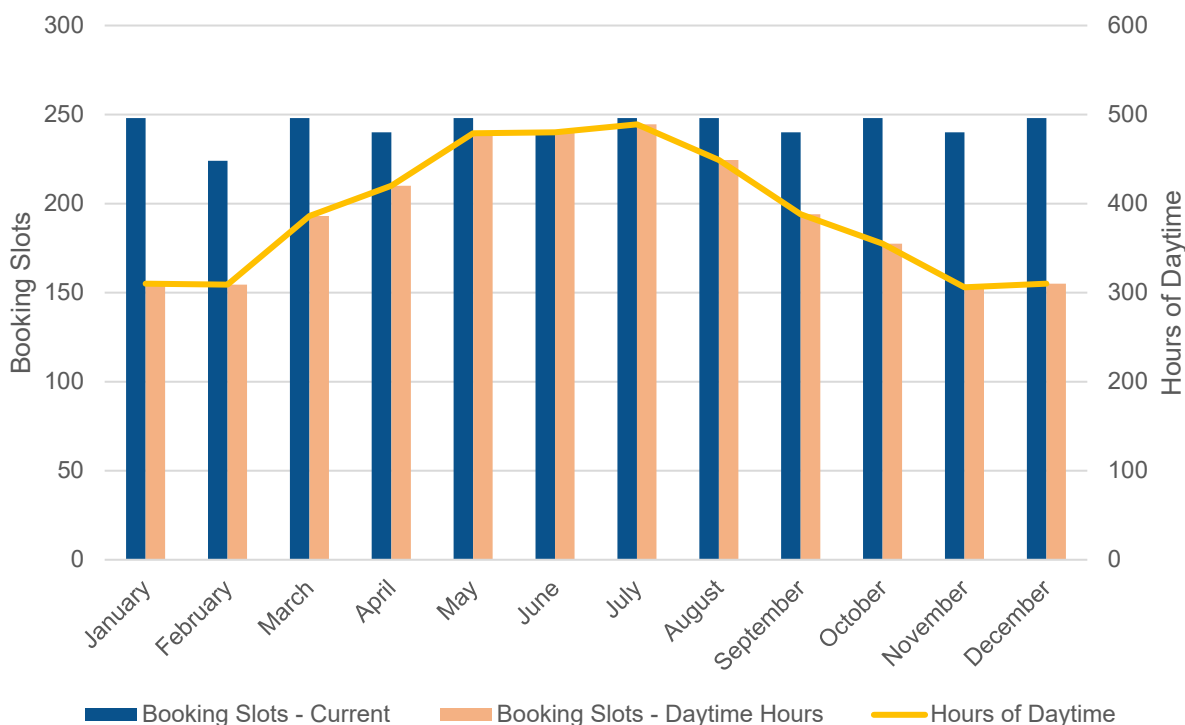
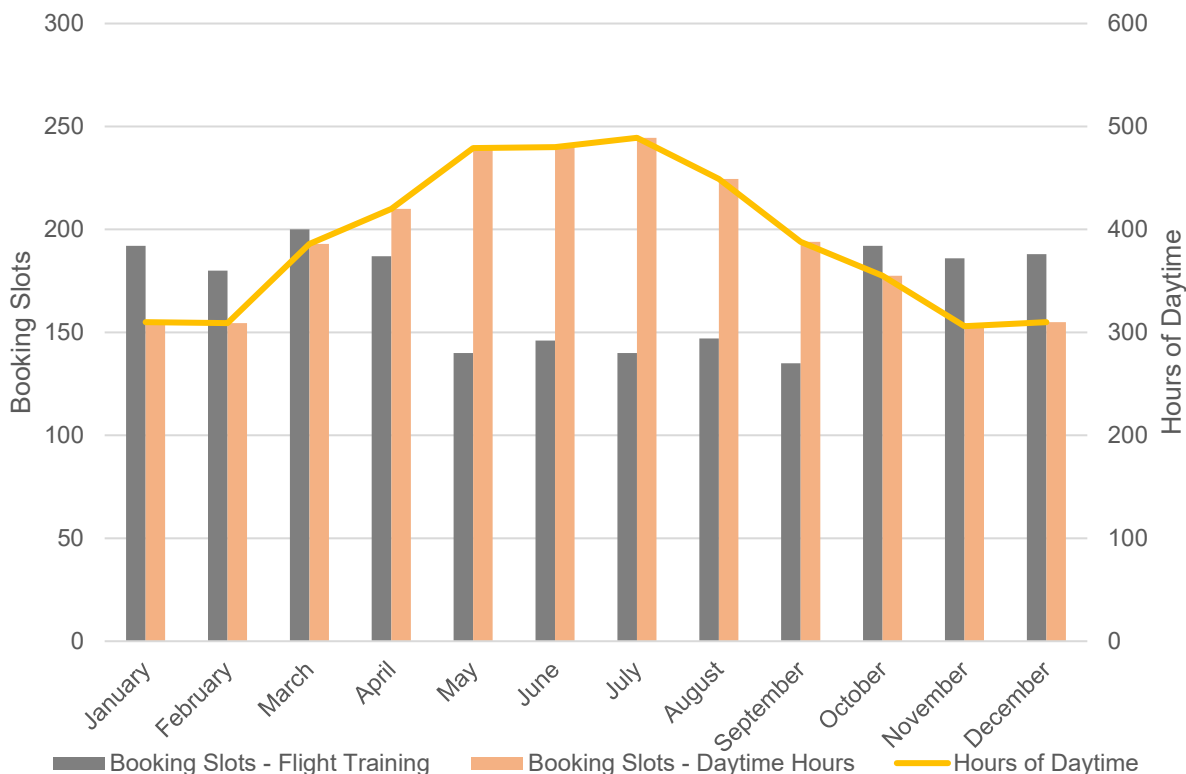


Figure 7.6 plots the number of monthly booking slots for flight training that can be accommodated if Final Proposed Procedures 3, 6, 7, and 8 are adopted together. As shown, during the May 1 – September 30 period when additional restrictions are implemented on alternating seasonal weekends and mornings and evenings between Friday and Monday, the amount of booking slots available for flight training decreases significantly versus the number of slots that could theoretically be accommodated based on the hours of daylight available. The reduction in the availability of the Airport for flight training is expected to represent a significant constraint during peak season operations.

Figure 7.6 - Booking Slots With Final Proposed Procedures vs. Daytime Hours (2021)



Both FTUs also contend with other factors that influence the viability of their respective businesses, beyond the implications of the Final Proposed Noise Abatement Procedures. These factors include the adequacy of meteorological conditions for the intended flight, maintenance related downtime in their respective fleets, and cancellations by students and CFIs for a variety of reasons (e.g., illness, fatigue, etc.). Data provided by DFC for an unspecified three-month period indicated that 1.37 reservations were cancelled for every reservation that was recorded. DFC also indicated that for the 12-month period of November 1, 2020 to October 31, 2021, 46% of days had weather suitable for flight training, 26% of days were partially unavailable, and 27% of days were unflyable on account of weather. Concern was noted that Final Proposed Procedures 6 and 7, that impose additional restrictions between May 1 and September 30, will limit the ability of the FTUs to operate in their peak period with generally better weather conditions (50% good weather days based on data provided by DFC).

Additional concerns noted by the two FTUs during consultations from a cost and revenue standpoint included potential reductions in student volumes if the Airport’s reduced hours of operation for flight training and circuit restrictions have the potential to limit student progress or do not align with their schedules. Similar, concern was cited regarding the challenges in recruiting and retaining qualified CFIs, who may choose to work at other FTUs if they are unable to maximize their potential incomes due to the restrictions imposed on flight training.

Finally, discussion is provided in this submission relating to student pilots and CFIs flying to alternative airports to complete their training if such activities cannot occur at Oshawa due to the proposed restrictions. Using an example of a student and their instructor intending to complete a circuit training flight at the Oshawa Airport; however, the circuit is at capacity as per Final Proposed Procedure 9. In this case, Toronto / Buttonville Airport or Kawartha Lakes Airport could be used to perform the training, as further described in the Aviation System analysis. Using Buttonville or Kawartha Lakes would increase the cost incurred by the student by approximately \$100 to \$140 respectively, as per the estimated flight times shown in Table 7.22.

Table 7.22 - Hypothetical Flight Training Transit Time Costs

	Oshawa	Buttonville	Kawartha Lakes
Lesson Time	60 min.	60 min.	60 min.
Transit Time	-	25 min.	35 min.
Total Billable Time	60 min.	85 min.	95 min.
Total Lesson Cost	\$245	\$347	\$388
Notes:			
<ul style="list-style-type: none"> • Transit time includes the flight to and from Toronto / Buttonville or Kawartha Lakes, assuming a 95 kt cruise speed • Lesson costs are calculated based on an assumed Cessna 172 hourly cost of \$170 and instructor hourly cost of \$75 			

Other Revenue and Economic Impacts

Through the stakeholder consultation program, an additional consideration that was frequently raised was that analysis was not completed and produced identifying the potential financial impacts to businesses based at the Airport, other than the two FTUs. Such matters are discussed qualitatively as follows:

- **Aeronautical Revenues:** Operating revenues of the Airport include aeronautical rates and charges levied by the City through the Airport Operator, including landing fees, apron fees, tie-down fees, airport improvement fees, and fuel surcharges as noted below. With the implementation of the Final Proposed Procedures, the expected decrease in aircraft movements at the Airport may result in reduced aeronautical revenues for the facility. For example, flight training activity that is not displaced to an unrestricted day or time and is cancelled altogether will result in decreased landing fee and fuel revenues for the City. Based on the assumptions documented in Table 7.21 and landing fee revenues of \$15.00 per affected FTU flight, it is estimated that \$51,495 and \$38,865 in potential landing fee revenues would not have been received in 2019 and 2020, respectively, based on the potential reduction in flight training activity at the Airport.
- **Fuel Sales:** Aviation fuel, including 100 Low Lead and Jet A-1, is sold directly by the Airport and by the Enterprise Aviation Group of Companies. The foreseen reduction in activity at the Airport as a result of the Final Proposed Procedures is expected to result in reduced revenues for Enterprise Aviation, and for the City through their direct fuel sale revenues and revenues from surcharges applied to fuel sold by Enterprise Aviation. A quantitative estimate is not provided for the possible reduction in fuel sales, although the potential is noted and will likely have revenue impacts.

- **Airport Business Impacts:** A number of private aviation-related businesses are located at the Airport, including the Enterprise Aviation Group of Companies, Aviation Unlimited, Smooth Air Charter, W.G. Cox Aviation Supplies, Corporate Aircraft Restoration, Ryan Terminal Holdings, Airborne Sensing, and Optech. The operations of each of these businesses may potentially experience negative impacts as a result of the implementation of the Final Proposed Procedures.

Final Proposed Procedure 3 would reduce the operational availability of the Airport. A decrease in arrivals and departures may impact the Fixed-Base Operator services of the Enterprise Aviation Group of Companies, and the expanded overnight restricted period has the potential to impact the aircraft operations of customers / clients of Aviation Unlimited, Smooth Air Charter, Corporate Aircraft Restoration, Airborne Sensing, and Optech. If aircraft operators perceive Oshawa Executive Airport to be a less desirable base on account of operational restrictions, demand for hangar leases and development may also decrease.

The flight training restrictions contemplated in Final Proposed Procedures 6-9 have the potential to negatively impact the operations of businesses that support the FTUs located at the Airport. Through consultations with the Enterprise Aviation Group of Companies, it is noted that the company has approximately \$480,000 in annual revenues gained through providing maintenance services to Durham Flight Centre – decreases in flight training activity could negatively impact this business line.

- **Regional Economic Benefits:** The most recent economic impact study for the Airport was completed by R.P. Erickson and Associates in 2007 using data collected in 2005¹¹. A survey was completed of firms that were either located at the Airport or that undertake activities directly related to Airport-generated activities. The Study found that the Airport's direct economic benefits in 2005 included the support of 215 Full-Time Equivalent positions, \$8.6M in labour earnings, and \$28.3M in Gross Domestic Product value added. When considering total economic benefits, the Study found that the Airport supported 438 Full-Time Equivalent positions, \$16.0M in labour earnings, and added \$57.8M to the Gross Domestic Product.

While the 2007 economic impact study relies on data from 17 years ago, the ongoing business activities of the Airport can reasonably be inferred to contribute to the regional economy. Possible decreases in activity at the Airport that may occur as a result of the implementation of the Final Proposed Procedures have the potential to reduce the Airport's contribution to the regional economy, although the scale of this change cannot be quantified as this time.

- **Airport Operating Expenses:** Increases in the level of effort of administering the Final Proposed Noise Abatement Procedures are expected with corresponding cost implications. While the magnitude of these increases cannot yet be quantified, the City is pursuing the development of Final Proposed Noise Abatement Procedures to address a known community issue, including the cost implications that will arise with potential solutions.

¹¹ RP Erickson & Associates. (2007, January). *The Economic Impact of the Oshawa Municipal Airport: 20005*.

7.4 Aircraft Emission Implications

7.4.1 Summary of Changes

Based on feedback received through the stakeholder engagement program and updated materials made available by the City of Oshawa, the following changes have been made with respect to implementation implications:

- Updated information is provided the 2021 air quality study recently completed by the City of Oshawa;
- Air quality impacts as a result of the number of impacted aircraft movements have been updated; and
- References to discarded Draft Proposed Procedures have been removed.

7.4.2 Evaluation

The implications of the Final Proposed Procedures with respect to aircraft emissions are summarized in Table 7.23 and reviewed below. Relevant background information on past air quality studies commissioned by the City of Oshawa is also provided to contextualize the analysis provided herein.

Table 7.23 - Final Proposed Noise Abatement Procedures, Aircraft Emission Implications

No.	Final Proposed Noise Abatement Procedure	Aircraft Emission Implications?
1	Overnight Preferential Runways: Between the hours of 9:30 PM and 7:30 AM, consideration should be given to using Runway 12 for arrivals and Runway 30 for departures, consistent with safety of operations.	Yes
2	Tower Open Preferential Runways: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° at up to 5 kts.	Yes
3	Overnight Restricted Hours: Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.	Yes
4	Overnight Engine Run-Ups: Scheduled engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.	No
5	Departure Turns: Departing aircraft will continue to fly on the runway heading until they reach 1,000 ft. ASL before making any turns.	No
6	Time of Day Flight Training Restrictions: Flight training aircraft are not permitted to depart Friday-Monday before 8:00 AM and after 4:00 PM May 1 – September 30; and Friday-Monday before 8:00 AM and after 8:00 PM October 1 – April 30.	Yes
7	Alternating Seasonal Weekend Flight Training Restrictions: Flight training is not permitted on the 1st and 3rd Sunday of the month and 2nd and 4th Saturday of the month from May 1 – September 30.	Yes
8	Statutory Holiday Flight Training Restrictions: Flight training is not permitted on the following federal statutory holidays: New Year's Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.	Yes
9	Circuit Restrictions: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.	Yes

Background – Air Quality Studies

The City of Oshawa has completed air quality studies in 2015, 2019, 2020, and 2021. In the 2019 air quality study¹², four high-volume air sampling monitoring units were installed near each runway threshold, with data collection occurring between July 4, 2019 and September 22, 2019. The report notes that the selected locations were expected to have the greatest concentration of aircraft related pollutants. Key findings were as follows:

- The study did not identify any exceedances of the Ontario Ambient Air Quality Criteria, and the report notes that the monitoring showed very low levels of all pollutants. Significant differences between the four stations (i.e., four runways) were not identified, suggesting that the greatest impact on air quality was from ambient background levels / concentrations;
- With respect to Nitrogen Dioxide, the average of all measurements taken at the Airport (2.5 µg/m³) was less than the annual average recorded at Durham College (12.5 µg/m³);
- For Sulfur Dioxide, the average of all measurements taken at the Airport (2.0 µg/m³) was less than the provincial average (3.1 µg/m³);
- The average concentration of airborne lead (0.011 µg/m³) was noted to be less than the 2001 measurement by the Ministry of the Environment, Conservation and Parks, although more recent data was not noted to be available for comparison; and
- For concentrations of suspended particulates, average and maximum concentrations were compared to 2016 data from comparator sites in west Toronto and the Simcoe Experimental Farm. The 2019 average and maximum of all measurements taken at the Airport were noted to be less than those of the comparator sites.

The 2021 air quality study¹³, included as Appendix C, involved the installation of five air quality monitoring units at locations under flight paths in the residential neighbourhoods surrounding the Airport (Bermuda Park, Deer Valley Park, Marigold Avenue, Somerville Street, and Woodlea Crescent). Air pollutant concentrations at these five locations were deemed by the consultant to be representative of the impacts experienced in the surrounding community. Monitoring occurred between July 8, 2021 and September 10, 2021. Key findings were as follows:

- As with the 2019 study, the 2021 study did not identify any exceedances of the Ontario Ambient Air Quality Criteria;
- With respect to Nitrogen Dioxide, none of the measured concentrations were in excess of guideline values, and the average of all measurements recorded in 2021 was less than the annual averages recorded during the 2019 monitoring program and at Durham College during 2017;
- The average concentration of airborne lead (0.002 µg/m³) was noted to be less than the 2001 measurement by the Ministry of the Environment, Conservation and Parks; and
- For total concentrations of suspended particulates, the average and maximum of all measurements recorded in 2021 were less than the averages and maximums recorded at nearby Environment Canada Stations, although concentrations were higher than what was measured in support of the 2019 study.

¹² RWDI Consulting Engineers and Scientists. (2020, October 28). Oshawa Executive Airport Air Quality Monitoring, Oshawa, Ontario – Ambient Monitoring (RWDI #1903663).

¹³ RWDI Consulting Engineers and Scientists. (2022, January 2). Oshawa Executive Airport, Oshawa, Ontario – Ambient Air Quality Monitoring (RWDI #2104007).

Summarized, the consultants indicated through the 2021 air quality study that during the peak summer season for aircraft movements, monitoring identified low levels of all pollutants, and all measured levels were below the Ontario Ambient Air Quality Criteria.

Final Proposed Noise Abatement Procedure 1 – Overnight Preferential Runways

The recommended use of Runway 12 for overnight arrivals and Runway 30 for overnight departures is not anticipated to change the number of aircraft movements that will occur at the Airport, and therefore not result in a net change in aircraft emissions. The flightpaths favoured in this Final Proposed Procedure are primarily over areas with lower population densities and may result in a minor improvement in the level of potential aircraft emission exposure to residential dwellings situated to the south, west, and east of the Airport. However, given the infrequency of overnight operations because of the existing and proposed nighttime restricted periods, emission impacts are expected to be negligible.

Final Proposed Noise Abatement Procedure 2 – Tower Open Preferential Runways

The utilization criteria identified in Final Proposed Procedure 2 are anticipated to result in the increased use of Runway 30, with departures to the northwest, arrivals from the southeast, and the traffic circuit to the northeast of the Airport. The Runway 30 departure path and right-hand crosswind leg are located over less densely populated areas of Oshawa and Whitby – accordingly, the intention is to decrease the prevalence of aircraft operating at high power settings over extensive residential areas. This Final Proposed Procedure would not change the number of aircraft movements that occur at the Airport nor their duration – therefore, while net emission levels would likely remain constant, the distribution of these emissions would be felt on an increased basis over sparsely populated areas northwest of the Airport.

Final Proposed Noise Abatement Procedure 3 – Overnight Restricted Hours

As noted in Section 7.2, modifying the overnight hours at the Airport from 10:30 PM to 9:30 PM, and from 6:30 AM to 7:30 AM, will result in a two-hour increase in the overnight period of restricted operations. In 2019 and 2020, it was found that 2,618 and 1,266 annual aircraft movements, respectively, occurred during this two-hour period. Emission reductions will be realized where a flight that would have otherwise occurred during this period does not do so on account of the proposed restriction – however, it is anticipated that a proportion of movements may be shifted to non-restricted hours of the day. Accordingly, aircraft emission implications are expected to be limited.

Final Proposed Noise Abatement Procedures 6, 7, 8, and 9

The Final Proposed Procedures noted above address various controls on flight training activities at the Airport, including both the days and hours during which such training can occur. Potential reductions in aircraft activity levels would result in lower emission levels in the region. As noted previously, air quality in the area is currently found to meet applicable standards and guidelines.

Final Proposed Noise Abatement Procedures 4 and 5

Minimal reductions in aircraft emissions are anticipated with the proposed restriction of overnight scheduled engine maintenance run-ups. As maintenance run-ups are non-discretionary in nature, it is anticipated that this activity would shift to daytime hours. The departure procedure specified in Final Proposed Procedure 5 is similarly anticipated to have negligible impacts on aircraft emissions.

7.5 Airport Capacity Implications

7.5.1 Summary of Changes

Aside from the removal of references to discarded Draft Proposed Procedures, no revisions have been made to the evaluation of capacity implications.

7.5.2 Evaluation

Airport capacity is the theoretical and / or practical number of aircraft movements that can occur during a specified timeframe – typically, capacity is analyzed for a peak hour, peak day, or on an annual basis. The capacity implications of the Final Proposed Procedures are described herein.

Table 7.24 - Final Proposed Noise Abatement Procedures, Airport Capacity Implications

No.	Final Proposed Noise Abatement Procedure	Airport Capacity Implications?
1	Overnight Preferential Runways: Between the hours of 9:30 PM and 7:30 AM, consideration should be given to using Runway 12 for arrivals and Runway 30 for departures, consistent with safety of operations.	No
2	Tower Open Preferential Runways: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° at up to 5 kts.	No
3	Overnight Restricted Hours: Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.	Yes
4	Overnight Engine Run-Ups: Scheduled engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.	No
5	Departure Turns: Departing aircraft will continue to fly on the runway heading until they reach 1,000 ft. ASL before making any turns.	No
6	Time of Day Flight Training Restrictions: Flight training aircraft are not permitted to depart Friday-Monday before 8:00 AM and after 4:00 PM May 1 – September 30; and Friday-Monday before 8:00 AM and after 8:00 PM October 1 – April 30.	No
7	Alternating Seasonal Weekend Flight Training Restrictions: Flight training is not permitted on the 1st and 3rd Sunday of the month and 2nd and 4th Saturday of the month from May 1 – September 30.	No
8	Statutory Holiday Flight Training Restrictions: Flight training is not permitted on the following federal statutory holidays: New Year's Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.	No
9	Circuit Restrictions: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.	No

Background – Airport Capacity

To understand the impacts of the proposed procedures and restrictions, HM Aero utilized the Prototype Airfield Capacity Model to estimate the capacity of the Airport’s runway system. The Prototype Airfield Capacity Model was developed by the U.S. Airport Cooperative Research Program and serves as a spreadsheet-based desktop modelling tool to assist in the preparation of high-level capacity estimates.

Airfield capacity is the estimated number of aircraft movements that can be accommodated in a given period of time, based on an underlying set of assumptions such as fleet mix, separation minima, weather conditions and technological aides. As shown in Table 7.25, the hourly aircraft movement capacity of the Airport in Visual Meteorological Conditions is estimated at 57 movements, including touch-and-go’s.

Table 7.25 - Hourly Airfield Capacity Estimate (Single Runway Operations, VMC)

Capacity	Movements per Hour
Arrivals Capacity Including Touch-and-Go’s	27
Mixed Operations Departures Capacity Including Touch-and-Go’s	30
Total Mixed Operations Capacity	57

Final Proposed Noise Abatement Procedures 1 and 2

The preferential use of Runway 12 for arrivals and Runway 30 for departures will impact the utilization of individual runways but is not expected to impact the total capacity of the airfield system.

Final Proposed Noise Abatement Procedure 3 – Overnight Restricted Hours

Reducing the operating hours of the airport will reduce the overall capacity of the airfield system. As noted in Section 7.2, changing the overnight hours at the Airport from 10:30 PM to 9:30 PM, and from 6:30 AM to 7:30 PM, will result in a two-hour increase in the overnight period of restricted operations. Using the estimated mixed operations capacity of 57 movements per hour, this change would result in a daily decrease in capacity of 114 movements. Under the current restrictions, assuming 57 movements per hour, 16 hours of operations per day, and 365 operational days per year, the absolute (or maximum throughput) capacity of the airfield is approximately 333,000 annual movements. With the implementation of the proposed restrictions, the daily hours of operation would decrease to 14, resulting in the absolute capacity being reduced to approximately 291,000 annual movements. Practical capacity is the highest realistic throughput that an airport can maintain over the long-term, considering factors such as inclement weather and operational disruptions. When a practical capacity factor of 0.85 is applied, the resulting annual capacities are estimated at 283,000 movements and 248,000 movements respectively. For comparison, the Airport recorded 90,380 movements in 2019.

Final Proposed Noise Abatement Procedures 4, 5, 6, 7, 8, and 9

Final Proposed Procedures 4 to 9 are not anticipated to result in changes to the absolute or practical annual airfield capacity of the Airport. It is noted that the impacts experienced in flight training operations as a result of Final Proposed Procedures 6 to 9 may result in the net reduction of flight training movements at the Airport, thereby reducing the degree to which the Airport’s annual capacity is utilized. Conversely, the redistribution of flight training movements from restricted periods to non-restricted periods may result in increased instances where the hourly airfield capacity is approached or met, as traffic is concentrated in fewer hours of the day.

7.6 Implementation Implications

7.6.1 Summary of Changes

Based on feedback received through the stakeholder engagement program, the following changes have been made with respect to implementation implications:

- Additional commentary is provided on how each of the Final Proposed Procedures are intended to be implemented by the City and Airport Operator; and
- References to discarded Draft Proposed Procedures have been removed.

7.6.2 Evaluation

The City has committed to operating the Airport as a “Good Community Neighbour” and recognizes that improvements are required in the balance between aircraft operations and resident concerns. The endorsement of the Final Proposed Procedures by City Council will underscore the City’s commitment to future implementation and enforcement. The preliminary implementation process is anticipated to include¹⁴:

1. Submission of the Final Proposed Procedures to Transport Canada for review and, if deemed satisfactory, approval pursuant to CAR 602.105;
2. Distribution of advance notice to all Airport tenants and common aircraft operators;
3. Updating of all NAV CANADA aeronautical materials within the next 56-day publication cycle (i.e., Canada Air Pilot, Canada Flight Supplement), NAV CANADA air traffic control procedures (Section 7.8), and Airport manuals and procedures;
4. The development of internal (City and Airport Operator) procedures to support monitoring and the identification of potential noncompliance; and
5. Long-term monitoring by the Airport Operator and the City of the efficacy of the implemented noise abatement procedures, collection of noise complaints, investigation by the City and the Airport Operator, and enforcement by Transport Canada.

Within the aviation community, compliance with the CARs and procedures enacted pursuant thereto is largely achieved on a voluntary and self-initiated basis. From consultations with the Airport Operator, adherence to the existing Voluntary Noise Abatement Procedures is understood to be widespread – in the future, it is anticipated that aircraft operators will achieve similar or greater levels of compliance to the Final Proposed Procedures. In instances where voluntary compliance does not occur, enforcement action can be taken to ensure the desired outcomes of the given procedure are realized, where appropriate.

Compliance with the Final Proposed Procedures, when implemented, will be enforceable pursuant to the authority of CAR 602.105. The City, through its contracted Airport Operator, will be responsible for monitoring and identifying instances of potential noncompliance. Alleged instances of noncompliance will be reported to Transport Canada for investigation and action pursuant to their aviation enforcement policy, which is noted by the agency to balance both fairness and firmness.

Penalties for violating noise abatement procedures enacted pursuant to CAR 602.105 can be as high as \$5,000 for an individual and \$25,000 for a company.

¹⁴ The implementation process may be revised by the City and the Airport Operator in the future based on feedback received from Transport Canada and NAV CANADA. The order of the steps described above may also be revised.

Table 7.26 - Final Proposed Noise Abatement Procedures, Implementation Implications

No.	Final Proposed Noise Abatement Procedure	Implementation Implications?
1	Overnight Preferential Runways: Between the hours of 9:30 PM and 7:30 AM, consideration should be given to using Runway 12 for arrivals and Runway 30 for departures, consistent with safety of operations.	Yes
2	Tower Open Preferential Runways: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° at up to 5 kts.	Yes
3	Overnight Restricted Hours: Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.	Yes
4	Overnight Engine Run-Ups: Scheduled engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.	Yes
5	Departure Turns: Departing aircraft will continue to fly on the runway heading until they reach 1,000 ft. ASL before making any turns.	Yes
6	Time of Day Flight Training Restrictions: Flight training aircraft are not permitted to depart Friday-Monday before 8:00 AM and after 4:00 PM May 1 – September 30; and Friday-Monday before 8:00 AM and after 8:00 PM October 1 – April 30.	Yes
7	Alternating Seasonal Weekend Flight Training Restrictions: Flight training is not permitted on the 1st and 3rd Sunday of the month and 2nd and 4th Saturday of the month from May 1 – September 30.	Yes
8	Statutory Holiday Flight Training Restrictions: Flight training is not permitted on the following federal statutory holidays: New Year's Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.	Yes
9	Circuit Restrictions: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.	Yes

Final Proposed Noise Abatement Procedure 1 – Overnight Preferential Runways

The overnight preferential runway criteria, if adopted, are expected to be published in the Canada Flight Supplement, Canada Air Pilot (Noise Abatement Procedures Section), and the City's Noise & Traffic Management Policy, and notice will be provided to tenants and based aircraft operators. Pilots will be responsible for reviewing these publications as part of their pre-flight planning activities and will be expected to operate their aircraft in compliance with the Procedure, provided that the preferential runway usage requested is consistent with safe aircraft operations.

During the proposed overnight restricted period (9:30 PM to 7:30 AM) when the preferential runway criteria would be in affect, the NAV CANADA Air Traffic Control Tower is unstaffed from 10:30 PM to 6:30 AM and in these hours, the Airport operates as a Mandatory Frequency facility. During the Tower's unstaffed hours, pilots will be responsible for using the Automated Weather Observation System (AWOS) to verify weather conditions at the Airport and determine whether the preferred runway can be used for their intended operation (e.g., due to wind conditions). Pilots will also be responsible for broadcasting their intentions on the Mandatory Frequency to determine whether their arrival or departure on the respective overnight preferred runway can safely occur when accounting for other aircraft activity. As the overnight restricted period identified in Final Proposed Procedure 3 significantly reduces activity levels at the Airport during the hours when the overnight preferential runway criteria are in effect, significant implementation challenges are not expected for aircraft operators.

The Airport Operator currently maintains a database of overnight aircraft movements and will continue to do so. Upon receipt of a community inquiry regarding an overnight arrival or departure on a non-preferential runway, the Airport Operator will log such an inquiry / complaint, explain the provisions of the Final Proposed Procedure, and potentially contact the aircraft operator to determine what circumstances led to a non-preferential runway being used (e.g., weather conditions, conflicting traffic, expedited arrivals for air ambulance aircraft, etc.).

Final Proposed Noise Abatement Procedure 2 – Tower Open Preferential Runways

If adopted, Final Proposed Procedure 2 will require updates to NAV CANADA's internal Standard Operating Procedures for air traffic control services specific to Oshawa Executive Airport. More specifically, sections pertaining to aircraft runway assignment criteria. NAV CANADA will continue to be responsible for the operational assignment of runways during their hours of operation based on their utilization criteria, and pilots will continue to have discretion in accepting or rejecting a clearance for a given runway based on their ability to determine whether safety can be ensured.

Potential community concerns received related to preferential runway use are expected to be received by the Airport Operator. The Airport Operator will be responsible for logging such inquiries or complaints, explaining the runway utilization criteria adopted by NAV CANADA and potential reasons for variations from these criteria, and may choose to follow up with NAV CANADA at an appropriate time to determine the reason(s) for the specific change in runway utilization.

Final Proposed Noise Abatement Procedure 3 – Overnight Restricted Hours

The overnight restricted hours, if adopted, are expected to be published in the Canada Flight Supplement, Canada Air Pilot (Noise Abatement Procedures Section), and the City's Noise & Traffic Management Policy. Notice will also be provided to tenants and aircraft operators based at the Airport. Pilots will be responsible for familiarizing themselves with this restriction and operating in compliance with the regulations, subject to the exemptions proposed.

As noted previously, the Airport Operator records overnight aircraft operations and maintains a database of such operations. The Airport Operator will be responsible for regularly reviewing this database to identify exempted activities and potential violations. Upon receipt of a community inquiry regarding an alleged violation, the Airport Operator will log the inquiry, explain the provisions and exemptions of the Final Proposed Procedure, and determine whether the alleged incident in question constitutes a violation.

Final Proposed Noise Abatement Procedure 4 – Overnight Engine Run-Ups

The restriction on scheduled overnight engine run-ups is expected to be published in the Canada Flight Supplement, Canada Air Pilot (Noise Abatement Procedures Section), the City's Noise & Traffic Management Policy, and through notice provided to tenants and aircraft operators. Aircraft operators and maintenance providers will be expected to familiarize themselves with this restriction and conduct their run-ups accordingly.

As the Airport Operator does not regularly maintain a staffed presence at the facility overnight and in absence of tools available to monitor scheduled maintenance run-ups, compliance with Final Proposed Procedure 4 will be verified on a complaint-initiated basis. Upon receipt of notice of an alleged breach, the Airport Operator will log the inquiry, collect information from the complainant (e.g., occurrence date and time, and aircraft operator if known), and investigate to determine whether the alleged violation occurred. It is noted that unless sufficient information is provided by the complainant, the ability of the Airport Operator to verify whether a violation occurred will be highly limited. Identifying the cause of the run-up (i.e., scheduled vs. unscheduled maintenance) will rely on information provided by the operator in question.

Final Proposed Noise Abatement Procedure 5 – Departure Turns

The departure turn provision is intended to be published in the Canada Flight Supplement, Canada Air Pilot (Noise Abatement Procedures Section), the City's Noise & Traffic Management Policy, and through notice provided to tenants and aircraft operators. NAV CANADA would not be required to include the altitude provision in its take-off clearances, and pilots would be responsible for familiarizing themselves with this requirement and operating their aircraft in compliance.

NAV CANADA's radar surveillance at the Airport terminates at 2,000 ft. ASL and alternative systems (i.e., ADS-B) will not be available for the foreseeable future to track compliance with Final Proposed Procedure 5. Upon receipt of notice of an alleged instance of noncompliance, the Airport Operator may work with the complainant to gather information about the situation. However, validating that a violation occurred is anticipated to be significantly challenged by the absence of radar surveillance data that confirms an aircraft's altitude.

Final Proposed Noise Abatement Procedures 6, 7, and 8

The proposed restrictions on flight training contemplated through Final Proposed Procedures 6, 7, and 8 are expected to be published in the Canada Flight Supplement, Canada Air Pilot (Noise Abatement Procedures Section), and the City's Noise and Traffic Management Policy. Notice will also be provided to tenants and aircraft operators based at the Airport, and an emphasis will be placed on working with the two based FTUs to ensure that their staff clearly understand the Final Proposed Procedures if adopted. It is expected that student pilots and pilots conducting flight training at the Airport will be educated on the Final Proposed Procedures, if adopted, by their respective FTU and / or CFI.

NAV CANADA will not be responsible for briefing pilots on the flight training restrictions or ensuring compliance. NAV CANADA also does not have the obligation or authority to deny a clearance to arriving or departing aircraft based on its intended operation. The onus will be on the Pilot in Command of each flight to familiarize themselves and operate in accordance with the Final Proposed Procedures, if adopted. Given the volume and operational complexity of flight training activities at the Airport, a significant emphasis will be placed on the City and Airport Operator working proactively to ensure that FTUs, CFIs, and student pilots are aware of the requirements of the Final Proposed Procedures.

As FTUs will be permitted to utilize their fleets for non-flight training purposes during the restricted periods completed in Final Proposed Procedures 6, 7, and 8 (e.g., for sightseeing, familiarization flights, aircraft rentals), proactive reviews using the NCAMS data provided to the Airport Operator will not be possible, as the purpose of each flight is not recorded in the dataset. Similarly, flight training conducted in private aircraft not registered to an FTU will not be readily apparent in the NCAMS dataset. It is anticipated that, given the volume of aircraft movements recorded in the NCAMS dataset provided to the Airport Operator, investigations of potential instances of noncompliance will be reactive in nature based on the receipt of a complaint or inquiry from the community. The Airport Operator will be required to liaise with the FTU or aircraft operator associated with the alleged violation to determine the true purpose of flight and verify whether the occurrence aircraft was conducting flight training or an exempted activity. Depending on the volume of inquiries received, this process has the potential to increase the workload borne by the City, Airport Operator, and FTUs / aircraft operators.

Final Proposed Noise Abatement Procedure 9 – Circuit Restrictions

The proposed restrictions on the number of aircraft completing training in the circuit is expected to be published in the Canada Flight Supplement, Canada Air Pilot (Noise Abatement Procedures Section), and the City's Noise and Traffic Management Policy. Notice will be provided to tenants and aircraft operators based at the Airport, including the two based FTUs to ensure that their staff clearly understand the requirements if adopted.

NAV CANADA will not be responsible for implementing or enforcing the proposed restriction on the number of aircraft conducting circuit training flights. Aside from visual observation, the Airport Operator does not have monitoring systems available to track the number of aircraft performing circuit training activities. From an implementation perspective, the proposed restriction of a maximum of four aircraft conducting training flights in the circuit will be significantly challenged by the reliance on pilots determining the number of training flights currently operating in the circuit prior to their entry for the same intended operation. The implementation of this Final Proposed Procedure will also be limited by the ability of the Airport Operator to specifically identify aircraft not adhering to the procedure and investigate instances of alleged noncompliance.

7.7 Aviation System Implications

7.7.1 Summary of Changes

Based on feedback received through the stakeholder engagement program, the following changes have been made with respect to the consideration of aviation system implications:

- The impacts of Final Proposed Procedure 3, 6, 7, 8, and 9 have been recharacterized to identify that the displacement of aircraft movements may result in increased noise concerns in other communities; and
- References to discarded Draft Proposed Procedures have been removed.

7.7.2 Evaluation

The Final Proposed Procedures were developed while considering potential implications for other airports that are part of the same aviation system as Oshawa Executive Airport. These facilities include, but are not limited to:

- **Toronto Pearson International Airport:** Toronto Pearson is located 65 km west of Oshawa and functions as the region's primary commercial passenger and cargo facility. General aviation and business aviation operations also occur at Toronto Pearson, although such users require prior approval to optimize the use of the facility's capacity. Noise abatement procedures have been enacted pursuant to CAR 602.105, including overnight restricted hours of between 12:30 AM and 6:30 AM.
- **Billy Bishop Toronto City Airport:** Toronto City Airport is located 50 km southwest supports regional commercial passenger services, general aviation, and business aviation. Operations by aircraft with more demanding takeoff and landing performance characteristics can be limited by the facility's comparatively short runways. Noise abatement procedures have been enacted pursuant to CAR 602.105, which include limiting arrivals and departures overnight and prohibiting all jet and certain propeller aircraft.
- **Toronto Buttonville Municipal Airport:** Toronto Buttonville is located 40 km west of the Airport and primarily supports flight training, general aviation, and business aviation. The facility is 100% privately owned by Cadillac Fairview and is operated by Torontair Ltd. Noise abatement procedures are in effect pursuant to CAR 602.105, and flights are prohibited after 12:00 AM unless approved by the Airport Manager. The long-term future of Toronto Buttonville is uncertain; in 2011, development plans were submitted for a mixed-use residential, commercial, and employment redevelopment project that was subsequently appealed, although these plans were withdrawn in 2020. As of early 2020, Cadillac Fairview indicated that Buttonville would continue to operate until at least the spring of 2023.

- **Peterborough Municipal Airport:** Peterborough Airport is located 55 km east of Oshawa and supports a mix of general aviation, business aviation, flight training, and aviation industrial users. While procedures have been enacted to minimize overflights of noise sensitive areas, overnight operations are not subject to curfews or restrictions.
- **Kawartha Lakes Municipal Airport:** Kawartha Lakes Airport is located 50 km north of Oshawa and primarily supports general aviation users and flight training. No restrictions are currently imposed on overnight operations.

Several other aerodromes with varying levels of infrastructure (e.g., paved and grass runways) and service levels are also located throughout the region, which form part of the aviation system for general aviation users. It is noted that the long-term future of Toronto Buttonville Airport is uncertain, with the potential closure and redevelopment of the facility reported in several sources at an indeterminate time in the future. The closure of Toronto Buttonville, in combination with the implementation of the Final Proposed Procedures at Oshawa Executive Airport, may result in further impacts to the aviation system as general aviation, business aviation, and flight training activity is distributed throughout the region.

Table 7.27 - Final Proposed Noise Abatement Procedures, Aviation System Implications

No.	Final Proposed Noise Abatement Procedure	Aviation System Implications?
1	Overnight Preferential Runways: Between the hours of 9:30 PM and 7:30 AM, consideration should be given to using Runway 12 for arrivals and Runway 30 for departures, consistent with safety of operations.	No
2	Tower Open Preferential Runways: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° at up to 5 kts.	No
3	Overnight Restricted Hours: Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.	Yes
4	Overnight Engine Run-Ups: Scheduled engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.	No
5	Departure Turns: Departing aircraft will continue to fly on the runway heading until they reach 1,000 ft. ASL before making any turns.	No
6	Time of Day Flight Training Restrictions: Flight training aircraft are not permitted to depart Friday-Monday before 8:00 AM and after 4:00 PM May 1 – September 30; and Friday-Monday before 8:00 AM and after 8:00 PM October 1 – April 30.	Yes
7	Alternating Seasonal Weekend Flight Training Restrictions: Flight training is not permitted on the 1st and 3rd Sunday of the month and 2nd and 4th Saturday of the month from May 1 – September 30.	Yes
8	Statutory Holiday Flight Training Restrictions: Flight training is not permitted on the following federal statutory holidays: New Year's Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.	Yes
9	Circuit Restrictions: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.	Yes

Final Proposed Noise Abatement Procedures 1, 2, 4, and 5

The above-noted Final Proposed Procedures primarily address the way aircraft operations occur at the Airport and do not implement usage restrictions. Accordingly, the noted Final Proposed Procedures 1,2,4 and 5 are not expected to serve as significant forces that will displace aircraft operations from Oshawa Executive Airport to other facilities in the surrounding aviation system. While Final Proposed Procedure 4 will restrict overnight engine run-ups associated with scheduled maintenance, this is not anticipated to be a significant factor that would shift aircraft maintenance operations to other airports.

Final Proposed Noise Abatement Procedure 3 – Overnight Restricted Hours

As noted in Section 7.2, 2,618 aircraft movements occurred during the additional two-hour period of overnight operational restrictions in 2019. In 2020, 1,285 movements were recorded during these hours. It is recognized that a proportion of these movements may be flexible in their arrival or departure times and shift their schedules accordingly, while some of the remaining proportion may choose not to operate their flight altogether – both possibilities result in no impacts to the aviation system. For aircraft operations during the proposed restricted period of 9:30 PM to 7:30 AM that cannot be rescheduled or cancelled, the following impacts to other airports in the aviation system may result:

1. Non-exempt aircraft that have a firm requirement to depart between 9:30 PM and 7:30 AM will need to originate their flight from an alternative airport. Depending on the aircraft type and the time of departure, these movements may originate from Toronto Pearson (subject to approval between 12:30 AM and 6:30 AM), Toronto City Airport (if before 11:00 PM), Toronto Buttonville (if before 12:00 AM), Peterborough (unrestricted), or Kawartha Lakes (unrestricted). Aircraft movements in this category may increase activity at other airports in the aviation system. It is noted that the fee environment of Toronto Pearson will likely limit the displacement of traffic to this facility to a select group of corporate and charter aircraft operators.
2. Non-exempt aircraft that are not based at the Airport that have a firm requirement to arrive between 9:30 PM and 7:30 AM may choose to use the same airports as noted above in 1., subject to the described restrictions, thereby increasing activity at other airports in the aviation system. Aircraft based at the Airport may continue to return during the restricted hours, negating impacts to the aviation system.
3. On days with no flight training restrictions (Tuesday – Thursday), the exemption for returning aircraft based at the Airport may result in pilots departing Oshawa before 9:30 PM and training at other airports in the regional system, such as Peterborough and Kawartha Lakes before returning unrestricted. While the displacement of restricted flight training activity to other airports in the regional system would reduce the business impacts that are expected to be experienced by FTUs, the additional flight time to and from these airports (approximately 15 minutes each way) is expected to increase aircraft rental and instructor costs borne by students.

Summarized, the expanded overnight restricted period may result in a modest increase in late evening / early morning activity at other airports in the surrounding aviation system. The displacement of aircraft movements to these airports may result in increased noise complaints from surrounding residents.

Table 7.28 - Aviation System Overnight Restrictions

Airport	Overnight Restrictions	Exemptions
Oshawa Executive Airport	Existing: 10:30 PM – 6:30 AM Proposed: 9:30 PM – 7:30 AM	<ul style="list-style-type: none"> • Police • Air ambulances • Industrial emergencies • Returning based aircraft
Toronto Pearson International Airport	12:30 AM – 6:30 AM (dependent on aircraft noise certification)	<ul style="list-style-type: none"> • Permission required to operate during overnight restricted hours
Billy Bishop Toronto City Airport	11:00 PM – 6:45 AM	<ul style="list-style-type: none"> • Air ambulances • Emergencies
Toronto Buttonville Municipal Airport	After 12:00 AM	<ul style="list-style-type: none"> • Approval required from Airport Manager
Peterborough Municipal Airport	Unrestricted	
Kawartha Lakes Municipal Airport	Unrestricted	

Final Proposed Noise Abatement Procedures 6, 7, and 8

Final Proposed Procedure 6, which is intended to implement a series of time-of-day restrictions on flight training activity, enables pilots to depart the Airport before the enactment of the restricted period and subsequently return during the restricted hours. This provision may result in aircraft departing Oshawa for the purpose of conducting flight training and flying to other airports in the area before returning to Oshawa, increasing activity levels at these facilities. For the whole-day restrictions contemplated in Final Proposed Procedures 7 and 8, the primary impact to the aviation system would be if FTUs based at the Airport choose to operate satellite facilities at other airports (e.g., Peterborough, Kawartha Lakes) to enable continued operations during alternating summer weekend restricted days and on statutory holidays.

While Peterborough and Kawartha Lakes may have residual airport capacity with which to absorb this activity, increased activity levels at both airports may potentially result in community noise concerns and complaints given their proximity to residential dwellings.

Final Proposed Noise Abatement Procedure 9 – Circuit Restrictions

Circuit training flights are an integral component of Transport Canada’s licensing and training requirements and is also an important part of maintaining pilot proficiency. The limit of four aircraft in the circuit conducting training flights stipulated in Final Proposed Procedure 13 will likely result in demand exceeding the stipulated maximum during peak periods. For demand for circuit training flights that is not reallocated to non-peak hours and days, is anticipated that FTUs may direct their aircraft to fly to other airports in the aviation system to complete their circuit training requirements.

Peterborough Municipal Airport may receive a proportion of this displaced capacity, although high-volume flight training currently occurs at this facility and noise abatement procedures have been enacted to address concerns from aircraft circuit noise. Based on its proximity to the Airport and the lower volumes of traffic at the site, Kawartha Lakes Municipal Airport may also become a preferred location for the absorption of surplus circuit training activity from Oshawa. In both cases, displaced flight training activity has the potential to result in increased aircraft movements at each airport and potentially result in increased resident noise concerns.

7.8 Air Traffic Management Implications

7.8.1 Summary of Changes

Based on feedback received through the stakeholder engagement program, the following changes have been made with respect to the consideration of air traffic management implications:

- Implications as a result of Final Proposed Procedures 2, 3, 5, 6, 7, 8, and 9 have been revised;
- Addition of commentary on the future of the Air Traffic Control Tower; and
- References to discarded Draft Proposed Procedures have been removed.

7.8.2 Evaluation

NAV CANADA is the private not-for-profit corporation responsible for Canada's air navigation system. NAV CANADA operates an Air Traffic Control Tower 365 days per year from 6:30 AM to 10:30 PM; during unstaffed hours, the Airport is a Mandatory Frequency area. If approved by Transport Canada, the Final Proposed Procedures will be published in the Canada Flight Supplement and Canada Air Pilot for review by aircraft operators. NAV CANADA has identified through consultations that its Air Traffic Controllers will not be responsible for the enforcement of the Final Proposed Procedures or briefing pilots on their requirements.

Table 7.29 - Final Proposed Noise Abatement Procedures, Safety Implications

No.	Final Proposed Noise Abatement Procedure	Air Traffic Management Implications?
1	Overnight Preferential Runways: Between the hours of 9:30 PM and 7:30 AM, consideration should be given to using Runway 12 for arrivals and Runway 30 for departures, consistent with safety of operations.	No
2	Tower Open Preferential Runways: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° at up to 5 kts.	Yes
3	Overnight Restricted Hours: Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.	Yes
4	Overnight Engine Run-Ups: Scheduled engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.	No
5	Departure Turns: Departing aircraft will continue to fly on the runway heading until they reach 1,000 ft. ASL before making any turns.	No
6	Time of Day Flight Training Restrictions: Flight training aircraft are not permitted to depart Friday-Monday before 8:00 AM and after 4:00 PM May 1 – September 30; and Friday-Monday before 8:00 AM and after 8:00 PM October 1 – April 30.	No
7	Alternating Seasonal Weekend Flight Training Restrictions: Flight training is not permitted on the 1st and 3rd Sunday of the month and 2nd and 4th Saturday of the month from May 1 – September 30.	No
8	Statutory Holiday Flight Training Restrictions: Flight training is not permitted on the following federal statutory holidays: New Year's Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.	No
9	Circuit Restrictions: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.	No

Final Proposed Noise Abatement Procedures 1 and 4

Final Proposed Procedures 1 and 4 address activity during hours when the Air Traffic Control Tower is not in operation, and no air traffic management implications have been identified.

Final Proposed Noise Abatement Procedure 2 – Tower Open Preferential Runways

The runway utilization criteria outlined in this Final Proposed Procedure would require updates to NAV CANADA's internal Standard Operating Procedures for air traffic control services specific to Oshawa Executive Airport. Through engagement with NAV CANADA, concern was identified that implementing a 5 kt tailwind limit would result in repeated instances of pilots not accepting clearances for Runway 30 and instead requesting an alternative runway, resulting in increased air traffic controller workloads and operational challenges. Final Proposed Procedure 2 no longer proposes to implement a tailwind provision as originally contemplated in the Draft Proposed Procedure and includes a reduced crosswind limit of 5 kts based on stakeholder feedback.

Final Proposed Noise Abatement Procedure 3 – Overnight Restricted Hours

During the initial project submission, consideration was given as to whether the proposed changes to the Airport's hours of operation would result in changes to the Air Traffic Control Tower's hours of operation. Through consultations with NAV CANADA, it was noted that changes to the level of service provided at the Airport would require a fulsome aeronautical study and business case analysis as per the organization's standard procedure. While revisions to the Air Traffic Control Tower's hours of operations were not identified through consultations as being a direct outcome of the adoption of the Final Proposed Procedures, the potential for operational changes in the future continues to be noted.

Final Proposed Noise Abatement Procedure 5 – Departure Turns

NAV CANADA has noted that take-off clearances with altitude restrictions are not typically issued to VFR departures, and that NAV CANADA does not intend to include the 1,000 ft. ASL restriction contemplated in Final Proposed Procedure 5 within their aircraft clearances. Pilots would be responsible for familiarizing themselves with this requirement and operating in compliance.

It is also noted that NAV CANADA's radar surveillance terminates at 2,000 ft. ASL and systems are not currently available with the data granularity to monitor or validate compliance with Final Proposed Procedure 5. The unavailability of radar surveillance and resulting aircraft altitude information will significantly challenge the ability for instances of alleged non-compliance to be investigated for the purposes of enforcement.

Final Proposed Noise Abatement Procedures 6, 7, 8, and 9

During consultations with NAV CANADA, it was noted that the organization does not have the authority to deny a taxi or takeoff clearance to a departing flight training aircraft except in very rare circumstances. Similarly, NAV CANADA noted that it will not be responsible for monitoring for compliance with the circuit capacity restriction noted in Final Proposed Procedure 13, or for restricting the number of aircraft in the circuit. As noted previously, the onus is expected to be on the pilots to comply with the requirements of the Final Proposed Procedures, if adopted.

Air Traffic Control Tower Status

A recurring theme during consultations with aviation stakeholders was the operational value that the NAV CANADA Air Traffic Control Tower provides at the Airport and concerns that this facility could have its hours reduced or be closed altogether if activity decreases significantly following the implementation of the Final Proposed Procedures identified herein. This concern and the potential implications of reduced activity levels at the Airport are noted and understood. NAV CANADA indicated that they do not currently have plans change the level of service at the Oshawa Air Traffic Control Tower to respond to the implementation of the Final Proposed Procedures. Prior to such a level of service change being initiated, NAV CANADA is mandated to complete an aeronautical study and business case.

7.9 Safety Implications

7.9.1 Summary of Changes

Based on feedback received through the stakeholder engagement program, the following changes have been made with respect to the consideration of safety implications:

- Additional commentary is provided on the safety implications of Final Proposed Procedures 1, 4, and 6;
- The safety concerns of Final Proposed Procedure 2 identified by many airport users have been addressed through wording revisions; and
- References to discarded Draft Proposed Procedures have been removed.

7.9.2 Evaluation

Safety is of paramount importance and underscores all aspects of the Airport's operation. This includes safety for pilots and aircraft operators, individuals at the Airport, and the surrounding population. As a Transport Canada-certified facility, the Airport is required to maintain a Safety Management System, Emergency Response Plan, and various other procedures that address its safe operation. The Final Proposed Procedures have been developed considering aviation safety, with implications described as follows.

Table 7.30 - Final Proposed Noise Abatement Procedures, Safety Implications

No.	Final Proposed Noise Abatement Procedure	Safety Implications?
1	Overnight Preferential Runways: Between the hours of 9:30 PM and 7:30 AM, consideration should be given to using Runway 12 for arrivals and Runway 30 for departures, consistent with safety of operations.	No
2	Tower Open Preferential Runways: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° at up to 5 kts.	No
3	Overnight Restricted Hours: Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.	No
4	Overnight Engine Run-Ups: Scheduled engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.	No
5	Departure Turns: Departing aircraft will continue to fly on the runway heading until they reach 1,000 ft. ASL before making any turns.	No
6	Time of Day Flight Training Restrictions: Flight training aircraft are not permitted to depart Friday-Monday before 8:00 AM and after 4:00 PM May 1 – September 30; and Friday-Monday before 8:00 AM and after 8:00 PM October 1 – April 30.	No
7	Alternating Seasonal Weekend Flight Training Restrictions: Flight training is not permitted on the 1st and 3rd Sunday of the month and 2nd and 4th Saturday of the month from May 1 – September 30.	No
8	Statutory Holiday Flight Training Restrictions: Flight training is not permitted on the following federal statutory holidays: New Year's Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.	No
9	Circuit Restrictions: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.	No

Final Proposed Noise Abatement Procedure 1 – Overnight Preferential Runways

The overnight preferential usage of Runway 12 for arrivals and Runway 30 for departures described in Final Proposed Procedure 1 is not anticipated to have a negative impact on aviation safety. Runway 12-30 is noted to be preferential from a runway length perspective (4,250 ft.) compared to Runway 05-23 (2,654 ft.). Further, despite the preferential assignment described in the Final Proposed Procedure, pilots will continue to be able to select their arrival or departure runway based on their fulsome analysis of aviation safety considerations, including wind speed and direction, their overall pilot skill level, and meteorological conditions.

Concern was articulated by certain aviation users during the stakeholder engagement program that Final Proposed Procedure 1 would result in aircraft operating on converging flight paths and pilots landing or departing on a non-wind favoured runway. The wording of Final Proposed Procedure 1 has been revised to include “consideration should be given to” and “consistent with safety of operations” to emphasize that pilots have discretion in selecting the safest runway.

Additionally, Final Proposed Procedure 1 will be in effect overnight when the NAV CANADA Air Traffic Control Tower is closed (10:30 PM to 6:30 AM) and the Airport is operated under Mandatory Frequency rules. As these hours coincide with the current (10:30 PM to 6:30 AM) and proposed (9:30 PM to 7:30 AM) overnight restricted periods, activity levels at the Airport are significantly lower. While two or more aircraft may be arriving and / or departing at the Airport during the hours contemplated in Final Proposed Procedure 1 on occasion, pilots will continue to have discretion in selecting a runway that does not represent a risk to aviation safety when considering conflicting traffic.

Final Proposed Noise Abatement Procedure 2 – Tower Open Preferential Runways

Final Proposed Procedure 2 will implement a maximum 90° crosswind of 5 kts for Runway 30 operations before a different (wind-aligned) runway would be assigned by NAV CANADA. Landings and take-offs in crosswind conditions require the use of different pilot techniques and control inputs compared to instances where the prevailing winds are aligned with the runway centreline and necessitate additional attention to minimize the effects of lateral drift. Maintaining alignment with the runway centreline in crosswind conditions can be further challenged when the runway surface is contaminated with water or snow, for example.

Training in crosswind conditions is a standard component of Transport Canada’s licensing requirements at all levels, including the Private Pilots License. Transport Canada’s TP 13723 Flight Test Guide - Private Pilot Licence - Aeroplane (6th Edition) includes several requirements for pilots to demonstrate their ability to handle crosswind landing conditions, including slipping, take-offs, and landings. Recurrent practice in crosswind conditions is also an important factor in maintaining pilot proficiency. While new pilots that are beginning their initial flight training will have the least experience with operating in crosswind conditions, training in such conditions will be conducted under the supervision of a CFI, during which time proper techniques will be developed.

Consultations with the two Flight Training Units based at the Airport also indicated that a 5 kt crosswind limit would be more acceptable than the 10 kts previously proposed, based on the skill levels of their student pilots.

Final Proposed Noise Abatement Procedure 4 – Overnight Engine Run-ups

During the stakeholder engagement process, certain aviation users noted that the wording of Draft Proposed Procedure 4 may be misinterpreted by pilots as applying to engine run-ups completed as a standard pre-flight checklist task to ascertain the safe and proper operation of the engine. Concern was also articulated that the Draft Proposed Procedure may result in exempted aircraft operations (e.g., law enforcement and air ambulance operations) that encounter a maintenance issue being unable to complete a post-maintenance engine run-up. Based on this feedback, the wording of Final Proposed Procedure 4 was modified to include “scheduled engine run-ups associated with aircraft maintenance” as opposed to “engine run-ups associated with aircraft maintenance.” This revision is intended to highlight that only prolonged duration scheduled run-ups are proposed to be restricted.

Final Proposed Noise Abatement Procedure 5 – Departure Turns

Final Proposed Procedure 5 stipulates that aircraft departing the Airport will maintain runway heading to an altitude of 540 ft. AGL before making their crosswind or departure turn. This is consistent with operations in a typical traffic circuit and will limit low-level turns. Accordingly, no significant safety implications are anticipated.

Final Proposed Noise Abatement Procedure 6 – Time of Day Flight Training Restrictions

During stakeholder engagement with aviation users and the FTUs, concern was articulated that pilots conducting flight training may feel rushed in returning to the Airport prior to the commencement of the evening restricted periods from Friday to Monday. Safety implications could include shortening or omitting pre-flight inspections and runups, missing checklist items, and / or flying through unsafe conditions in order to return to the Airport on time without violating the Draft Proposed Procedure. Recognizing the potential safety risk that the wording of the Draft Proposed Procedure posed, Final Proposed Procedure 6 now clarifies its application only to departing flight training aircraft. Flight training aircraft are proposed to be permitted to return to the Airport after the restricted hours commence to reduce the pressure imposed on pilots.

Final Proposed Noise Abatement Procedures 3, 4, 7, 8, and 9

These Final Proposed Procedures limit the Airport’s hours of operations and / or activities that can occur at the facility (e.g., engine run-ups, flight training). These procedures do not change the manner in which flight operations will occur, and as such are not anticipated to result in direct aviation safety implications.

7.10 Fleet Implications

7.10.1 Summary of Changes

Based on feedback received through the stakeholder engagement program, the following changes have been made with respect to fleet implications:

- The evaluation of Final Proposed Procedure 2 has been revised; and
- References to discarded Draft Proposed Procedures have been removed.

7.10.2 Evaluation

The Airport is currently used by a wide range of aircraft types; the predominant user group being single-engine and twin-engine flight training and general aviation aircraft. Based on 2020 NCAMS data, 90% of all movements were comprised of the following aircraft types: Cessna 150, 152, 172, 182, and 185; Piper PA-27 and PA-28; Cirrus SR-22; and Diamond DA-40. Other common aircraft fleets include small and medium business jets (e.g., Dassault Falcon 10, Cessna Citation), single and twin-engine turboprop aircraft (e.g., Pilatus PC-12, Beechcraft King Air), and larger users such as the Basler BT-67.

Table 7.31 - Final Proposed Noise Abatement Procedures, Fleet Implications

No.	Final Proposed Noise Abatement Procedure	Fleet Implications?
1	Overnight Preferential Runways: Between the hours of 9:30 PM and 7:30 AM, consideration should be given to using Runway 12 for arrivals and Runway 30 for departures, consistent with safety of operations.	No
2	Tower Open Preferential Runways: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° at up to 5 kts.	No
3	Overnight Restricted Hours: Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.	No
4	Overnight Engine Run-Ups: Scheduled engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.	No
5	Departure Turns: Departing aircraft will continue to fly on the runway heading until they reach 1,000 ft. ASL before making any turns.	No
6	Time of Day Flight Training Restrictions: Flight training aircraft are not permitted to depart Friday-Monday before 8:00 AM and after 4:00 PM May 1 – September 30; and Friday-Monday before 8:00 AM and after 8:00 PM October 1 – April 30.	No
7	Alternating Seasonal Weekend Flight Training Restrictions: Flight training is not permitted on the 1st and 3rd Sunday of the month and 2nd and 4th Saturday of the month from May 1 – September 30.	No
8	Statutory Holiday Flight Training Restrictions: Flight training is not permitted on the following federal statutory holidays: New Year’s Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.	No
9	Circuit Restrictions: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.	No

Final Proposed Noise Abatement Procedures 1 and 5

Final Proposed Procedures 1 and 5 are existing voluntary procedures that are proposed to be made mandatory without revisions. Consultations with the Airport Operator did not identify any fleet implications with these existing procedures, and performance requirements are not imposed with these procedures that would negatively impact the fleet types that commonly utilize the Airport.

Final Proposed Noise Abatement Procedure 2 – Tower Open Preferential Runways

Final Proposed Procedure 2 is recommended to implement a maximum 90° crosswind limit of 5 kts for Runway 30 operations before an alternate runway would be assigned as being active by NAV CANADA. Aircraft are certified during flight testing to a maximum demonstrated crosswind component, which is generally lower for smaller flight training and general aviation aircraft. The Cessna 150 and Cessna 152, for example, comprised 12% of total movements in 2020 and have maximum demonstrated crosswind components of 12 kts to 13 kts, depending on the model and year of manufacturing¹⁵. The Cessna 172, which comprised 65% of movements in 2020, has a maximum demonstrated crosswind of 15 kts¹⁶.

¹⁵ Limits are as noted in the 1977 Cessna 150M Pilot’s Operating Handbook and the 1980 Cessna 152 Pilot’s Operating Handbook.

¹⁶ Per the 1979 Cessna 172N Pilot’s Operating Handbook.

The Final Proposed Procedure is well below the maximum demonstrated crosswind component for representative general aviation and flight training aircraft, and significant fleet implications are not anticipated.

Final Proposed Noise Abatement Procedures 3, 4, 6, 7, 8, and 9

Final Proposed Procedures 3, 4, 6, 7, 8, and 9 are restrictions that limit the Airport's hours and days of operations and the scale of flight training activity. These procedures will not impact the types of aircraft that make use of the Airport during these operational confines.

8 CLOSING

The City of Oshawa, as the owner of Oshawa Executive Airport, is committed to ensuring that the facility is operated within the context of being a “Good Community Neighbour” and under the overarching goal that the Airport shall be:

“A leader in environmental stewardship including noise mitigation, wildlife management and energy conservation.”

The Final Proposed Noise Abatement Procedures detailed herein have been developed through the direction of Oshawa City Council per the third of the four pillars described by the ICAO Balanced Approach to Aircraft Noise Management as a step in making progress to reduce the aircraft noise concerns of Oshawa residents living in the vicinity of the Airport. While a reduction in complaints is expected, it is recognized that the Final Proposed Procedures are unlikely to entirely eliminate concerns altogether and ongoing monitoring will be required to identify successes and required improvements.

This submission has been prepared to document the steps that the City, through its consultant, has taken pursuant to Transport Canada’s AC 302-002 process for the implementation of new mandatory noise abatement procedures at the Airport. This has included a comprehensive and wide-reaching stakeholder engagement program that indicated that consensus cannot be secured on the Final Proposed Procedures among consulted parties. The Proposed Noise Abatement Procedures documented herein are respectfully provided to Transport Canada for its consideration pursuant to the authority of CAR 602.105 and following Steps 5 to 11 of the Advisory Circular process.

Pending Transport Canada’s decision on whether the Final Proposed Procedures are approved, the City and Airport Operator are committed to supporting the implementation phase and conducting long-term monitoring as to the efficacy of the noise abatement procedures.

Appendix A - Stakeholder Engagement Presentation



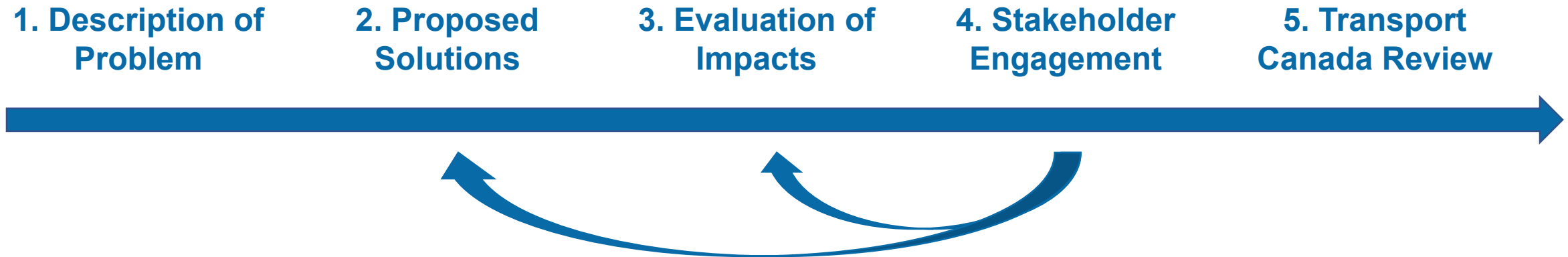
Proposed Noise Abatement Procedures

Oshawa Executive Airport | Stakeholder Engagement



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Transport Canada Prescribed Process

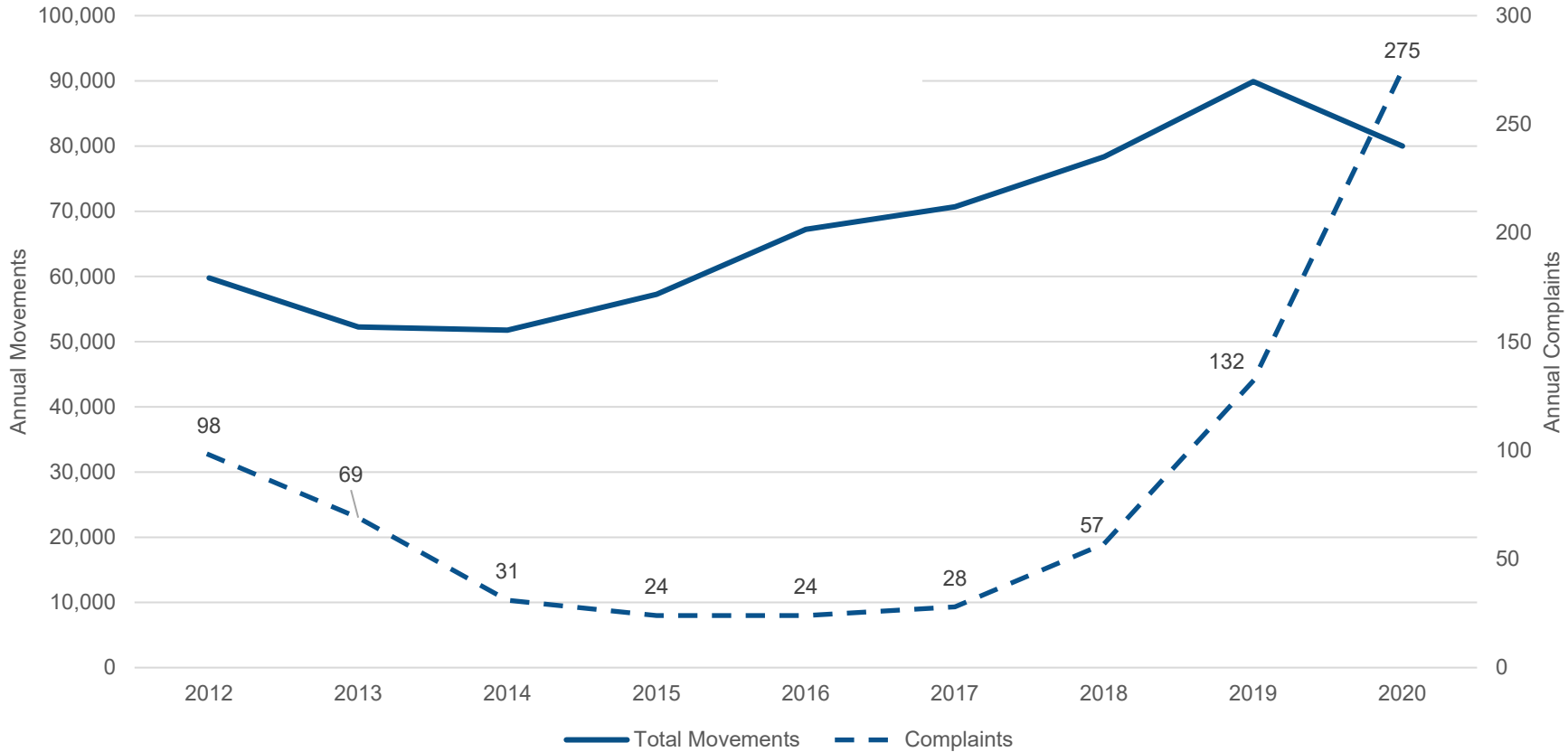


- The process is prescribed by Transport Canada in Advisory Circular 302-002 – the only approved process
- HM Aero serves as the City of Oshawa’s independent consultant – retained to develop a holistic approach for new procedures
- Some procedures are new, others are to formalize current voluntary measures with or without revisions
- Transport Canada is the final approval authority for the implementation of new regulatory procedures

Stakeholder Engagement

- Community and user feedback is important to the process
- Proposed Noise Abatement Procedures Public Consultation Materials document (Full Report and Executive Summary) and Report DS-21-190 are available online:
[Connectoshawa.ca/AirportFeedback](https://connectoshawa.ca/AirportFeedback)
- Direct outreach and public meetings:
 - Tuesday, November 23; 1:00 – 3:00 p.m. Airport Users
 - Tuesday, November 23; 6:30 – 8:30 p.m. Community Members
 - Wednesday, November 24; 1:00 – 3:00 p.m. Community Members
 - Wednesday, November 24; 6:30 – 8:30 p.m. Airport Users
 - Meetings with Transport Canada, NAV CANADA, COPA, ATAC, CBAA, Airport Businesses
- Feedback from consultations must be recorded, including where respondents concur and dissent, as well as the reasons for the positions taken

Historical Noise Complaints



Year	2019	2020
Annual Based FTU Movements	75%	72%
Annual Non-FTU Movements	25%	28%
Total	100%	100%

Proposed Noise Abatement Procedures

- The authority for the Proposed Noise Abatement Procedures comes from Canadian Aviation Regulation 602.105 – cannot introduce procedures that are not included within this Regulation
- The 14 Proposed Noise Abatement Procedures are designed to be a holistic solution – impacts should be considered together in a comprehensive manner
- Three categories:
 1. New Procedures
 2. Existing Voluntary Procedures – Formalize *Without* Changes
 3. Existing Voluntary Procedures – Formalize *With* Changes

Proposed Noise Abatement Procedures

No.	Proposed Noise Abatement Procedure	Existing / New	Notes / Rationale
602.105(a) Preferential Runways			
1	Tower Closed Preferential Runways: When the Air Traffic Control Tower is closed, pilots shall use Runway 12 for arrivals and Runway 30 for departures consistent with safety of operations.	Existing Voluntary Procedure, Formalize Without Revisions	During hours when the NAV CANADA Tower is closed, routing arrivals from the northwest to Runway 12 and departures to northwest from Runway 30 will minimize overflights of built-up areas to the west, south, and east.
2	Tower Open Preferential Runways: Aircraft will use Runway 30 when the winds are from a heading of 210° (incrementally) to 030° at up to 10 kts (18.52 km/h) or from a heading of 031° (incrementally) to 209° at up to 5 kts (9.26 km/h).	Existing Voluntary Procedure, Formalize With Revisions	Currently, Runway 30 is the preferential runway when the winds are blowing from a heading of 210° to 030° at up to 5 knots. The Proposed Noise Abatement Procedure will increase the utilization of Runway 30 by increasing the maximum 90° crosswind to 10 knots, and by introducing a maximum tailwind component of up to 5 knots.
602.105(c) Hours When Aircraft Operations are Prohibited or Restricted			
3	Overnight Restricted Hours: Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.	Existing Voluntary Procedure, Formalize With Revisions	Currently, the overnight operational restriction applies between 10:30 PM and 6:30 AM (8 overnight restricted hours). The Proposed Noise Abatement Procedure increases this window to 9:30 PM to 7:30 AM, for a total of 10 overnight restricted hours. This change will increase the number of 'quiet' overnight hours for residents. No changes are proposed to the existing exemptions for based aircraft, police, medical, and industrial emergency operations.
4	Overnight Engine Run-Ups: Engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.	New Procedure	The intent of this procedure is to limit prolonged noise from overnight engine run-ups, except where an aircraft is conducting a runup as part of its pre-departure checklist.
602.105(d) Arrival Procedures			
5	Arrival Turns: Aircraft arriving at the Airport will remain at least 1,000 ft. ASL (540 ft. AGL) before making the turn for their final approach for landing.	Existing Voluntary Procedure, Formalize Without Revisions	This existing voluntary procedure is intended to limit low-level turns over built-up areas.
6	Approach Angle: Approaches are to remain on or above an assumed 3° glide slope.	Existing Voluntary Procedure, Formalize Without Revisions	This existing voluntary procedure is intended to limit low-level final approaches over built-up areas.
7	Circling Procedures: If weather conditions permit, circling procedures are to be conducted at 1,460 ft. ASL (1,000 ft. AGL).	Existing Voluntary Procedure, Formalize Without Revisions	This existing voluntary procedure is intended to limit low-level circling approach procedures over built-up areas.

Proposed Noise Abatement Procedures

No.	Proposed Noise Abatement Procedure	Existing / New	Notes / Rationale
602.105(e) Departure Procedures			
8	Departure Turns: Aircraft departing the Airport will continue to fly on the runway heading until they reach 1,000 ft. ASL (540 ft. AGL) before making any turns.	Existing Voluntary Procedure, Formalize Without Revisions	This existing voluntary procedure is intended to limit low-level turns over built-up areas.
602.105(g) Prohibition or Restriction of Training Flights			
9	Prior Permission for Flight Training: Prior permission by the Airport Manager is required for all flight training, including private and commercial pilot recurrent training.	Existing Voluntary Procedure, Formalize Without Revisions	This existing voluntary procedure is intended to provide the opportunity for the Airport Manager to brief flight training aircraft on the various noise abatement procedures of the Airport, and to ensure that compliance can be achieved.
10	Time of Day Flight Training Restrictions: Flight training is not permitted Friday-Monday before 8:00 AM and after 4:00 PM May 1 – September 30; and Friday-Monday before 8:00 AM and after 8:00 PM October 1 – April 30.	Existing Voluntary Procedure, Formalize With Revisions	Currently, flight training aircraft are not permitted to conduct touch-and-go procedures after 4:00 PM on any Saturday or Sunday. The original intent of this voluntary procedure was to decrease the frequency of aircraft overflights resulting from continuous touch-and-go's (i.e., high volume flight training). However, stop-and-go's and full-stop / taxi-back procedures continue to be permitted after 4:00 PM. The proposed procedure would prohibit all flight training from Friday to Monday year-round, with more restrictive hours in the summer months when residents typically are utilizing their outdoor amenity spaces. This restriction would apply to all flight training, including circuits, arrivals and departures to and from the practice area, and cross-country flights.
11	Alternating Seasonal Weekend Flight Training Restrictions: Flight training is not permitted on the 1 st and 3 rd Sunday of the month and 2 nd and 4 th Saturday of the month from May 1 – September 30.	New Procedure	In the summer months (May through September), alternating Saturdays and Sundays would also be subject to flight training prohibitions. This restriction would apply to all flight training, including circuits, arrivals and departures to and from the practice area, and cross-country flights.
12	Statutory Holiday Flight Training Restrictions: Flight training is not permitted on the following federal statutory holidays: New Year's Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.	Existing Voluntary Procedure, Formalize With Revisions	Currently, circuit training is not permitted on the Sunday or Monday of holiday long weekends. The Proposed Noise Abatement Procedure would formally identify the federal statutory holidays on which flight training is prohibited. This restriction would apply to all flight training, including circuits, arrivals and departures to and from the practice area, and cross-country flights.
13	Circuit Flight Training Restrictions: A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.	Existing Voluntary Procedure, Formalize With Revisions	Currently, a maximum of 12 aircraft are permitted in the circuit for training purposes on Runway 05-23. The Proposed Noise Abatement Procedure would apply to both Runway 05-23 and Runway 12-30 and create a cap of 4 aircraft in the circuit for training purposes. The intent of this change would be to limit the frequency of overflights resulting from high-volume flight training.
602.105(j) Minimum Aerodrome Operation Altitudes			
14	Toronto Zoo: Pilots are to maintain 2000 ASL or above over Toronto Zoo (N43 49 05 W79 11 15).	Existing Voluntary Procedure, Formalize Without Revisions	This existing voluntary procedure is intended to limit low-level overflights of the Toronto Zoo, which can also cause distress to animals.

Provide Your Feedback

- Online - Connect Oshawa:

[Connectoshawa.ca/AirportFeedback](https://connectoshawa.ca/AirportFeedback)

- Paper Feedback Forms Available Via Service Oshawa:

Please Call (905) 436-3311 (Regular Business Hours)

Feedback will be received until **12:00pm on Monday, November 29, 2021** and will be used to refine the Draft Proposed Noise Abatement Procedures, where appropriate.

Residential land uses are shown in blue



Appendix B - Stakeholder Written Submissions

Ben Crooks

From: Laura Moebs <LMoebs@oshawa.ca>
Sent: November 10, 2021 2:28 PM
To: Stephen Wilcox; Tom Goodeve
Cc: Adam Martin; Ben Crooks
Subject: FW: Noise at The Oshawa Executive Airport

FYI - comments/a suggestion received regarding noise at the Oshawa Airport.

-----Original Message-----

From:
Sent: Tuesday, November 9, 2021 7:32 PM
To: Laura Moebs <LMoebs@oshawa.ca>
Cc:
Subject: Noise at The Oshawa Executive Airport

Dear Laura:

I am unable to attend any of the virtual workshops regarding Noise Abatement on 23 & 24 November. Nevertheless I do believe that the initiative of The Vancouver harbour regarding noise is worthy of investigation. West coast seaplanes have switched from planes powered by petroleum based engines to battery powered aircraft. While this is a move that leaves a smaller carbon footprint and reduces maintenance, it also causes less noise. It may be a path that Oshawa might want to follow!

Yours sincerely,

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1 Owned P1 P1 ownership

2 Airport overview P2P2 facility may be closed

Practically Both these statements are problematical.

Please quote and see Para 3.02.03 and 3.02.04 Schedule C Table 2 of
“Operating and Option Agreement.”

Hyperlinking ?

Historical activity P4 Fig 2.3

please provide the full graph airport traffic from 1974 and shows airport from its peak in 1979 of 143,200 total and training of 98,600 see page 78 of existing Airport Business Plan.

Airport and aircraft noise management P6

“ICAO information has been publicly available since “1970s

Land use planning

This would refer to the Ontario planning act of 2014 AIRPORTS

Please provide the noise forecasts overlay on todays oshawa map to show where resident building would be restricted, curtailed ,. modified etc under current guidelines.

What actions has Oshawa taken in this regard in the last 50 years by way of bylaws Permits , building codes and planning

What upgrade programs have been available Federally and Provincially and City generated and what was Oshawa’s level of participation..

To deal with the issue

What responsibility is Oshawa prepared to accept for the past substandard building approvals in proximity to the airport.

The Analysis p10-33 summary.

P10380 complaints. Minus 21 ,67 ,190 = some 100+/-

In a database that lacked any due diligence.

P 11. Displayed graph with an overlay designed to confuse

that suggests a complaint ratio of ~.001 per movement.0013

Or 1 complaint for every 1500 persons.....1417 persons

170,071/120

And That Oshawa council requires significant reductions

As outlined on page32 and summarized on page 46

Almost all of which are extraordinary and unprecedented in Canada and will require regional national and international consultation by both TC and Nav Canada

see page 61 and 63

To handle the results of a "Noise" Study Nothing for which there are no results.

See page 33

What noise level are we talking about?

See Sgro report Page 13

Ben Crooks

From: Laura Moebs <LMoebs@oshawa.ca>
Sent: November 24, 2021 8:46 PM
To: Stephen Wilcox; Tom Goodeve; Adam Martin; Ben Crooks
Subject: FW: Oshawa Airport Draft Proposed Noise Abatement Procedures

FYI

From: Planning <Planning@oshawa.ca>
Sent: Wednesday, November 24, 2021 8:13 AM
To: Laura Moebs <LMoebs@oshawa.ca>
Subject: FW: Oshawa Airport Draft Proposed Noise Abatement Procedures



From: [REDACTED]
Sent: Tuesday, November 23, 2021 10:07 PM
To: Planning <Planning@oshawa.ca>
Subject: Oshawa Airport Draft Proposed Noise Abatement Procedures

To whom it may concern,

My name is [REDACTED] and I am an airport user at the Oshawa airport. I was a part of the workshop on Tuesday November 23rd at 1pm. I am a pilot in the ATPL training program at Toronto Airways/Canadian Flight Academy and have been an airport user since September 2020.

In regards to the proposed noise abatement procedures, I have some concerns that were mentioned in the workshop which I would like to echo. Firstly, the proposal to use runway 30 for departures and use runway 12 for arrivals during the hours in which the tower is closed is extremely concerning. Safety is the number one priority in aviation and this suggestion goes against circuit courtesy. Whether we are flying at a controlled or uncontrolled airport, we always aim to use the same runway for take offs and for landings. I understand that at night time we do not anticipate many take offs and landings however they do occur. As mentioned in the presentation, the majority of airport users at Oshawa are training pilots. To ask pilots with very minimal experience to manage their own traffic separation with oncoming traffic coming directly at them is frankly, reckless. In the night time our vision is already at a disadvantage coupled with the changeover of it becoming an uncontrolled airport, we are placing too much trust in that all users of the airport have properly read the noise abatement procedures prior to their flight. I implore you to reconsider this procedure.

Another concern is the procedure of only 4 aircraft allowed in the circuit at once. It was mentioned in the presentation that incoming traffic who are just landing would be permitted to enter the zone, but I question what happens if they can't make their landing and need to overshoot? Are they now breaking a noise abatement procedure because there's already 4 aircraft in the circuit and they need to do a go around procedure and join the circuit? We cannot jeopardize a safe landing by placing stress on the pilots to avoid doing an overshoot because that would result in having more than 4 planes in the circuit.

As mentioned by one of the other attendees, noise abatement procedures need to be simplified. We are dealing with many inexperienced pilots and creating multiple, convoluted noise abatement procedures will ensure unintentional infractions. Noise abatement procedures need to be clear and concise, suggesting an alternating schedule during certain months in the summer is unrealistic. As a pilot I have heard on frequency, incoming traffic from other airports planning to do a touch and go on holidays, which currently is not permitted. If we already have pilots struggling to understand our noise abatement procedures, adding these new suggestions that do not have consistency will cause further confusion.

I have questions about the data presented. There appeared to be a large increase in noise complaints in 2020. I find this biased because the public was encouraged to work from home during this time due to the pandemic. We were encouraged to stay home every day, not just Monday to Friday. As more offices are encouraging a return to work in 2022 I think it would be safe to assume complaints will go down as people are spending less time in their home located underneath the flight path of the airport. The airport, which has existed since 1941, so yet again I have to question why we saw such a spike in 2020 in complaints if it was not due to the work from home/stay at home orders.

Another question I have in regards to the data about the noise complaints, is who is the community complaining about? Are we quantifying the complaints that are filed against medevac and police operations? I doubt that every time a noise complaint is made, the person has identified and confirmed the aircraft to not be a medevac or police operation. These are essential services provided to the community and can unfortunately skew the data. Again, we must question the bias presented in this data.

Finally, another issue with these restrictions being placed on the Oshawa airport is that flight training is going to continue. Whether the residents of the surrounding area are opposed to it or not, the training will continue. These proposed procedures are going to push trainees to surrounding communities in Peterborough, Lindsay, and Greenbank. This is not solving the issue, this is pushing the problem into other communities and is taking on the notion of "not in my backyard". This is a substandard attitude to have when being a community member. The residents of Oshawa want the airport to be considerate of the community however they are not willing to consider their surrounding communities who will feel the ripple effect of these proposed procedures. This isn't a team player attitude and it boils down to these changes being suggested solely for selfish purposes.

Thank you for taking the time to read my concerns. Please feel free to email me back should you require further information.

Thanks,


Confidentiality: The information contained in this e-mail, including any attachments, is confidential and is intended solely for the use of the individual or entity to whom it is addressed. The contents of this e-mail may also be subject to



To Mayor Dan Carter

As Captain of the Canadian owners And Pilots Association Flight-70 (COPA-70) I would like to make a several comments and suggestions regarding the Draft Proposed Noise Abatement Procedures (Report DS-21-190).

The recommendations before the Council are coming from a study done by the H.M. Aviation Consulting Corporation and I agree the study has been done professionally, is accurate and reproducible. However the study is relying heavily on statistics and events that have occurred in the past. It is the position of COPA-70 that not enough emphasis has been placed on newer technology and equipment that is now available and would eliminate much of the noise associated with flight school training aircraft.

Specifically there are several companies that are already producing and marketing all electric training aircraft or will be within a year. The most promising such aircraft is is the all electric Diamond eDA40 (google diamond eDA40).

Diamond Aircraft Industries Inc is a global corporation that has a Canadian factory located in London Ontario. It has a prototype two place all electric training aircraft which should be available for purchase in 2022/2023.

Other examples of all electric aircraft that are suitable for training and in production right now include the Yuneec E430 which is produced in China. (google Yuneec E430)

The Pipistrel – Alpha Electro is a two place trainer produced in their factories located in Slovinia, Italy and China.

Other low noise aircraft are Homebuilt all electric aircraft, short take off and Landing aircraft (STOL), Vertical take off and landing aircraft (VTOL) and ultralight aircraft with water cooled engines.

The aircraft described above are expected to be showing up at the Oshawa Airport in the very near future and would have little noise impact to observers on the ground.

Therefore COPA-70 recommends that the following classes of aircraft be exempt from all future noise abatement procedures to be implemented at the Oshawa Airport:

All Electric Aircraft

All STOL Aircraft

All VTOL Aircraft

All Ultralight and Advanced Ultralights with Water Cooled Engines.

It is further requested that these specific types of aircraft be named in any directives from Transport Canada as being exempt from all noise abatement procedures.

Sincerely

[REDACTED]
[REDACTED] (Captain of COPA Flight-70 Oshawa)
[REDACTED]

NOTE – this document should be considered in the public domain and may be shared freely with other interested parties.

Ben Crooks

From: Laura Moebs <LMoebs@oshawa.ca>
Sent: November 26, 2021 9:21 AM
To: Ben Crooks; Adam Martin
Cc: Stephen Wilcox; Tom Goodeve
Subject: FW: Airport noise survey comments
Attachments: [REDACTED].pdf

FYI please see below and attached for more noise abatement comments.

Thanks,
Laura

From: [REDACTED]
Sent: Thursday, November 25, 2021 9:56 PM
To: Laura Moebs <LMoebs@oshawa.ca>
Cc: Planning <Planning@oshawa.ca>
Subject: Airport noise survey comments

attn. Laura Moebs

Draft Proposed Procedures

The Draft Proposed Noise Abatement Procedures for the Oshawa Executive Airport contain 14 proposed procedures as outlined in Report [DS-21-190](#) dated September 29, 2021.

1

Do you support the introduction of mandatory noise abatement procedures at Oshawa Executive Airport?

-

Hell No

-
-

My comment: Deal with unnecessary noise from cars and trucks. Then additional noise abatement at the airport might be appropriate.

Each of the 14 proposed mandatory noise abatement procedures for Oshawa Executive Airport are shown below. Please indicate whether you

support each of the proposed noise abatement procedures by making a selection.

2

Tower Closed Preferential Runways

When the Air Traffic Control Tower is closed, pilots shall use [Runway 12](#) for arrivals and [Runway 30](#) for departures consistent with safety of operations.

[See a map for reference.](#)

- Yes

My comment: Meaningless. Pilots will do what they want. Safety overrides noise abatement. You can hope the whiners think this quiets the neighbourhood.

3

Tower Open Preferential Runways

Aircraft will use [Runway 30](#) when the winds are from a heading of 210° (incrementally) to 030° at up to 10 knots (18.52 km/h) or from a heading of 031° (incrementally) to 209° at up to 5 knots (9.26 km/h).

[See a map for reference.](#)

-

No

- My comment; 602.96 (3) (e) directs pilots to take off and land into the wind. Insurance is void if we contravene regulations. Will taxpayers pay for accidents?

-

4

Overnight Restricted Hours

Between the hours of 9:30 PM and 7:30 AM, only police, medical and industrial emergency flights are permitted to arrive at and depart from the Airport. Airport tenants with aircraft based at the Airport are permitted to arrive between the hours described above, but are not permitted to depart, independent from police, medical, and industrial emergency flights.

-

No

My comment: You can restrict hours at stores and gas stations and customers will shop when they can. But flying schools can't train pilots for night flying in the daytime. Owners and renters can't get their legal requirement of night landings in daytime.

-

5

Overnight Engine Run-Ups

Engine run-ups associated with aircraft maintenance are prohibited from 9:30 PM to 7:30 AM.

-

No

-

My comment: Maybe this will impress whiners. Since Inter City left, has a maintenance run-up ever happened after 5 p.m.?

6

Arrival Turns

Aircraft arriving at the Airport will remain at least 1,000 ft. ASL (540 ft. AGL) before making the turn for their final approach for landing. [Note: ASL means "Above Sea Level". AGL means "Above Ground Level".]

-

Yes

My comment: Mere virtue-signalling. Perhaps whiners will be impressed.

-

7

Approach Angle

Approaches are to remain on or above an assumed 3° glide slope.

-

No

-

- My comment: This implies the approach slope lights are working.

-

8

Circling Procedures

If weather conditions permit, circling procedures are to be conducted at 1,460 ft. ASL (1,000 ft. AGL).

-

No

-

- My comment: There's an instrument approach for each runway. Why would there be any circling?

9

Departure Turns

Aircraft departing the Airport will continue to fly on the same heading/alignment as the departure runway until they reach 1,000 ft. ASL (540 ft. AGL) before making any turns.

-

Yes

10

Prior Permission Required (PPR) For Flight Training

Prior permission by the Airport Manager is required for all flight training, including private and commercial pilot recurrent training.

-

No

-

- My comment: Sounds like you're trying to say that practice is training, which is not in the regulations.

11

Time of Day Flight Training Restrictions

Flight training is not permitted Friday-Monday before 8:00 AM and after 4:00 PM from May 1 to September 30 of any calendar year; and Friday-Monday before 8:00 AM and after 8:00 PM from October 1 to April 30 of any calendar year.

-

No

My comment: I guess the schools would sue the city (my taxes) for their losses. What did you learn from your legal dealings with [REDACTED]?

12

Alternating Seasonal Weekend Flight Training Restrictions

Flight training is not permitted on the 1st and 3rd Sundays of any given month and the 2nd and 4th Saturdays of the month from May 1 to September 30.

-

No

My comment: People work on weekdays and train for their licence on weekends. Do you think all the trainees are from China?

13

Statutory Holiday Flight Training Restrictions

Flight training is not permitted on the following federal statutory holidays: New Year's Day; Good Friday; Victoria Day; Canada Day; Labour Day; National Day for Truth and Reconciliation; Thanksgiving Day; Remembrance Day; Christmas Day; and Boxing Day.

-

No

My comment: Do you think the schools are open on New Year's, Christmas and Boxing Day? Better to close Highway 401 and the railways on holidays.

14

Circuit Flight Training Restrictions

A maximum of 4 aircraft are permitted in the circuit for training purposes for any runway at any given time.

-

No

-

You're encouraging multi-runway operation. Scary to think of four aircraft in each circuit.

15

Toronto Zoo

Pilots are to maintain 2000 ASL or above over Toronto Zoo (N43 49 05 W79 11 15).

•

No

My comment: How is this going to help the whiners?

16

Is there additional feedback you would like to share regarding aircraft noise at Oshawa Executive Airport?

Additional feedback: Pilots are not getting recognition for voluntary or self-imposed noise abatement. Example: Coarse pitch. Schools teach power reductions after climbing to the airport boundary. Have you tried to encourage owners to do this?

More coarse pitch: I stay in coarse pitch until I'm over the ravine, and I know other pilots do this. You should get out there and learn what is really happening. Buy a clipboard and a chair and get some first-hand knowledge. Put a sound meter app on your smart phone. Persuading pilots to avoid fine pitch on downwind and base leg would get real noise reduction.

What do other airports do? Have you listened to pilots and residents at Peterborough? They brought in a noise procedure after Seneca College moved in.

Instead of these outlandish time restrictions, why not adopt regs that seem to work at other airports such as Buttonville? Right turns after takeoff on 12 could be restricted to 1500 MSL or 2000 MSL. Left turns after takeoff on 23 similarly. Proceeding to the west or south-west from 30 could be limited to 1500 or 2000 MSL.

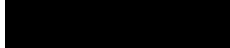
Demographic Information

Please provide your contact information.

17

Contact name: [REDACTED]

18

Email address or telephone number: 

19

What type of interest do you represent?

- Residence yes

- Business The flight school's problems are my problems. If they can't fly, I can't rent from them.

20

How old are you?

- 17 and under

- 18 – 24

- 25 – 34

- 35 – 44

- 45 – 54

- 55 – 64

- 65 – 74 That's me. My first landing at Oshawa was in 1966. Why did you allow residential construction near the airport? It was cow country back then.

- 75+

21

Are you an airport user? If yes, how would you best describe yourself?

- Aircraft Owner

- Business Owner

- Mechanic

Oshawa Airport Business Owner

Pilot That's me.

Regular Airport Flyer yes

Regular Airport User yes

I am not an airport user

Select all that apply.

22

How many people live in your primary place of residence?

• 1 Just me.

2

3

4

5

6

7

8

9

10

23

What are the ages of the individuals that live in your home?



- 0-5
- 6-16
- 17-25
- 26-40
- 41-55
- 56-65

66+ yes

Select all that apply.

24

What best describes your primary place of residence?

- Within the following boundary: Conlin Rd. to the north, Ritson Rd. to the east, Rossland Rd. to the south and Thickson Rd. to the west
- Oshawa, outside of the above boundary  
- Durham Region
- Greater Toronto Area
- Ontario

25

Are you an Oshawa resident, and/or Oshawa business/property owner?

- Yes
resident and property owner 

26

How did you learn about this community engagement opportunity?

- City of Oshawa website

Connect Oshawa website

Mailed or hand-delivered item

Email
yes

Oshawa This Week

Social Media

Word of mouth

Other (please specify)

Planning Services

planning@oshawa.ca

905-436-3311

50 Centre Street South
Oshawa, Ontario, L1H 3Z7

Feedback will be received until noon on Monday, November 29, 2021 and will be used to refine the Draft Proposed Noise Abatement Procedures where appropriate, which will be presented to the Development Services Committee and Council for consideration.

Sent from my mobile device

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Ben Crooks

From: Laura Moebs <LMoebs@oshawa.ca>
Sent: November 26, 2021 9:39 AM
To: Adam Martin; Ben Crooks
Cc: Tom Goodeve; Stephen Wilcox
Subject: FW: Oshawa Airport workshop

FYI more noise abatement comments.

From: Planning <Planning@oshawa.ca>
Sent: Friday, November 26, 2021 8:15 AM
To: Laura Moebs <LMoebs@oshawa.ca>
Subject: FW: Oshawa Airport workshop



From: [REDACTED]
Sent: Thursday, November 25, 2021 10:16 PM
To: Planning <Planning@oshawa.ca>
Subject: Oshawa Airport workshop

Hi,

I am an owner/pilot at Oshawa, and a long time resident in Durham region. I attended the subject workshop however because of connection problems using teams wasn't able to ask questions or provide comment. That said, the other participants did cover some of the questions and comments I had very well. This email is to provide my comments on the proposed restrictions and report:

The report doesn't utilize benchmarking of other airports, or noise control constraints of other jurisdictions. It's not clear that the frequency of complaints is typical or more than the norm for an airport, or other forms of infrastructure. No data is presented. Also the constraints being proposed are more complex and restrictive than any other airport in Canada, which is excessive for an airport of this size and volume. Again, no comparison is made or justification for differences provided.

The complaint data in the report does not provide adequate detail and presents an incomplete picture. For example, how many complaints originate from each address? How does this benchmark to other jurisdictions?

Other airports such as Pearson and Billy Bishop (Toronto Island) also have historically had noise complaints but continue to operate and with less restrictions than being proposed. No comparisons have been made.

The report does not take into consideration weather. Limiting flights and training to specific days or times does not result in a linear reduction of traffic. By narrowing the available flight windows, with weather conditions, can result in long periods where no flying is possible. When combined with trainees and instructors availability, the impact is not a linear reduction in training frequency. Instead, it's likely that trainees and instructors will abandon Oshawa or flying as a career.

Limiting training or having to "seek permission" for training in my own aircraft runs counter to safety for aircraft owners at Oshawa. Further, limiting the number of aircraft in the circuit to four in available flight windows will impact my ability to obtain recurrent training and maintain flight proficiency. This is a threat to safety. Limitations on run ups is a direct threat to flight safety and makes little sense.

No justification is provided for seeking enforceable restrictions, when compliance to voluntary restrictions has been high. The restrictions proposed are unnecessarily complex and likely to lead to errors by pilots.

Finally, I believe the city is losing sight of the broader context. This region needs an airport as part of its infrastructure in the same way it needs transit, hiways, and other facilities. Canada needs new pilots trained to maintain its capability to transport goods, people, patients, perform rescue, and and fight fires. 200 households that are the source of the complaints, who purchased homes in the flight path of an airport that has been there for 80 years, are dictating the infrastructure and usage for Durham region. Does that make sense? Many businesses and jobs will be impacted these restrictions. The report does not adequately evaluate the real and total impact.

Oshawa and Durham region councillors need to show the courage to do what's right for all constituents, and have a vision for the region that includes the necessary infrastructure.



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Ben Crooks

From: Laura Moebs <LMoebs@oshawa.ca>
Sent: November 30, 2021 11:33 AM
To: Adam Martin; Ben Crooks
Cc: Stephen Wilcox; Tom Goodeve
Subject: FW: Message to Attendees of the Oshawa Airport Draft Proposed Noise Abatement Procedures Workshop

[FYI additional noise abatement comments.](#)

From: Planning <Planning@oshawa.ca>
Sent: Monday, November 29, 2021 8:39 AM
To: Laura Moebs <LMoebs@oshawa.ca>
Subject: FW: Message to Attendees of the Oshawa Airport Draft Proposed Noise Abatement Procedures Workshop

From: [REDACTED]
Sent: Friday, November 26, 2021 9:19 PM
To: Planning <Planning@oshawa.ca>; omar.alghabra@parl.gc.ca; [REDACTED]
Subject: Re: Message to Attendees of the Oshawa Airport Draft Proposed Noise Abatement Procedures Workshop

Response to Oshawa proposed noise abatement procedures.

Although I live in Bowmanville, I spend almost every day in Oshawa, including most of my shopping, etc.

Airports are part of a Federal Transportation Network, they are not islands unto themselves.

I live near the 401, and can hear trains from both sets of tracks near my house, yet, I was aware of these things when I moved into my house, and accept that (excessively loud) noise as a matter of fact. I do not ask that they be shut down periodically so I can have a quiet time. We live in a busy part of the Province, by choice, so that comes with trade-offs.

I am an employee at a flight school in Oshawa, as well as a pilot, and owner of an aircraft based at Oshawa airport. I use my plane for pleasure, as well as travel across the country.

I attended the online workshop on Nov 24, and had asked to speak, but was not called upon. Perhaps the deadline for the end of the workshop came before we all got to speak. I felt my voice was not heard. I know of another pilot/ hanger owner/aviation business owner who tried to sign up for the workshop, and could not, the website said the limited spots were all taken. There were also homeowners taking up spots that should have been available for airport users. When I brought this up with the workshop coordinator, she said there were still spots available, so I don't know..... What I do know is that some of the airport users who wanted to be heard, were not.

I participated in the earlier multiple choice survey conducted by MP Colin Carrie. I found the survey very biased toward the anti-airport side, however the vast majority of people who did the survey seemed to favor the airport operations.

These proposals, if approved, will probably result in the closing of the flight schools, and associated maintenance facilities at Oshawa, and several hundred of us will be unemployed. Who will compensate us for that? Will an EIA be conducted to identify the true costs of implementing these changes? Such studies are conducted for far less important issues. I believe the costs will be in the tens of millions initially, and the hundreds of millions as the airport winds down, both for the City and the airport tenants and users.

There are several issues at play.

1) Houses were built within the NEF profile, contrary to Federal and Provincial guidelines. Were any of these homes subject to increased noise attenuation building codes? These homeowners probably have a solid basis for a class-action lawsuit against the City of Oshawa on that basis. The home owners bought near the airport, and now seek to close it. The City should be offering to buy them out, and demolish the ones truly too close. The land could be resold for more appropriate utilization. This would be Oshawa's most cost effective solution to the problem.

2) Many noise complaints are coming from a few people, and a few houses. I believe the statistics are being padded and it's mostly just a few individuals responsible. I have heard they are being "encouraged" by some local councillors, and real estate agents who want the airport closed and developed. Some of these elected people, and their families have property nearby, and will benefit financially from closing the airport and starting housing development.

3) The City wants to build on the airport property, and has already approached the Federal Government to get out of the requirement to keep the airport open till 2047. The hundreds of aircraft business owners, hanger owners, aircraft owners, and employees (substantial tools/training costs) at the airport invested tremendous amounts of money here, on the basis of the airport being here under that contract. This will leave the City open to recourse from all these people.

The new fees, already approved, will drastically impact the Flight Schools, and will terminate almost all aircraft arrivals from other airports. The fees are being listed as \$5 and \$6 fees, but in the fine print, we see the true cost, \$15/movement. Classic bait and switch. The students will be the ones paying, and will likely seek a new school in some other city as a result. The airport will die by a thousand cuts. No small airport has ever benefited from such fees.

Should the flight numbers decrease below a certain threshold, Nav Canada will probably close the Tower. I assume the City will get all the movement statistics, and aircraft information from the Tower, how will any of these rules, fees, and procedures be enforced without someone there? Will the City need to hire staff to do this?

The downwind landing requirement is unsafe, and when the tower is closed, at night or permanently, will mandate head-on traffic. In addition, some aircraft, and students will not handle this well, with a probability of accidents. There is jet traffic, mixing with small aircraft, could be a problem with opposite direction procedures. We have a police helicopter operating out of Oshawa, in and outside the zone, and they do not like advertising where and what they are doing (police surveillance), which is not a problem when the Tower is operating, as the Tower typically knows where they are, and guides the traffic around them. With no Tower, who knows..... look at the police drone strike at Buttonville, almost had 2 fatalities in that one, had the drone been 3 feet higher.

Not all training flights are through the flight schools. Many flights could be classed as training flights, or pleasure flights, or cross country flights, or a mixture of all 3. Who will be determining what flight fits what category, and thus the rules to follow? How will that be enforced equally and fairly? Do pilots have a legal obligation to divulge flight details to just anybody on their activities elsewhere? Privacy issues and policies in place?

Night currency requirements will be only possible to satisfy during a 2 week period in early April, and late August, under the proposed rules. There will also be restrictions from other rules, during this time, as well as weather issues. This will result in ALL PILOTS trying to do night flights in the few remaining evenings. This will not be physically possible. In addition, the new rules will prohibit flying cross country to a different airport, completing the training, and returning to Oshawa. No night training will also curtail enrolments at the

flight schools, the students will go elsewhere for their complete training. How many hundreds of thousands of dollars does each college student spend in Oshawa while getting their airline training?

Turns below a certain altitude prohibited, and a 3 degree glide slope, no objection here, but I would have thought that we would generate less noise impact by turning at a lower altitude where appropriate and safe, avoiding some housing in the process. As the City council continues to approve housing to be built in close proximity, the problem is designed to get worse. For example, Garrard and Taunton apartment buildings, and others off the north end of the airport toward the UOIT..

RE the 4 aircraft in the circuit at one time? Slot assignments maybe? What happens when 6 planes approach the airport at the same time? Impractical.

Why is the City of Oshawa trying to restrict flights over the Toronto Zoo? The restriction has been in the CFS for many years, under the Toronto procedures. It's not even in Oshawa.

Maintenance engine run-ups at night? I have no problem with that, as conceivably it would only be an air ambulance in an emergency maintenance situation, and who really needs that? Really though, that issue happened 25 years ago, let's deal with today's problems.



On Fri, 19 Nov 2021 at 12:11, Planning <Planning@oshawa.ca> wrote:

Draft Proposed Noise Abatement Procedures Workshop

Thank you for registering for one of the four virtual workshops the City is holding (two for Community Members and two for Airport Users) with respect to the Draft Proposed Noise Abatement Procedures for the Oshawa Executive Airport.

Pursuant to the direction of Public Health Ontario, these workshops will take place in an electronic format to maintain social/physical distancing.

The workshops will take place on November 23, 2021 and November 24, 2021. You have registered for the November 24th workshop for Airport Users which will begin at 6:30 p.m. Opening remarks will be made by City staff, followed by a presentation from . Following the presentation there will be a Q&A session, during which participants will have the opportunity to ask questions related to the topics discussed in the presentation. Staff are pleased to provide you with a copy of the presentation in advance of the meeting (attached). The HM Aero Executive Summary report for the Draft Proposed Noise Abatement Procedures is also attached to this email, to review in advance of the meeting. A copy of the entire H.M. Aero report can be viewed at www.oshawa.ca/business-and-investment/business-plan.asp.

Agenda

6:30 p.m. – Opening Remarks

6:40 p.m. – Presentation

Ben Crooks

From: Laura Moebs <LMoebs@oshawa.ca>
Sent: November 30, 2021 11:39 AM
To: Ben Crooks; Adam Martin
Cc: Stephen Wilcox; Tom Goodeve
Subject: FW: Noise Abatement Oshawa Airport

[FYI additional airport comments.](#)

From: Planning <Planning@oshawa.ca>
Sent: Monday, November 29, 2021 8:41 AM
To: Laura Moebs <LMoebs@oshawa.ca>
Subject: FW: Noise Abatement Oshawa Airport

From: [REDACTED]
Sent: Sunday, November 28, 2021 9:57 PM
To: Planning <Planning@oshawa.ca>
Subject: Noise Abatement Oshawa Airport

B U F S

BAN URBAN FLIGHT SCHOOLS

[REDACTED]
2021

NOVEMBER 29,

Dear Mayor Carter & Councillors:

We support the Oshawa Executive Airport but the noisy Flight Schools are out of control!

Oshawa has outgrown the current invasive flight school driven airport operations.

The Flight Schools -

- Continue to negatively impact residents daily lives

- They operate using citizens tax **\$\$\$\$'s**
- They are holding the city hostage under a court injunction while continuing to operate

All of the Above Are -

- Causing chaos in our skies,
- Monopolizing our runways
- Impeding Executive Jets & Real Airport Business from proper utilization of the infrastructure like a true Executive Airport should.

The time has come for the Oshawa Airport to have Economic Order restored enabling a balanced operation to successfully move to the future.

We need to see some payback of the \$7,000,000 infrastructure improvements that have been spent at the Airport in the last 5 years

We **don't** teach people to shoot in the City, similarly, we **shouldn't** teach people to fly in the City. A recent Transport Canada Standing Committee Report on Flight Schools, supports and recommends, that Flight School activities should be conducted in **RURAL AREAS ONLY!**

City Council needs to take back control of the airport from the "Hi-jacking noisy lawnmowers in the sky" in order to move to a True Executive Airport Status, operating as a Profitable Economic Business, contributing **\$\$\$\$'s** to the operating deficit and overall economy for the City of Oshawa.

Our Sincerest Request,

[REDACTED]

[REDACTED]

Confidentiality: The information contained in this e-mail, including any attachments, is confidential and is intended solely for the use of the individual or entity to whom it is addressed. The contents of this e-mail may also be subject to legal privilege, and all rights of that privilege are expressly claimed and not waived. Any distribution, use or copying of this e-mail, or the information it contains, by anyone other than the intended recipient, is unauthorized and strictly prohibited. If you are not an addressee identified above, please immediately notify the sender and destroy the e-mail and any attachments without making a copy. Thank you.

Durham Flight Centre Stakeholder Submission

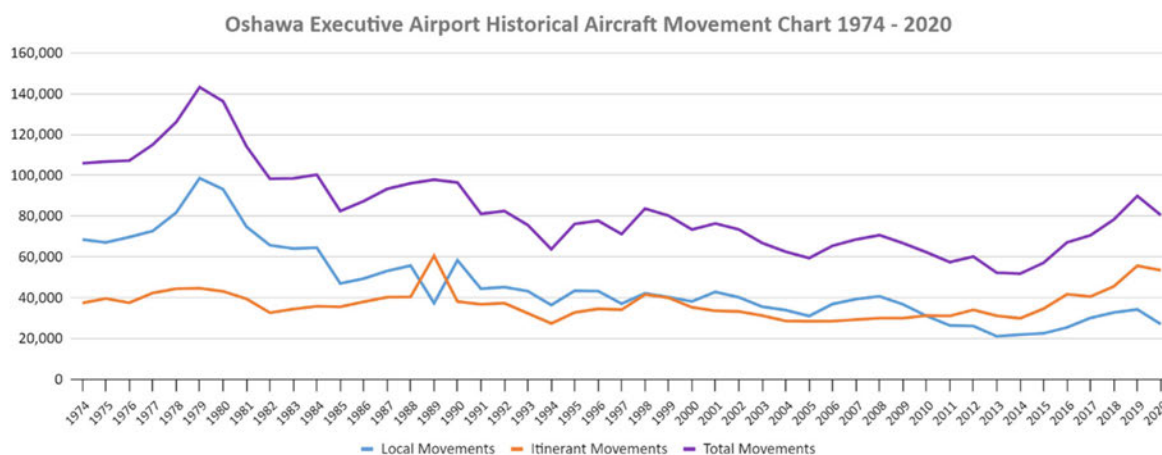
As the general discussion in the November 24, 2021, stakeholder meeting addressed the more general concerns of and question from Durham Flight Centre, this document is concerned primarily with the analysis and the figures presented in the HM Aero report. It does not represent a complete record of the items raised, which we trusted were captured during the meeting. We believe that at some points omitted the analysis some salient details and / or did not account for some critical factors in the context of the flying and flight training conducted by the schools. While specific data contained here pertains mainly to Durham Flight Centre, we believe that the points apply in general to both flight training schools.

General Notes

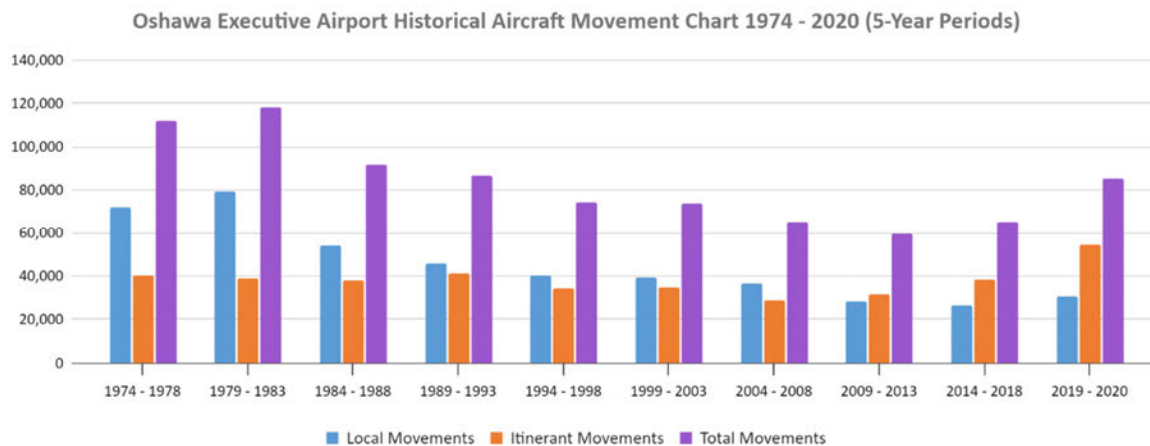
Airport Activity Is Not At Historical Highs

CYOO has a long history, having been established in the 1940's. The HM Aero report does not consider activity at airport prior to 1997; this decision was justified by the desire to utilize a single data source for the movements. However, the information for earlier periods is available - and relevant to the discussion.

- HM Aero notes a “record high number of movements” in 2019 at 90,000, but ignores the period in the 1970's and early 1980's where movements peaked at 143,000 and were consistently well above 100,000 (Movement history was published in the Oshawa Airport 2015-2019 Business Plan amongst other City of Oshawa documents)
- Local movements are being targeted for noise abatement, but they have decreased steadily from the 1970's and compose relatively less of the total movements versus almost any other time since 1974.
- Aviation is cyclical, and activity levels will continue to vary based on long cycle and short cycle trends



A different way to look at this information is to look at the 5-year averages of activity versus the two years 2019-2020, which helps to smooth out yearly variability. Note that the itinerant movements are at an historical high in 2019-2020.



Data Sources and References:

Oshawa Executive Airport. (2015, June). Airport Business Plan 2015–2019. City of Oshawa. <https://www.oshawa.ca/business-and-investment/resources/Airport%20Business%20Plan%20July2015%20withAppendicesFINAL.pdf>

Statistics Canada. (2019, May 16). Aircraft movements, by class of operation, airports with NAV CANADA towers, annual [Dataset]. <https://doi.org/10.25318/2310001801-eng>

Statistics Canada. (2021, September 27). Aircraft movements, by class of operation and peak hour and peak day of movements, for airports with NAV CANADA towers, monthly [Dataset]. <https://doi.org/10.25318/2310000201-eng>

School Operations Include Significant Other Components

The HM Aero report assumed that the movements of aircraft at Durham Flight Centre were all flight training related, which is not the case. The school also rents aircraft to qualified pilots, does sightseeing flights, and offers familiarization flights to individuals who are interested in experiencing flying/piloting. These activities would continue outside of the proposed flight training restrictions.

- It is unclear how the restrictions be managed and enforced with the mix of allowed flights and disallowed flights utilizing the same aircraft. What approach is being proposed and what would the time and cost burden be on the schools with the proposed approach?
- Pilots who do not have the luxury of aircraft ownership have the option to rent and fly the school aircraft, and this option would remain unrestricted by the core proposed restrictions on flight training, 10, 11 and 12. The mix of rental versus training might change once the restrictions open-up availability on the aircraft fleet for non-training purposes.

Improperly Characterized Proposals

Proposals 10 and 12 are not characterized properly. Proposal 10, which is for Time of Day Flight Training Restrictions, is categorized as an existing voluntary procedure to be formalized with revisions. This is a gross misrepresentation. The existing voluntary restriction is with one specific type of flight training activity (touch-and-go's) during certain times, whereas the proposal is to **preclude all flight training** during an extended timeframe. Proposal 12 similarly takes the existing voluntary limits on circuit training on long weekends, a particular source of noise, and suggests a complete ban on flight training on statutory holidays.

- The current voluntary procedures preclude certain activities and redirect training to less intrusive exercises, but allows flight training to occur.
- A revision would follow-suit with extensions of the restrictions on activities that are notable generators of noise complaints.
- These outright bans should be more properly labeled as New Procedures so as to not mislead the readers of the report

Qualitative Data – Noise Complaints

The HM Aero report focuses predominantly on noise complaint data accumulated by the City and provides extensive analysis of the complaints considering different factors such as runway, weather, time of day etc., yet the foundation of the analysis, the raw complaint data, has not been fully shared with the impacted stakeholders

- We have questions about how causality is established between the flight training at the airport and the noise complaints received.
 - Examples abound of complaints that are received but are not flight training related
 - Complaints during period in 2020 when the flights schools were completely shuttered due to COVID-19.
 - Complaints about aircraft that are attributed to the school but have nothing to do with the school.
 - Complaints about flight school aircraft that are not conducting training.
 - Complaints that come in when no school aircraft is currently flying.
 - Etc.
- The report suggests a link between the complaints and the volume of local movements (related to figure 3.1) , but other explanations are not considered and no clear evidence of a link is provided. Consider the public meetings in 2018 and 2019 that raised awareness and in which community activity was organized could have engendered complaints
 - The spike in complaints in March and April of 2021 given the flight school activity levels could also be explained by publicized May 5th special meeting and the awareness of and communication about the meeting that stimulated/encouraged more complaints. The spike from these two months (~160 complaints) skews the annual totals.
 - A similar increase was seen in 2012 without increased flight activity.

Cost Analysis Regarding FTU Lost Revenue

Daylight Hours Impact Available Flying Hours

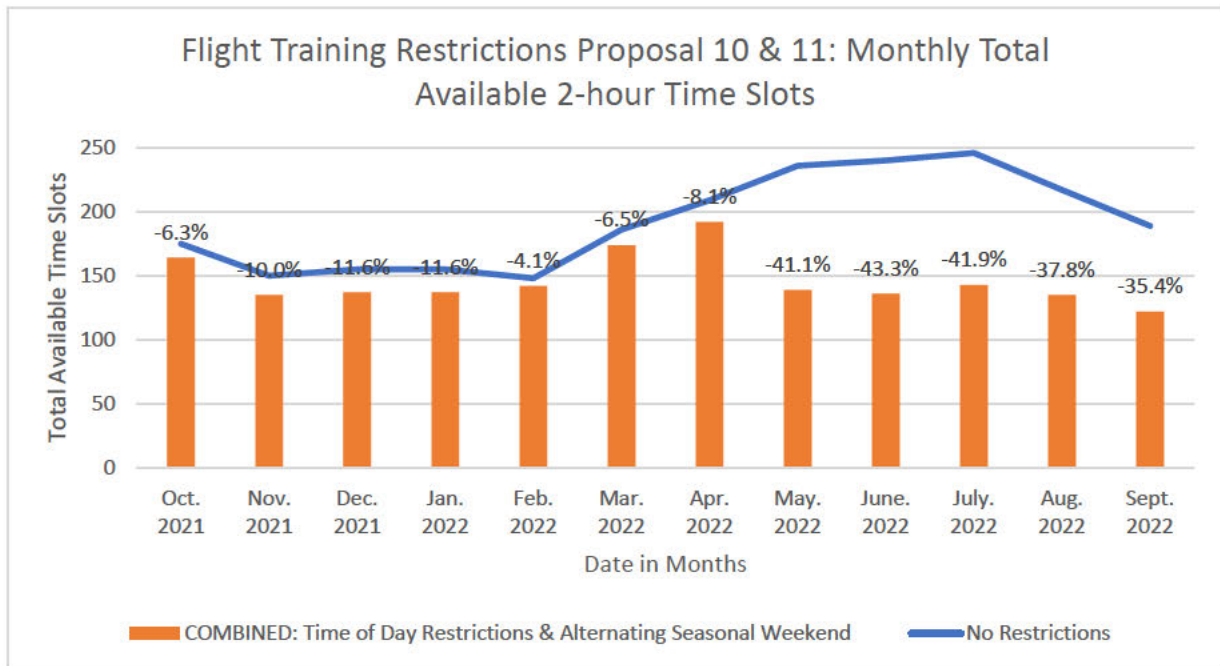
Flight training is predominantly an activity undertaken during daylight, as defined and controlled under Transport Canada regulations. Approximately 90% of Durham Flight Centre training flights are conducted in this daylight period, as well as the majority of rentals. HM Aero did not appear to account for the seasonal differences in daylight hours in the analysis of the impact of the restrictions on flight training.

- For example, in December the daylight hours are much shorter (10.25 hours), and the 90 hours available after restrictions as quoted in the report is misleading as not all of these 90 hours are daylight hours. Compare this with approximately 16 hours of daylight in July.
- Historically 56% of flights take place in the May 1 to Sep 30 timeframe primarily because of the longer daylight hours during this part of the year

Available Hours versus Useable Hours

The general approach taken by HM Aero looks at the available hours, comparing unrestricted with restricted scenarios. The use of straight time for this comparison does not take into account the realities of aircraft bookings for the school. Durham Flight Centre typically uses two-hour time slots for a flights that average one hour, the revenue generating portion of the booking. Rather than a comparison of hours of training time, the analysis should consider available booking slots.

- This view may or may not impact the revenue decrease noted by HM Aero in looking at the historical flying (we don't have the data to do this analysis), but we believe that it is misleading to suggest that rescheduled flights can be squeezed into the new restricted hours
- Time slots are 2 hours for booking purposes, so the available "slots" are less, i.e., we are closer to capacity than HM Aero's analysis indicates
- Currently have decreased availability due to cleaning procedures related to COVID-19 – this has increased the turn around time between flights
- Taking the booking slots into consideration, the proposed restrictions in the May 1 to September 30 timeframe result in a substantial decrease in booking opportunities, up to a 43% drop in June (see chart below).



Weather Impact on Flying

Weather is a very significant factor in flying, and in particular with flight training. Based on a review of the November 1, 2020 to October 31, 2021 period, there were only 169 good weather days. A total of 193 days were impacted by weather, resulting in significant lost flying hours. This period was not considered atypical of the weather patterns that are experienced at the Oshawa Executive Airport.

- Bad weather days are days in which no flight training/flying takes place
- Marginal days in which part (~1/2) of the day is unavailable (bad weather) or training activities are notably restricted
- Relatively lower percentage of good weather days in the October 1 to April 30 period and higher percentage of bad weather days

Weather Day Analysis

Based on Review of 1 Nov 2020 - 31 Oct 2021

	Total Days			May 1 - Sep 30			Oct 1 - Apr 30		
Total Days	365			153			212		
Days Excluded (Closed)	3	1%	▼	0	0%	▼	3	1%	▼
Good Weather Days	169	46%	▼	76	50%	▼	93	44%	▼
Weather Impacted Days	193	53%	▼	77	50%	▼	116	55%	▼
Marginal Weather Days	95	26%	▼	42	27%	▼	53	25%	▼
Bad Weather Days	98	27%	▼	35	23%	▼	63	30%	▼

Seasonality of Flight Training

Historically 56% of our activity, including flight training, takes place during the May to September period due to daylight availability and weather.

- The longer available daylight hours during this time, as well as the better weather, certainly are correlated to this statistic.
- Also, these months represent a much more pleasant time to go flying in a small aircraft, a factor that is not considered in the analysis.

Combined Effect of Weather, Daylight Hours, Usable Hours, and Seasonality

The combined effect of the above factors is difficult to quantify because they are not fully independent; however, a major point in trying to understand and quantify the financial and operational impacts of the proposed restrictions is in scheduling for renters and students.

- In a period of three months at the school, 2,258 reservations were completed, and 3,100 reservations were cancelled for weather, maintenance and a variety of other reasons - a 1.37:1.0 cancelled to completed ratio.
- Flexibility is critical to the school's operation; as available time is restricted, the required flexibility is lost. A string of unfortunate weather days can have a disastrous impact on school financials.
- With the availability of the dataset for the movements by the school a more comprehensive combined analysis might be feasible.

Enterprise Aviation Group

Stakeholder Meeting Follow-up

The Enterprise Aviation Group (referred to collectively here as “EAI”) has aircraft charter and management, maintenance and FBO services businesses that are based at the Oshawa Executive Airport. This follow-up submission is not intended as a comprehensive list of the points that were made in the stakeholder meeting on November 25, 2021. We are confident that the discussion points from the stakeholder meeting were properly documented by HM Aero. Instead, this document is intended to clarify and address specific issues that we believe may not have been covered fully in the meeting.

Specifically, this document focuses on the general impact of and rationale for the proposed noise abatement procedures as contained in the HM Aero report that was available to us.

Impact Analysis – Aviation Ecosystem

The FTUs at the airport are important drivers of activity in the airport and with the businesses that are aviation community. A reduction in this activity has a secondary effect on other businesses outside of the airport, however, the current focus on the aviation side.

Fuel Sales at the Airport

- The two flight schools are the largest consumers of aviation fuels at the airport. Reductions in their flying resulting from the noise abatement restrictions will of course lead to decreased volumes for the FBO. This economic impact is not quantified in the HM Aero report.
 - Volumes for the two flight schools combined will approach 500,000 litres this year. The proposed restrictions would almost certainly reduce the consumption levels.
 - Lower on field consumption decrease in the revenue of the airport as there is a \$0.10 per litre fee airport fee included in the fuel sales.
 - The change in the timing of the demand for fueling may have implications for staffing levels and operating hours for the FBO.

Flight Training Aircraft Maintenance Services

- Currently have a significant portion of the EAI maintenance group that work on school aircraft
 - Fewer movements and less flying will reduce the requirement for maintenance services and thus the EAI maintenance group
 - Currently provide in excess of \$450k in maintenance services provided to the school.
 - Parts and other third-party groups that participate in support of the aircraft will be impacted over time.

Combined Effect of New Fees and Noise Abatement on Flight Training

- There is new \$15 landing fee for commercial aircraft of less than 2,000 kgs that is effective on January 1, 2021, that will significantly increase the costs for the flight schools operating out of Oshawa. DFC estimates this cost at \$300,000 per year, based on recent flight history.
- Has HM aero considered the combined effects of the proposed noise restrictions and the newly introduced landing fees?
 - It is not difficult to imagine that there will a significant reduction in movements resulting from the higher fees. And if the fees reduce the movements, are the proposed restrictions required?

Reduced Operating Hours at the Airport

The proposal to reduce the operating hours at the airport seems only indirectly driven by the noise complaints. How many complaints were received specifically for morning or late evening activity? Regardless, it is unusual to have such an important piece of transportation infrastructure with such restricted hours.

- In comparison to other airports across the country this is a rather unique window of no activity – far more extended than elsewhere.
- What is the impact on the Nav Canada operations at the airport? Will hours / service be reduced in line with the reduction in airport hours, or will there perhaps be a more significant reduction based on optimizing staffing?
- FBO operations may be impacted by this additional restriction, as flight departments or private pilots may find the limitations too restrictive and as a result they avoid Oshawa.

Flight Training Aircraft Maintenance Services

- Overarching goal is to reduce the number of movements at the airport and in particular to reduce the number of local movements.
 - Currently have a significant portion of the Enterprise maintenance operation working on school aircraft
 - This will impact the maintenance business of Enterprise as well – fewer aircraft and/or less hours on the existing aircraft will reduce the maintenance services needed
 - \$480k on maintenance services provided to DFC
 - Parts and other third-party groups that participate in support of the aircraft

Underutilization of Airport Infrastructure

The analysis by HM Aero notes that the Oshawa Executive Airport's practical capacity is currently at 283,000 movements and the restrictions will reduce this to 248,000 movements. How is this underutilization expected to impact the infrastructure over the longer term? And if the infrastructure is impacted, what is expected to happen to the aviation business on the field.

- The airport represents significant investment by different levels of government - \$17 million for the move to the north field (of which \$1.5 million was from City of Oshawa), millions more for runway 12-30, the new control tower, etc.
- Aviation businesses made decisions on investments and strategies based on the plans for the airport as communicated through the City. From the 2015-2019 Airport Business Plan:

“Today, the Airport is an executive level regional airport and is centrally located within the City of Oshawa and the Region of Durham. The Airport has been owned and operated by the City since 1997 and has seen an ever increasing role as a community airport.”

“The Airport functions as a key component of the Region's transportation infrastructure and has a significant positive impact on the City and Regional economy.”

“The "cost" of the Airport is offset many times over by the infrastructure role it plays in maintaining and growing business and commerce on a City/Regional/East GTA basis, accommodating medical flights, police services, supporting emergency preparedness and the general aviation community.”

- Currently at around 90,000 movements (below the 102,000 in the plan), however, the restrictions will push this figure lower – potentially significantly lower depending on the impact on the viability of the flight schools. Such a decrease typically comes with an impact on the quality of the maintenance and upkeep of the infrastructure of this regional airport.
- Although it doesn't come down to a single number and safety is a major consideration, a minimum activity level at the airport is needed to maintain the control tower. What would the movements be if both flight training units were to cease flying at the airport? Would this level be sufficient to support the control tower? If one school were to close, would the level of movements be sufficient?

Impact on the Airport Business Plan

- There has not been an update to the business plan since the 2015 version; the current proposals seem to be a material deviation from the direction and models that were incorporated in this document
- When will a new plan be available and what are the likely impacts?

Here are my thoughts concerning the Oshawa Airport and the Noise Levels.

It would be nice if after reading this the people in charge would actually give a damn – But I don't think they would. But it would be nice if they did. I am not alone concerning the noise levels at the Oshawa Airport. Over the years more and more complaints have been voiced but the complaints have fallen on deaf ears. The powers that be just don't give a damn about the tax paying and voting citizens who live here, but they should. It would be a real nice change if for once they did.

My name is [REDACTED] and living at [REDACTED] for over thirty years. This is not a NIMBY RANT! My wife and I moved here over thirty years ago. We knew that the airport was here when we moved here. At the time it was not that big a deal but over the thirty years the noise level and activity at the airport has increased and the curfew times have been pushed up later and later until now the curfew is 10:30 P.M. But we have planes flying over our house past 10:30 P.M. Now the bulk of this noise is from the flying school. There are times during the day and at night when planes are passing over our house and those of our neighbors ever 60 seconds. I am told this is called circuit training! To us who live here and pay taxes here this is called TORTURE! If you are sitting in your back yard talking to family or friends you have to stop talking because you can't hear each other until the plane passes over. But the next plane passes over 60 seconds later, and then the next one, and then the next one, and then the next one, and then the next one! Not a pleasant experience. Then comes the night time when night time training begins, and yes Tito, every 60 seconds until 10:30P.M. or after.

The other thing that has happened over the past thirty years is the slow but ever so increasing number of twin engine jets. How would you like to have a twin engine jet pass over your house at 7:30A.M. or how about 2:30A.M. If the pilot is up, I guess everybody is up including their kids. Gee isn't that just nice! Isn't that just grand!

My MPP Colin Carrie had all the people around the airport send him an e-mail about their thoughts on the airport specially that bloody flying school that is the worst offender when it comes to noise. That airport, the flying school, twin engine jets, it's driven us slowly nuts, it's the death of a thousands cuts! People are screaming for affordable housing. The airport lands would provide a perfect site for affordable housing. Instead it's being used for a handful of people to work out some top gun fantasy! From time to time The Oshawa This Week has run articles about expanding the airport, lengthening runways! To where, over the roofs of peoples houses?

The airport and the flying school should take wings and fly away never to be seen or HEARD AGAIN.

Yours truly,
[REDACTED]
[REDACTED]

November 25, 2021

Ben Crooks

From: Laura Moebs <LMoebs@oshawa.ca>
Sent: December 3, 2021 2:41 PM
To: Adam Martin; Ben Crooks
Cc: Stephen Wilcox; Tom Goodeve
Subject: FW: Noise Abatement Workshop Feed-Back for the Oshawa Executive Airport

FYI – additional airport comments received.

From: Planning <Planning@oshawa.ca>
Sent: Friday, December 3, 2021 2:40 PM
To: Laura Moebs <LMoebs@oshawa.ca>; Stephen Wilcox <SWilcox@oshawa.ca>
Subject: FW: Noise Abatement Workshop Feed-Back for the Oshawa Executive Airport



From: [REDACTED]
Sent: Friday, December 3, 2021 2:39 PM
To: Planning <Planning@oshawa.ca>; [REDACTED]
Subject: Noise Abatement Workshop Feed-Back for the Oshawa Executive Airport

Att'n: CYOO Noise Abatement Workshop Feed-Back Stake-Holders:

I'm hoping that this email finds the correct recipients. If not, please forward this along to the correct Stake-Holders.

My name is [REDACTED] and I'm an owner of a Cessna 172. I've been based at the Oshawa Executive Airport (CYOO) for over 4 years. I'm also the Co-Captain/Vice-President of the Canadian Owners & Pilot's Association local chapter COPA Flight 70 - Durham Region -

Please find some of my comments after attending the Airport Users Workshop on Tues. Nov 23, 2021:

1. With Covid-19 the staffing issues of the NAV Canada Tower at CYOO needs to be addressed, given some potential procedure changes that are contemplated. Safety must always be the #1 priority of any planned changes.
2. In speaking to another resident that lives in close proximity to the end of Runway 12, he was woken up in the middle the night on Tues Nov 23, by a departing jet I believe. The resident was not happy by this occurrence,

however once I told him that only Medivac, Police or Military aircraft were allowed to depart from 10:30PM to 6:30AM, he was happy to know this info. Nobody had ever reached out to let him know. He thought it was some Corporate Jet owner departing in middle of the night for his condo in the Bahamas. A better education to the local residences should be carried out, explaining what off hours departures are really for and how this translates into benefits for the local residents.

3. Aircraft that display high decibel levels for departures should not be allowed to use CYOO at anytime. Limits should be set, if not already in place. This way the residence around the airport will know that excessive noise level aircraft will not be a future issue for noise abatement reasons.

4. Runway 30 should always be used for higher decibel/heavier aircraft, with a right hand turn-out, if a high level of safety is maintained. Current wind and weather conditions must always be taken into consideration.

5. Other rural runways should be sought after and/or created for the flight schools circuit training purposes. As an example Markham Airport (CNU8) currently sits closed and un-used . This runway could be expanded and improved with minimal expense., as apposed to creating a brand-new airport. Given it's rural location and all circuit activity should be carried out to the north of the east/west runway, minimal overhead noise would be experienced by the local mostly rural residents. This option should be examined. This would drastically reduce the amount of circuits noise that is being produced by the 2 flight schools at CYOO.

Please feel free to contact me if you have any further questions or comments.

Best regards,



Aircraft Owner and Co-Captain/VP - COPA Flight 70 - Durham Region -

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[REDACTED]
[REDACTED]

Oshawa Executive Airport,
1200 Airport Blvd.,
Oshawa, Ontario. L1J 8P5
Attention: Airport Manager

Dear Sir:

I am prompted to write this letter to you to show my support for the airport following a letter published in the local newspaper from [REDACTED] seems to think that the airport should be shut down just so she can enjoy her BBQ's on the patio without aircraft noise. The world does not revolve around [REDACTED] who, I believe, is a local "activist" and is always bleating about something and signing petitions and generally making a nuisance of herself.

The Oshawa Airport has been in existence since 1941 I believe and forms a vital and integral part of the Oshawa economy and vibrancy. I never fail to be "gobsmacked" by people who buy a house near an airport or a highway then complain about the planes or the trucks. The airport has been around long before [REDACTED] bought in the neighbourhood and it will continue long into the future I hope. Personally, I love to see the aircraft flying overhead and always look up to see if I can identify the type, number of engines, and the general comings and goings of all the aircraft. I also find the engine noise very soothing. I often bring my grandson over to the airport where we can watch the aircraft taking off and landing.

Don't listen to the naysayers like [REDACTED] who are always looking for something to complain about.

I am sending a copy of this letter to my local MP, Ryan Turnbull, just so he knows there are people here who think the airport is great and that the likes of [REDACTED] are in the minority.

Sincerely,

[REDACTED]
[REDACTED]

[REDACTED]

Ben Crooks

From: Laura Moebs <LMoebs@oshawa.ca>
Sent: November 24, 2021 8:46 PM
To: Adam Martin; Ben Crooks; Stephen Wilcox; Tom Goodeve
Subject: FW: Noise Abatement Proposal

FYI

From: Planning <Planning@oshawa.ca>
Sent: Wednesday, November 24, 2021 5:39 PM
To: Laura Moebs <LMoebs@oshawa.ca>
Subject: FW: Noise Abatement Proposal



Planning Services | City of Oshawa
905-436-3853 | 1-800-667-4292
planning@oshawa.ca | www.oshawa.ca
"Dedicated to serving our community."



From: [REDACTED]
Sent: Wednesday, November 24, 2021 5:39 PM
To: Planning <Planning@oshawa.ca>
Subject: Noise Abatement Proposal

I participated on Wednesday's afternoon's call and would like to ensure that my points are recorded

1. The Consultants report identifies that the Oshawa Airport is unique as it is surrounded by high density residential dwellings. Given that as the basis the Consultants work tries to demonstrate that the number of flights can increase. All the voluntary measures that are proposed cannot be managed by the existing Airport Management Organization. In summary the work done by the consultants have very good intentions but if they cannot be managed then they are not effective.

Current frustration from the Community is evidence that even though complaints increase the number of flight movements increase.

2. The Noise Complaints number has increased and this number does not reflect the total number of people frustrated with the Flight Schools. Many residents are frustrated that City Council is not able to address the problem as the Airport Management Team is supporting the increased activity at the Airport and is able to advance their agenda over the Tax Payers of Oshawa. This has resulted in many community members not reaching out to complain as it is futile. The evidence they cite is that the complaints increase and the noise just increases with no accountability.
3. Ten years ago when the Airport wanted to expand, Mr Steve Wilcox addressed the community at a "Town Hall" meeting at the airport. He compared Jet Traffic as bringing new business opportunities to

the City and that Flight Schools don't bring value for the City. Yes, according to Mr. Wilcox jet noise is loud but it clears the airspace quickly but Flight Schools are like buzzing bees. You (residents) don't want the buzzing bees. Mr Wilcox also acknowledged that when flight movement exceed 60,000 the level of noise complaints increase. Given that the Airport Management communicated all of this to the residents we now find ourselves with significant expansion of Flight Schools and movements over 60,000. This is the reason that I do not believe that the Current Airport Management team can bring balance to the Airport with any Volunteer Proposals cited in the Consultants Report.

4. It is recognized we need a place for Pilots to train. The Federal Government acknowledges this and in their findings they recommend that Flight Schools be located in Rural Areas. Why do the Consultants that have been retained by the City not recognize the work completed in the Federal Govt report and follow their suggestions. The Consultants did not want to address this fact and instead said that Flight Schools can be managed in Urban areas. The answer is very simple that they cannot as one can see if they Google any Airport in North America and the problems community have with Flight Schools.
5. The City of Peterborough created no fly zones to protect animals (cows) according to comments from the Consultants. The City of Oshawa will not support a no fly zone according to the Consultants. So basically the environmental welfare of a dairy cow in Peterborough is of greater significance than a tax payer in the City of Oshawa.
6. Some Community members on the Wednesday call expressed concern that without a Flight School we miss out on Revenue so we need to consider the business loss if we don't have a flight school. These Community members should be made aware that **if** the City charged a landing fee of \$30.00 for movement on the runway the City will be ahead by the following amount

$$\$30.00 \times 70,000 \text{ annual movements} = \$ 2,100,000.$$

In the report from the City it is cited the potential loss of revenue of 750K\$ from the flight school to the City if it left. Currently according to the City of Oshawa finance group one flight school is not paying anything to the City as it involved in a legal battle. I assume the flight school with the elevated flight movements is the school in question. The City is not missing out on anything as we are subsidizing the Flight School. The City is missing out on significant revenue opportunities with not charging landing fees and this demonstrates the ability the Airport Manager has over the City in not placing a landing fee on Airport users.

Mr. Wilcox brings forward that the City benefits from fuel sales to all aircraft. This revenue stream is insignificant to the actual cost of maintaining the runway. I pay taxes at the Gas pump to support highways in Ontario. I also pay if I want to drive on Hwy 407. In today's world there is a cost for everything and people have to start paying moving forward. I know Airport landing fees is not part of the agenda topic but it demonstrates very quickly that if the Airport Management does not manage the Airport to bring good environmental and economic decisions for the City how does the community

The Current Airport Management team have implemented practices that benefits the Airport Users. It is very difficult to have the Community accept that the Airport Management will be in a position to enforce any recommendations that brings a burden to the Airport users from the Consultants report. The Airport Management team has not demonstrated that they are good Corporate Citizens to the Community.

7. The fact that a Flight School can operate without a licence from the City of Oshawa at the Airport provides evidence that Flight Schools have their own agenda and no matter what guidelines result from the report the Flight Schools will do what they want and the Airport Management Team have not shown any evidence of preventing the Users in following any guidelines. The Airport Management team have allowed the Users to have their way with "Their Airport" that is financed and supported by the Tax

Payers of Oshawa. It is disappointing that even though the Airport Management and the City are one unit, the Airport Management are managing the City to suit the Airport Users agenda.

8. [REDACTED] (a caller on today's session) made a very enlightening point on today's call. He reported a near miss of two airplanes over the Thickson and Rossland area. His report could not be investigated as it had to be reported by one of the pilots. The reason Flight Schools do touch and goes is that take offs and landings are the most challenging part of flying. This requires them to repeat this difficult exercise many times. Why would the City of Oshawa accept that practicing the most difficult part of flying over the residents of Oshawa is acceptable? A near miss accident does not get investigated opens the question to what happens when one of these Flight School planes has a problem and has to land in an uncontrolled manner in a school playground during school time. Just look in the news of a plane landing on the 407 just last month due to mechanical problems. I do not want to see that event happen in Oshawa.
9. Community leaders have to start making Environmental and Economic decisions that bring Value to residents. We find ourselves dealing with Global Climate Change and Government at all levels have to begin to understand the consequences attached to decisions that have significant environmental consequences.

Thank you for the Opportunity to Participate in the Noise Abatement program

[REDACTED]

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Ben Crooks

From: Laura Moebs <LMoebs@oshawa.ca>
Sent: November 26, 2021 1:08 PM
To: Adam Martin; Ben Crooks
Cc: Tom Goodeve; Stephen Wilcox
Subject: FW: Noise Abatement Feedback for Consultants

FYI noise abatement comments (note he did already provide comments but these are additional ones).

From: Planning <Planning@oshawa.ca>
Sent: Friday, November 26, 2021 10:24 AM
To: Laura Moebs <LMoebs@oshawa.ca>
Subject: FW: Noise Abatement Feedback for Consultants



From: [REDACTED]
Sent: Friday, November 26, 2021 10:11 AM
To: Planning <Planning@oshawa.ca>
Subject: Noise Abatement Feedback for Consultants

My wife and I further reviewed the report and would like to add more comments to my original email that I submitted on Wednesday afternoon.

The Consultants report offers the Community hope in reducing the number of Flight School movements to 4. But this number is suggested by the Consultants to be a voluntary measure. There are no consequences to any of the Voluntary measures put forth in the report. If there are no consequences then basically there is no way of enforcing any measures. To improve on the report the word, Voluntary should be removed from the conditions pertaining to the Flight School Operations.

The Consultants have identified that the increase in Flight School movements accounts for the increased need for a Noise Abatement Program and should be stronger in their recommendations to Council. With respect to consequences there needs to be a penalty that is applied not only to the individual or company not adhering to the new measures but the Airport Management Organization has to be subjected to a penalty that is at least twice that of the penalty as they are the ones who failed to follow the rules.

When asked about creating a cap to the number of movements to 60,000 or 70,000, the Consultants were very quick in their response that is not in any of their recommendations. To my wife and I if there is not a cap

and there is just a voluntary measure with no consequence then the work presented to the Community does not address the Noise Abatement Issue that they were asked by the City to address.

Regards,

A solid black rectangular redaction box covering the signature area.

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Ben Crooks

From: Laura Moebs <LMoebs@oshawa.ca>
Sent: November 26, 2021 7:03 PM
To: Adam Martin; Ben Crooks
Cc: Stephen Wilcox; Tom Goodeve
Subject: FW: Noise Abatement Statements

FYI please see below for [REDACTED] third set of comments re: noise abatement.

From: Planning <Planning@oshawa.ca>
Sent: Friday, November 26, 2021 2:09 PM
To: Laura Moebs <LMoebs@oshawa.ca>
Subject: FW: Noise Abatement Statements

From: [REDACTED]
Sent: Friday, November 26, 2021 2:03 PM
To: Planning <Planning@oshawa.ca>
Subject: Noise Abatement Statements

This is my third email as new information surfaces the more I read the document.

During the call two callers expressed concerns and this is how they were addressed by Mr. Wilcox and the Consultants

1. Caller from a lady who commented that she has been on the call for an hour and in that hour, 20 Flight Training movements went over her house and it us unbearable

Answer from Mr. Wilcox and Consultants

Yes, we know the concerns from the community and that is why we were asked to prepare the report

2. Caller who wanted to know why plane bank right or left and should they not bank to keep the airport in full view

Answer from Mr. Wilcox and Consultants

There is no hard and fast rule according to Mr. Wilcox as both are acceptable.....Later on Mr Wilcox explains that a circuit can take 6 minutes to complete

So, if four aircraft are allowed to be training at any one time and it takes 6 minutes to complete the circuit then on Flight Training Aircraft will be over that ladies house 10 times in an hour. There are four planes in the circuit. That means that the lady who complained about 20 will be subjected to 40 Flights in an hour because the Consultants report said that was bearable!!

Let's assume that it takes 12 minutes and not 6 to do a circuit. That takes us down to the magic number of 20 that the lady was expressing as being unbearable.

The language used in the report does not speak in a language that the Community understands. The only way to address this is to have a Town Hall meeting .

The lady who heard the number of 4 from the Consultants was quite happy but basically she was being misled by the Consultants because according to the math the Consultants were saying that the airport can double the activity and you (Mrs Homeowner) have no grounds to complain because you approved the report.

The report should be expressed in flights per hour not per runway. Again these facts can only come out from having a live discussion. It is very deceitful if the four flights per runway result in a flight activity that produces movements over a residents house of the magnitude that my math suggests.

The fact that the lady exited the meeting with the wrong understanding of the information from the Consultants is wrong !!!!



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Ben Crooks

From: Laura Moebs <LMoebs@oshawa.ca>
Sent: November 30, 2021 11:37 AM
To: Adam Martin; Ben Crooks
Cc: Stephen Wilcox; Tom Goodeve
Subject: FW: Feedback form from the City - Community Workshop

FYI Additional comments from [REDACTED] re draft noise abatement procedures.

From: Planning <Planning@oshawa.ca>
Sent: Monday, November 29, 2021 8:41 AM
To: Laura Moebs <LMoebs@oshawa.ca>
Subject: FW: Feedback form from the City - Community Workshop

From: [REDACTED]
Sent: Sunday, November 28, 2021 1:56 PM
To: Planning <Planning@oshawa.ca>
Subject: Feedback form from the City - Community Workshop

I have gone on line and reviewed the Feedback form and I would like to say that the Feedback form asks questions that are too technical for residents to answer.

During the Workshop certain information came out that caused significant concern for me but was not able to bring forward as there was limited time. Below is just a few examples that caused me to stop the process as I did not want to express myself to questions that I did not understand.

The main issue with respect to Noise Abatement is with the number of movements.

The Consultant's report suggests a Voluntary measure of having 4 flights per runway for flight training. During the Workshop Mr Wilcox answered a caller's concern regarding Flight Circuit training and communicated that 6 minutes is a circuit that the flight school uses. So using Mr. Wilcox's information of a 6 minute circuit and the Consultants suggestion of 4 flights per runway. The Community will have 40 flights per hour over their residence. (4 planes X 10 Circuits/hour)

A couple called into the Workshop to address a concern that since the Workshop started at least 20 Flight school planes went over their residence. The couple expressed concern that the number of 20 was unbearable. Mr. Wilcox reassured the caller that the Noise Abatement Workshop is to address these concerns. So, if this couple answers Yes to the Question regarding 4 flights/ runway on the Feedback form are they saying yes that they accept 40 flights an hour over their house? The couple did not know the context of 4. The number 4 is smaller than 20. My point being here is that the Feedback form has to be in a language that the community can understand. I can see a few months from now when this couple phone in to address the unbearable noise only to receive a comment that it was you the home owner who approved of this frequency.

The report talks about Voluntary measures a number of times and Violations will being investigated. But who is to do the Investigation? We found out that during the Workshop that Transport Canada will only get involved if a formal filing is done by a pilot and there is radar or an expert to confirm. I do not believe that any

measure that contains the word Voluntary will ever be investigated by Transport Canada so basically and condition with the word Voluntary does not create any rules that will be followed.

The main issue that the Community has is for a Safe Operation of the Airport that brings balance to the Airport Users and the residents. The main issue driving the need for Noise Abatement has to do with increased Flight Movements. When asked about creating a cap on aircraft movements the Consultants said that was not part of their study. I found this statement alarming. The Consultants stated a number of times that the situation in Oshawa is unique in that the residential area around the airport is high density. Given those statements the Consultants turn around and say that 40 flights per hour from the Flight School is their recommendation ???

I also learned from the Workshop that the NAV Canada tower is without staff during certain hours of the day. Does the absence of staff in the NAV Canada tower coincide with Flight School operations ? Basically, are there 40 flight school movements combined with commercial and pleasure airport traffic all occurring without NAV Canada staff. For a resident of Oshawa, I find this very concerning.

There was a lot of information that came out from the Workshop and a significant amount of discussion needs to occur to better understand what their recommendations mean to the residents of Oshawa. The Feedback form is not structured in a way that will allow me to communicate the concerns I have concerning the operations and the future plans for the Airport. Greater Community discussion is necessary to ensure that the information is communicated clearly and Safety is the top priority for the Operations at the Oshawa Airport.

Regards

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Ben Crooks

From: Laura Moebs <LMoebs@oshawa.ca>
Sent: November 30, 2021 11:37 AM
To: Ben Crooks
Subject: FW: Proposed noise measures

Not sure if Adam forwarded you his email or not but just in case, see below.

From: [REDACTED]
Sent: Friday, November 26, 2021 4:34 PM
To: Stephen Wilcox <SWilcox@oshawa.ca>
Cc: Laura Moebs <LMoebs@oshawa.ca>; Adam Martin <adam.martin@hmaero.ca>
Subject: Re: Proposed noise measures

Steve, one caller reported a near miss to Transport Canada and their reply was they need to hear from the pilot and there needs to be evidence supported by an expert.

Those two conditions were not met so investigation was never pursued. Moving forward there will be more of that response from Transport Canada

On Wednesday, a lady called in to address the 20 flights per hour that was occurring during the call was too excessive and you calmed her by telling her that is why the Consultants are here.

She was reassured but if she did some basic math she would find the following.

If according to you a flight circuit could be 6 minutes and given 4 flights in the circuit then that lady could possibly have 40 movements over her house. Even if the circuit is 12 minutes it results in 20 movements over her house

As you said many years ago, Flight Schools are like buzzing bees and they bring little economic value to the City. That caller left the call with improper information for her to process.

The Consultant's report must express their numbers to the community in a language they understand. Movements per hour will allow them to better understand the report .

Removing the word Voluntary must be done as the Flight School have demonstrated they create their own rules

Regards

[REDACTED]

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From: Stephen Wilcox <SWilcox@oshawa.ca>
Sent: Friday, November 26, 2021 4:18:17 PM
To: [REDACTED]

Cc: Laura Moebs <LMoebs@oshawa.ca>; Adam Martin <adam.martin@hmaero.ca>

Subject: Proposed noise measures



Planning forwarded me your email comments and we will send them to the consultant but I wanted to clarify one point you raised. All of the proposed restriction would be mandatory and enforcement by Transport Canada with fines up to \$25,000 per incident. The voluntary ones are what we have now. I hope this gives you some piece of mind.

Stephen Wilcox A.A.E
Airport Manager, Oshawa Executive Airport
CEO, Total Aviation and Airport Solutions
1200 Airport Blvd, Suite 200
Oshawa, Ontario
L1J 8P5
905-576-8146 Ext 3858

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Ben Crooks

From: Laura Moebs <LMoebs@oshawa.ca>
Sent: January 7, 2022 11:38 AM
To: Adam Martin; Ben Crooks
Cc: Tom Goodeve; Stephen Wilcox
Subject: FW: Removal of both flight schools and the airport study meeting

Importance: High

FYI – I know it's a bit late but here is another recently received comment regarding noise at the airport, just to include for the records.

Thanks,
Laura



Laura Moebs, Principal Planner | City of Oshawa
905-436-3311 ext. 2818 | 1-800-667-4292
LMoebs@oshawa.ca | www.oshawa.ca
"Dedicated to serving our community."



From [REDACTED]
Sent: Thursday, January 6, 2022 1:14 PM
To: Laura Moebs <LMoebs@oshawa.ca>
Cc: Mayor@Oshawa.ca; Coe, Lorne <lorne.coe@pc.ola.org>; [REDACTED] Internet, Mayor <mayor@whitby.ca>; Tom Goodeve <TGoodeve@oshawa.ca>
Subject: RE: Removal of both flight schools and the airport study meeting
Importance: High

Good afternoon Laura,

Thank you for your response.

It seems like now the City of Oshawa and Council are listening. **We still need to NOT authorize a lease renewal for both of the existing Flight Schools at the Oshawa Airport.**

The community has grown drastically in the last 15 years and the flight schools create a severe risk to our community and create a noise problem for all tax paying residents all across Durham. The Flight schools have created 90% of the noise and safety issues for our area. They need to move up north in a lower populated region. This is just safety planning. You will reduce risk to the City of Oshawa.

It is time NOT to renew any leases for flight schools.

Light, small in and out Jet traffic by executives is fine.

Flight schools and their Constant circle checks and take off and landings have created enormous noise issues.

Sincerely

[REDACTED]

[REDACTED]

[REDACTED]

From: Laura Moebs <LMoebs@oshawa.ca>

Sent: January 6, 2022 1:05 PM

To: [REDACTED]

Cc: Mayor@Oshawa.ca; Coe, Lorne <lorne.coe@pc.ola.org>; [REDACTED] Internet, Mayor <mayor@whitby.ca>; Tom Goodeve <TGoodeve@oshawa.ca>

Subject: RE: Removal of both flight schools and the airport study meeting

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi [REDACTED]

This report is technical in nature and summarizes Phase 2 of the Air Quality and Noise Study that was conducted this past summer. As such, it does not reference removing the flight schools in any way.

However, I do want to note that the City is currently in the process of developing noise abatement procedures under a federal process prescribed by Transport Canada, with the intent to develop solutions to address noise concerns

Appendix C - 2021 Noise Study

OSHAWA EXECUTIVE AIRPORT

OSHAWA, ONTARIO

NOISE STUDY

RWDI # 2104007

January 2, 2022

SUBMITTED TO

Stephen Wilcox A.A.E.
Airport Manager
swilcox@oshawa.ca

Oshawa Executive Airport

1200 Airport Blvd Suite 200
Oshawa, Ontario
L1J 8P5
T: 905.576.8146 x 3858

SUBMITTED BY

John DeYoe, d.E.T.
Project Director / Principal
john.deyoe@rwdi.com

RWDI AIR Inc.

Consulting Engineers & Scientists
600 Southgate Drive
Guelph Ontario Canada N1G 4P6
T: 519.823.1311
F: 519.823.1316



GLOSSARY

Ambient Sound	Existing sound conditions due to current airport operations, including sound from other existing industrial facilities, transportation sources, animals, and sounds of nature.
dB (decibel)	A unit of measure of sound pressure that compresses a large range of numbers into a more meaningful scale. Hearing tests indicate that the lowest audible pressure is approximately 2×10^{-5} Pa (0 dB), while the sensation of pain is approximately 2×10^2 Pa (140 dB). Generally, an increase of 3 dB is perceived as twice as loud.
dBA	The decibel (dB) sound pressure level filtered through the A filtering network to approximate human hearing response at low frequencies.
INM	Integrated Noise Model – A model by the FAA for sound from airports and airborne aircraft engaged in takeoff and landing operations.
ISO	International Standards Organization.
L _{AEQ}	The L _{AEQ} is the average A-weighted sound level over a specified period of time. It is a single-number representation of the cumulative acoustical energy measured over a time interval. If a sound level is constant over the measurement period, the L _{EQ} will equal the constant sound level where f is the fraction of time the constant level L is present.
L _{AEQD}	The L _{AEQ} for daytime hours (07:00-22:00).
L _{AEQN}	The L _{AEQ} for nighttime hours (22:00-07:00).
L _{DEN}	The average sound for a 24-hour period that accounts for increased sensitivity to sound during evening and nighttime hours by applying a penalty of 5 dB for sound in evening hours, and a 10 dB penalty for sound occurring during nighttime hours. The penalty causes an increase in the calculated sound level occurring during the period. Daytime hours are 07:00 to 19:00, evening hours are 19:00 to 22:00, and nighttime hours are defined from 22:00 to 07:00.
Sound	A dynamic (fluctuating) pressure.



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LIST OF FIGURES

Figure 1: Sound Level Meter Locations

LIST OF APPENDICES

Appendix A: Detailed monitoring results

Appendix B: Daytime L_{EQ5}

Appendix C: Air Traffic Volumes

1 INTRODUCTION

RWDI was retained by Oshawa Executive Airport to complete a noise monitoring program in the community surrounding the Airport. The monitoring was undertaken as an investigation into current conditions. The monitoring took place at five locations beneath flight paths, between July and September of 2021. The locations were selected based on their proximity to the airport and their proximity to flight paths and are shown in Figure 1. The locations were :

Location 1 – backyard Revelstoke Court – departure path for runway 23, landing path for runway 05

Location 2 – backyard Barbados Street – departure path for runway 23, landing path for runway 05

Location 3 – backyard Woodlea Crescent – departure path for runway 12, landing path for runway 30

Location 4 – backyard Bessborough Drive – departure path for runway 12, landing path for runway 30

Location 5 – backyard Juniper Street – flightpath for runways 12/30

Besides the considerations listed above the sites were not in proximity to noise interferences, were secure and had residents who volunteered their properties. The sites were selected by airport staff with some input from RWDI.

1.1 Measurement Methodology

Sound pressure level measurements at the locations were performed using Larson Davies 820 or 812 precision Integrating Sound Level Meter (SLM). The SLMs use a preamplifier and a PCB, Class 1 condenser microphone. The SLM was field calibrated using a precision acoustic calibrator prior to measurements and at several points throughout the monitoring. A windscreen was used during all measurements.

Figure 1 shows the ambient survey locations. The monitoring locations were checked at numerous times during the monitoring periods. The data from the instruments was also downloaded during these periods.

1.2 Airport Location Notes

Throughout this report, the locations are referenced by the runway numbers. This is the end of the runways that the airplanes land on. The airplanes take off over the other end of the runway. For instance, when runway 12 is in use the airplanes are landing at the threshold of runway 12 but taking off over the samplers at the threshold of runway 30. The runways are named for the direction the airplanes are heading. For example, when the airplanes are using runway 30, they are travelling on an azimuth angle of 300 (NW); using runway 12 they are travelling on an azimuth angle of 120 (SE).



1.3 Environmental Conditions

The sound monitoring was conducted from July 6th, 2021 to September 13th, 2021. Meteorological data for the sound measurement period was taken from the Environment Canada public information for the station located at the Oshawa Executive Airport. Measurement data was excluded when windspeeds exceeded 20 km/hr and/or when the relative humidity exceeded 95%.

When wind speeds are elevated the noise from the wind begins to dominate the noise measurements. This is partly alleviated by the wind screen foam that covers the microphone but only to a point. High humidity event can cause microscopic condensation on the microphone which creates a hissing background.

1.4 Monitoring Results

The differences in number of valid records at the monitoring location can be attributed to unexpected equipment downtime because power related issues. Table 1 shows the A-weighted averaged sound level (L_{AEQ}) of valid data within the different specified time periods. Appendix A shows detailed results for each of the five locations. Appendix B shows Daytime L_{EQ} 's for the monitoring period. Appendix C shows the aircraft movements.

Table 1: Measurement Results

Station	1	2	3	4	5
Street	Revelstoke	Barbados	Woodlea	Bessborough	Juniper
Overall L_{EQ} (dBA)	54.1	56.1	53.7	54.8	52.9
Daytime L_{EQ} (dBA)	55.3	57.2	54.7	55.8	54.2
Nighttime L_{EQ} (dBA)	46.0	48.9	47.1	48.2	44.2
Number of Readings	1528	1523	1291	1578	1521
Valid Readings	1084	1081	908	1117	1085
Nighttime % over 45 dBA	50.2	73.7	67.2	66.6	25.4
Daytime % over 55 dBA	18.9	21.2	20.5	32.1	13.7
Data Recovery %	92	92	78	97	91

1.5 Monitoring Results Cross Comparison

As a comparison of impacts at different locations, four days were examined. This was to determine the level of difference between locations where the airplanes depending on aircraft activity. On August 5 there were 511 movements that were predominantly from Runways 12/30. On August 6 there were 451 movements which were predominantly on Runway 23. August 25 had 413 movements predominantly on Runway 23. August 31 had 437 movements predominantly on Runway 30.

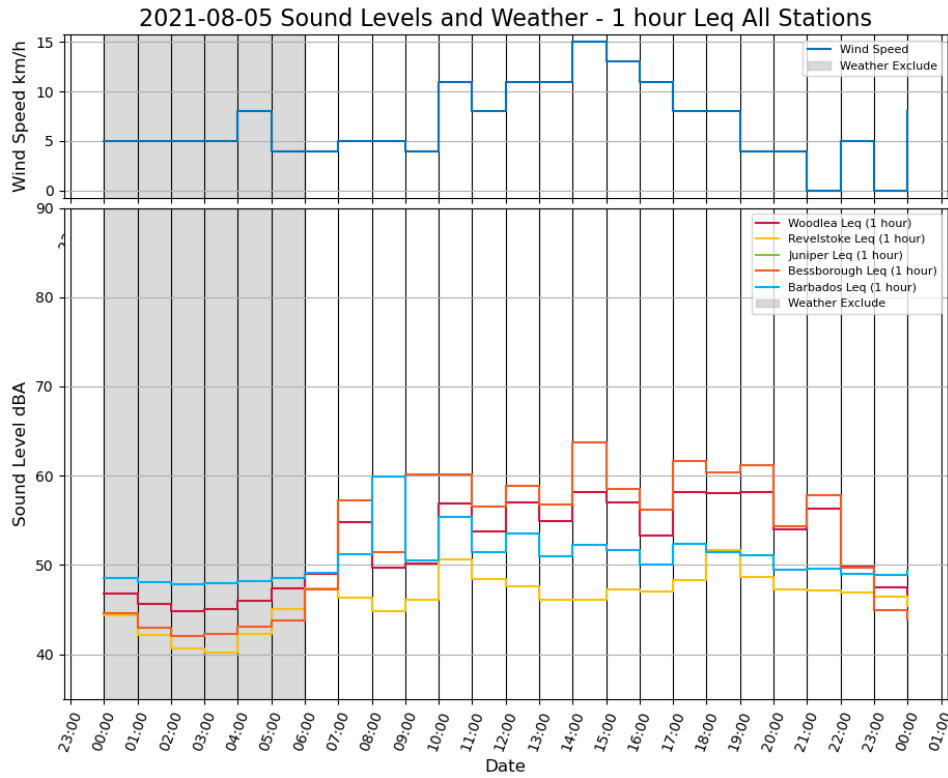


Figure 1.4.1

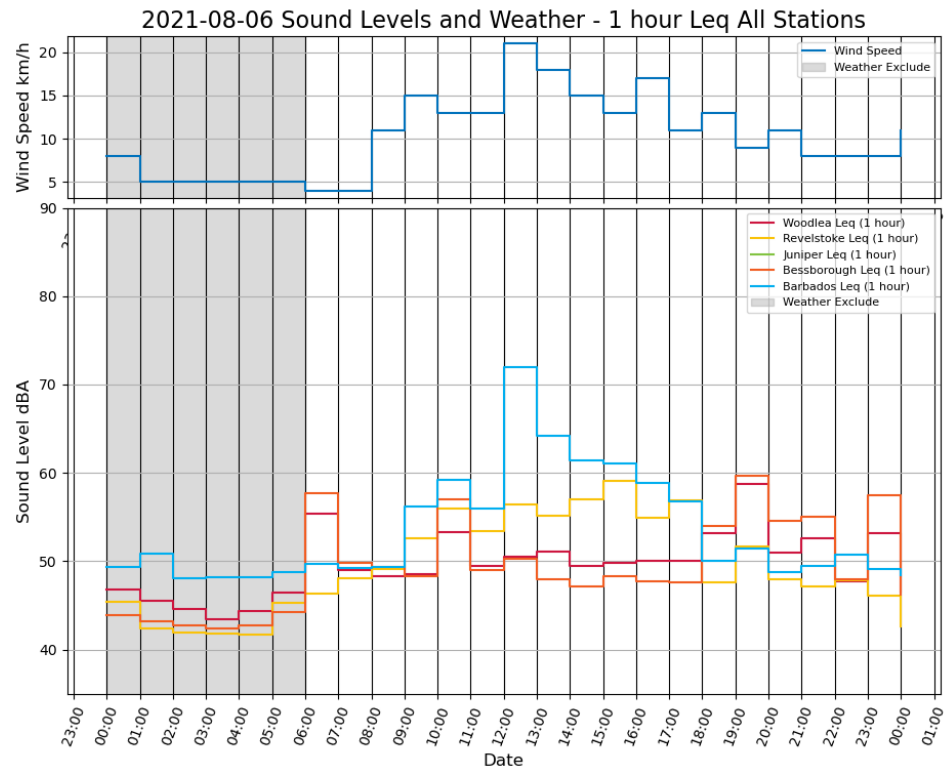


Figure 1.4.2

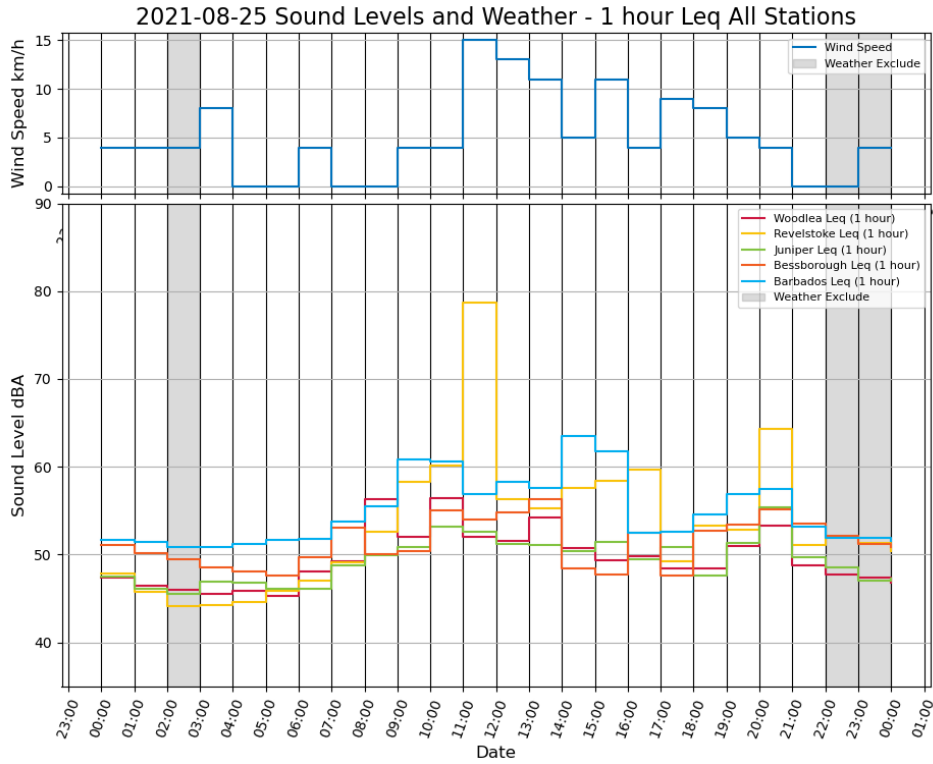


Figure 1.4.3

*** Please Note: Revelstoke 11:00 am adjusted to 56.8 dBA due to 5-minute anomaly

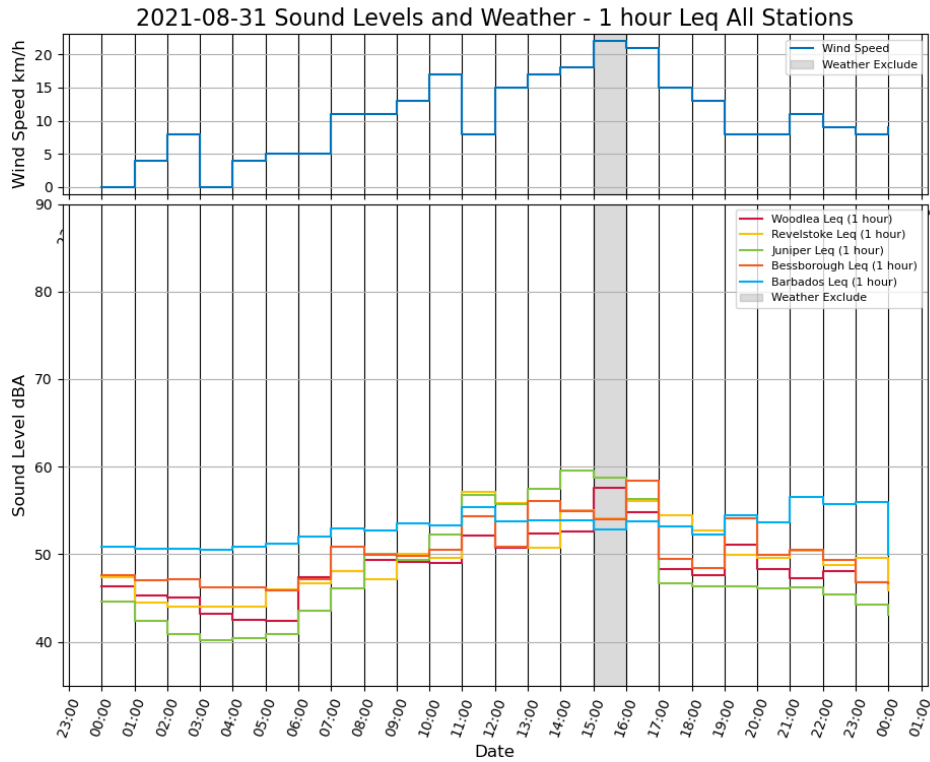


Figure 1.4.4



Table 1.4.1: Daytime L_{EQ} values for Select Days

Station	Street	August 5 RW 12/30 in use, Flights above Stations 3,4,5	August 6 RW 23 in use, Flights above Stations 1,2	August 25 RW 23 predominant, Flights above Stations 1,2	August 31 RW 30 in use, Flights above Stations 3,4,5
1	Revelstoke	47.8	54.2	56.7	52.7
2	Barbados	53.2	58	58.4	54
3	Woodlea	56	52.1	52.3	50.1
4	Bessborough	55.3	53.2	53.1	52.2
5	Juniper			52.4	53.5

1.6 Distribution of Air Traffic Movements

It is important to note that the aircraft noise is not a constant and that the heavy traffic days with more than 300 movements occurred just less than 50 % of the time during the study period. The table below shows the distribution of air traffic movements.

Table 1.6.1: Distribution of Aircraft Movements

Days with < 100 flights	10
Days with 100 -200 flights	12
Days with 200 -300 flights	13
Days with 300 - 400 flights	13
Days with 400 -500 flights	19
Days with >500 flights	2
Total # of Days	69

2 DISCUSSION

The sites chosen were all in backyards which was intended to demonstrate actual impacts in the community. The sites were all in subdivisions fairly near to, but not adjacent to arterial roads. There is a notable urban hum at all the locations. There was also a fairly constant background of air conditioners and other mechanical equipment at the sites.

The provincial noise guidelines do not apply in this case. The Noise Exposure Forecast (NEF) standards are not actually comparable to L_{EQ} measurement data though as a rough conversion the NEF 35 limit is roughly comparable to a 24-hour L_{EQ} limit of 67 dBA and all the 24-hour L_{EQ}'s were below that.

The world bank guideline is not applicable either, but it has been used at other airports. The World Bank guidelines are typically use for new industrial and infrastructure developments to ensure that lenders do not sponsor projects that cause problems in existing communities.



Table 2.1 : World Bank Group Noise Level Guidelines

Receptor	Noise Level Guidelines	
	L _{AEQD} 07:00 22:00 (dBA)	L _{AEQN} 22:00 07:00 (dBA)
Residential; institutional; and educational	55	45
Industrial; commercial	70	70

There is undoubtedly noise impact from aircraft at all the locations, but it is not definitively obvious from the measured data. All the locations show generally high levels of ambient noise. There is certainly a fairly high background due to the urban hum, mechanical noise, and other domestic sounds. The nighttime values are high even though aircraft movements for this airport are sparse during nighttime hours.

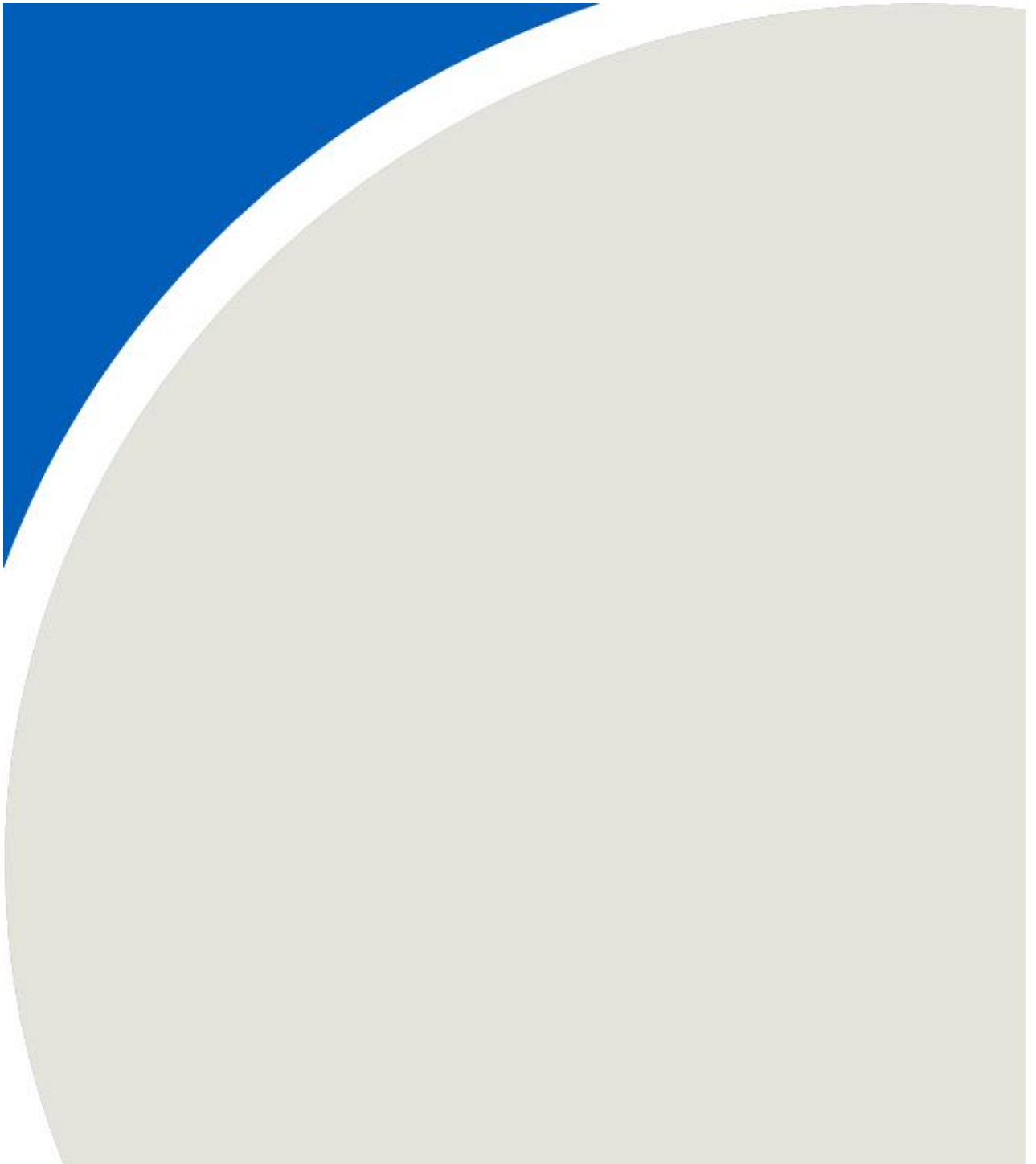
In the comparative assessment of high traffic days, the August 5 and 6 data would indicate that high aircraft volumes would add roughly 3 to 5 dBA at receptors on the flight path which equates to roughly a doubling of the sound pressure level. The August 25 and August 31 data does support that hypothesis also but only at the Revelstoke and Barbados stations which were on take-off paths on those days.

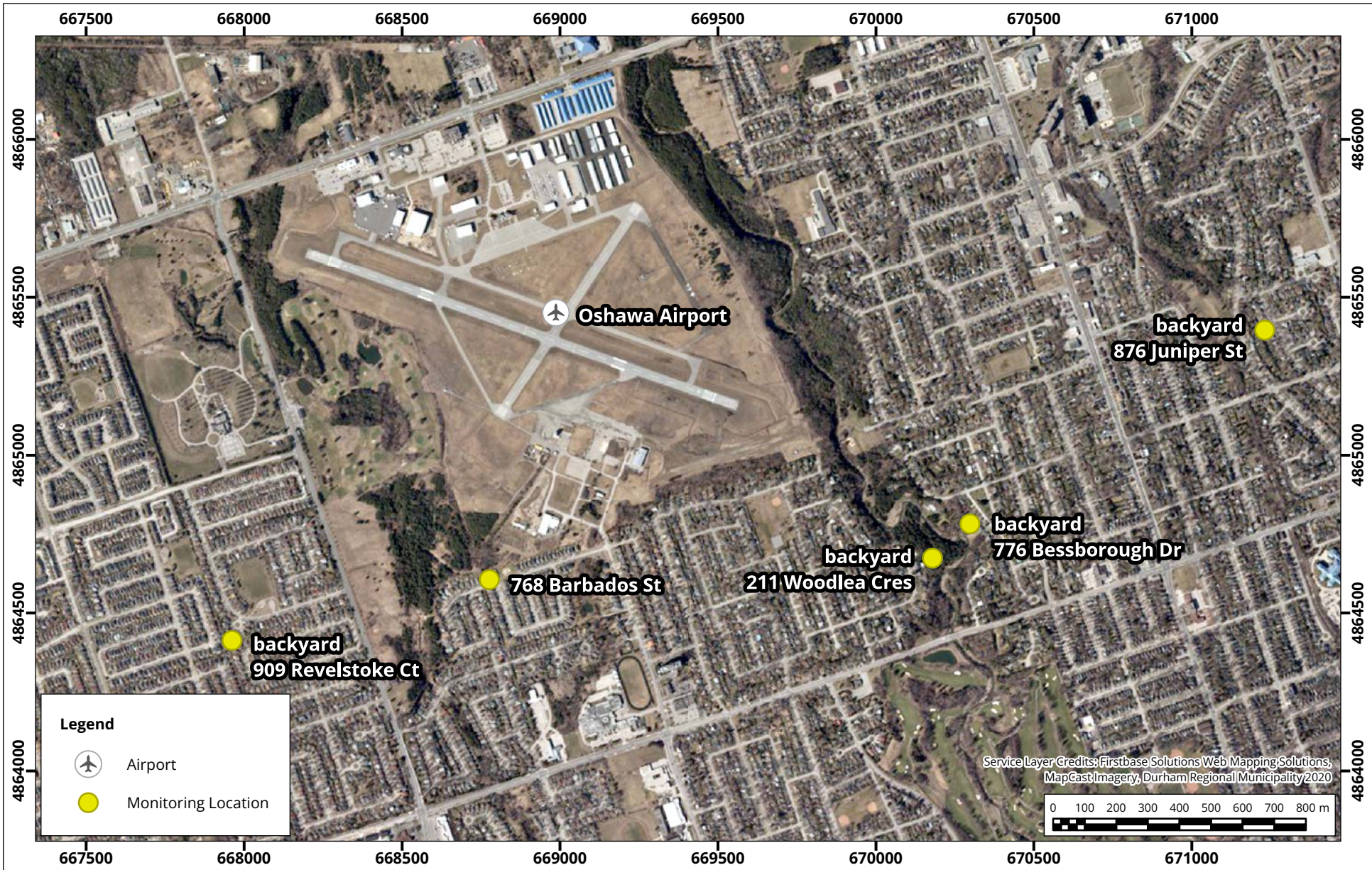
There were no 24-hour L_{EQ}'s that were above 67 dBA so the NEF assessment that allowed development at the monitoring locations is still valid.

There were many occurrences where the measured values were above the World Bank guidelines, though this is not an applicable standard, but it is presented for comparative purposes.

A finalized copy of this report will also include a frequency analysis of intervals with elevated events. Unfortunately, that analysis is not available at the present time.

FIGURES





Oshawa Airport Noise Monitoring Program July 7 to September 13, 2021

Map Projection: NAD 1983 UTM Zone 17N
Oshawa Airport Air Quality - Oshawa, ON

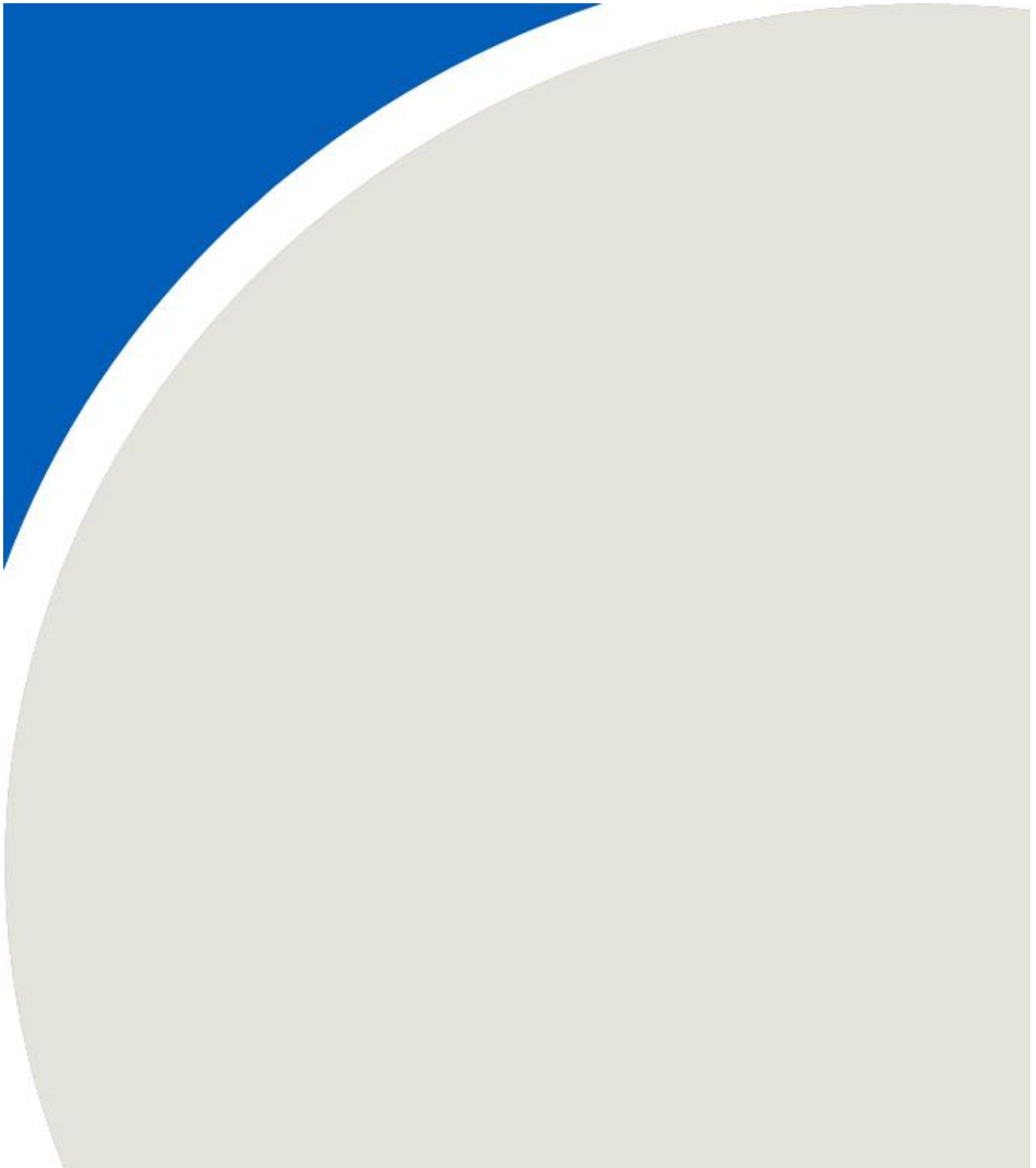


Drawn by: RL	Figure: 1
Approx. Scale: 1:17,000	
Date Revised: Oct 13, 2021	



Project #: 2104007

APPENDIX A



Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	dir (10s)	nd Spd (km	Weather	Weather Exclude
2021-Jul-06 10:00	55.6					27.9	62	28	17		FALSE
2021-Jul-06 11:00	48.2	49.9				29.2	55	27	17		FALSE
2021-Jul-06 12:00	50.6	50.3		51.7		30.2	52	31	21		TRUE
2021-Jul-06 13:00	52.1	48.6		52.8	49.0	30.2	48	29	17		FALSE
2021-Jul-06 14:00	51.7	47.4	59.4	48.5	46.4	30.8	46	30	21		TRUE
2021-Jul-06 15:00	52.6	48.0	50.8	57.7	47.1	30.7	46	31	24		TRUE
2021-Jul-06 16:00	50.9	49.0	50.1	52.6	46.8	30.7	50	31	15		FALSE
2021-Jul-06 17:00	49.7	49.0	50.1	51.6	46.5	29.7	49	34	26		TRUE
2021-Jul-06 18:00	49.3	50.4	48.3	55.9	49.2	28.6	48	33	22		TRUE
2021-Jul-06 19:00	49.3	50.5	48.5	50.2	47.2	27	53	33	11		FALSE
2021-Jul-06 20:00	48.1	51.2	46.1	49.4	46.6	25.7	59	31	9		FALSE
2021-Jul-06 21:00	47.8	48.6	45.3	46.1	45.1	24.3	65	30	8		FALSE
2021-Jul-06 22:00	48.3	48.7	44.8	45.8	44.5	21.4	79	33	8		FALSE
2021-Jul-06 23:00	47.7	48.0	44.1	45.0	41.6	21.8	77	34	8		FALSE
2021-Jul-07 00:00	47.5	45.7	43.1	44.6	40.8	21.5	78	35	11		FALSE
2021-Jul-07 01:00	46.6	44.0	42.1	44.0	37.8	21.7	78	1	8		FALSE
2021-Jul-07 02:00	45.8	42.7	41.9	43.4	37.3	21.9	78	34	13		FALSE
2021-Jul-07 03:00	47.8	47.4	50.3	45.5	38.3	20.1	94	36	13		FALSE
2021-Jul-07 04:00		51.1	52.5	50.9	38.3	19.6	99	12	11	Rain,Fog	TRUE
2021-Jul-07 05:00		53.5	55.2	53.2	40.9	19	97	8	13		TRUE
2021-Jul-07 06:00		51.0	51.3	51.1	39.7	18	97	7	11	Heavy Rain, Fog	TRUE
2021-Jul-07 07:00		56.7	59.2	58.1	43.7	17.6	99	10	9	Rain	TRUE
2021-Jul-07 08:00		46.0	49.2	53.2	42.0	17.7	94	7	15		FALSE
2021-Jul-07 09:00		44.6	50.6	59.3	41.9	18.1	91	9	13		FALSE
2021-Jul-07 10:00		47.6	47.4	50.4	40.3	17.8	88	3	17		FALSE
2021-Jul-07 11:00		47.7	50.1	51.3	43.2	18.2	82	6	21		TRUE
2021-Jul-07 12:00		45.1	55.5	52.1	42.5	18.3	80	5	13		FALSE
2021-Jul-07 13:00		55.3	53.5	58.7	45.8	19	74	6	11		FALSE
2021-Jul-07 14:00		46.0	57.1	60.8	43.1	19.8	73	9	13		FALSE
2021-Jul-07 15:00		47.9	51.7	62.3	43.1	19.3	74	6	13		FALSE
2021-Jul-07 16:00		46.5	53.9	60.0	43.6	18.5	79	1	24		TRUE
2021-Jul-07 17:00		57.1	46.1	52.7	43.6	18.2	78	5	13		FALSE
2021-Jul-07 18:00		54.7	45.1	45.8	43.0	17.6	78	5	13		FALSE
2021-Jul-07 19:00		47.7	51.5	56.8	42.1	17.2	77	5	9		FALSE
2021-Jul-07 20:00		46.0	48.0	52.6	40.8	16.3	74	6	8		FALSE
2021-Jul-07 21:00		46.2	41.4	52.0	39.4	15.9	74	8	11		FALSE
2021-Jul-07 22:00		49.2	41.3	48.7	42.2	15.5	74	6	11		FALSE
2021-Jul-07 23:00		45.4	39.2	43.4	37.2	15.3	74	2	13		FALSE
2021-Jul-08 00:00		40.5	40.6	43.7	37.5	15.1	74	6	15		FALSE
2021-Jul-08 01:00		39.9	40.6	44.0	38.2	15.3	71	4	15		FALSE
2021-Jul-08 02:00		39.5	38.9	43.7	37.3	14.8	78	1	13		FALSE
2021-Jul-08 03:00		39.7	39.3	43.7	37.3	14	83	1	9		FALSE
2021-Jul-08 04:00		41.8	40.6	43.8	37.6	14.4	76	8	9		FALSE
2021-Jul-08 05:00		46.2	42.4	45.9	38.1	14.3	78	9	5		FALSE
2021-Jul-08 06:00		46.8	43.0	45.9	40.1	14.7	78	9	11		FALSE
2021-Jul-08 07:00		47.6	42.9	47.0	40.2	15.2	73	9	11		FALSE
2021-Jul-08 08:00		44.9	50.6	51.8	41.5	15.5	72	8	15		FALSE
2021-Jul-08 09:00		52.2	53.6	52.6	42.9	14.3	87		4	Thunderstorms, Moderate Rain	TRUE
2021-Jul-08 10:00		57.7	63.5	60.5	45.0	13.9	99	10	13	Thunderstorms, Heavy Rain, Fog	TRUE
2021-Jul-08 11:00		55.9	63.3	59.6	46.6	14.4	99		5	Thunderstorms, Rain	TRUE
2021-Jul-08 12:00		63.9	66.4	64.2	51.1	15.3	100	31	21	Thunderstorms, Moderate Rain, Fog	TRUE
2021-Jul-08 13:00		59.0	63.2	60.2	45.9	16.4	98	8	9	Rain	TRUE
2021-Jul-08 14:00		45.1	54.3	52.4	42.4	19.4	90	36	8		FALSE
2021-Jul-08 15:00		43.6	48.5	50.1	40.8	19	93	13	5	Rain	TRUE
2021-Jul-08 16:00		47.5	50.7	51.5	40.9	18.5	99	25	8	Rain	TRUE
2021-Jul-08 17:00		45.5	48.1	49.2	39.3	19.2	95	27	5		FALSE
2021-Jul-08 18:00		46.9	46.2	51.9	38.9	19.2	96	18	5		TRUE
2021-Jul-08 19:00		46.2	46.9	50.6	40.0	18.4	99	18	5		TRUE
2021-Jul-08 20:00		47.0	47.6	49.5	41.9	18.3	99		0		TRUE
2021-Jul-08 21:00		46.3	44.6	48.8	39.9	18.1	100	13	5		TRUE
2021-Jul-08 22:00		45.8	44.5	47.9	36.3	17.8	100	11	8		TRUE
2021-Jul-08 23:00		45.6	43.8	47.6	36.3	17.7	100	9	5	Fog	TRUE
2021-Jul-09 00:00		39.3	43.3	47.3	34.6	17.3	100	10	9	Fog	TRUE
2021-Jul-09 01:00		38.3	43.0	47.1	38.8	17.4	100	9	5	Rain, Fog	TRUE
2021-Jul-09 02:00		42.3	43.0	46.8	34.3	17.5	100	3	5	Rain, Fog	TRUE
2021-Jul-09 03:00		41.9	46.7	49.3	35.2	17.4	100		4	Fog	TRUE
2021-Jul-09 04:00		40.9	44.4	46.9	34.0	17.3	100	7	8	Fog	TRUE
2021-Jul-09 05:00		46.9	46.7	47.7	37.2	17.4	100	9	5	Fog	TRUE
2021-Jul-09 06:00		47.1	48.1	55.5	37.1	17.4	100		4	Fog	TRUE

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	Rel Hum (%)	Dir (10s)	Ind Spd (km)	Weather	Weather Exclude
2021-Jul-09 07:00		47.4	48.0	52.7	38.5	17.7	100		0	Fog	TRUE
2021-Jul-09 08:00		43.9	46.0	47.7	63.8	18.1	100	10	8	Fog	TRUE
2021-Jul-09 09:00		44.3	47.0	57.0	41.2	17.9	100	7	11		TRUE
2021-Jul-09 10:00		41.6	46.4	60.8	60.2	18.3	96	6	8		TRUE
2021-Jul-09 11:00		44.6	49.2	50.4	61.4	19.2	92	36	15		FALSE
2021-Jul-09 12:00		44.4	49.9	47.1	59.1	18.9	90	35	11		FALSE
2021-Jul-09 13:00		46.3	57.7	55.4	59.5	18.4	95	35	9	Rain, Fog	TRUE
2021-Jul-09 14:00		47.4	52.4	52.5	50.4	18.5	93	35	15	Rain	TRUE
2021-Jul-09 15:00		44.0	49.5	54.0	43.6	19.1	88	33	15		FALSE
2021-Jul-09 16:00		43.3	47.8	51.0	44.7	19.1	87	34	13		FALSE
2021-Jul-09 17:00		45.7	47.3	46.5	41.7	19	87	33	15		FALSE
2021-Jul-09 18:00		47.9	47.6	46.8	41.7	18.2	90	33	21		TRUE
2021-Jul-09 19:00		49.3	47.0	50.1	40.9	17.6	91	35	18		FALSE
2021-Jul-09 20:00			45.1	46.5	39.5	17.5	91	35	8		FALSE
2021-Jul-09 21:00			43.7		37.7	17.4	91	31	5		FALSE
2021-Jul-09 22:00			43.9			17.3	92	31	5		FALSE
2021-Jul-09 23:00			42.6			17.3	90	33	5		FALSE
2021-Jul-10 00:00						15.7	95	36	8		FALSE
2021-Jul-10 01:00						15.3	96	34	13		TRUE
2021-Jul-10 02:00						15	98	34	11		TRUE
2021-Jul-10 03:00						14.8	98	36	15		TRUE
2021-Jul-10 04:00						14.3	97	35	11		TRUE
2021-Jul-10 05:00						14.4	95	36	18		FALSE
2021-Jul-10 06:00						15.8	91	36	18		FALSE
2021-Jul-10 07:00						17.6	80	1	17		FALSE
2021-Jul-10 08:00						20	64	36	11		FALSE
2021-Jul-10 09:00						21.8	58	4	8		FALSE
2021-Jul-10 10:00						22.3	55	7	8		FALSE
2021-Jul-10 11:00						22.2	61		13		FALSE
2021-Jul-10 12:00						23.4	54	18	13		FALSE
2021-Jul-10 13:00						22.6	60	20	13		FALSE
2021-Jul-10 14:00						23	52	15	13		FALSE
2021-Jul-10 15:00						23.2	52	13	11		FALSE
2021-Jul-10 16:00						23.2	49	12	15		FALSE
2021-Jul-10 17:00						22.9	51	13	13		FALSE
2021-Jul-10 18:00						22.4	52	16	9		FALSE
2021-Jul-10 19:00						21.2	57	12	8		FALSE
2021-Jul-10 20:00						19.1	71		0		FALSE
2021-Jul-10 21:00						16.6	84	3	4		FALSE
2021-Jul-10 22:00						15.1	93	1	8		FALSE
2021-Jul-10 23:00						15	94	1	5		FALSE
2021-Jul-11 00:00						14.2	96	34	5		TRUE
2021-Jul-11 01:00						14.3	95	33	4		FALSE
2021-Jul-11 02:00						14	94	1	8		FALSE
2021-Jul-11 03:00						14.1	94	36	4		FALSE
2021-Jul-11 04:00						14.1	95	1	4		FALSE
2021-Jul-11 05:00						14.6	95	2	8		FALSE
2021-Jul-11 06:00						15.5	95	3	8		FALSE
2021-Jul-11 07:00						18.6	79	6	11		FALSE
2021-Jul-11 08:00						19.5	78	7	15		FALSE
2021-Jul-11 09:00						19.9	74	8	13		FALSE
2021-Jul-11 10:00						20.6	67	8	13		FALSE
2021-Jul-11 11:00						21.1	71	7	11		FALSE
2021-Jul-11 12:00		57.4				21.3	73	10	11		FALSE
2021-Jul-11 13:00		46.3				21.4	74	12	11		FALSE
2021-Jul-11 14:00	55.7	44.3		59.4	42.4	20.9	78	11	13		FALSE
2021-Jul-11 15:00	60.6	48.2		62.8	45.3	21	80	9	11		FALSE
2021-Jul-11 16:00	51.6	45.8	51.5	53.5	42.3	21.7	73	7	9		FALSE
2021-Jul-11 17:00	55.5	51.3	54.1	58.8	42.5	22.2	68	9	13		FALSE
2021-Jul-11 18:00	54.8	47.5	52.7	55.8	43.0	21.5	78	11	11		FALSE
2021-Jul-11 19:00	53.2	53.0	51.4	54.2	42.1	20.8	83	12	8		FALSE
2021-Jul-11 20:00	54.0	47.0	48.1	53.8	41.7	19.8	87	9	15		FALSE
2021-Jul-11 21:00	55.9	47.8	50.5	57.4	43.3	19.6	87	6	9		FALSE
2021-Jul-11 22:00	54.0	47.8	51.5	55.4	40.8	19.5	88	8	9		FALSE
2021-Jul-11 23:00	46.7	46.2	41.3	45.4	39.0	19.3	91	3	9		FALSE
2021-Jul-12 00:00	45.3	42.9	40.1	44.1	37.4	19.1	93	7	8		FALSE
2021-Jul-12 01:00	44.1	41.1	38.8	44.0	36.6	19.3	88	5	8		FALSE
2021-Jul-12 02:00	43.2	40.5	37.8	43.5	35.8	18.7	92	2	8		FALSE
2021-Jul-12 03:00	43.6	39.7	37.2	43.4	35.4	19.2	82	8	11		FALSE
2021-Jul-12 04:00	46.7	41.8	40.3	47.3	36.0	18.9	86	7	9		FALSE
2021-Jul-12 05:00	45.4	47.0	42.3	44.7	37.4	18.7	90	1	9		FALSE
2021-Jul-12 06:00	46.4	47.0	44.6	45.2	38.7	19.1	93	2	11		FALSE

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	dir (10s)	nd Spd (km	Weather	Weather Exclude
2021-Jul-12 07:00	69.0	47.2	47.6	51.5	40.2	20	86	8	11		FALSE
2021-Jul-12 08:00	71.0	55.5	53.7	45.3	42.7	21.1	79	6	9		FALSE
2021-Jul-12 09:00	48.1	47.1	49.4	46.1	43.2	22.3	70	10	13		FALSE
2021-Jul-12 10:00	50.1	50.5	51.7	49.6	54.7	23	71	7	13		FALSE
2021-Jul-12 11:00	50.9	49.7	48.6	51.3	47.8	22.7	71	11	9		FALSE
2021-Jul-12 12:00	58.2	48.8	55.0	58.7	46.3	23.6	70	11	9		FALSE
2021-Jul-12 13:00	56.5	49.7	54.1	59.4	47.8	23.9	69	17	11		FALSE
2021-Jul-12 14:00	55.9	50.4	52.4	59.4	45.9	22.2	78	14	11		FALSE
2021-Jul-12 15:00	56.9	47.6	57.8	59.7	45.6	22.6	78	12	5		FALSE
2021-Jul-12 16:00	52.7	50.4	50.4	53.1	43.3	22.8	74	9	17		FALSE
2021-Jul-12 17:00	60.3	48.5	61.7	64.2	45.0	23	73	8	17		FALSE
2021-Jul-12 18:00	56.6	49.4	56.9	60.0	46.5	23.1	72	9	13		FALSE
2021-Jul-12 19:00	49.6	49.3	52.2	47.9	44.8	22.4	75	10	13		FALSE
2021-Jul-12 20:00	48.5	49.2	45.0	49.4	42.2	21.3	81	10	9		FALSE
2021-Jul-12 21:00	52.6	47.6	50.6	55.5	41.6	20.6	85	6	8		FALSE
2021-Jul-12 22:00	50.6	47.7	46.7	51.7	41.8	20.4	86	10	9		FALSE
2021-Jul-12 23:00	46.7	46.7	40.8	47.3	41.1	20.2	88	9	8		FALSE
2021-Jul-13 00:00	46.3	43.7	41.1	44.8	39.0	19.9	93	9	8	Rain	TRUE
2021-Jul-13 01:00	45.4	42.6	41.5	45.0	38.8	19.9	95	7	13		FALSE
2021-Jul-13 02:00	45.4	42.8	42.1	44.9	38.7	20	96	9	9		TRUE
2021-Jul-13 03:00	44.7	40.4	40.7	44.1	37.4	19.7	98	9	8		TRUE
2021-Jul-13 04:00	45.0	42.1	42.2	44.7	38.5	19.6	99	11	8		TRUE
2021-Jul-13 05:00	46.2	47.4	44.3	45.3	39.2	19.5	100	7	8		TRUE
2021-Jul-13 06:00	47.1	47.7	44.9	47.1	41.6	20.1	99	8	8		TRUE
2021-Jul-13 07:00	51.5	47.8	45.6	49.7	40.9	20.7	98	10	15		TRUE
2021-Jul-13 08:00	47.6	47.7	44.7	47.6	40.7	21.5	96	10	13		TRUE
2021-Jul-13 09:00	48.2	46.8	45.8	48.0	44.8	22	94	9	13		FALSE
2021-Jul-13 10:00	47.7	44.7	44.4	52.6	44.7	23.7	88	12	15		FALSE
2021-Jul-13 11:00	49.2	46.0	45.2	49.2	48.2	23.8	88	12	9		FALSE
2021-Jul-13 12:00	49.9	44.9	48.0	52.1	44.9	25.2	81	14	13		FALSE
2021-Jul-13 13:00	48.0	44.4	48.2	50.2	43.9	25.9	78	15	17		FALSE
2021-Jul-13 14:00	49.8	46.0	48.6	52.9	44.9	26.8	73	18	13		FALSE
2021-Jul-13 15:00	58.6	63.7	62.4	59.7	60.3	23.4	95	13	17	Thunderstorms, Heavy Rain, Fog	TRUE
2021-Jul-13 16:00	50.4	45.9	54.9	49.6	47.2	24.1	91	12	13		FALSE
2021-Jul-13 17:00	52.1	51.3	55.5	52.9	50.2	24.1	94	12	11		FALSE
2021-Jul-13 18:00	48.7	47.6	49.0	48.3	46.7	23.6	93	11	8		FALSE
2021-Jul-13 19:00	48.5	47.2	47.1	48.3	48.2	23.3	92	15	5		FALSE
2021-Jul-13 20:00	48.3	47.5	47.8	48.8	46.5	22.8	90	19	13		FALSE
2021-Jul-13 21:00	47.9	47.8	48.9	49.1	46.4	21.9	96	21	17		TRUE
2021-Jul-13 22:00	47.8	47.8	45.2	48.3	46.0	21.6	94	19	18		FALSE
2021-Jul-13 23:00	47.0	47.7	44.6	47.7	45.1	21.6	94	22	13		FALSE
2021-Jul-14 00:00	46.5	43.7	44.9	47.0	44.1	21.4	97	20	11	Rain	TRUE
2021-Jul-14 01:00	50.0	47.6	50.5	49.9	43.1	21.1	100		4		TRUE
2021-Jul-14 02:00	45.4	38.7	43.9	46.4	40.3	20.6	100	20	5		TRUE
2021-Jul-14 03:00	45.0	40.0	42.8	45.8	40.8	20.6	100	19	8		TRUE
2021-Jul-14 04:00	44.7	42.0	42.5	45.7	40.1	20.6	98	24	8		TRUE
2021-Jul-14 05:00	46.0	47.0	45.3	46.3	39.9	20.2	98	26	8		TRUE
2021-Jul-14 06:00	45.6	48.6	45.5	46.6	44.7	20.6	94	26	13		FALSE
2021-Jul-14 07:00	46.3	48.0	45.9	47.6	44.7	21.6	87	26	13		FALSE
2021-Jul-14 08:00	47.6	46.3	48.2	49.4	47.9	22.5	84	28	11		FALSE
2021-Jul-14 09:00	48.8	47.6	48.9	50.8	45.5	23.5	73	27	17		FALSE
2021-Jul-14 10:00	52.3	50.7	51.3	55.4	53.0	24.5	67	26	15		FALSE
2021-Jul-14 11:00	52.1	49.2	56.4	59.2	50.1	25.5	62	29	9		FALSE
2021-Jul-14 12:00	50.4	50.2	50.1	63.4	49.5	26.6	56	24	13		FALSE
2021-Jul-14 13:00	49.0	54.9	48.7	49.5	51.3	26	67	20	17		FALSE
2021-Jul-14 14:00	48.9	57.8	51.0	48.2	54.0	26.7	64	20	17		FALSE
2021-Jul-14 15:00	50.9	57.8	49.8	49.9	58.4	26.8	63	21	17		FALSE
2021-Jul-14 16:00	49.3	58.6	55.1	48.4	53.5	26.8	62	18	15		FALSE
2021-Jul-14 17:00	51.5	55.3	50.8	52.8	50.5	26.9	63	19	15		FALSE
2021-Jul-14 18:00	50.9	57.9	48.0	50.7	51.4	25.3	74	21	15		FALSE
2021-Jul-14 19:00	50.3	59.3	47.4	55.8	52.8	25.1	76	19	8		FALSE
2021-Jul-14 20:00	49.1	58.1	48.2	50.3	52.2	23.9	83	23	8		FALSE
2021-Jul-14 21:00	46.2	57.6	45.5	46.5	51.7	23.4	85	18	8		FALSE
2021-Jul-14 22:00	46.7	53.3	45.3	46.1	45.6	22.7	90	17	8		FALSE
2021-Jul-14 23:00	48.8	48.0	47.1	47.9	43.4	22	95	16	4		FALSE
2021-Jul-15 00:00	45.5	43.2	43.2	44.9	42.3	21.1	99	15	8		TRUE
2021-Jul-15 01:00	44.4	41.5	41.7	44.1	41.2	20.2	100		4	Fog	TRUE
2021-Jul-15 02:00	43.7	42.3	41.0	44.4	39.6	19.8	100	10	5	Fog	TRUE
2021-Jul-15 03:00	42.8	41.5	41.2	44.3	38.7	19.3	100	7	4	Fog	TRUE
2021-Jul-15 04:00	43.3	43.1	42.5	44.3	38.8	19.6	100	14	4	Fog	TRUE
2021-Jul-15 05:00	45.2	47.4	45.0	45.7	40.1	19.7	100		4	Fog	TRUE

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Jul-15 06:00	45.4	47.3	47.2	47.2	41.2	20	100	12	4	Fog	TRUE
2021-Jul-15 07:00		47.7	49.6	48.5	45.0	22	93	16	8		FALSE
2021-Jul-15 08:00		46.4	50.6	60.5	56.6	22.9	84	18	11		FALSE
2021-Jul-15 09:00		55.5	49.2	55.3	59.6	23.7	82	18	8		FALSE
2021-Jul-15 10:00		57.4	50.5	49.3	58.7	24.2	76	18	15		FALSE
2021-Jul-15 11:00		60.9	50.5	49.4	59.3	24.9	75	17	13		FALSE
2021-Jul-15 12:00		53.9	51.1	49.5	58.4	25.7	72	17	17		FALSE
2021-Jul-15 13:00	49.2	59.3	51.0	49.7	60.8	26.8	67	19	18		FALSE
2021-Jul-15 14:00	49.8	55.5	51.3	52.5	59.0	27	67	20	30		TRUE
2021-Jul-15 15:00	52.3	59.1	54.2	56.0	60.6	27.3	65	20	34		TRUE
2021-Jul-15 16:00	52.7	56.5	54.0	55.3	60.0	27	65	20	30		TRUE
2021-Jul-15 17:00	52.1	54.5	53.8	54.4	69.8	26.3	69	20	30	Thunderstorms	TRUE
2021-Jul-15 18:00	50.3	52.2	51.1	53.5	52.4	25.9	70	22	26		TRUE
2021-Jul-15 19:00										Thunderstorms, Rain, Fog	
	54.0	60.7	58.0	55.8	61.7	22.7	91	30	35		TRUE
2021-Jul-15 20:00	60.7	60.9	65.5	62.4	63.5	22.4	94	29	9		FALSE
2021-Jul-15 21:00	56.4	55.5	61.1	58.9	57.7	22.4	98	23	5		TRUE
2021-Jul-15 22:00	44.7	49.8	51.0	49.4	48.6	22.1	92	27	15		FALSE
2021-Jul-15 23:00	44.5	49.8	47.2	49.3	47.9	20.6	92	27	8		FALSE
2021-Jul-16 00:00	44.1	47.8	45.9	48.7	47.7	19.9	92	27	13		FALSE
2021-Jul-16 01:00	42.8	47.0	44.4	48.2	47.3	19.4	91	29	15		FALSE
2021-Jul-16 02:00	41.9	45.3	43.7	47.9	45.1	18.9	92	30	9		FALSE
2021-Jul-16 03:00	41.2	44.8	43.0	47.7	45.0	18.4	93	31	13		FALSE
2021-Jul-16 04:00	41.7	45.0	43.0	47.6	45.1	18.5	94	26	9		FALSE
2021-Jul-16 05:00	43.4	47.2	44.2	47.8	46.2	17.9	94	31	8		FALSE
2021-Jul-16 06:00	45.1	47.7	45.1	48.8	48.3	18	92	31	8		FALSE
2021-Jul-16 07:00	44.9	46.2	49.0	49.2	48.0	18.7	89	33	9		FALSE
2021-Jul-16 08:00	47.0	47.1	49.5	50.5	51.4	19.7	83	33	17		FALSE
2021-Jul-16 09:00	51.9	49.9	59.4	58.4	62.9	20.7	75	30	9		FALSE
2021-Jul-16 10:00	48.2	44.4	45.2	50.5	57.5	21.7	67	29	9		FALSE
2021-Jul-16 11:00	50.2	44.6	48.7	54.8	51.5	22.9	58	35	8		FALSE
2021-Jul-16 12:00	48.0	44.3	57.3	51.5	75.3	22.8	59	1	13		FALSE
2021-Jul-16 13:00	52.0	49.3	70.8	55.3	52.7	23.2	56	36	11		FALSE
2021-Jul-16 14:00	48.6	42.2	46.2	51.9	51.2	23.5	53	36	9		FALSE
2021-Jul-16 15:00	47.4	44.8	55.0	48.5	50.6	23	70	12	11		FALSE
2021-Jul-16 16:00	57.2	43.2	56.4	61.2	50.3	23.5	66	18	8		FALSE
2021-Jul-16 17:00	51.6	44.2	51.6	53.9	48.0	22.6	73	19	5		FALSE
2021-Jul-16 18:00	50.7	60.4	48.0	54.1	57.1	21.5	79	22	8		FALSE
2021-Jul-16 19:00	50.3	54.1	45.9	53.7	55.5	20.8	81		0		FALSE
2021-Jul-16 20:00	44.5	47.1	43.5	47.0	46.1	20.4	84		0	Fog	TRUE
2021-Jul-16 21:00	41.6	51.2	42.3	47.6	51.0	19.9	90		0		FALSE
2021-Jul-16 22:00		49.2	41.6	46.7	45.9	19.2	94	7	4		FALSE
2021-Jul-16 23:00		46.9	45.5	58.8	45.6	19	95	1	5		FALSE
2021-Jul-17 00:00		41.6	41.6	45.6	45.7	18.7	94	7	8		FALSE
2021-Jul-17 01:00		41.2	40.3	45.2	46.3	18.4	89	2	11		FALSE
2021-Jul-17 02:00		43.0	40.1	45.5	47.6	18.7	86		0		FALSE
2021-Jul-17 03:00		44.1	38.3	45.3	47.3	17.9	91	1	8		FALSE
2021-Jul-17 04:00		41.9	38.9	45.0	43.5	17.8	93	4	5		FALSE
2021-Jul-17 05:00		47.3	41.6	45.8	44.0	19.1	80	9	8		FALSE
2021-Jul-17 06:00		46.9	42.5	46.6	44.6	19	83	3	9		FALSE
2021-Jul-17 07:00		47.1	47.7	52.6	52.3	19.3	82	6	13		FALSE
2021-Jul-17 08:00		47.7	52.0	56.1	47.1	18.9	87	11	9	Rain	TRUE
2021-Jul-17 09:00		49.6	52.6	54.7	50.2	18.5	95	5	8	Rain	TRUE
2021-Jul-17 10:00		52.8	54.4	56.3	52.9	18.7	96	4	15	Rain	TRUE
2021-Jul-17 11:00		51.2	52.4	52.7	52.2	19.7	93	1	9	Rain	TRUE
2021-Jul-17 12:00		47.7	49.2	53.1	50.8	19.6	90	2	11	Rain	TRUE
2021-Jul-17 13:00		47.6	48.3	47.3	49.3	20	83	5	21	Rain	TRUE
2021-Jul-17 14:00		48.4	50.5	50.8	48.5	20	81	6	15	Rain	TRUE
2021-Jul-17 15:00		50.4	46.8	47.2	47.8	20.2	73	5	17		FALSE
2021-Jul-17 16:00		45.2	45.6	46.2	46.1	20.2	79	5	5		FALSE
2021-Jul-17 17:00		48.7	43.6	45.4	45.3	21.3	76	4	8		FALSE
2021-Jul-17 18:00		47.6	44.4	45.4	46.3	21.4	70	5	9		FALSE
2021-Jul-17 19:00		47.5	50.4	56.1	50.3	20.7	79	10	4		FALSE
2021-Jul-17 20:00		46.6	47.1	50.4	45.0	20.2	84		0		FALSE
2021-Jul-17 21:00		47.1	43.0	47.2	46.2	19.4	95		0		FALSE
2021-Jul-17 22:00		46.9	42.9	46.1	45.6	18.9	96	32	5		TRUE
2021-Jul-17 23:00		51.0	41.6	45.5	49.8	19	97		0	Rain	TRUE
2021-Jul-18 00:00		41.7	40.6	44.8	44.8	19.7	89	34	11		FALSE
2021-Jul-18 01:00		40.4	40.6	44.7	44.3	19.1	93	35	8		FALSE
2021-Jul-18 02:00		43.4	40.7	44.9	46.5	19.6	91	34	9		FALSE
2021-Jul-18 03:00		40.2	40.1	44.6	44.0	18.8	95	35	5		FALSE
2021-Jul-18 04:00		41.8	39.9	44.7	44.0	18.7	96	4	4		TRUE

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	dir (10s)	nd Spd (km	Weather	Weather Exclude
2021-Jul-18 05:00		47.4	41.8	45.2	44.2	18.3	97	36	8		TRUE
2021-Jul-18 06:00		46.9	42.2	45.4	45.3	19	97	36	9		TRUE
2021-Jul-18 07:00		47.0	43.2	46.6	45.1	21.2	86	4	5		FALSE
2021-Jul-18 08:00		46.8	43.7	46.5	46.3	22.1	86	33	8		FALSE
2021-Jul-18 09:00		44.5	44.1	47.2	46.1	23.7	76	1	8		FALSE
2021-Jul-18 10:00		46.0	54.9	55.8	46.7	24.8	65		4		FALSE
2021-Jul-18 11:00		54.6	61.3	60.7	48.9	24.9	71	17	11		FALSE
2021-Jul-18 12:00		48.9	55.5	59.0	49.9	25.3	69	18	11		FALSE
2021-Jul-18 13:00		48.0	53.6	58.3	49.0	25.5	70	17	11		FALSE
2021-Jul-18 14:00		48.8	56.8	59.5	50.0	24.9	74	20	11		FALSE
2021-Jul-18 15:00		58.3	50.6	55.7	58.7	25.3	77	16	11		FALSE
2021-Jul-18 16:00		55.0	59.2	47.9	57.8	27.8	49		17		FALSE
2021-Jul-18 17:00		52.5	46.8	46.5	53.6	28	54	32	17		FALSE
2021-Jul-18 18:00		52.4	47.2	48.0	50.2	26.7	58	32	13		FALSE
2021-Jul-18 19:00		51.3	47.5	47.5	49.8	24.4	64	6	11		FALSE
2021-Jul-18 20:00		49.6	48.0	50.0	48.5	22.8	69	34	9		FALSE
2021-Jul-18 21:00		49.7	44.9	47.5	47.2	22.1	71	33	11		FALSE
2021-Jul-18 22:00		49.2	44.0	45.7	47.4	21.8	68	35	15		FALSE
2021-Jul-18 23:00		49.3	44.5	48.3	46.7	21.8	71	34	21		TRUE
2021-Jul-19 00:00		46.3	44.0	45.9	45.8	21	73	33	17		FALSE
2021-Jul-19 01:00		43.7	41.9	45.4	44.8	20.5	76	34	15		FALSE
2021-Jul-19 02:00		43.2	40.9	45.4	44.2	20.4	78	35	18		FALSE
2021-Jul-19 03:00		41.7	41.5	45.4	43.8	20.4	80	34	17		FALSE
2021-Jul-19 04:00		44.0	41.8	45.0	44.5	20	83	35	18		FALSE
2021-Jul-19 05:00		48.9	45.8	46.1	45.4	20	85	35	18		FALSE
2021-Jul-19 06:00		49.2	45.6	46.9	46.9	20.2	86	35	18		FALSE
2021-Jul-19 07:00		49.0	46.1	47.6	50.4	21.3	83	36	15		FALSE
2021-Jul-19 08:00		49.8	47.3	54.4	52.5	22.9	79	35	11		FALSE
2021-Jul-19 09:00		66.7	44.9	48.2	50.7	24.7	75	31	11		FALSE
2021-Jul-19 10:00		49.4	47.6	55.0	53.2	26.3	70	32	8		FALSE
2021-Jul-19 11:00		53.6	47.1	60.0	55.6	27.2	63	32	13		FALSE
2021-Jul-19 12:00		51.4	46.3	49.8	62.0	27.9	53	32	21	Haze	TRUE
2021-Jul-19 13:00	48.8	50.3	47.2	50.2	49.9	28.3	49	34	22		TRUE
2021-Jul-19 14:00	49.1	49.3	50.8	50.0	52.5	28.3	52	30	22	Haze	TRUE
2021-Jul-19 15:00	50.0	50.6	49.7	53.3	53.9	27.8	57	32	22	Haze	TRUE
2021-Jul-19 16:00	50.7	48.5	49.9	54.0	49.4	27.4	62	33	15	Haze	FALSE
2021-Jul-19 17:00	50.3	48.8	50.7	52.8	48.4	27.1	63	33	13	Haze	FALSE
2021-Jul-19 18:00	46.8	49.1	46.0	47.5	53.7	26.4	65	32	11	Haze	FALSE
2021-Jul-19 19:00	45.9	49.1	46.3	48.0	50.6	25.6	69	30	5	Haze	FALSE
2021-Jul-19 20:00	46.8	49.1	45.3	53.1	51.1	24.3	72	32	9	Haze	FALSE
2021-Jul-19 21:00	45.4	49.5	44.2	47.5	51.4	23	77	34	13	Haze	FALSE
2021-Jul-19 22:00	46.3	49.6	43.8	46.0	49.8	22.4	79	33	9	Haze	FALSE
2021-Jul-19 23:00	46.4	48.3	43.1	45.5	48.6	21.9	81	24	5	Haze	FALSE
2021-Jul-20 00:00	45.6	43.9	45.2	45.2	47.2	20.8	87	24	5	Haze	FALSE
2021-Jul-20 01:00	44.5	41.7	42.0	44.7	46.1	19.6	92		4	Fog	TRUE
2021-Jul-20 02:00	43.7	39.3	40.9	44.4	45.6	19	94		4	Fog	TRUE
2021-Jul-20 03:00	43.9	42.6	40.3	44.7	43.2	18.5	96		4	Fog	TRUE
2021-Jul-20 04:00	43.9	42.3	41.9	44.7	43.9	18.3	97		4	Fog	TRUE
2021-Jul-20 05:00	46.5	47.7	47.5	46.0	46.9	18	97		0	Fog	TRUE
2021-Jul-20 06:00	48.7	48.5	46.3	48.3	47.1	19.2	94		0	Fog	TRUE
2021-Jul-20 07:00	51.0	48.5	46.3	49.0	47.0	21.5	85	24	5	Haze	FALSE
2021-Jul-20 08:00	47.8	47.1	49.6	50.0	51.8	23.2	72	22	8	Haze	FALSE
2021-Jul-20 09:00	48.8	58.1	48.4	49.6	54.9	24.8	64	22	8		FALSE
2021-Jul-20 10:00	49.3	55.0	47.3	48.4	58.1	25.3	63	24	9		FALSE
2021-Jul-20 11:00	49.8	57.5	69.2	50.1	56.8	25.4	62	19	13	Haze	FALSE
2021-Jul-20 12:00	48.1	53.8	66.1	52.9	54.6	26.4	61	20	18	Haze	FALSE
2021-Jul-20 13:00	49.3	51.8	49.0	51.1	55.0	26.5	65	22	17	Haze	FALSE
2021-Jul-20 14:00	50.2	50.1	51.5	50.5	51.1	24.7	70	21	13	Haze	FALSE
2021-Jul-20 15:00	50.0	49.8	47.9	47.7	51.1	26.5	67	26	9	Haze	FALSE
2021-Jul-20 16:00	52.5	55.5	55.1	53.2	54.0	22.4	81	34	22	Thunderstorms, Rain	TRUE
2021-Jul-20 17:00	47.7	50.0	50.9	47.8	49.7	21.6	84	33	15	Rain	TRUE
2021-Jul-20 18:00	46.4	50.4	47.7	49.5	49.0	21.5	78	34	11		FALSE
2021-Jul-20 19:00	55.0	51.2	48.6	59.0	54.6	21.6	77	36	9		FALSE
2021-Jul-20 20:00	46.3	48.8	44.2	50.3	47.9	20.6	81	35	8		FALSE
2021-Jul-20 21:00	44.7	48.7	42.0	45.5	47.3	20.6	85	33	9		FALSE
2021-Jul-20 22:00	46.2	49.2	42.6	44.9	47.4	19	85	4	17	Rain	TRUE
2021-Jul-20 23:00	46.3	47.8	43.5	44.8	47.0	18.5	95	1	9		FALSE
2021-Jul-21 00:00	45.2	44.4	42.3	44.7	45.5	17.6	92	1	13		FALSE
2021-Jul-21 01:00	44.1	42.9	39.5	44.1	44.2	16.7	89	1	13		FALSE
2021-Jul-21 02:00	43.1	42.3	39.2	43.6	43.8	15.7	92	35	11		FALSE
2021-Jul-21 03:00	43.3	41.8	37.0	43.4	43.6	14.8	94	34	9		FALSE
2021-Jul-21 04:00	43.0	43.1	38.1	43.8	44.0	14.4	94	34	11		FALSE

Blank spaces indicate missing data

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	Dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Jul-21 05:00	45.6	47.0	42.1	44.8	45.4	14	93	33	11		FALSE
2021-Jul-21 06:00	49.4	47.3	43.9	45.5	47.3	14.9	90	34	11		FALSE
2021-Jul-21 07:00	48.3	48.1	45.7	49.2	50.7	16.5	82	34	13		FALSE
2021-Jul-21 08:00	49.3	49.0	46.7	49.9	50.3	18.5	75	34	21		TRUE
2021-Jul-21 09:00	47.7	48.6	61.5	48.4	49.6	20.3	64	34	13		FALSE
2021-Jul-21 10:00	51.3	50.5	49.6	54.9	51.0	22	53	32	18		FALSE
2021-Jul-21 11:00	58.9	54.9	47.7	55.4	51.5	23.1	45	2	26		TRUE
2021-Jul-21 12:00	51.2	55.0	49.2	55.2	53.7	23.7	43	35	21		TRUE
2021-Jul-21 13:00	49.7	54.3	50.2	50.3	68.9	24	42	35	24		TRUE
2021-Jul-21 14:00	52.5	53.3	54.3	62.6	68.5	24.4	42	33	15		FALSE
2021-Jul-21 15:00	49.6	51.2	49.6	54.5	59.9	23.2	41	35	18		FALSE
2021-Jul-21 16:00	48.0	53.7	56.1	49.2	53.4	24.4	39	32	17		FALSE
2021-Jul-21 17:00	49.4	55.1	48.5	51.8	53.8	24.4	38	31	21		TRUE
2021-Jul-21 18:00	48.4	51.9	48.5	56.2	53.5	23.4	42	33	13		FALSE
2021-Jul-21 19:00		64.2	47.2	54.1	51.9	21.6	56	31	21		TRUE
2021-Jul-21 20:00		49.4	46.5	48.9	50.8	19.9	62	31	17		FALSE
2021-Jul-21 21:00		49.2	46.1	46.0	48.2	18.7	66	31	15		FALSE
2021-Jul-21 22:00		49.7	47.5	55.2	49.7	17.9	71	34	15		FALSE
2021-Jul-21 23:00		47.8	44.4	46.0	46.5	17.1	76	34	15		FALSE
2021-Jul-22 00:00		42.1	42.2	43.6	45.3	16.4	81	34	15		FALSE
2021-Jul-22 01:00		40.6	40.0	43.3	44.8	15.8	85	34	11		FALSE
2021-Jul-22 02:00		42.8	37.8	43.2	47.4	15.2	89	35	11		FALSE
2021-Jul-22 03:00		40.1	37.3	43.0	44.6	15.2	90	34	9		FALSE
2021-Jul-22 04:00		42.3	38.1	43.2	45.0	14.7	92	34	9		FALSE
2021-Jul-22 05:00		47.0	41.8	46.3	46.3	14.7	95	34	11		FALSE
2021-Jul-22 06:00		48.2	44.4	58.9	48.6	15.2	95	35	11		FALSE
2021-Jul-22 07:00		48.2	45.2	49.5	51.1	17.1	89	34	11		FALSE
2021-Jul-22 08:00		50.4	46.7	52.5	61.7	19.6	79	33	9		FALSE
2021-Jul-22 09:00		49.0	62.6	58.4	61.7	21.2	67	30	8		FALSE
2021-Jul-22 10:00		48.0	52.2	49.3	62.1	22.7	54	33	9		FALSE
2021-Jul-22 11:00		60.9	49.2	60.4	52.6	24	44	32	15		FALSE
2021-Jul-22 12:00		50.0	57.6	54.0	52.2	24.6	45	35	21		TRUE
2021-Jul-22 13:00		50.5	52.2	54.3	56.7	24.3	41	34	11		FALSE
2021-Jul-22 14:00		50.0	52.0	60.5	54.0	24.8	42		13		FALSE
2021-Jul-22 15:00		49.8	49.3	53.0	52.2	23	56	29	11		FALSE
2021-Jul-22 16:00		49.4	51.8	55.6	51.4	24.8	48	31	18		FALSE
2021-Jul-22 17:00		50.6	51.6	53.3	51.4	24.4	43	35	13		FALSE
2021-Jul-22 18:00		50.0	48.6	47.9	51.6	23.4	49	35	17		FALSE
2021-Jul-22 19:00		51.0	46.3	47.4	52.3	22.2	54	33	11		FALSE
2021-Jul-22 20:00		49.8	45.8	51.4	50.6	20.2	60	33	9		FALSE
2021-Jul-22 21:00		49.1	43.7	47.9	50.0	18.2	69	33	8		FALSE
2021-Jul-22 22:00		50.5	44.3	46.8	51.6	17	74	35	8		FALSE
2021-Jul-22 23:00		46.6	41.7	45.8	46.6	15.6	81	36	8		FALSE
2021-Jul-23 00:00		42.9	41.6	44.5	46.4	14.7	85	1	8		FALSE
2021-Jul-23 01:00		40.0	38.2	43.7	45.2	15.5	82	35	13		FALSE
2021-Jul-23 02:00		41.2	37.7	43.5	45.2	14.2	87	35	11		FALSE
2021-Jul-23 03:00		41.4	37.5	43.3	45.1	14.1	92	34	9		FALSE
2021-Jul-23 04:00		42.8	38.9	43.4	45.5	15	93	35	13		FALSE
2021-Jul-23 05:00		46.5	42.7	44.6	46.9	14.5	96	34	9		TRUE
2021-Jul-23 06:00		48.1	46.6	46.8	48.7	16.2	91	35	13	Rain	TRUE
2021-Jul-23 07:00		48.4	46.2	49.8	50.1	18.7	77	35	13		FALSE
2021-Jul-23 08:00		48.1	47.1	49.5	52.5	20.7	62	35	13		FALSE
2021-Jul-23 09:00		48.7	46.0	52.6	51.8	21.8	53	33	9		FALSE
2021-Jul-23 10:00		50.6	46.9	51.2	50.9	23.1	45		9		FALSE
2021-Jul-23 11:00		48.8	43.5	50.4	49.9	23.9	43	36	11		FALSE
2021-Jul-23 12:00		58.1	56.4	54.3	73.0	23.8	52	18	13		FALSE
2021-Jul-23 13:00	50.0	58.0	52.1	50.9	74.1	23.8	47	20	17		FALSE
2021-Jul-23 14:00	50.2	55.8	53.2	51.0	58.5	23.8	45	21	18		FALSE
2021-Jul-23 15:00	51.7	56.9	49.2	56.3	59.3	24.1	45	20	17		FALSE
2021-Jul-23 16:00	51.9	57.1	47.4	50.0	60.8	24.5	45	21	13		FALSE
2021-Jul-23 17:00	52.5	58.9	47.6	48.8	62.1	24.4	42	19	15		FALSE
2021-Jul-23 18:00	51.5	56.0	45.3	47.3	58.2	24.3	44	22	9		FALSE
2021-Jul-23 19:00	54.5	57.6	44.9	49.4	58.5	23.2	47	20	8		FALSE
2021-Jul-23 20:00	53.7	52.9	45.7	48.0	57.2	21.8	54	21	4		FALSE
2021-Jul-23 21:00	47.7	47.4	43.3	47.1	49.5	17.7	76	9	5		FALSE
2021-Jul-23 22:00	50.2	50.0	47.8	50.5	50.2	16.4	81	35	4		FALSE
2021-Jul-23 23:00	47.7	48.3	43.5	46.1	50.2	15.7	83	36	4		FALSE
2021-Jul-24 00:00	46.7	43.2	41.8	45.4	51.7	15.2	84	3	5		FALSE
2021-Jul-24 01:00	53.0	40.8	40.6	44.7	52.5	14.8	85	32	5		FALSE
2021-Jul-24 02:00	47.5	40.9	38.7	43.8	51.3	13.7	89	1	5		FALSE
2021-Jul-24 03:00	45.9	39.4	38.3	43.6	51.3	13	94	1	8		FALSE
2021-Jul-24 04:00	46.0	40.2	37.6	43.4	51.5	13.9	89		0		FALSE

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Jul-24 05:00	47.9	44.3	41.2	46.3	51.7	12.2	96	2	5		TRUE
2021-Jul-24 06:00	48.1	45.0	42.4	47.0	51.8	17.1	93	9	9		FALSE
2021-Jul-24 07:00	51.3	44.8	48.6	53.3	51.9	18.9	88	10	13		FALSE
2021-Jul-24 08:00	54.4	46.7	52.7	56.8	52.5	20.9	79	13	13		FALSE
2021-Jul-24 09:00	54.3	47.1	52.8	57.3	52.3	21.6	74	13	13		FALSE
2021-Jul-24 10:00	57.0	48.3	53.9	61.3	61.3	22.2	66	14	15		FALSE
2021-Jul-24 11:00	58.2	48.7	53.3	59.9	55.0	22.8	63	15	13		FALSE
2021-Jul-24 12:00	56.4	47.5	57.8	59.4	52.8	22.4	68	14	9		FALSE
2021-Jul-24 13:00	52.6	49.4	60.7	53.4	53.4	22.2	74	13	9		FALSE
2021-Jul-24 14:00	49.3	50.0	51.7	48.0	49.4	21.6	84	11	9	Rain	TRUE
2021-Jul-24 15:00	48.6	44.0	45.1	46.9	54.3	22.1	83	13	11	Rain	TRUE
2021-Jul-24 16:00	49.0	45.0	45.7	48.0	50.1	21.9	78	15	17	Rain	TRUE
2021-Jul-24 17:00	48.0	48.3	47.6	48.1	50.9	21.3	86	18	11		FALSE
2021-Jul-24 18:00	52.0	51.9	51.7	51.9	54.7	20.9	90	17	8	Rain, Fog	TRUE
2021-Jul-24 19:00	48.5	46.3	45.7	48.0	52.1	20.8	93	13	9		FALSE
2021-Jul-24 20:00	48.1	45.9	45.4	46.9	51.4	21.4	95	14	5		FALSE
2021-Jul-24 21:00	50.1	47.9	48.1	50.9	52.3	21.8	94	20	17		FALSE
2021-Jul-24 22:00	53.5	52.7	54.1	55.7	55.5	21.4	97	24	11	Rain, Fog	TRUE
2021-Jul-24 23:00	53.3	53.6	57.1	55.4	55.6	21	97	21	24	Rain	TRUE
2021-Jul-25 00:00	47.1	44.1	49.1	48.3	50.6	20.9	99	24	15		TRUE
2021-Jul-25 01:00	45.0	40.0	44.2	46.0	49.9	20.3	100	29	8	Fog	TRUE
2021-Jul-25 02:00	44.8	39.3	42.7	45.3	50.1	20.2	98	27	13		TRUE
2021-Jul-25 03:00	44.2	38.9	41.9	45.2	50.2	19.3	98	26	8		TRUE
2021-Jul-25 04:00	44.2	40.9	41.9	45.4	50.6	18.2	100	26	5		TRUE
2021-Jul-25 05:00	47.7	44.3	43.4	46.9	50.8	16.8	100	30	5	Fog	TRUE
2021-Jul-25 06:00	46.9	44.8	43.3	49.2	51.1	18.3	100	24	5		TRUE
2021-Jul-25 07:00	45.7	44.4	42.9	46.8	51.1	19.8	96	21	9		TRUE
2021-Jul-25 08:00	47.3	44.3	44.0	51.8	53.0	20.9	93	23	8		FALSE
2021-Jul-25 09:00	47.4	50.9	46.5	49.2	58.4	22	88	23	8		FALSE
2021-Jul-25 10:00	45.9	56.0	43.4	53.8	62.5	23.5	84	25	9		FALSE
2021-Jul-25 11:00	47.6	47.1	44.7	53.3	51.6	25.2	69	26	18		FALSE
2021-Jul-25 12:00	48.7	53.0	47.5	51.1	57.2	25.2	75	17	17		FALSE
2021-Jul-25 13:00	48.5	57.3	45.9	49.9	60.4	25.7	71	21	15		FALSE
2021-Jul-25 14:00	48.4	53.3	46.5	53.6	59.6	26.8	67	19	15		FALSE
2021-Jul-25 15:00	50.1	58.1	48.4	50.9	61.3	28.3	59	23	17		FALSE
2021-Jul-25 16:00		54.6	47.5	49.3	58.3	27.5	58	20	15		FALSE
2021-Jul-25 17:00		56.4	46.4	49.9	58.0	28.9	51	22	9		FALSE
2021-Jul-25 18:00		48.4	47.6	49.1	52.6	28.8	42	29	17		FALSE
2021-Jul-25 19:00		47.1	46.1	47.1	51.0	26.1	49	30	15		FALSE
2021-Jul-25 20:00		46.2	45.7	54.2	50.4	24.4	52	29	15		FALSE
2021-Jul-25 21:00		46.9	45.0	52.2	50.7	21.7	62	31	11	Haze	FALSE
2021-Jul-25 22:00		45.9	43.5	56.8	50.3	20.7	65	27	4	Haze	FALSE
2021-Jul-25 23:00		44.9	42.5	48.6	48.8	19.4	72	31	8	Haze	FALSE
2021-Jul-26 00:00		42.1	44.0	45.3	48.3	17.6	82		0	Haze	FALSE
2021-Jul-26 01:00		39.9	40.0	44.2	48.3	16.8	87		0	Fog	TRUE
2021-Jul-26 02:00		39.9	38.0	43.9	48.2	18.5	72	30	9	Haze	FALSE
2021-Jul-26 03:00		41.1	37.8	44.1	48.3	15.6	91	36	8	Fog	TRUE
2021-Jul-26 04:00		41.8	39.9	44.4	48.6	15.4	89		4	Fog	TRUE
2021-Jul-26 05:00		45.5	44.1	46.5	49.8	15	93	36	8	Fog	TRUE
2021-Jul-26 06:00		47.4	47.0	49.5	50.7	17	84	36	4	Haze	FALSE
2021-Jul-26 07:00		48.2	46.4	50.0	51.8	21.3	68		0		FALSE
2021-Jul-26 08:00		48.5	48.4	52.2	50.9	23.9	61	22	5		FALSE
2021-Jul-26 09:00		46.4	44.8	48.4	55.5	26	55	23	11		FALSE
2021-Jul-26 10:00		46.6	69.5	51.4	55.0	27.8	48		13		FALSE
2021-Jul-26 11:00		49.2	49.3	54.8	54.5	28.1	47	21	13	Haze	FALSE
2021-Jul-26 12:00		56.5	48.4	50.9	59.2	28.3	43	18	18		FALSE
2021-Jul-26 13:00		54.2	48.9	52.9	64.3	28	44	19	13	Haze	FALSE
2021-Jul-26 14:00		54.7	47.6	47.7	71.4	28	47	22	9		FALSE
2021-Jul-26 15:00		59.7	50.4	61.2	63.0	28.6	42	20	17	Haze	FALSE
2021-Jul-26 16:00	49.3	54.0	54.0	51.4	58.5	27.8	50	19	11		FALSE
2021-Jul-26 17:00	48.0	53.7	52.4	47.4	60.0	28.6	48	21	5		FALSE
2021-Jul-26 18:00	47.1	53.3	48.5	46.8	57.0	27.2	58		8		FALSE
2021-Jul-26 19:00	48.4	46.5	45.2	48.1	47.8	26.5	45	34	8		FALSE
2021-Jul-26 20:00	46.8	46.9	46.5	46.8	49.3	24	56	32	5		FALSE
2021-Jul-26 21:00	46.6	47.2	43.9	46.6	48.7	21.7	62	36	4		FALSE
2021-Jul-26 22:00	46.7	46.0	43.1	46.9	46.8	20.4	68	2	4		FALSE
2021-Jul-26 23:00	46.1	45.1	41.9	45.2	43.2	18.5	80		0		FALSE
2021-Jul-27 00:00	45.3	42.5	41.2	44.4	48.0	17.2	86		0		FALSE
2021-Jul-27 01:00	53.5	39.5	40.1	43.8	48.4	16.6	88	31	5		FALSE
2021-Jul-27 02:00	46.2	39.2	37.4	43.4	48.2	16.2	89	1	5		FALSE
2021-Jul-27 03:00	43.9	39.2	37.5	43.5	48.2	15.1	95	35	4		FALSE
2021-Jul-27 04:00	43.9	40.7	39.4	44.2	48.2	15	95		4		FALSE

Blank spaces indicate missing data

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Jul-27 05:00	47.6	45.3	44.9	47.4	49.3	14.9	95	2	9		FALSE
2021-Jul-27 06:00	48.2	46.1	44.4	49.3	49.6	16.4	94		0		FALSE
2021-Jul-27 07:00	48.4	46.0	44.9	49.4	48.6	19.3	82	1	5		FALSE
2021-Jul-27 08:00	48.4	47.0	46.0	50.3	68.7	20.2	83	28	5	Rain	TRUE
2021-Jul-27 09:00	56.3	52.8	53.2	59.6	55.8	19	93	32	8	Rain	TRUE
2021-Jul-27 10:00	49.5	46.4	48.4	51.5	50.5	18.6	93	5	17	Rain	TRUE
2021-Jul-27 11:00	53.3	46.5	48.2	59.9	51.7	18.9	93	19	8	Rain	TRUE
2021-Jul-27 12:00	47.9	43.9	45.6	57.4	53.4	19.4	92	21	9		FALSE
2021-Jul-27 13:00	49.2	43.9	47.6	52.6	68.6	20.5	88		4		FALSE
2021-Jul-27 14:00	47.2	43.4	44.2	49.4	58.5	21.4	83	33	9		FALSE
2021-Jul-27 15:00	46.3	44.7	43.5	47.2	52.3	23.4	73	31	17		FALSE
2021-Jul-27 16:00	46.6	44.1	44.5	46.6	47.6	23.1	70				FALSE
2021-Jul-27 17:00	51.9	45.9	46.4	55.3	47.9	24	65	29	11		FALSE
2021-Jul-27 18:00	46.3	46.0	42.7	46.5	53.9	23.7	67	33	9		FALSE
2021-Jul-27 19:00	46.5	45.5	42.6	47.1	46.6	22.7	70	32	9		FALSE
2021-Jul-27 20:00	47.5	45.8	45.2	50.9	47.4	20.6	82	31	8		FALSE
2021-Jul-27 21:00	47.0	46.6	42.3	53.1	47.6	19.3	87	36	5		FALSE
2021-Jul-27 22:00	46.7	45.9	42.4	45.7	50.3	18.1	95	1	5		FALSE
2021-Jul-27 23:00	46.3	44.8	40.4	44.7	45.0	17	97	1	8		TRUE
2021-Jul-28 00:00	45.1	40.1	38.3	44.3	42.8	17.2	98	3	9		TRUE
2021-Jul-28 01:00	43.6	39.0	36.6	44.2	42.1	17.5	96	8	11		TRUE
2021-Jul-28 02:00	43.3	38.7	36.6	44.0	42.1	17.2	98	6	11		TRUE
2021-Jul-28 03:00	43.7	39.0	37.0	44.0	42.1	16.7	96	6	11		TRUE
2021-Jul-28 04:00	44.1	40.5	37.1	44.2	42.5	15.9	97	4	9		TRUE
2021-Jul-28 05:00	45.0	45.3	40.3	46.0	43.5	15.2	99	3	9		TRUE
2021-Jul-28 06:00	46.3	45.6	41.1	46.0	44.7	16.7	95		0		FALSE
2021-Jul-28 07:00	48.1	45.1	42.3	48.5	51.5	18.5	87	7	8		FALSE
2021-Jul-28 08:00	56.0	45.2	52.2	58.2	53.9	20	81	9	8		FALSE
2021-Jul-28 09:00	54.6	48.3	54.3	58.3	52.0	20.4	74		4		FALSE
2021-Jul-28 10:00	59.1	46.0	56.1	62.8	50.0	21.4	68		9		FALSE
2021-Jul-28 11:00	59.1	48.3	56.2	62.3	56.5	22.4	69	15	11		FALSE
2021-Jul-28 12:00	56.8	45.2	54.5	61.1	53.0	22.1	70	13	13		FALSE
2021-Jul-28 13:00	57.8	46.4	60.3	60.8	50.2	22.4	66	13	13		FALSE
2021-Jul-28 14:00	56.1	46.0	53.3	58.5	53.1	22.8	64	12	9		FALSE
2021-Jul-28 15:00	58.5	48.5	56.4	62.3	55.8	23.2	62	16	15		FALSE
2021-Jul-28 16:00	56.9	46.7	52.9	58.2	52.1	22.9	60	15	13		FALSE
2021-Jul-28 17:00	58.7	48.7	56.9	61.7	51.9	22.7	62	18	11		FALSE
2021-Jul-28 18:00	58.1	47.5	54.8	64.2	51.3	22.2	60	19	13		FALSE
2021-Jul-28 19:00	58.0	61.3	52.9	59.8	51.1	21.5	62	20	5		FALSE
2021-Jul-28 20:00	56.3	52.7	52.5	59.3	50.3	20.4	67		0	Haze	FALSE
2021-Jul-28 21:00	51.5	44.9	49.1	53.9	52.7	16.7	87		4		FALSE
2021-Jul-28 22:00	47.9	44.5	42.6	46.7	50.9	16.6	87		0		FALSE
2021-Jul-28 23:00	47.2	44.6	42.7	45.8	49.5	16	93	36	4		FALSE
2021-Jul-29 00:00	46.3	41.0	41.7	45.4	49.5	15.7	94		0		FALSE
2021-Jul-29 01:00	53.7	41.1	40.9	47.0	49.7	16.2	90		0		FALSE
2021-Jul-29 02:00	46.7	39.6	37.2	43.9	49.0	15	96		4		TRUE
2021-Jul-29 03:00	43.9	39.7	38.3	43.9	49.2	16.2	92		0		FALSE
2021-Jul-29 04:00	44.2	40.6	38.3	44.2	49.2	16.6	94	9	8		FALSE
2021-Jul-29 05:00	45.1	44.0	41.5	45.7	49.3	17.2	92	9	9		FALSE
2021-Jul-29 06:00	47.7	44.1	43.2	47.9	49.4	17.7	93	10	8		FALSE
2021-Jul-29 07:00	48.7	47.0	45.4	49.9	49.9	18.2	92		0	Rain	TRUE
2021-Jul-29 08:00	56.0	52.2	54.6	59.4	56.4	17.8	100	11	11	Heavy Rain, Fog	TRUE
2021-Jul-29 09:00	53.8	52.5	55.1	55.3	54.9	19.3	99	12	9	Rain, Fog	TRUE
2021-Jul-29 10:00	54.0	48.7	53.1	55.7	54.0	19.5	98	19	5	Heavy Rain, Fog	TRUE
2021-Jul-29 11:00	52.6	50.3	55.3	55.4	55.1	18.3	99	11	11	Rain, Fog	TRUE
2021-Jul-29 12:00	50.2	43.6	50.4	52.9	51.4	18.6	100	10	13	Rain, Fog	TRUE
2021-Jul-29 13:00	48.3	42.4	46.2	47.7	53.7	18.5	99	9	13	Fog	TRUE
2021-Jul-29 14:00	47.6	41.5	45.6	46.6	51.6	18.8	98		9	Fog	TRUE
2021-Jul-29 15:00	57.8	43.4	52.3	64.4	76.9	19.6	94	7	8		FALSE
2021-Jul-29 16:00	51.3	42.8	47.3	54.5	50.3	20.7	89	8	9		FALSE
2021-Jul-29 17:00	48.3	42.9	42.7	47.4	49.9	20.7	88	6	9		FALSE
2021-Jul-29 18:00	47.5	45.5	42.1	49.7	50.7	20.8	87	4	9		FALSE
2021-Jul-29 19:00	49.4	45.2	44.2	55.4	49.8	20.7	86	30	5		FALSE
2021-Jul-29 20:00	47.1	44.3	43.7	50.1	50.4	19.2	94	29	8		FALSE
2021-Jul-29 21:00	45.5	45.3	43.3	45.9	51.8	18.9	96	28	5		TRUE
2021-Jul-29 22:00	46.6	44.9	42.9	46.3	50.5	18.7	96	24	5		TRUE
2021-Jul-29 23:00	46.8	44.1	43.0	47.3	50.8	17.9	96		0		TRUE
2021-Jul-30 00:00	44.6	41.2	40.7	45.4	51.3	18.9	90	33	9		FALSE
2021-Jul-30 01:00	44.6	43.0	44.0	45.5	50.9	18.1	86	35	28		TRUE
2021-Jul-30 02:00	44.4	43.5	45.1	45.6	50.9	17.1	91	35	22		TRUE
2021-Jul-30 03:00	44.6	43.9	44.3	46.1	51.2	16.7	91	35	26		TRUE
2021-Jul-30 04:00	44.0	44.5	45.8	45.5	51.2	15.9	93	34	21		TRUE

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	Rel Hum (%)	Dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Jul-30 05:00	44.6	51.4	42.9	45.8	51.4	15.1	90	33	24		TRUE
2021-Jul-30 06:00	46.0	46.2	43.9	49.0	52.0	15.2	85	35	17		FALSE
2021-Jul-30 07:00	48.3	46.6	46.1	51.3	52.8	16.3	80	34	24		TRUE
2021-Jul-30 08:00	50.1	48.3	47.4	52.3	68.6	16.6	76	36	28		TRUE
2021-Jul-30 09:00	50.4	49.0	65.0	53.9	64.7	16.5	69	36	24		TRUE
2021-Jul-30 10:00	51.3	46.5	48.7	57.1	67.5	17.6	66	36	26		TRUE
2021-Jul-30 11:00	50.6	49.1	49.0	53.2	65.9	18.6	57	34	26		TRUE
2021-Jul-30 12:00	53.5	55.4	51.8	58.8	60.2	18.9	55	34	26		TRUE
2021-Jul-30 13:00	51.2	50.1	53.9	62.7	73.2	18.9	57	34	30		TRUE
2021-Jul-30 14:00	52.7	47.6	55.0	58.0	53.7	19.8	54	34	22		TRUE
2021-Jul-30 15:00	51.0	49.1	55.3	52.3	56.2	20.2	52	34	22		TRUE
2021-Jul-30 16:00	50.8	47.3	47.4	55.4	52.5	19.6	51	34	22		TRUE
2021-Jul-30 17:00	50.1	48.0	48.7	53.9	50.9	19.5	49	29	17		FALSE
2021-Jul-30 18:00	50.2	48.3	47.7	63.6	51.3	18.6	53	29	21		TRUE
2021-Jul-30 19:00	48.3	47.5	45.6	49.5	55.4	17.3	59	29	15		FALSE
2021-Jul-30 20:00	47.3	45.1	45.5	51.4	51.0	15	70	29	11		FALSE
2021-Jul-30 21:00	50.0	45.8	47.7	51.5	52.1	13.9	76	29	11		FALSE
2021-Jul-30 22:00	53.2	45.7	49.0	52.8	50.9	12.7	82	30	9		FALSE
2021-Jul-30 23:00	47.2	44.5	41.2	46.5	50.1	12	85	36	8		FALSE
2021-Jul-31 00:00	46.5	42.3	41.9	46.2	49.8	10.9	93	35	8		FALSE
2021-Jul-31 01:00	45.2	40.7	37.6	43.7	49.7	10.4	95	2	5		FALSE
2021-Jul-31 02:00	45.4	42.1	36.7	43.5	54.0	9.5	97	1	5		TRUE
2021-Jul-31 03:00	45.8	39.8	36.1	44.2	49.7	10.3	94	2	4		FALSE
2021-Jul-31 04:00	45.4	40.8	36.9	43.7	49.6	9.2	97	1	5		TRUE
2021-Jul-31 05:00	46.0	43.9	40.2	44.4	49.8	10.7	97	35	8		TRUE
2021-Jul-31 06:00	45.8	44.2	40.3	50.0	50.1	12.9	89	35	8		FALSE
2021-Jul-31 07:00	45.6	44.8	42.1	47.8	51.0	14.5	79	35	5		FALSE
2021-Jul-31 08:00	45.4	45.6	41.2	46.8	50.4	17.3	70	31	5		FALSE
2021-Jul-31 09:00	45.7	44.2	43.2	48.9	50.2	18.8	55		9		FALSE
2021-Jul-31 10:00	48.5	45.8	44.5	50.3	49.9	19.7	45	25	9		FALSE
2021-Jul-31 11:00	52.5		44.5	48.9	55.1	20	48	18	11		FALSE
2021-Jul-31 12:00			49.4	50.5		19.9	45	20	18		FALSE
2021-Jul-31 13:00			50.4	51.4		18.6	54	21	21		TRUE
2021-Jul-31 14:00			48.0	48.7		18.4	61	20	15		FALSE
2021-Jul-31 15:00			50.4	48.4		17.9	65	17	5	Rain	TRUE
2021-Jul-31 16:00			43.2	48.5		17.6	72	12	8	Rain	TRUE
2021-Jul-31 17:00			43.2	45.1		17.3	79	6	5		FALSE
2021-Jul-31 18:00			53.0	51.6		15.8	95	6	11	Moderate Rain	TRUE
2021-Jul-31 19:00			52.1	63.6		15.1	95	7	11		FALSE
2021-Jul-31 20:00			46.7	48.0		14.6	98	9	9		TRUE
2021-Jul-31 21:00			43.8	46.0		14.9	98	11	11		TRUE
2021-Jul-31 22:00			48.7	51.0		15.5	99	10	11		TRUE
2021-Jul-31 23:00			44.6	46.6		16.3	99	9	9	Moderate Rain	TRUE
2021-Aug-01 00:00			60.0	58.8		16.6	99	10	11	Rain	TRUE
2021-Aug-01 01:00			55.6	54.6		16.4	99	11	13		TRUE
2021-Aug-01 02:00			45.5	45.2		16.3	100	6	5		TRUE
2021-Aug-01 03:00			43.5	45.0		16.1	100		4		TRUE
2021-Aug-01 04:00			42.8	44.6		15.5	100	35	5		TRUE
2021-Aug-01 05:00			42.9	44.9		15.4	100	35	8		TRUE
2021-Aug-01 06:00			42.0	46.2		15.7	99	32	8		TRUE
2021-Aug-01 07:00			42.3	46.5		16.3	95		0		FALSE
2021-Aug-01 08:00			43.2	48.8		17.3	96	33	8		TRUE
2021-Aug-01 09:00			42.6	45.8		18.8	88	35	13		FALSE
2021-Aug-01 10:00			43.2	47.4		19.5	78	32	17		FALSE
2021-Aug-01 11:00			44.0	46.7		19.2	79	31	13		FALSE
2021-Aug-01 12:00			46.9	45.5		18.9	79	31	15		FALSE
2021-Aug-01 13:00			47.1	54.8		19.8	73	29	17		FALSE
2021-Aug-01 14:00			44.3	46.7		20.6	68	32	15		FALSE
2021-Aug-01 15:00			47.1	47.0		20.7	71	35	24		TRUE
2021-Aug-01 16:00			47.5	49.2		18.6	79	2	28		TRUE
2021-Aug-01 17:00			48.3	51.8		18.3	80	1	21		TRUE
2021-Aug-01 18:00			45.5	50.5		17.6	82	2	13		FALSE
2021-Aug-01 19:00			44.4	47.7		17.5	79	36	17		FALSE
2021-Aug-01 20:00			43.7	44.4		16.9	82	35	13		FALSE
2021-Aug-01 21:00			42.5	46.1		16	87	34	9		FALSE
2021-Aug-01 22:00			43.6	45.0		16.1	86	33	9		FALSE
2021-Aug-01 23:00			42.3	44.1		16.2	83	33	15		FALSE
2021-Aug-02 00:00			42.2	44.0		15	83	33	15		FALSE
2021-Aug-02 01:00			39.0	43.7		13.7	92	33	9		FALSE
2021-Aug-02 02:00			38.6	44.0		14.1	95	35	11		FALSE
2021-Aug-02 03:00			37.7	43.5		14.5	97	35	13		TRUE
2021-Aug-02 04:00			38.3	43.5		13.9	96	35	13		TRUE

Blank spaces indicate missing data

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	Dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Aug-02 05:00			42.4	44.3		13.5	93	35	13		FALSE
2021-Aug-02 06:00			41.7	44.7		14	86	35	15		FALSE
2021-Aug-02 07:00			43.7	46.3		16.1	73	36	17		FALSE
2021-Aug-02 08:00			47.1	46.6		17.6	67	35	17		FALSE
2021-Aug-02 09:00			44.2	46.5		19.7	58	34	15		FALSE
2021-Aug-02 10:00			45.3	50.0		21	52	35	17		FALSE
2021-Aug-02 11:00			46.4	49.6		21.8	45	34	22		TRUE
2021-Aug-02 12:00			46.1	56.5		22.5	47	31	11		FALSE
2021-Aug-02 13:00			47.4	54.6		23.1	41	33	9		FALSE
2021-Aug-02 14:00			47.4	53.9		23.5	41	36	17		FALSE
2021-Aug-02 15:00			46.3	47.0		24.1	42	29	15		FALSE
2021-Aug-02 16:00			47.4	52.0		22.9	46	24	13		FALSE
2021-Aug-02 17:00			53.1	52.3		22.5	46	24	9		FALSE
2021-Aug-02 18:00			52.8	51.8		22.8	45	20	13		FALSE
2021-Aug-02 19:00			47.0	47.8		20.8	52	22	11		FALSE
2021-Aug-02 20:00			56.4	48.7		19.8	56	24	4	Haze	FALSE
2021-Aug-02 21:00			47.0	48.4		15.4	79	35	5		FALSE
2021-Aug-02 22:00			45.3	47.5		15.4	79		0		FALSE
2021-Aug-02 23:00			43.1	45.7		14.1	84	36	8		FALSE
2021-Aug-03 00:00			41.2	45.4		13.5	85	36	8		FALSE
2021-Aug-03 01:00			38.9	43.7		13.6	83		0		FALSE
2021-Aug-03 02:00			37.6	43.3		13.4	85	1	4		FALSE
2021-Aug-03 03:00			37.4	43.1		12.7	87	35	4		FALSE
2021-Aug-03 04:00			39.9	43.6		12.3	92		0		FALSE
2021-Aug-03 05:00			45.4	45.4		11	98	36	4		TRUE
2021-Aug-03 06:00			45.4	54.3		12.2	93		0		FALSE
2021-Aug-03 07:00			46.1	52.0		16.8	73		0		FALSE
2021-Aug-03 08:00			46.9	50.8		19.7	63	26	9		FALSE
2021-Aug-03 09:00			45.6	50.4		21.4	61	21	8		FALSE
2021-Aug-03 10:00			46.6	53.6		22.4	65	18	8		FALSE
2021-Aug-03 11:00			47.0	55.4		23.3	58	19	11		FALSE
2021-Aug-03 12:00			46.6	50.1		23.5	55	20	17		FALSE
2021-Aug-03 13:00			55.3	50.5		24.1	54	19	18		FALSE
2021-Aug-03 14:00			69.3	52.8		24.9	48	19	15		FALSE
2021-Aug-03 15:00			49.3	51.3		24.7	47	18	18		FALSE
2021-Aug-03 16:00			50.4	53.9		24.8	47	19	15		FALSE
2021-Aug-03 17:00			47.2	56.0		24.8	45	21	15		FALSE
2021-Aug-03 18:00			49.4	58.4		24.1	51	18	11		FALSE
2021-Aug-03 19:00			46.7	48.6		23.1	61	22	11		FALSE
2021-Aug-03 20:00			47.3	57.9		22.1	69	21	5	Haze	FALSE
2021-Aug-03 21:00			46.5	55.6		20.8	78		4		FALSE
2021-Aug-03 22:00			45.4	49.0		20.4	80		4		FALSE
2021-Aug-03 23:00			43.1	49.4		17.4	95	10	5		FALSE
2021-Aug-04 00:00			40.1	44.7		15.9	98	4	5		TRUE
2021-Aug-04 01:00			40.1	44.6		15.7	98	2	8		TRUE
2021-Aug-04 02:00			38.5	43.5		15.4	98	36	4		TRUE
2021-Aug-04 03:00			37.3	43.1		14.6	99	2	8		TRUE
2021-Aug-04 04:00			38.4	43.0		14.3	97	1	8		TRUE
2021-Aug-04 05:00			42.8	45.8		14.5	99		0		TRUE
2021-Aug-04 06:00			45.1	47.3		15.6	96	31	4		TRUE
2021-Aug-04 07:00			45.6	48.7		18.4	80		0		FALSE
2021-Aug-04 08:00			46.5	49.5		20.7	68	35	5		FALSE
2021-Aug-04 09:00			43.3	52.2		23.1	59		0		FALSE
2021-Aug-04 10:00		61.6	45.6	51.6		24.3	56	14	9		FALSE
2021-Aug-04 11:00		47.8	56.1	63.3		25.3	46	22	11		FALSE
2021-Aug-04 12:00	57.6	48.5	56.7	61.3	54.2	25.9	45	20	8		FALSE
2021-Aug-04 13:00	54.2	46.9	55.4	58.8	58.1	26.1	47	17	13		FALSE
2021-Aug-04 14:00	52.9	51.4	60.1	54.0	48.4	26.1	39	19	13		FALSE
2021-Aug-04 15:00	58.7	51.3		60.2	48.3	26.3	37	17	13		FALSE
2021-Aug-04 16:00	54.8	48.5		57.4	51.7	26.3	40	16	13		FALSE
2021-Aug-04 17:00	54.5	47.5		55.5	51.2	25.6	43	13	11		FALSE
2021-Aug-04 18:00	58.4	50.5		60.3	53.5	24.8	47	13	8		FALSE
2021-Aug-04 19:00	56.9	48.6		58.2	61.1	23.4	55	12	5		FALSE
2021-Aug-04 20:00	52.4	47.6		55.1	54.6	21.1	79	11	8		FALSE
2021-Aug-04 21:00	57.8	47.6		60.3	49.3	19	88	8	4		FALSE
2021-Aug-04 22:00	54.6	47.0		56.0	49.2	18	90	35	5		FALSE
2021-Aug-04 23:00	47.4	46.8		45.2	48.1	16.1	97	2	5		TRUE
2021-Aug-05 00:00	46.8	44.4		44.6	48.5	15.8	96	35	5		TRUE
2021-Aug-05 01:00	45.6	42.1		43.0	48.0	15	99	36	5		TRUE
2021-Aug-05 02:00	44.8	40.6		42.1	47.9	14.5	98	35	5		TRUE
2021-Aug-05 03:00	45.1	40.2		42.3	47.9	13.9	98	36	5		TRUE
2021-Aug-05 04:00	46.0	42.3		43.1	48.1	13.6	98	1	8		TRUE

Blank spaces indicate missing data

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	dir (10s)	nd Spd (km	Weather	Weather Exclude
2021-Aug-05 05:00	47.4	45.1		43.8	48.5	13.5	98	34	4		TRUE
2021-Aug-05 06:00	49.1	47.3		47.2	49.1	14.5	96	4	4		TRUE
2021-Aug-05 07:00	54.8	46.3		57.3	51.2	18	89	36	5		FALSE
2021-Aug-05 08:00	49.7	44.9		51.4	59.9	21.9	73	11	5		FALSE
2021-Aug-05 09:00	50.1	46.1		60.1	50.5	23.5	67		4		FALSE
2021-Aug-05 10:00	56.9	50.7		60.1	55.4	24.6	63	14	11		FALSE
2021-Aug-05 11:00	53.7	48.4		56.5	51.4	24.3	66	15	8		FALSE
2021-Aug-05 12:00	57.1	47.6		58.9	53.5	25.4	60	16	11		FALSE
2021-Aug-05 13:00	54.9	46.1		56.8	51.0	25.9	54	18	11		FALSE
2021-Aug-05 14:00	58.1	46.1		63.8	52.3	26.4	42	17	15		FALSE
2021-Aug-05 15:00	57.0	47.3		58.5	51.7	26.4	43	20	13		FALSE
2021-Aug-05 16:00	53.3	47.0		56.1	50.1	26.2	48	21	11		FALSE
2021-Aug-05 17:00	58.1	48.3		61.6	52.3	26.2	43	18	8		FALSE
2021-Aug-05 18:00	58.0	51.6		60.4	51.4	25.6	45	20	8		FALSE
2021-Aug-05 19:00	58.1	48.6		61.2	51.1	23.3	60	16	4		FALSE
2021-Aug-05 20:00	54.0	47.2		54.3	49.5	21.9	68	15	4	Haze	FALSE
2021-Aug-05 21:00	56.3	47.2		57.8	49.6	18	86		0		FALSE
2021-Aug-05 22:00	49.8	46.9		49.7	49.0	17.3	92	2	5		FALSE
2021-Aug-05 23:00	47.4	46.4		44.9	48.9	16.6	94		0		FALSE
2021-Aug-06 00:00	46.8	45.5		43.9	49.4	16.1	97	1	8		TRUE
2021-Aug-06 01:00	45.5	42.4		43.2	50.8	15.9	97	2	5		TRUE
2021-Aug-06 02:00	44.6	42.0		42.7	48.1	15.6	99	1	5		TRUE
2021-Aug-06 03:00	43.4	41.8		42.4	48.2	15.3	98	1	5		TRUE
2021-Aug-06 04:00	44.4	41.7		42.8	48.2	15	99	1	5		TRUE
2021-Aug-06 05:00	46.5	45.3		44.3	48.8	14.7	100	36	5		TRUE
2021-Aug-06 06:00	55.3	46.4		57.7	49.7	15.4	98		4		TRUE
2021-Aug-06 07:00	49.0	48.1		49.8	49.3	19.5	94	33	4		FALSE
2021-Aug-06 08:00	48.3	49.1		49.4	49.3	22.6	71	20	11		FALSE
2021-Aug-06 09:00	48.6	52.6		48.3	56.2	23.9	67	21	15		FALSE
2021-Aug-06 10:00	53.3	56.0		57.0	59.2	24.5	60	20	13		FALSE
2021-Aug-06 11:00	49.5	53.4		49.0	55.9	25	64	20	13		FALSE
2021-Aug-06 12:00	50.5	56.5		50.2	72.0	25.5	59	19	21		TRUE
2021-Aug-06 13:00	51.1	55.2		47.9	64.3	26.2	57	19	18		FALSE
2021-Aug-06 14:00	49.5	57.0		47.1	61.5	26.8	54	18	15		FALSE
2021-Aug-06 15:00	49.8	59.1		48.3	61.1	27.1	53	18	13		FALSE
2021-Aug-06 16:00	50.0	54.9		47.8	58.9	27.5	50	18	17		FALSE
2021-Aug-06 17:00	50.1	56.9		47.6	56.8	26.4	61	14	11		FALSE
2021-Aug-06 18:00	53.2	47.6		54.0	50.0	25.2	66	13	13		FALSE
2021-Aug-06 19:00	58.7	51.6		59.6	51.5	23.9	75	12	9		FALSE
2021-Aug-06 20:00	50.9	47.9		54.6	48.8	22.8	82	11	11		FALSE
2021-Aug-06 21:00	52.6	47.1		55.1	49.5	21	93	9	8		FALSE
2021-Aug-06 22:00	47.7	47.9		47.9	50.8	20.5	95	9	8		FALSE
2021-Aug-06 23:00	53.2	46.2		57.5	49.1	22.8	86	23	8		FALSE
2021-Aug-07 00:00	46.6	42.6		46.2	48.4	22.9	84	22	11		FALSE
2021-Aug-07 01:00	55.0	40.4		49.9	47.4	22.2	87	23	8		FALSE
2021-Aug-07 02:00	46.5	44.3		43.8	51.8	21.3	94	18	5		FALSE
2021-Aug-07 03:00	43.4	40.0		42.2	48.2	19.4	99		0	Fog	TRUE
2021-Aug-07 04:00	43.5	40.7		41.7	48.3	17.8	99	36	4	Fog	TRUE
2021-Aug-07 05:00	43.1	44.3		42.8	48.6	17.2	99	3	9	Fog	TRUE
2021-Aug-07 06:00	44.9	44.4		48.8	48.9	17.8	99	2	4	Fog	TRUE
2021-Aug-07 07:00	46.9	45.4		50.5	49.0	20.3	94	2	5		FALSE
2021-Aug-07 08:00	46.5	45.0		48.2	49.2	21.7	80	32	5		FALSE
2021-Aug-07 09:00	46.3	47.5		46.1	49.6	23.6	72	25	5		FALSE
2021-Aug-07 10:00	47.8	51.7		48.0	52.0	24	73	19	5		FALSE
2021-Aug-07 11:00	49.6	48.5		48.3	54.7	24.8	69		4		FALSE
2021-Aug-07 12:00	57.1	46.3		49.7	59.6	26.5	69	13	8		FALSE
2021-Aug-07 13:00	49.2	49.4		46.5	53.2	27	61	16	13		FALSE
2021-Aug-07 14:00	51.8	45.6		47.2	49.9	27.2	57	18	11		FALSE
2021-Aug-07 15:00	55.7	59.7		56.4	59.3	20.5	93	32	26	Thunderstorms, Heavy Rain, Fog	TRUE
2021-Aug-07 16:00	64.0	57.5		62.0	58.6	20.1	98	36	9	Rain	TRUE
2021-Aug-07 17:00	47.3	46.3		48.4	49.9	21.9	94	33	5		FALSE
2021-Aug-07 18:00	47.8	47.6		50.0	51.1	22.6	91	34	8		FALSE
2021-Aug-07 19:00	47.6	47.3		45.9	50.3	22.3	89	35	5		FALSE
2021-Aug-07 20:00	46.4	47.0		46.3	51.2	21.4	95	12	4	Fog	TRUE
2021-Aug-07 21:00	45.9	46.4		45.6	50.9	20.9	99	8	4		TRUE
2021-Aug-07 22:00	46.4	45.7		45.8	51.7	20.6	100	9	5	Fog	TRUE
2021-Aug-07 23:00	45.8	45.6		45.2	51.1	19.4	100	32	5	Fog	TRUE
2021-Aug-08 00:00	45.6	42.7		45.0	51.0	19	100	2	8	Fog	TRUE
2021-Aug-08 01:00	44.3	40.1		44.4	50.2	18.3	100	1	5	Fog	TRUE
2021-Aug-08 02:00	43.4	39.7		43.8	50.3	18.2	100		4	Fog	TRUE
2021-Aug-08 03:00	42.9	41.3		43.6	50.5	17.9	100	36	5	Fog	TRUE

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	Dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Aug-08 04:00	42.9	40.5		43.9	50.8	18.8	100	9	8	Fog	TRUE
2021-Aug-08 05:00	43.7	44.0		44.4	50.9	19.6	100	7	8	Fog	TRUE
2021-Aug-08 06:00	54.3	45.1		58.4	51.2	20	100	9	8	Fog	TRUE
2021-Aug-08 07:00	44.9	45.2		45.5	51.3	20.7	100		0	Fog	TRUE
2021-Aug-08 08:00	52.2	43.5		57.7	50.7	22.1	99	9	8	Fog	TRUE
2021-Aug-08 09:00	47.4	47.0		50.1	49.4	23.7	90	13	9	Fog	TRUE
2021-Aug-08 10:00	54.7	46.5		58.4	48.9	25.4	78	21	11		FALSE
2021-Aug-08 11:00	49.2	62.4		46.9	57.7	25.5	77	20	5		FALSE
2021-Aug-08 12:00	48.4	56.3		46.1	60.4	25.8	73	17	13		FALSE
2021-Aug-08 13:00	49.9	55.8	54.4	50.4	58.1	25.2	80	14	11		FALSE
2021-Aug-08 14:00	56.0	52.6	53.7	59.3	52.1	25.7	78	12	9		FALSE
2021-Aug-08 15:00	54.0	53.9	54.9	58.2	51.3	25.7	74	18	8		FALSE
2021-Aug-08 16:00	55.6	56.9	49.9	60.3	50.7	26.1	74	18	9		FALSE
2021-Aug-08 17:00	55.0	57.9	52.6	55.8	51.0	24.6	80	14	13		FALSE
2021-Aug-08 18:00	51.9	52.6	52.8	53.2	52.1	24.5	84	13	11		FALSE
2021-Aug-08 19:00	49.1	51.1	48.9	52.2	53.9	23.5	93	13	8		FALSE
2021-Aug-08 20:00	46.8	48.4	43.8	47.3	51.2	22.8	94	12	8		FALSE
2021-Aug-08 21:00	49.8	47.9	45.0	52.1	50.8	21.9	97	10	5		TRUE
2021-Aug-08 22:00	46.6	47.5	43.6	47.9	50.9	22.4	96	10	9		TRUE
2021-Aug-08 23:00	46.9	47.1	43.3	51.0	50.7	22.6	93	12	4		FALSE
2021-Aug-09 00:00	45.9	44.0	42.8	47.7	50.6	22.2	96	10	4	Fog	TRUE
2021-Aug-09 01:00	45.0	42.6	42.9	45.7	50.7	21.3	100	8	4	Fog	TRUE
2021-Aug-09 02:00	44.1	43.1	42.5	44.9	50.1	20.4	100	10	5	Fog	TRUE
2021-Aug-09 03:00	43.3	41.9	40.8	44.6	50.3	20.4	100		0	Fog	TRUE
2021-Aug-09 04:00	43.7	42.7	40.3	44.4	50.6	19.3	100		0	Fog	TRUE
2021-Aug-09 05:00	45.5	46.4	43.0	45.0	50.9	19.1	100		0	Fog	TRUE
2021-Aug-09 06:00	46.9	47.7	43.4	46.9	51.4	20.2	100	9	4	Fog	TRUE
2021-Aug-09 07:00	48.5	48.1	45.2	52.0	52.1	22.2	97	10	8	Fog	TRUE
2021-Aug-09 08:00	57.1	46.1	54.1	59.9	51.4	23.6	92	12	5		FALSE
2021-Aug-09 09:00	56.0	47.1	53.5	60.8	51.7	25.1	85	15	8		FALSE
2021-Aug-09 10:00	56.6	48.9	54.7	61.3	54.5	26.5	76	17	9		FALSE
2021-Aug-09 11:00	69.1	52.2	55.7	60.3	60.0	27.3	72	16	9		FALSE
2021-Aug-09 12:00	48.5	53.4	47.8	50.3	57.5	28	71	18	8	Haze	FALSE
2021-Aug-09 13:00	47.7	56.1	44.9	47.4	59.7	28.9	62	16	9		FALSE
2021-Aug-09 14:00	47.5	54.7	44.5	48.9	57.7	29.7	60	17	9		FALSE
2021-Aug-09 15:00	47.6	56.1	45.4	48.7	58.0	30.2	60	18	9		FALSE
2021-Aug-09 16:00	56.4	49.8	50.8	59.9	52.3	29.3	62	15	15		FALSE
2021-Aug-09 17:00	57.6	50.2	57.0	60.2	54.3	29.2	61	16	11		FALSE
2021-Aug-09 18:00	59.1	50.1	55.4	63.0	52.0	27.4	70	11	9		FALSE
2021-Aug-09 19:00	53.1	51.2	51.1	55.1	51.3	25.3	71	11	13		FALSE
2021-Aug-09 20:00	58.0	49.4	53.3	61.2	57.5	24.5	77	9	11		FALSE
2021-Aug-09 21:00	54.3	49.4	49.2	56.1	51.5	24.5	79	8	8		FALSE
2021-Aug-09 22:00	52.4	49.8	49.6	54.3	51.2	24.4	81	8	15	Rain	TRUE
2021-Aug-09 23:00	46.7	48.3	44.1	48.5	50.3	24.3	83	8	17		FALSE
2021-Aug-10 00:00	46.7	46.0	43.8	46.6	50.0	23.9	88	8	13		FALSE
2021-Aug-10 01:00	46.0	44.0	42.6	46.7	50.0	24.2	87	9	15		FALSE
2021-Aug-10 02:00	45.6	45.3	43.2	47.5	50.3	24.8	82	14	5		FALSE
2021-Aug-10 03:00	44.6	44.4	41.7	45.4	50.4	24	85	10	9		FALSE
2021-Aug-10 04:00	44.9	44.9	40.4	44.2	49.9	23.9	87	14	5		FALSE
2021-Aug-10 05:00	44.8	47.5	42.4	44.4	49.7	22.9	94		4		FALSE
2021-Aug-10 06:00	47.3	47.4	43.6	49.6	50.0	23.2	95	11	8		FALSE
2021-Aug-10 07:00	48.0	48.0	44.1	51.8	50.7	24.6	88	17	8		FALSE
2021-Aug-10 08:00	50.6	48.5	45.9	51.9	57.5	24.7	83	18	13		FALSE
2021-Aug-10 09:00	49.7	48.1	48.4	49.5	53.1	25.4	81	20	17		FALSE
2021-Aug-10 10:00	48.8	50.4	48.2	52.8	52.5	25.7	77	19	24		TRUE
2021-Aug-10 11:00	49.4	50.5	49.3	56.6	52.7	26	78	20	17		FALSE
2021-Aug-10 12:00	49.3	52.4	48.4	50.4	59.7	25.6	76	19	18		FALSE
2021-Aug-10 13:00	50.2	49.1	50.0	49.7	62.6	25.2	80	18	18		FALSE
2021-Aug-10 14:00	56.2	49.2	51.8	51.4	55.9	25.1	82	18	11		FALSE
2021-Aug-10 15:00	48.1	46.8	48.9	53.1	50.7	25.7	76	17	8		FALSE
2021-Aug-10 16:00	50.0	50.6	46.9	52.9	51.1	25.9	80	14	8		FALSE
2021-Aug-10 17:00	57.3	48.7	52.3	62.4	51.5	25.5	83	14	13		FALSE
2021-Aug-10 18:00	47.9	49.4	48.7	48.8	51.5	25.8	82	18	9		FALSE
2021-Aug-10 19:00	47.4	49.1	45.6	47.2	51.9	25.5	84	21	8		FALSE
2021-Aug-10 20:00	46.5	48.8	45.7	48.3	51.0	24.8	93	23	5	Fog	TRUE
2021-Aug-10 21:00	45.7	48.6	45.0	48.7	50.7	24.7	92	25	8		FALSE
2021-Aug-10 22:00	45.7	48.0	45.1	48.5	51.2	24.9	83	26	11		FALSE
2021-Aug-10 23:00	45.1	47.1	44.0	48.3	50.8	24.5	84	26	9		FALSE
2021-Aug-11 00:00	45.4	44.4	43.3	48.1	51.0	23.4	91	31	8		FALSE
2021-Aug-11 01:00	44.5	43.9	42.6	47.2	50.7	23.6	90	25	4		FALSE
2021-Aug-11 02:00	43.0	44.3	41.7	46.6	50.8	21.5	100		0		TRUE
2021-Aug-11 03:00	42.7	43.9	41.0	45.9	50.4	22.8	99	21	8		TRUE

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Aug-11 04:00	43.5	44.6	41.1	51.0	50.2	22.5	100	31	5	Fog	TRUE
2021-Aug-11 05:00	44.7	46.5	42.4	45.0	50.4	21.3	100	3	5	Fog	TRUE
2021-Aug-11 06:00	45.9	47.2	43.3	45.9	50.5	23	99	12	5	Fog	TRUE
2021-Aug-11 07:00	48.9	50.7	46.8	49.5	53.5	23.7	92	22	18	Rain	TRUE
2021-Aug-11 08:00	47.2	47.6	48.6	48.2	56.1	25.1	85	17	5		FALSE
2021-Aug-11 09:00	48.9	48.0	48.0	52.2	52.1	26.2	72	23	21		TRUE
2021-Aug-11 10:00	50.3	49.9	50.2	50.7	53.3	25.6	75	21	18		FALSE
2021-Aug-11 11:00	49.5	50.5	49.3	50.5	52.1	28.6	65	27	21		TRUE
2021-Aug-11 12:00	48.2	50.1	49.2	50.5	53.2	28.5	67	21	13		FALSE
2021-Aug-11 13:00	48.4	51.8	47.9	48.5	57.7	29.3	64	23	17		FALSE
2021-Aug-11 14:00	49.5	52.1	49.5	49.2	65.5	29.8	61	21	21		TRUE
2021-Aug-11 15:00	49.9	51.7	50.3	50.2	54.7	30	59	19	22		TRUE
2021-Aug-11 16:00	50.3	50.4	49.9	50.7	52.8	29.1	68	21	28		TRUE
2021-Aug-11 17:00	50.7	55.0	51.9	50.7	57.5	28.3	70	22	21		TRUE
2021-Aug-11 18:00	49.4	51.3	48.7	49.5	52.5	27.4	68	21	22		TRUE
2021-Aug-11 19:00	50.2	55.5	50.8	51.6	54.7	26.5	72	22	26		TRUE
2021-Aug-11 20:00	48.4	52.6	49.6	49.7	52.5	25.3	73	20	21		TRUE
2021-Aug-11 21:00	46.9	49.4	47.2	50.5	53.4	24.6	81	19	5		FALSE
2021-Aug-11 22:00	46.2	49.5	44.9	50.4	50.7	24.2	82	19	13		FALSE
2021-Aug-11 23:00	47.3	49.2	46.4	49.7	50.7	24.3	81	20	17		FALSE
2021-Aug-12 00:00	46.5	47.6	46.5	48.5	50.5	23.6	82	21	15		FALSE
2021-Aug-12 01:00	46.2	46.5	44.5	48.1	50.3	22.8	84	22	15		FALSE
2021-Aug-12 02:00	44.6	45.2	43.5	47.2	50.2	22.6	88	20	8		FALSE
2021-Aug-12 03:00	44.9	45.1	44.3	46.7	50.0	22.6	88	21	8		FALSE
2021-Aug-12 04:00	44.7	45.0	42.7	45.3	49.4	23	91	18	8		FALSE
2021-Aug-12 05:00	45.7	47.8	43.0	45.5	49.6	23.1	91	22	13		FALSE
2021-Aug-12 06:00	46.2	47.4	44.8	45.5	50.2	22.9	90	22	11		FALSE
2021-Aug-12 07:00	51.3	51.7	51.6	52.6	54.1	21.6	97		4	Rain	TRUE
2021-Aug-12 08:00	48.0	47.8	48.2	48.5	52.8	22.9	92	22	18		FALSE
2021-Aug-12 09:00	48.9	48.5	48.3	61.2	52.7	23.1	87	21	13		FALSE
2021-Aug-12 10:00	49.4	55.7	48.2	51.0	54.5	24.2	79	21	24		TRUE
2021-Aug-12 11:00	59.0	53.2	50.3	50.8	60.9	25	74	21	17		FALSE
2021-Aug-12 12:00	49.8	54.2	49.8	51.2	56.1	26.1	71	21	24		TRUE
2021-Aug-12 13:00	50.8	55.2	66.0	53.5	59.0	27	69	24	17		FALSE
2021-Aug-12 14:00	51.4	53.0	63.3	54.1	53.4	27.8	66	20	18		FALSE
2021-Aug-12 15:00	50.5	52.5	50.3	52.7	56.6	27.4	68	21	21		TRUE
2021-Aug-12 16:00	51.4	53.2	49.8	52.5	55.6	27.4	68	22	21		TRUE
2021-Aug-12 17:00	49.9	53.1	51.4	50.1	55.2	28	64	23	17		FALSE
2021-Aug-12 18:00	50.7	57.2	49.1	51.6	60.4	27.8	63	22	13		FALSE
2021-Aug-12 19:00	49.8	52.5	48.6	51.8	54.4	26.6	65	22	17		FALSE
2021-Aug-12 20:00	48.7	50.8	51.0	50.0	54.5	25.8	68	20	11	Haze	FALSE
2021-Aug-12 21:00	47.8	55.3	47.4	50.4	58.3	24.8	72	21	8		FALSE
2021-Aug-12 22:00	48.8	52.1	47.0	51.3	55.1	24.4	75	23	5		FALSE
2021-Aug-12 23:00	47.1	48.8	46.8	49.8	50.3	22.8	82	22	8		FALSE
2021-Aug-13 00:00	46.6	47.4	47.5	49.4	50.3	23.3	92	20	5		FALSE
2021-Aug-13 01:00	46.0	44.6	44.7	48.2	49.8	22.8	99	22	11	Fog	TRUE
2021-Aug-13 02:00	45.4	44.2	44.0	47.1	49.3	22.5	100	21	11	Fog	TRUE
2021-Aug-13 03:00	45.2	45.5	43.3	48.5	49.6	22.5	99	20	9	Fog	TRUE
2021-Aug-13 04:00	45.0	44.7	42.7	46.4	49.7	22.5	100	21	9	Fog	TRUE
2021-Aug-13 05:00	45.3	46.3	43.3	46.9	49.7	22.3	100	22	8	Fog	TRUE
2021-Aug-13 06:00	46.3	47.0	43.2	46.9	50.0	22.3	100	23	4	Fog	TRUE
2021-Aug-13 07:00	47.2	48.1	44.5	48.2	50.7	22.8	97	24	5	Fog	TRUE
2021-Aug-13 08:00	47.0	46.8	44.7	48.2	51.3	24.3	90	20	8		FALSE
2021-Aug-13 09:00	47.6	48.1	44.4	49.0	51.5	25.7	84	18	8		FALSE
2021-Aug-13 10:00	49.2	55.1	47.2	49.9	58.2	26.8	76	21	13		FALSE
2021-Aug-13 11:00	49.5	51.8	48.2	51.1	52.3	25.9	78	22	17		FALSE
2021-Aug-13 12:00	48.9	57.8	58.5	49.6	59.3	26.8	74	20	17		FALSE
2021-Aug-13 13:00	50.2	58.8	48.8	52.0	55.9	27.7	70	22	18		FALSE
2021-Aug-13 14:00	50.5	55.9	50.0	51.4	62.4	26.7	74	22	24		TRUE
2021-Aug-13 15:00	51.0	52.7	50.1	53.8	59.4	27.2	70	21	22		TRUE
2021-Aug-13 16:00	50.5	51.3	50.9	50.9	52.5	25.8	79	22	17	Thunderstorms	FALSE
2021-Aug-13 17:00	62.0	62.5	65.0	63.8	64.4	23.7	89	17	8	Thunderstorms	FALSE
2021-Aug-13 18:00	51.1	50.6	54.9	54.9	52.2	24.1	93	2	5		FALSE
2021-Aug-13 19:00	48.1	50.4	49.1	49.6	51.8	23.2	75	34	18		FALSE
2021-Aug-13 20:00	48.6	49.9	48.3	52.0	52.7	21	66	34	21		TRUE
2021-Aug-13 21:00	47.5	50.0	47.3	51.7	51.9	20.8	61	33	15		FALSE
2021-Aug-13 22:00	47.7	49.1	46.3	51.1	51.2	20	62	34	15		FALSE
2021-Aug-13 23:00	46.8	49.1	46.1	50.6	51.7	19.6	60	34	18		FALSE
2021-Aug-14 00:00	46.4	47.9	45.6	49.7	51.3	18.8	65	33	9		FALSE
2021-Aug-14 01:00	44.7	41.6	44.0	46.4	50.9	18.5	66	32	9		FALSE
2021-Aug-14 02:00	44.4	41.2	41.9	46.1	50.9	18.2	70		4		FALSE
2021-Aug-14 03:00	44.2	40.4	41.1	44.7	51.0	15.9	84	29	5		FALSE

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	Dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Aug-14 04:00	43.9	40.3	39.0	44.6	51.2	16.1	75	33	11		FALSE
2021-Aug-14 05:00	45.3	45.8	39.0	44.5	51.4	14.9	82	32	9		FALSE
2021-Aug-14 06:00	45.7	46.2	41.1	45.7	51.8	16.2	84		11		FALSE
2021-Aug-14 07:00	46.3	47.0	46.0	48.9	53.1	18.9	77	32	15		FALSE
2021-Aug-14 08:00	47.8	49.8	45.7	50.3	53.0	20.2	71	31	24		TRUE
2021-Aug-14 09:00	48.3	48.2	49.8	49.4	53.8	21	61	32	21		TRUE
2021-Aug-14 10:00	50.1	48.3	48.1	49.3	53.6	21.6	51	32	22		TRUE
2021-Aug-14 11:00	52.2	50.7	52.5	55.8	55.0	22.1	47	33	21		TRUE
2021-Aug-14 12:00	48.9	52.1	57.0	48.9	53.8	23	45	31	22		TRUE
2021-Aug-14 13:00	51.5	51.1	55.2	55.9	57.1	23.7	40	31	26		TRUE
2021-Aug-14 14:00	50.3	49.1	50.7	53.2	53.1	23.4	40	31	17		FALSE
2021-Aug-14 15:00	48.7	51.6	53.4	50.4	55.2	23.7	41	31	18		FALSE
2021-Aug-14 16:00	49.8	54.1	56.6	56.0	52.9	23.3	43	33	17		FALSE
2021-Aug-14 17:00	46.5	51.8	47.8	46.4	54.6	22.9	47	36	26		TRUE
2021-Aug-14 18:00	49.4	53.6	58.4	52.8	52.2	21.8	50	33	17		FALSE
2021-Aug-14 19:00	47.8	49.1	46.7	50.2	51.9	20.3	53	33	21		TRUE
2021-Aug-14 20:00	48.5	63.0	46.6	53.9	53.1	18.3	64	34	15		FALSE
2021-Aug-14 21:00	45.2	50.8	44.4	48.7	54.2	16.7	69	33	9		FALSE
2021-Aug-14 22:00	46.7	48.6	44.4	46.6	53.1	16.2	72	28	8		FALSE
2021-Aug-14 23:00	46.0	46.3	43.3	45.9	53.5	14.7	79	36	5		FALSE
2021-Aug-15 00:00	44.9	44.0	42.2	44.4	51.4	13.6	82	35	5		FALSE
2021-Aug-15 01:00	46.6	42.8	45.5	47.1	50.8	14.5	82	32	5		FALSE
2021-Aug-15 02:00	46.2	42.7	41.0	45.8	51.7	14.1	82	35	9		FALSE
2021-Aug-15 03:00	43.0	41.4	40.8	43.7	50.8	13.5	85	35	9		FALSE
2021-Aug-15 04:00	42.9	40.5	36.5	43.4	50.4	13.1	88	36	11		FALSE
2021-Aug-15 05:00	43.1	47.1	38.3	43.7	51.6	13	88	1	9		FALSE
2021-Aug-15 06:00	44.1	45.9	39.5	43.7	50.6	13.5	84	2	8		FALSE
2021-Aug-15 07:00	45.7	48.8	39.4	46.6	52.9	15.9	71		0		FALSE
2021-Aug-15 08:00	50.8	46.7	44.1	53.3	50.8	18.6	60	8	13		FALSE
2021-Aug-15 09:00	57.5	47.1	53.1	60.0	50.9	19.9	55	8	13		FALSE
2021-Aug-15 10:00	59.1	48.9	58.5	63.1	50.7	20.9	44	5	11		FALSE
2021-Aug-15 11:00	58.1	50.6	53.9	58.9	52.2	21.5	50	16	13		FALSE
2021-Aug-15 12:00	59.7	52.0	54.8	60.7	54.7	21.6	53	13	11		FALSE
2021-Aug-15 13:00	56.6	54.3	56.2	60.1	51.4	22.7	43	15	11		FALSE
2021-Aug-15 14:00	53.1	56.5	50.7	56.3	53.4	22.3	44	14	13		FALSE
2021-Aug-15 15:00	57.7	55.6	54.9	60.7	53.6	22.5	44	15	9		FALSE
2021-Aug-15 16:00	54.8	53.7	52.9	57.4	54.5	22.7	46	17	9		FALSE
2021-Aug-15 17:00	54.0	49.7	48.3	54.7	52.2	22	48	15	8		FALSE
2021-Aug-15 18:00	56.4	47.9	52.7	57.7	50.2	21.1	52	11	8		FALSE
2021-Aug-15 19:00	59.7	53.7	53.7	63.9	53.9	19.5	60	10	5		FALSE
2021-Aug-15 20:00	57.5	47.4	56.8	60.6	54.2	17.4	70	11	5		FALSE
2021-Aug-15 21:00		48.7	52.1	55.9	52.2	15.2	84	4	4		FALSE
2021-Aug-15 22:00		47.2	45.0	47.4	51.6	14.1	87	1	5		FALSE
2021-Aug-15 23:00		46.3	43.2	45.9	50.5	13.9	88	36	8		FALSE
2021-Aug-16 00:00		44.3	42.2	45.0	50.1	13	92	1	9		FALSE
2021-Aug-16 01:00		41.0	40.4	45.4	49.7	12.6	93	2	9		FALSE
2021-Aug-16 02:00		40.1	39.5	45.1	49.8	12.6	94	36	5		FALSE
2021-Aug-16 03:00		40.3	39.0	44.8	49.9	12.2	96	36	5		TRUE
2021-Aug-16 04:00		40.2	37.8	44.0	50.0	12.3	96	2	9		TRUE
2021-Aug-16 05:00		45.6	39.8	45.8	50.1	12.8	94	2	9		FALSE
2021-Aug-16 06:00		46.7	41.1	47.7	50.7	13.5	94	1	8		FALSE
2021-Aug-16 07:00		47.9	43.0	54.2	51.9	16.9	80	7	9		FALSE
2021-Aug-16 08:00		50.0	52.0	60.0	53.1	19.3	73	8	13		FALSE
2021-Aug-16 09:00		49.6	51.9	55.1	51.2	21.4	69	9	15		FALSE
2021-Aug-16 10:00		51.2	53.1	58.8	51.2	22.4	64	10	15		FALSE
2021-Aug-16 11:00		53.2	54.6	58.8	51.9	23	56	11	18		FALSE
2021-Aug-16 12:00	61.8	58.1	53.4	62.2	58.3	23.4	55	11	21		TRUE
2021-Aug-16 13:00	59.4	63.5	58.2	62.0	54.2	24.1	52	9	22		TRUE
2021-Aug-16 14:00	53.9	64.0	51.7	53.6	50.3	23.8	55	8	21		TRUE
2021-Aug-16 15:00	57.0	63.7	53.7	59.6	52.7	23	57	10	17		FALSE
2021-Aug-16 16:00	56.1	61.6	54.8	58.9	51.9	22.4	57	10	15		FALSE
2021-Aug-16 17:00	55.5	45.7	52.8	57.6	49.0	22.4	60	8	15		FALSE
2021-Aug-16 18:00	56.3	49.1	53.8	58.1	53.7	21.8	60	9	13		FALSE
2021-Aug-16 19:00	60.1	47.2	55.0	62.5	48.8	21.1	63	7	11		FALSE
2021-Aug-16 20:00	56.5	48.0	55.7	59.7	48.1	21.2	63	8	9		FALSE
2021-Aug-16 21:00	57.7	48.2	54.7	59.8	48.5	21.2	61	8	13		FALSE
2021-Aug-16 22:00	51.1	47.7	49.5	52.7	47.8	20.8	64	8	13		FALSE
2021-Aug-16 23:00	47.8	47.1	45.2	49.9	45.2	20.3	68	8	11		FALSE
2021-Aug-17 00:00	47.1	44.7	44.6	49.5	44.8	20.3	73	7	15		FALSE
2021-Aug-17 01:00	46.7	42.5	44.9	49.7	44.8	20.4	76	8	8		FALSE
2021-Aug-17 02:00	45.8	41.3	44.0	47.1	44.1	20.5	80	8	13		FALSE
2021-Aug-17 03:00	45.6	40.8	44.3	47.2	43.8	20.2	84	8	9		FALSE

Blank spaces indicate missing data

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	Dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Aug-17 04:00	45.6	40.5	42.6	46.9	43.4	20.3	87	7	9		FALSE
2021-Aug-17 05:00	44.8	45.0	41.3	46.6	43.7	20.6	90	6	4		FALSE
2021-Aug-17 06:00	46.7	45.8	42.2	46.7	43.8	21	93	7	8		FALSE
2021-Aug-17 07:00	47.8	46.1	43.3	49.1	44.6	21.7	92	9	8		FALSE
2021-Aug-17 08:00	47.2	48.1	44.0	52.5	46.8	22.1	92	11	9		FALSE
2021-Aug-17 09:00	47.4	50.6	44.7	48.4	47.9	23.2	84	14	5		FALSE
2021-Aug-17 10:00	50.2	50.3	46.7	49.9	47.8	23.6	82	13	9		FALSE
2021-Aug-17 11:00	50.6	54.0	50.1	57.2	47.9	24.4	79		4		FALSE
2021-Aug-17 12:00	49.2	50.2	47.1	55.5	48.7	25.8	73		4		FALSE
2021-Aug-17 13:00	49.3	53.7	47.4	53.4	50.7	25.4	73	20	5		FALSE
2021-Aug-17 14:00	50.6	56.0	47.0	50.3	56.4	26.7	68	18	13		FALSE
2021-Aug-17 15:00	55.6	55.0	49.5	58.2	58.1	26.4	67	19	13		FALSE
2021-Aug-17 16:00	53.1	51.0	49.9	56.4	49.8	25.8	73	17	8		FALSE
2021-Aug-17 17:00	53.2	52.7	49.5	56.7	51.0	26.5	68	17	9		FALSE
2021-Aug-17 18:00	56.3	53.1	55.1	60.2	50.7	25.4	75	16	8		FALSE
2021-Aug-17 19:00	55.4	51.0	52.5	58.6	51.4	23.6	88	12	9		FALSE
2021-Aug-17 20:00	48.2	49.8	46.2	49.1	49.0	22.9	96	12	9		TRUE
2021-Aug-17 21:00	48.5	50.1	47.2	51.6	48.6	22.7	96	11	9		TRUE
2021-Aug-17 22:00	48.3	59.5	46.9	51.4	48.6	22.9	96	12	8		TRUE
2021-Aug-17 23:00	47.4	49.9	46.7	50.2	48.0	22.8	96	17	5		TRUE
2021-Aug-18 00:00	46.9	57.5	45.9	50.0	47.8	22.4	95	19	4		FALSE
2021-Aug-18 01:00	45.8	46.8	45.0	49.7	46.2	20.7	100	18	4	Fog	TRUE
2021-Aug-18 02:00	44.8	45.9	43.0	48.8	44.3	19.3	100	8	5		TRUE
2021-Aug-18 03:00	44.5	44.1	43.1	48.2	45.3	19.2	100	5	5	Fog	TRUE
2021-Aug-18 04:00	44.7	44.5	42.8	47.2	46.7	19.5	100		0	Fog	TRUE
2021-Aug-18 05:00	44.7	46.2	42.2	46.2	49.5	19.8	100	2	5	Fog	TRUE
2021-Aug-18 06:00	45.7	46.6	42.6	46.6	44.8	20.7	100	1	5	Fog	TRUE
2021-Aug-18 07:00	53.7	46.6	45.4	46.5	49.7	21.4	100	2	8	Fog	TRUE
2021-Aug-18 08:00	46.1	47.9	44.8	45.8	47.3	22.3	98	5	8	Fog	TRUE
2021-Aug-18 09:00	46.2	47.9	44.1	45.2	47.0	23.2	95	9	8	Fog	TRUE
2021-Aug-18 10:00	53.8	49.6	43.9	46.5	47.0	24.5	84	7	11		FALSE
2021-Aug-18 11:00	53.9	54.9	66.6	60.9	48.4	25	79	10	8		FALSE
2021-Aug-18 12:00	48.6	52.4	46.4	52.1	49.0	25.4	78	8	11		FALSE
2021-Aug-18 13:00	50.4	54.2	48.0	54.9	58.8	25.4	80	13	13		FALSE
2021-Aug-18 14:00	50.4	55.1	55.0	50.7	60.4	26.2	77	9	11		FALSE
2021-Aug-18 15:00	53.4	57.7	53.9	58.6	52.5	26	75	11	15		FALSE
2021-Aug-18 16:00	51.0	56.6	48.7	51.1	53.9	25.6	75	12	13		FALSE
2021-Aug-18 17:00	54.4	50.9	52.7	57.7	50.3	25.7	78	8	13		FALSE
2021-Aug-18 18:00	55.8	52.6	53.4	60.3	52.2	24.5	81	11	13		FALSE
2021-Aug-18 19:00	54.8	49.1	52.5	56.2	54.3	23.4	84	11	11		FALSE
2021-Aug-18 20:00	54.7	48.7	54.7	57.7	53.1	22.4	94	9	8		FALSE
2021-Aug-18 21:00	48.9	49.8	50.2	53.5	53.9	22.6	93	6	8		FALSE
2021-Aug-18 22:00	48.6	50.0	46.0	51.6	49.4	22.4	92	6	8		FALSE
2021-Aug-18 23:00	48.1	49.3	46.4	50.8	49.0	22.3	92	4	9		FALSE
2021-Aug-19 00:00	47.9	48.5	45.8	50.7	47.7	21.8	94	33	5		FALSE
2021-Aug-19 01:00	47.0	45.0	45.3	51.0	47.7	21	96	30	5		TRUE
2021-Aug-19 02:00	45.8	45.5	44.6	49.9	50.8	20.7	97	36	5		TRUE
2021-Aug-19 03:00	45.1	43.0	44.8	48.8	50.3	20.6	98	2	5		TRUE
2021-Aug-19 04:00	44.8	42.7	43.7	46.7	49.9	21	97	33	4		TRUE
2021-Aug-19 05:00	44.1	45.9	44.0	45.7	50.0	20.8	99	35	8		TRUE
2021-Aug-19 06:00	47.1	47.2	43.7	45.6	50.3	20.5	100	26	9		TRUE
2021-Aug-19 07:00	45.7	47.5	44.3	46.7	50.4	21.6	98	34	11		TRUE
2021-Aug-19 08:00	47.3	48.7	46.2	60.3	50.7	24.4	84	36	15		FALSE
2021-Aug-19 09:00	50.9	57.3	55.8	54.1	51.4	25.3	75	34	15		FALSE
2021-Aug-19 10:00	49.5	58.2	54.5	50.9	52.1	26.7	64	35	13		FALSE
2021-Aug-19 11:00	48.3	57.3	47.6	49.7	51.7	28.2	54	1	21		TRUE
2021-Aug-19 12:00	49.7	52.2	51.4	55.3	52.3	28.6	50	36	21		TRUE
2021-Aug-19 13:00	50.8	54.9	51.4	55.6	53.4	28.9	51	34	18		FALSE
2021-Aug-19 14:00	50.2	55.1	52.4	52.4	66.2	29.5	49	33	17		FALSE
2021-Aug-19 15:00	51.2	54.8	50.4	49.9	51.8	29.6	51	32	11		FALSE
2021-Aug-19 16:00	52.7	57.7	52.5	51.2	52.9	29.7	46	34	13		FALSE
2021-Aug-19 17:00	52.3	52.5	49.2	50.9	49.6	29.3	48	34	15		FALSE
2021-Aug-19 18:00	49.6	54.5	51.3	57.6	51.9	28.3	52	34	15		FALSE
2021-Aug-19 19:00	48.8	54.6	50.2	53.5	49.8	26.7	60	33	11		FALSE
2021-Aug-19 20:00	52.7	54.2	52.8	57.8	52.8	24.9	68	34	13		FALSE
2021-Aug-19 21:00	50.5	51.1	48.7	54.4	52.5	23.3	71	33	9		FALSE
2021-Aug-19 22:00	49.5	51.6	48.5	52.5	52.5	22.8	79	34	15		FALSE
2021-Aug-19 23:00	49.0	51.2	48.4	52.4	52.0	22.6	75	36	18		FALSE
2021-Aug-20 00:00	47.8	49.0	48.3	51.8	50.8	22	76	35	17		FALSE
2021-Aug-20 01:00	47.5	47.8	47.4	50.8	50.4	21.4	80	35	15		FALSE
2021-Aug-20 02:00	47.0	48.4	47.1	50.5	48.5	21.1	83	35	15		FALSE
2021-Aug-20 03:00	46.5	45.9	47.0	49.5	45.0	20.9	85	35	13		FALSE

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	Dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Aug-20 04:00	46.0	44.7	46.4	49.8	44.9	20.6	88	35	13		FALSE
2021-Aug-20 05:00	44.8	47.9	45.2	48.1	44.9	20.4	90	36	8		FALSE
2021-Aug-20 06:00	49.7	47.4	45.3	45.1	45.9	20.4	93	36	13		FALSE
2021-Aug-20 07:00	48.4	48.8	46.1	48.9	48.6	22.1	86	36	17		FALSE
2021-Aug-20 08:00	48.6	50.4	51.5	49.2	51.2	23.4	79	36	22		TRUE
2021-Aug-20 09:00	49.1	51.9	51.3	49.2	50.8	24.7	78	35	13		FALSE
2021-Aug-20 10:00	53.7	54.0	56.1	55.5	51.2	26.9	67	1	13		FALSE
2021-Aug-20 11:00	51.2	60.0	52.8	54.0	50.6	28.4	62	34	15		FALSE
2021-Aug-20 12:00	55.0	55.0	52.9	56.4	73.3	29.1	56		9		FALSE
2021-Aug-20 13:00	53.2	54.7	54.0	56.2	50.3	29.7	56	36	13		FALSE
2021-Aug-20 14:00	59.3	55.8	53.7	53.9	49.1	29.9	52	1	13		FALSE
2021-Aug-20 15:00	53.2	57.4	51.2	54.6	49.3	29.1	60		8		FALSE
2021-Aug-20 16:00	53.9	53.6	51.9	56.2	50.5	28.3	61	18	11		FALSE
2021-Aug-20 17:00	53.6	58.5	53.3	56.8	56.5	28.6	58	20	8		FALSE
2021-Aug-20 18:00	50.7	59.6	52.2	54.0	58.1	28.3	61	22	8		FALSE
2021-Aug-20 19:00	50.0	52.4	51.0	57.5	54.5	26.9	65	22	8		FALSE
2021-Aug-20 20:00	53.5	53.8	54.5	55.4	52.7	26.4	66	31	5		FALSE
2021-Aug-20 21:00	50.0	50.4	52.1	53.7	56.4	24.8	77	34	8		FALSE
2021-Aug-20 22:00	49.6	50.1	52.1	52.2	53.4	24.3	78	35	11		FALSE
2021-Aug-20 23:00	48.4	49.4	51.7	52.1	47.2	24.3	78	36	15		FALSE
2021-Aug-21 00:00	49.2	48.4	51.7	53.4	47.9	24	78	36	11		FALSE
2021-Aug-21 01:00	48.1	49.7	51.7	51.3	48.9	23.6	79	36	13		FALSE
2021-Aug-21 02:00	55.0	45.8	50.8	60.5	46.4	23.2	83		4		FALSE
2021-Aug-21 03:00	46.4	46.1	51.6	49.7	48.0	22.9	85	36	11		FALSE
2021-Aug-21 04:00	46.2	43.5	50.0	49.1	43.8	22.4	88		0		FALSE
2021-Aug-21 05:00	45.2	46.6	49.7	48.3	43.0	21.9	94	2	5		FALSE
2021-Aug-21 06:00	44.5	47.4	47.4	46.8	43.8	21.8	95				FALSE
2021-Aug-21 07:00	48.8	46.4	46.0	46.2	43.9	24.2	86	8	5		FALSE
2021-Aug-21 08:00	53.6	46.5	49.8	57.1	44.5	24.8	81	11	4		FALSE
2021-Aug-21 09:00	60.0	54.5	54.8	62.5	45.5	26.3	73		4		FALSE
2021-Aug-21 10:00	56.6	53.5	54.4	61.0	46.6	27.9	69	8	8		FALSE
2021-Aug-21 11:00	56.1	52.1	54.9	61.2	48.2	28.3	64	13	11		FALSE
2021-Aug-21 12:00	52.1	50.3	50.5	64.4	47.4	27.3	63	13	13		FALSE
2021-Aug-21 13:00	56.7	51.3	53.5	60.9	49.2	26.7	61	15	8		FALSE
2021-Aug-21 14:00	54.8	49.5	53.1	58.5	47.4	26.2	69	12	9		FALSE
2021-Aug-21 15:00	57.0	54.0	55.1	61.4	47.7	26.7	60	13	9		FALSE
2021-Aug-21 16:00	56.5	53.1	52.3	60.1	48.4	27	62	18	8		FALSE
2021-Aug-21 17:00	57.8	57.1	54.6	60.1	51.2	27.7	57	18	8		FALSE
2021-Aug-21 18:00	53.4	56.0	52.5	58.5	48.7	26.9	60	17	5		FALSE
2021-Aug-21 19:00	61.6	54.8	53.0	68.0	50.2	25.7	65	11	5		FALSE
2021-Aug-21 20:00	53.9	53.6	54.5	58.3	51.6	24.8	68	11	4		FALSE
2021-Aug-21 21:00	48.9	48.8	50.5	52.3	48.5	22.3	83	3	5		FALSE
2021-Aug-21 22:00	50.7	50.3	49.4	52.6	50.4	22.3	84		0		FALSE
2021-Aug-21 23:00	47.6	48.4	48.9	50.5	45.7	21.3	89		4		FALSE
2021-Aug-22 00:00	47.9	50.1	48.4	50.9	45.3	20.5	91	2	8		FALSE
2021-Aug-22 01:00	46.6	49.1	47.4	50.2	43.4	20.4	92		0		FALSE
2021-Aug-22 02:00	55.7	45.4	46.9	49.3	43.0	19.7	94	36	4		FALSE
2021-Aug-22 03:00	78.5	44.9	45.5	49.3	43.6	19.9	94	35	5		FALSE
2021-Aug-22 04:00	44.4	41.9	48.3	47.3	42.5	18.9	97	2	9		TRUE
2021-Aug-22 05:00	66.8	45.8	47.8	45.6	42.7	19.3	96		0		TRUE
2021-Aug-22 06:00	44.9	46.2	47.2	45.7	43.5	19.1	97		4		TRUE
2021-Aug-22 07:00	44.9	46.3	45.8	51.4	43.1	21.2	90		4		FALSE
2021-Aug-22 08:00	44.1	45.4	45.9	46.9	44.0	22.8	85	28	5		FALSE
2021-Aug-22 09:00	44.5	44.6	46.5	47.5	44.2	24.8	74	30	5		FALSE
2021-Aug-22 10:00	50.6	52.1	47.9	53.2	45.8	25.9	70	3	5		FALSE
2021-Aug-22 11:00	53.2	56.9	53.6	55.8	47.9	27.2	65	33	5		FALSE
2021-Aug-22 12:00	52.4	58.9	54.4	53.1	46.9	28.9	61		9		FALSE
2021-Aug-22 13:00	49.7	55.4	68.1	52.8	49.0	28.7	61	31	15		FALSE
2021-Aug-22 14:00	53.5	72.7	48.2	55.6	49.6	27.9	66	18	9		FALSE
2021-Aug-22 15:00	56.9	55.9	56.5	61.6	48.7	29.2	60	21	5		FALSE
2021-Aug-22 16:00	54.4	57.6	54.1	56.4	49.1	29.5	62	32	15		FALSE
2021-Aug-22 17:00	51.2	54.7	51.2	55.0	51.8	27.4	70		4		FALSE
2021-Aug-22 18:00	53.7	54.4	53.4	54.8	48.2	27.3	71	32	11		FALSE
2021-Aug-22 19:00	50.9	52.6	52.2	53.9	47.5	26.7	74	1	8		FALSE
2021-Aug-22 20:00	55.4	57.6	56.5	56.1	49.5	25.6	78	34	11		FALSE
2021-Aug-22 21:00	50.1	50.2	50.1	52.9	48.0	24.6	84	34	13		FALSE
2021-Aug-22 22:00	48.5	51.2	50.1	52.4	47.1	24.2	86	34	13		FALSE
2021-Aug-22 23:00	48.4	50.8	50.1	52.7	46.8	23.7	91	33	15		FALSE
2021-Aug-23 00:00	49.2	48.5	49.3	52.9	45.5	23.1	86	34	13		FALSE
2021-Aug-23 01:00	48.6	49.5	49.7	52.2	44.1	23.1	87	35	15		FALSE
2021-Aug-23 02:00	47.4	48.9	49.7	52.1	43.8	22.7	92	34	13		FALSE
2021-Aug-23 03:00	47.5	49.5	48.0	50.9	43.6	22.8	93	35	15		FALSE

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	Dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Aug-23 04:00	47.3	49.7	49.9	50.8	45.6	23	92	35	13		FALSE
2021-Aug-23 05:00	45.1	47.7	49.0	49.1	43.3	22.6	95	35	15		FALSE
2021-Aug-23 06:00	46.8	47.6	48.9	47.4	44.4	22.2	96	34	13		TRUE
2021-Aug-23 07:00	46.3	47.2	47.4	46.0	45.8	23.2	93	36	15		FALSE
2021-Aug-23 08:00	48.3	49.5	48.0	52.2	48.0	24.5	88	34	18		FALSE
2021-Aug-23 09:00	53.3	52.4	69.4	55.8	49.9	25.8	80	34	13		FALSE
2021-Aug-23 10:00	53.6	58.4	53.3	55.4	49.9	27.6	71	34	13		FALSE
2021-Aug-23 11:00	73.7	53.6	55.3	53.9	49.8	29.4	63	32	21		TRUE
2021-Aug-23 12:00	52.4	53.2	49.5	53.9	57.2	30.1	60	34	13		FALSE
2021-Aug-23 13:00	50.9	56.5	48.6	50.2	51.1	30.9	48	31	22		TRUE
2021-Aug-23 14:00	55.2	54.1	50.8	51.7	50.6	31.4	45	32	24		TRUE
2021-Aug-23 15:00	51.2	54.7	51.9	51.0	49.5	31.3	42	30	15		FALSE
2021-Aug-23 16:00	53.2	52.3	52.2	53.0	51.5	30.5	46	29	22		TRUE
2021-Aug-23 17:00	54.2	57.0	53.2	52.9	53.3	29	45	33	21		TRUE
2021-Aug-23 18:00	51.5	56.1	53.7	51.3	52.0	27.9	44	33	17		FALSE
2021-Aug-23 19:00	49.8	56.0	48.2	53.4	51.1	26	55	33	13		FALSE
2021-Aug-23 20:00	54.2	58.7	49.8	54.4	50.8	23.9	63	35	9		FALSE
2021-Aug-23 21:00		52.2	49.5	53.9	50.0	23.1	67	35	8		FALSE
2021-Aug-23 22:00		51.0	48.6	51.7	50.4	22.2	75	33	13		FALSE
2021-Aug-23 23:00		49.5	48.6	51.4	49.6	21.3	81	33	8		FALSE
2021-Aug-24 00:00		47.2	47.9	54.0	48.6	21	84	27	8		FALSE
2021-Aug-24 01:00		45.3	46.5	48.9	48.6	19.6	91	28	5		FALSE
2021-Aug-24 02:00		45.0	44.4	47.7	48.6	19.9	91	26	8		FALSE
2021-Aug-24 03:00		44.9	44.7	47.9	48.8	19.7	94	27	8		FALSE
2021-Aug-24 04:00		42.7	44.2	46.5	49.0	17.9	99	30	8		TRUE
2021-Aug-24 05:00		46.3	43.8	45.9	49.2	17.5	98	25	5		TRUE
2021-Aug-24 06:00		46.8	45.9	46.1	49.7	18.2	96	29	8		TRUE
2021-Aug-24 07:00		47.5	47.6	48.6	50.1	20.1	90	23	5		FALSE
2021-Aug-24 08:00		47.2	48.4	49.9	50.2	22.4	79	27	8		FALSE
2021-Aug-24 09:00		50.8	50.7	51.4	50.0	24.4	67	31	8		FALSE
2021-Aug-24 10:00		56.9	55.9	60.3	52.9	26.3	60	30	5		FALSE
2021-Aug-24 11:00		55.1	52.5	63.8	52.8	27.3	59		13		FALSE
2021-Aug-24 12:00	51.5	56.1	56.2	51.7	55.8	27.2	61	19	15		FALSE
2021-Aug-24 13:00	50.5	58.2	48.6	50.6	59.4	27.3	61	18	15		FALSE
2021-Aug-24 14:00	53.8	57.8	54.7	58.0	56.6	28.5	48	18	15		FALSE
2021-Aug-24 15:00	53.4	60.1	51.9	53.3	58.6	28.7	48	22	13		FALSE
2021-Aug-24 16:00	53.3	58.2	52.9	54.4	58.5	29.8	47	21	9		FALSE
2021-Aug-24 17:00	53.9	55.6	54.3	56.3	55.7	29.4	48	19	13		FALSE
2021-Aug-24 18:00	53.7	59.5	53.0	59.1	59.1	28	57	17	5		FALSE
2021-Aug-24 19:00	49.5	58.4	48.1	50.9	59.4	26	68	13	5		FALSE
2021-Aug-24 20:00	52.4	58.7	51.9	55.5	58.6	25.4	74	11	5		FALSE
2021-Aug-24 21:00	54.6	54.8	50.5	59.6	57.6	23.7	83	9	8		FALSE
2021-Aug-24 22:00	52.2	50.0	53.1	57.3	53.2	23.2	86		4		FALSE
2021-Aug-24 23:00	48.3	48.2	48.2	52.2	51.8	21.5	94	2	8		FALSE
2021-Aug-25 00:00	47.4	47.8	47.5	51.0	51.6	21.5	93		4		FALSE
2021-Aug-25 01:00	46.5	45.7	46.1	50.2	51.4	21.3	91		4		FALSE
2021-Aug-25 02:00	46.0	44.1	45.5	49.5	50.9	19.9	96		4		TRUE
2021-Aug-25 03:00	45.5	44.3	46.9	48.6	50.9	19.7	97	1	8		TRUE
2021-Aug-25 04:00	45.9	44.6	46.8	48.1	51.2	19.8	95		0		FALSE
2021-Aug-25 05:00	45.3	45.9	46.1	47.6	51.7	19.4	94		0		FALSE
2021-Aug-25 06:00	48.0	47.1	46.1	49.7	51.8	19.9	93		4		FALSE
2021-Aug-25 07:00	49.3	49.1	48.7	53.1	53.8	22.6	85		0		FALSE
2021-Aug-25 08:00	56.4	52.6	49.9	50.0	55.5	24.6	76		0		FALSE
2021-Aug-25 09:00	52.1	58.3	50.9	50.5	60.9	26.3	75		4		FALSE
2021-Aug-25 10:00	56.4	60.1	53.2	55.0	60.6	28.3	69		4		FALSE
2021-Aug-25 11:00	52.0	78.7	52.6	53.9	56.9	28.2	71	17	15		FALSE
2021-Aug-25 12:00	51.5	56.3	51.2	54.8	58.3	27.9	70	19	13		FALSE
2021-Aug-25 13:00	54.2	55.3	51.1	56.3	57.6	29.1	66	18	11		FALSE
2021-Aug-25 14:00	50.8	57.6	50.4	48.4	63.5	28.2	72	17	5		FALSE
2021-Aug-25 15:00	49.3	58.4	51.5	47.8	61.8	27.3	77	19	11	Thunderstorms	FALSE
2021-Aug-25 16:00	49.8	59.7	49.5	52.5	52.4	27.6	72		4		FALSE
2021-Aug-25 17:00	48.4	49.2	50.8	47.6	52.6	27	77	18	9		FALSE
2021-Aug-25 18:00	48.4	53.3	47.7	52.7	54.6	26.6	83	19	8		FALSE
2021-Aug-25 19:00	51.0	52.9	51.3	53.4	56.9	26.5	83	21	5		FALSE
2021-Aug-25 20:00	53.3	64.3	55.4	55.2	57.5	26.1	81		4		FALSE
2021-Aug-25 21:00	48.8	51.1	49.7	53.5	53.2	25	90		0		FALSE
2021-Aug-25 22:00	47.8	52.0	48.6	52.1	51.9	23.6	96		0		TRUE
2021-Aug-25 23:00	47.3	51.4	47.0	51.2	51.9	22.2	98	33	4		TRUE
2021-Aug-26 00:00	46.8	50.4	47.3	50.9	51.5	22	100	35	4		TRUE
2021-Aug-26 01:00	47.1	49.4	47.0	50.4	51.3	20.9	100	36	4		TRUE
2021-Aug-26 02:00	45.4	46.1	46.2	49.4	51.2	20.9	100		0		TRUE
2021-Aug-26 03:00	45.5	46.9	46.3	49.1	51.3	20.9	97		0		TRUE

Blank spaces indicate missing data

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	Dir (10s)	nd Spd (km	Weather	Weather Exclude
2021-Aug-26 04:00	45.0	43.9	46.4	47.8	51.4	20.3	100		4		TRUE
2021-Aug-26 05:00	43.9	47.8	46.4	46.5	51.4	19.7	99		0	Fog	TRUE
2021-Aug-26 06:00	49.1	48.7	47.7	47.0	51.7	20.1	98		0		TRUE
2021-Aug-26 07:00	47.2	47.5	48.6	48.6	52.0	22.6	95	34	5		FALSE
2021-Aug-26 08:00	48.4	51.4	50.0	49.1	52.5	24.7	88	30	5		FALSE
2021-Aug-26 09:00	54.4	54.5	49.6	53.4	51.8	26.3	82	31	5		FALSE
2021-Aug-26 10:00	52.8	59.8	53.0	55.2	52.8	28.3	71		8		FALSE
2021-Aug-26 11:00	50.0	57.8	58.5	50.8	56.8	28.5	69	20	13		FALSE
2021-Aug-26 12:00	50.5	55.3	49.6	54.2	57.2	29.8	63	19	9	Haze	FALSE
2021-Aug-26 13:00	51.1	58.5	50.0	56.4	59.5	29.5	64	17	13		FALSE
2021-Aug-26 14:00	50.6	54.7	50.5	52.2	54.4	30.4	59	15	11		FALSE
2021-Aug-26 15:00	49.9	59.8	50.8	56.8	58.8	28.5	64	20	13		FALSE
2021-Aug-26 16:00	52.9	55.0	54.3	52.2	51.9	30.2	51		5		FALSE
2021-Aug-26 17:00	54.7	60.4	53.9	55.0	53.1	30.5	51	25	8		FALSE
2021-Aug-26 18:00	51.7	56.2	50.8	54.3	52.2	29.1	65	28	8		FALSE
2021-Aug-26 19:00	52.7	52.7	55.4	51.3	52.7	27.8	66	33	9		FALSE
2021-Aug-26 20:00	51.9	60.8	57.5	56.7	53.8	26.5	64	34	13		FALSE
2021-Aug-26 21:00	47.9	51.8	50.5	54.4	52.6	25.2	67	35	15		FALSE
2021-Aug-26 22:00	48.1	50.6	49.8	54.8	52.2	24.3	71	35	15		FALSE
2021-Aug-26 23:00	47.4	50.2	49.6	53.7	51.9	23.6	73	34	21		TRUE
2021-Aug-27 00:00	47.1	48.6	49.3	53.7	51.5	22.7	77	34	18		FALSE
2021-Aug-27 01:00	46.9	48.5	48.7	52.2	52.1	22.2	79	1	9		FALSE
2021-Aug-27 02:00	51.6	46.9	48.1	53.5	51.6	22.1	80	36	13		FALSE
2021-Aug-27 03:00	46.2	45.9	47.0	51.7	51.5	21.3	81	1	13		FALSE
2021-Aug-27 04:00	45.6	44.3	46.7	51.8	51.1	21.7	68	3	15		FALSE
2021-Aug-27 05:00	44.5	46.3	46.9	49.2	50.8	21.1	61	5	13		FALSE
2021-Aug-27 06:00	48.0	46.4	45.8	48.9	50.6	20.3	63	5	13		FALSE
2021-Aug-27 07:00	47.1	46.7	45.7	47.0	51.0	20.4	62	7	17		FALSE
2021-Aug-27 08:00	57.8	45.9	47.5	57.1	51.3	21.3	60	7	21		TRUE
2021-Aug-27 09:00	59.1	53.1	54.0	62.9	53.7	22.6	56	6	24		TRUE
2021-Aug-27 10:00	60.6	54.0	57.1	63.3	56.7	24	53	8	17		FALSE
2021-Aug-27 11:00	58.9	53.4	56.1	62.1	63.8	24.9	50	9	18		FALSE
2021-Aug-27 12:00	57.8	55.2	59.3	59.0	60.4	25.5	51	11	15		FALSE
2021-Aug-27 13:00	57.7	53.1	59.2	59.2	69.3	26.4	47	9	13		FALSE
2021-Aug-27 14:00	57.8	56.0	58.2	60.2	52.7	26.2	54	13	15		FALSE
2021-Aug-27 15:00	59.0	55.0	55.6	60.7	53.5	26.7	48	10	17		FALSE
2021-Aug-27 16:00	55.9	52.2	56.6	58.6	51.8	25.2	59	14	13		FALSE
2021-Aug-27 17:00	57.7	61.1	57.3	61.2	53.1	24.5	60	12	9		FALSE
2021-Aug-27 18:00	54.1	60.3	53.8	56.4	52.5	24.3	59	12	13		FALSE
2021-Aug-27 19:00	58.9	49.6	53.5	61.4	52.1	23.6	62	10	13		FALSE
2021-Aug-27 20:00	55.7	50.1	54.2	57.4	52.2	23	60	8	13		FALSE
2021-Aug-27 21:00	55.9	50.9	50.5	56.8	53.3	22.2	54	7	13		FALSE
2021-Aug-27 22:00	50.1	50.1	49.1	53.4	53.2	21.2	53	8	15		FALSE
2021-Aug-27 23:00	47.4	49.1	46.1	50.8	52.7	20.2	56	7	11		FALSE
2021-Aug-28 00:00	48.6	47.4	46.2	50.8	51.7	19.7	57	8	15		FALSE
2021-Aug-28 01:00	46.0	45.7	45.4	48.9	50.8	18.9	61	7	9		FALSE
2021-Aug-28 02:00	44.9	44.8	43.6	48.2	50.1	18.3	64	6	11		FALSE
2021-Aug-28 03:00	44.7	44.2	42.2	47.2	50.1	18.7	64	5	9		FALSE
2021-Aug-28 04:00	44.3	42.6	42.5	47.2	50.4	18.2	67	10	9		FALSE
2021-Aug-28 05:00	44.8	44.6	42.1	46.3	50.2	17.6	71	7	4		FALSE
2021-Aug-28 06:00	45.9	45.1	40.6	45.5	50.2	18.2	70		4		FALSE
2021-Aug-28 07:00	50.8	45.9	42.7	51.4	50.3	19	67	8	11		FALSE
2021-Aug-28 08:00	58.9	47.0	55.1	60.9	50.9	19.3	68	8	9		FALSE
2021-Aug-28 09:00	58.0	46.3	54.0	61.3	51.1	20.4	70	6	5		FALSE
2021-Aug-28 10:00	57.0	47.4	56.1	59.8	50.8	21.5	71	11	8		FALSE
2021-Aug-28 11:00	56.3	58.5	57.0	60.1	55.3	23.9	70	10	13		FALSE
2021-Aug-28 12:00	57.7	58.4	59.9	60.5	52.8	25.3	67	15	15		FALSE
2021-Aug-28 13:00	59.5	56.5	56.0	62.7	61.5	25.5	67	14	15		FALSE
2021-Aug-28 14:00	58.7	55.8	51.5	61.1	57.1	26	68	13	15		FALSE
2021-Aug-28 15:00	58.0	54.4	57.4	61.2	53.1	26.3	69	13	15		FALSE
2021-Aug-28 16:00	54.0	53.3	54.1	52.8	52.4	25.7	72	9	9		FALSE
2021-Aug-28 17:00	52.7	54.1	52.1	56.8	51.5	24.1	79	12	9	Rain	TRUE
2021-Aug-28 18:00	53.2	51.7	55.1	55.7	53.6	22.4	95	12	8	Moderate Rain, Fog	TRUE
2021-Aug-28 19:00	53.2	54.3	54.0	54.6	56.6	22.2	99	12	5	Rain, Fog	TRUE
2021-Aug-28 20:00	47.5	51.9	52.7	51.0	55.7	22.5	99		4		TRUE
2021-Aug-28 21:00	47.4	50.0	49.0	51.5	54.9	22.4	100		0	Fog	TRUE
2021-Aug-28 22:00	47.2	48.5	45.8	50.6	54.7	21.7	100	9	4	Fog	TRUE
2021-Aug-28 23:00	47.5	48.9	45.5	50.6	54.8	21.6	100		0	Fog	TRUE
2021-Aug-29 00:00	47.3	48.2	46.2	50.0	54.9	22	100	33	13	Fog	TRUE
2021-Aug-29 01:00	47.4	48.1	46.4	51.1	55.1	21.9	99	6	8		TRUE
2021-Aug-29 02:00	46.7	46.1	45.5	51.1	54.3	21.6	100	11	11	Fog	TRUE
2021-Aug-29 03:00	46.0	46.3	44.5	52.0	53.9	21.5	100	2	4	Fog	TRUE

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	Dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Aug-29 04:00	45.3	45.2	44.9	51.5	53.8	21.8	100		4	Fog	TRUE
2021-Aug-29 05:00	44.1	46.9	45.8	49.3	53.6	22.1	99	29	5	Fog	TRUE
2021-Aug-29 06:00	45.8	46.7	47.1	47.8	53.6	22	100		0	Fog	TRUE
2021-Aug-29 07:00	46.0	47.9	49.7	47.7	54.1	22.8	99	12	5	Fog	TRUE
2021-Aug-29 08:00	44.7	46.6	49.5	46.1	53.3	24.2	97	14	5	Fog	TRUE
2021-Aug-29 09:00	47.1	47.7	49.3	48.1	52.7	25.7	88	22	9		FALSE
2021-Aug-29 10:00	52.2	58.1	55.9	53.0	55.5	27	77	21	11		FALSE
2021-Aug-29 11:00	51.1	53.2	51.4	51.6	54.0	27.4	77	19	17		FALSE
2021-Aug-29 12:00	51.9	52.4	49.7	47.9	56.2	28.2	71	20	15		FALSE
2021-Aug-29 13:00	51.4	53.0	48.9	49.0	58.3	28.8	70	17	15		FALSE
2021-Aug-29 14:00	53.9	51.5	49.5	60.8	53.9	26.8	83	17	13		FALSE
2021-Aug-29 15:00	49.3	49.4	48.2	48.2	53.4	27.5	75	20	21		TRUE
2021-Aug-29 16:00	53.8	56.2	52.3	52.2	53.8	28.3	63	19	18		FALSE
2021-Aug-29 17:00	51.4	52.1	51.7	52.7	53.2	28	73	18	18		FALSE
2021-Aug-29 18:00	50.6	55.9	52.3	48.7	52.2	27.7	76	19	15		FALSE
2021-Aug-29 19:00	51.2	51.0	50.9	49.5	52.2	27.5	72	19	22	Thunderstorms	TRUE
2021-Aug-29 20:00	49.3	51.5	52.1	52.6	55.3	26.6	77	22	18	Thunderstorms	FALSE
2021-Aug-29 21:00										Thunderstorms, Heavy Rain, Fog	TRUE
	60.3	57.4	60.5	61.9	61.8	21.9	94	27	15		TRUE
2021-Aug-29 22:00	51.9	60.4	61.0	56.6	62.2	22.1	99		0	Rain	TRUE
2021-Aug-29 23:00	48.6	50.7	50.7	52.5	55.4	22.8	96		4	Rain	TRUE
2021-Aug-30 00:00	47.6	50.5	51.0	51.8	54.6	22.2	95	27	9	Rain	TRUE
2021-Aug-30 01:00	47.0	48.6	47.5	51.1	53.6	22.1	96	22	9		TRUE
2021-Aug-30 02:00	46.4	47.1	47.2	51.0	53.4	22.1	96	23	8		TRUE
2021-Aug-30 03:00	46.3	47.4	46.5	50.8	53.5	22.1	95	24	9		FALSE
2021-Aug-30 04:00	45.5	47.1	46.4	51.5	53.7	21.7	97	24	8		TRUE
2021-Aug-30 05:00	46.2	47.0	46.7	49.5	53.2	20.8	99	30	5		TRUE
2021-Aug-30 06:00	46.9	46.9	48.1	50.2	53.2	20.6	99	26	8		TRUE
2021-Aug-30 07:00	48.5	48.0	51.6	51.5	53.9	21.3	92	29	11		FALSE
2021-Aug-30 08:00	48.6	51.3	48.7	51.4	55.0	22.4	81	29	13		FALSE
2021-Aug-30 09:00	55.9	55.9	49.7	54.9	53.9	24.2	64	29	13		FALSE
2021-Aug-30 10:00	51.2	52.9	52.6	61.5	55.3	25.6	53	29	11		FALSE
2021-Aug-30 11:00	71.8	52.2	51.9	54.3	54.5	26.1	46	26	17		FALSE
2021-Aug-30 12:00	52.0	51.4	51.3	54.8	55.9	26.3	43	28	17		FALSE
2021-Aug-30 13:00	50.2	51.6	66.9	52.1	56.4	27.7	38	26	22		TRUE
2021-Aug-30 14:00	51.7	61.8	55.8	51.9	55.6	26	58	19	18		FALSE
2021-Aug-30 15:00	54.4	57.3	65.3	58.5	62.5	27.5	49	25	15		FALSE
2021-Aug-30 16:00	53.8	60.4	52.7	54.0	62.3	28.2	39	27	18		FALSE
2021-Aug-30 17:00	49.6	55.4	50.1	54.8	53.5	27.6	40	30	22		TRUE
2021-Aug-30 18:00	50.2	49.8	48.9	52.1	52.8	26.1	46	28	13		FALSE
2021-Aug-30 19:00	48.4	50.6	46.4	53.0	52.6	23.5	60	32	13		FALSE
2021-Aug-30 20:00	50.0	51.7	48.7	54.1	53.6	21.8	66	32	13		FALSE
2021-Aug-30 21:00	49.4	50.7	48.1	55.3	51.9	20.3	72	32	8		FALSE
2021-Aug-30 22:00	47.7	50.2	46.8	53.0	53.6	18.9	80		0		FALSE
2021-Aug-30 23:00	46.7	48.8	45.5	49.0	51.2	19.1	78	28	4		FALSE
2021-Aug-31 00:00	46.3	47.4	44.6	47.6	50.9	17.9	83		0		FALSE
2021-Aug-31 01:00	45.2	44.5	42.3	47.0	50.7	17.1	89	20	4		FALSE
2021-Aug-31 02:00	45.1	44.0	40.9	47.2	50.6	15.6	94	33	8		FALSE
2021-Aug-31 03:00	43.2	44.0	40.2	46.2	50.6	15.9	95		0		FALSE
2021-Aug-31 04:00	42.6	44.0	40.4	46.2	50.8	15.1	100		4		TRUE
2021-Aug-31 05:00	42.5	46.0	40.9	45.9	51.2	15.2	95	24	5		FALSE
2021-Aug-31 06:00	47.3	46.7	43.5	47.1	52.0	14.7	99	28	5		TRUE
2021-Aug-31 07:00	48.1	48.1	46.1	50.8	53.0	18.1	87	25	11		FALSE
2021-Aug-31 08:00	49.3	47.2	50.0	49.9	52.7	19.5	82	29	11		FALSE
2021-Aug-31 09:00	49.1	50.0	49.3	49.9	53.5	21.5	69	34	13		FALSE
2021-Aug-31 10:00	49.0	49.5	52.2	50.5	53.3	22.4	61	33	17		FALSE
2021-Aug-31 11:00	52.1	57.1	56.8	54.3	55.4	22.7	57	32	8		FALSE
2021-Aug-31 12:00	50.7	55.8	55.8	50.9	53.7	24	55	31	15		FALSE
2021-Aug-31 13:00	52.3	50.7	57.5	56.1	53.9	24.1	51	32	17		FALSE
2021-Aug-31 14:00	52.6	55.0	59.5	54.9	53.9	24.2	48	35	18		FALSE
2021-Aug-31 15:00	57.6	54.1	58.7	54.0	52.8	24.8	45	30	22		TRUE
2021-Aug-31 16:00	54.8	56.0	56.3	58.4	53.8	23.1	55	33	21		TRUE
2021-Aug-31 17:00	48.4	54.4	46.7	49.5	53.1	22.8	55	34	15		FALSE
2021-Aug-31 18:00	47.7	52.8	46.4	48.4	52.2	21.7	56	33	13		FALSE
2021-Aug-31 19:00	51.1	49.9	46.3	54.1	54.4	19.8	65	31	8		FALSE
2021-Aug-31 20:00	48.3	49.6	46.1	49.9	53.6	18.9	69	31	8		FALSE
2021-Aug-31 21:00	47.3	50.4	46.2	50.5	56.6	18.3	73	33	11		FALSE
2021-Aug-31 22:00	48.1	48.7	45.4	49.4	55.8	17.3	78	33	9		FALSE
2021-Aug-31 23:00	46.8	49.6	44.3	46.8	56.0	16.6	82	33	8		FALSE
2021-Sep-01 00:00	46.0	45.9	43.1	46.7	50.0	15.9	85	1	9		FALSE
2021-Sep-01 01:00	44.6	44.1	40.7	47.0	49.9	16.1	85	1	11		FALSE
2021-Sep-01 02:00	44.0	44.0	38.6	45.5	49.8	15.6	86	1	11		FALSE

Blank spaces indicate missing data

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	Dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Sep-01 03:00	42.5	43.6	38.0	45.8	49.9	15.7	85	36	11		FALSE
2021-Sep-01 04:00	43.0	44.1	38.3	45.1	50.5	15.5	81	36	9		FALSE
2021-Sep-01 05:00	43.2	46.2	39.7	44.6	50.0	15.2	79	1	13		FALSE
2021-Sep-01 06:00	45.3	47.3	41.6	44.3	50.2	15.7	72	3	13		FALSE
2021-Sep-01 07:00	47.3	47.6	41.1	45.3	50.5	16.9	68	5	11		FALSE
2021-Sep-01 08:00	49.6	48.8	48.6	47.3	51.5	18.6	59	5	17		FALSE
2021-Sep-01 09:00	49.8	49.0	60.5	56.8	52.0	19.2	56	5	18		FALSE
2021-Sep-01 10:00	52.7	47.8	47.3	60.3	51.2	19.8	55	6	15		FALSE
2021-Sep-01 11:00	55.6	46.5	59.5	57.4	50.9	20.6	52	6	17		FALSE
2021-Sep-01 12:00	48.5	51.7	55.7	45.9	53.1	22.5	48	3	11		FALSE
2021-Sep-01 13:00	51.6	55.9	53.7	53.3	52.1	22.6	42	2	15		FALSE
2021-Sep-01 14:00	51.8	52.9	49.3	50.1	55.7	22.8	40	34	15		FALSE
2021-Sep-01 15:00	50.1	50.4	54.9	50.5	53.6	22.7	40	4	13		FALSE
2021-Sep-01 16:00	49.3	54.4	64.0	45.7	52.1	23.3	40	36	18		FALSE
2021-Sep-01 17:00	48.9	51.4	51.7	46.6	51.6	23.3	40	35	17		FALSE
2021-Sep-01 18:00	48.6	53.7	55.3	50.6	57.5	22.1	40	2	13		FALSE
2021-Sep-01 19:00	46.8	50.4	45.8	45.2	52.2	19.9	47	34	9		FALSE
2021-Sep-01 20:00	48.2	48.2	45.0	50.6	52.9	17.7	59	34	9		FALSE
2021-Sep-01 21:00	47.3	50.0	44.4	50.1	53.3	16	66	34	9		FALSE
2021-Sep-01 22:00	53.8	51.1	45.1	53.6	54.9	16	65	34	15		FALSE
2021-Sep-01 23:00	47.3	48.1	43.9	47.2	52.0	16.1	64	36	15		FALSE
2021-Sep-02 00:00	46.1	48.4	40.6	46.0	55.8	15.1	69	35	13		FALSE
2021-Sep-02 01:00	53.2	43.5	38.5	44.7	49.9	13.5	75	35	9		FALSE
2021-Sep-02 02:00	47.3	42.6	36.6	43.2	50.1	12.5	76	36	9		FALSE
2021-Sep-02 03:00	44.3	42.6	35.5	42.6	50.3	12	75	34	9		FALSE
2021-Sep-02 04:00	44.3	42.9	35.5	42.5	50.3	10.7	79	33	11		FALSE
2021-Sep-02 05:00	45.2	45.7	38.3	42.3	50.7	9.4	84	34	5		FALSE
2021-Sep-02 06:00	47.6	47.2	42.0	43.7	51.7	10	83	34	11		FALSE
2021-Sep-02 07:00	47.5	48.2	45.3	48.5	52.2	12.3	74	33	13		FALSE
2021-Sep-02 08:00	49.3	48.8	43.8	50.6	52.9	15	65	34	15		FALSE
2021-Sep-02 09:00	48.4	47.2	44.5	46.3	51.8	16.4	58	34	18		FALSE
2021-Sep-02 10:00	48.4	50.7	51.2	49.6	52.0	16.9	56	33	22		TRUE
2021-Sep-02 11:00	51.9	54.4	54.5	51.2	72.7	17.5	57	32	30		TRUE
2021-Sep-02 12:00	49.6	51.6	52.3	50.6	52.5	17.6	57	32	28		TRUE
2021-Sep-02 13:00	51.8	56.4	52.5	55.0	53.7	17.8	57	33	28		TRUE
2021-Sep-02 14:00	55.5	55.2	55.6	54.9	53.2	18.6	57	35	22		TRUE
2021-Sep-02 15:00	54.1	54.6	51.4	57.8	52.6	18.6	57	35	24		TRUE
2021-Sep-02 16:00	49.7	56.3	50.8	53.0	53.2	17.9	60	36	28		TRUE
2021-Sep-02 17:00	48.5	50.8	48.9	47.6	52.6	16.3	66	35	22		TRUE
2021-Sep-02 18:00	47.7	50.6	46.8	46.7	52.5	16.3	67	34	15		FALSE
2021-Sep-02 19:00	48.4	48.2	48.0	50.0	51.5	16.1	69	33	11		FALSE
2021-Sep-02 20:00	48.7	48.0	44.0	50.0	51.2	15.4	69	33	11		FALSE
2021-Sep-02 21:00	48.1	49.2	43.8	51.7	50.3	15.2	70		4		FALSE
2021-Sep-02 22:00	49.7	47.3	42.9	48.4	50.1	14.7	74	30	4		FALSE
2021-Sep-02 23:00	47.1	48.4	39.8	44.6	53.3	13.3	80	34	8		FALSE
2021-Sep-03 00:00	46.7	44.8	43.3	47.2	49.8	13.9	82	21	4		FALSE
2021-Sep-03 01:00	44.8	42.6	37.4	42.8	49.5	13.6	83		0		FALSE
2021-Sep-03 02:00	43.7	42.4	37.4	42.7	49.6	10.9	92		0		FALSE
2021-Sep-03 03:00	43.3	42.4	35.8	42.0	49.7	11.6	94	30	5		FALSE
2021-Sep-03 04:00	42.8	42.7	36.1	41.6	49.8	9.6	97	1	8		TRUE
2021-Sep-03 05:00	43.1	46.0	38.3	41.7	50.1	9.6	98	36	8		TRUE
2021-Sep-03 06:00	44.8	47.5	40.2	42.6	50.7	10.9	97	35	9		TRUE
2021-Sep-03 07:00	47.7	48.1	43.0	44.1	51.2	12.6	93	1	15		FALSE
2021-Sep-03 08:00	51.9	47.9	46.8	55.7	51.9	15.6	79	2	18		FALSE
2021-Sep-03 09:00	47.3	47.3	45.8	48.8	51.4	16.9	73	33	8		FALSE
2021-Sep-03 10:00	51.6	52.0	51.1	55.9	50.5	17.8	70	31	9		FALSE
2021-Sep-03 11:00	52.8	60.2	50.6	52.6	51.3	18.9	63	33	9		FALSE
2021-Sep-03 12:00	46.6	61.0	53.9	47.2	60.5	20.2	58		11		FALSE
2021-Sep-03 13:00	54.5	68.7	51.1	57.5	54.5	21.3	55	31	13		FALSE
2021-Sep-03 14:00	49.5	54.5	47.6	46.2	51.1	21.6	54	1	9		FALSE
2021-Sep-03 15:00	51.3	58.6	48.7	49.2	53.2	21.1	58	34	13		FALSE
2021-Sep-03 16:00	50.9	62.4	46.9	52.4	50.8	20.8	64		13		FALSE
2021-Sep-03 17:00	49.3	56.1	46.6	49.4	50.9	20.3	65	20	18		FALSE
2021-Sep-03 18:00	49.8	55.4	50.2	47.7	57.2	19.7	69	23	9		FALSE
2021-Sep-03 19:00	47.7	50.9	51.6	45.3	55.6	18.7	73	34	5		FALSE
2021-Sep-03 20:00	47.1	49.7	45.5	47.0	51.0	17.3	78		0		FALSE
2021-Sep-03 21:00	51.2	47.4	50.6	52.3	50.9	16.2	81	29	8		FALSE
2021-Sep-03 22:00	48.4	49.1	45.4	48.8	53.7	14.5	87	33	5		FALSE
2021-Sep-03 23:00	45.7	46.6	40.6	43.9	49.7	13.9	92	34	5		FALSE
2021-Sep-04 00:00	46.6	46.0	40.8	46.5	50.3	12.6	96	31	8		TRUE
2021-Sep-04 01:00	51.8	43.4	38.5	42.6	49.8	12.9	95	35	11		FALSE
2021-Sep-04 02:00	46.6	43.3	38.4	42.8	54.5	12.3	97	36	9		TRUE

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Sep-04 03:00	42.6	43.6	38.0	43.2	49.8	12.7	96	1	11		TRUE
2021-Sep-04 04:00	42.9	43.7	36.8	43.2	49.8	12.2	97		0		TRUE
2021-Sep-04 05:00	43.2	45.8	36.1	42.6	49.9	11.6	100		0		TRUE
2021-Sep-04 06:00	45.9	47.1	40.4	44.0	51.9	11.1	99		0		TRUE
2021-Sep-04 07:00	46.9	47.6	41.1	45.8	50.1	14.1	93	36	4		FALSE
2021-Sep-04 08:00	47.6	46.1	42.7	49.2	51.9	18	71		4		FALSE
2021-Sep-04 09:00	51.1	47.9	45.9	53.5	50.5	20	62	21	5		FALSE
2021-Sep-04 10:00	56.1	45.6	52.9	59.4	50.9	20.6	57	19	9		FALSE
2021-Sep-04 11:00	58.5	46.2	63.2	61.4	53.6	20.7	60	21	15		FALSE
2021-Sep-04 12:00	59.5	50.0	56.4	62.6	52.8	21.2	61		5		FALSE
2021-Sep-04 13:00	58.7	54.3	56.8	62.4	52.7	22	59	18	9	Haze	FALSE
2021-Sep-04 14:00	56.4	51.5	50.4	59.8	50.4	22.7	55	13	13		FALSE
2021-Sep-04 15:00	56.8	47.2	56.2	58.7	50.5	21.7	59	19	13		FALSE
2021-Sep-04 16:00	59.9	56.0	56.1	53.8	57.7	22.2	52	15	5		FALSE
2021-Sep-04 17:00	56.1	50.8	58.8	56.2	50.7	22.3	54	19	5		FALSE
2021-Sep-04 18:00	56.9	50.3	57.2	59.0	50.7	20.6	68	12	8		FALSE
2021-Sep-04 19:00	51.6	47.5	52.3	54.2	50.4	20	70	11	9		FALSE
2021-Sep-04 20:00	50.1	47.9	49.8	52.9	50.6	20.3	69	12	8		FALSE
2021-Sep-04 21:00	54.6	50.3	54.4	58.9	51.0	21	69	15	11		FALSE
2021-Sep-04 22:00	51.9	48.5	50.8	56.0	52.3	21.1	76	15	11		FALSE
2021-Sep-04 23:00	48.9	49.4	45.6	52.6	50.0	21.1	79	16	9		FALSE
2021-Sep-05 00:00	48.7	49.4	48.5	52.2	51.2	19.6	94	12	8	Rain,Fog	TRUE
2021-Sep-05 01:00	52.4	53.3	55.4	53.8	55.1	19.1	99	12	5	Moderate Rain, Fog	TRUE
2021-Sep-05 02:00	53.4	53.6	55.8	54.9	58.0	18.8	99		4	Moderate Rain, Fog	TRUE
2021-Sep-05 03:00	49.8	49.9	57.1	52.7	53.5	19	99		4		TRUE
2021-Sep-05 04:00	44.5	43.6	47.3	48.8	51.2	19.4	98	20	9		TRUE
2021-Sep-05 05:00	44.1	43.2	44.5	48.9	51.0	19.6	98	19	9		TRUE
2021-Sep-05 06:00	44.1	43.0	45.9	46.3	50.5	19.7	99	24	8		TRUE
2021-Sep-05 07:00	44.4	43.2	45.8	45.4	50.5	19.7	98	26	8		TRUE
2021-Sep-05 08:00	45.6	43.3	47.3	45.0	50.5	19.7	96	28	11		TRUE
2021-Sep-05 09:00	45.0	44.7	47.6	46.3	52.0	20.2	91	28	11		FALSE
2021-Sep-05 10:00	47.6	49.4	47.7	50.6	50.8	22	71	30	15		FALSE
2021-Sep-05 11:00	47.2	51.4	48.4	46.4	52.5	22.7	64	28	21		TRUE
2021-Sep-05 12:00	55.6	50.7	50.0	51.8	52.5	24	53	28	18		FALSE
2021-Sep-05 13:00	55.0	51.2	54.6	49.0	52.4	24.5	48	28	21		TRUE
2021-Sep-05 14:00	53.8	52.9	47.9	55.9	52.3	24.3	44	28	21		TRUE
2021-Sep-05 15:00	56.8	52.5	47.9	47.7	62.8	25	44	28	15		FALSE
2021-Sep-05 16:00	52.9	49.7	47.4	48.8	52.4	25.3	42	27	9		FALSE
2021-Sep-05 17:00	48.7	49.5	47.5	51.6	52.2	25.5	40	26	22		TRUE
2021-Sep-05 18:00	47.3	50.9	48.0	46.3	53.4	23.7	49	29	18		FALSE
2021-Sep-05 19:00	48.4	49.2	51.8	54.7	52.5	20.4	59	30	11		FALSE
2021-Sep-05 20:00	48.3	49.1	47.6	52.7	56.4	19.6	62	28	8		FALSE
2021-Sep-05 21:00	51.3	49.0	48.9	52.9	56.8	19.9	63	31	9		FALSE
2021-Sep-05 22:00	46.5	48.2	46.7	50.6	52.4	19.4	63	31	17		FALSE
2021-Sep-05 23:00	47.6	48.2	48.1	49.0	52.8	18.1	80	26	8	Rain	TRUE
2021-Sep-06 00:00	46.1	45.0	44.0	46.7	52.1	17.8	81	29	8		FALSE
2021-Sep-06 01:00	44.4	45.0	42.0	46.3	51.5	16.2	86	30	9		FALSE
2021-Sep-06 02:00	43.5	42.9	40.4	45.5	51.4	17	82	31	8		FALSE
2021-Sep-06 03:00	42.3	43.0	40.0	45.9	51.4	15.2	90	28	9		FALSE
2021-Sep-06 04:00	41.8	42.7	38.9	44.8	51.4	14.1	95	30	4		FALSE
2021-Sep-06 05:00	41.9	45.4	39.2	46.9	51.5	15.1	94	30	8		FALSE
2021-Sep-06 06:00	43.0	45.9	40.2	46.6	51.6	15.6	86	25	15	Rain	TRUE
2021-Sep-06 07:00	48.5	49.2	50.3	49.2	52.8	15.4	91	28	13		FALSE
2021-Sep-06 08:00	44.2	49.7	44.6	45.6	52.7	16.4	79	27	18		FALSE
2021-Sep-06 09:00	45.5	47.6	47.5	47.7	51.3	18.6	70	28	18		FALSE
2021-Sep-06 10:00	44.8	49.8	47.6	49.5	51.8	19.7	57	28	28		TRUE
2021-Sep-06 11:00	54.4	49.3	51.8	48.1	52.3	20.7	52	28	26		TRUE
2021-Sep-06 12:00	59.5	51.0	54.7	51.9	52.3	21.5	49	28	22		TRUE
2021-Sep-06 13:00	58.2	51.5	51.9	54.0	52.2	22	47	29	24		TRUE
2021-Sep-06 14:00	57.2	49.1	54.9	49.5	53.8	22.5	50	28	18		FALSE
2021-Sep-06 15:00	52.4	49.4	48.9	49.5	54.2	21.4	52	30	17		FALSE
2021-Sep-06 16:00	54.9	48.6	48.5	53.2	53.6	21.7	53	28	17		FALSE
2021-Sep-06 17:00	51.9	49.2	49.2	52.8	53.6	21	57	29	24		TRUE
2021-Sep-06 18:00	48.8	49.5	49.6	52.6	54.0	19.5	60	30	30		TRUE
2021-Sep-06 19:00	47.0	48.6	47.8	54.1	53.8	17.2	69	30	9		FALSE
2021-Sep-06 20:00	51.6	48.8	48.7	55.2	53.5	16.6	72	29	11		FALSE
2021-Sep-06 21:00	47.3	47.3	48.3	51.0	52.6	15.6	78	26	8		FALSE
2021-Sep-06 22:00	46.2	46.7	45.0	47.1	50.3	15.5	80	28	11		FALSE
2021-Sep-06 23:00	46.3	46.5	42.1	46.3	50.1	14.3	85	28	5		FALSE
2021-Sep-07 00:00	45.2	44.6	41.1	44.8	50.1	13.2	88	29	8		FALSE
2021-Sep-07 01:00	44.0	43.0	40.0	43.4	50.5	13.5	87	27	5		FALSE
2021-Sep-07 02:00	42.7	42.2	37.9	42.9	50.5	10.9	95		4		FALSE

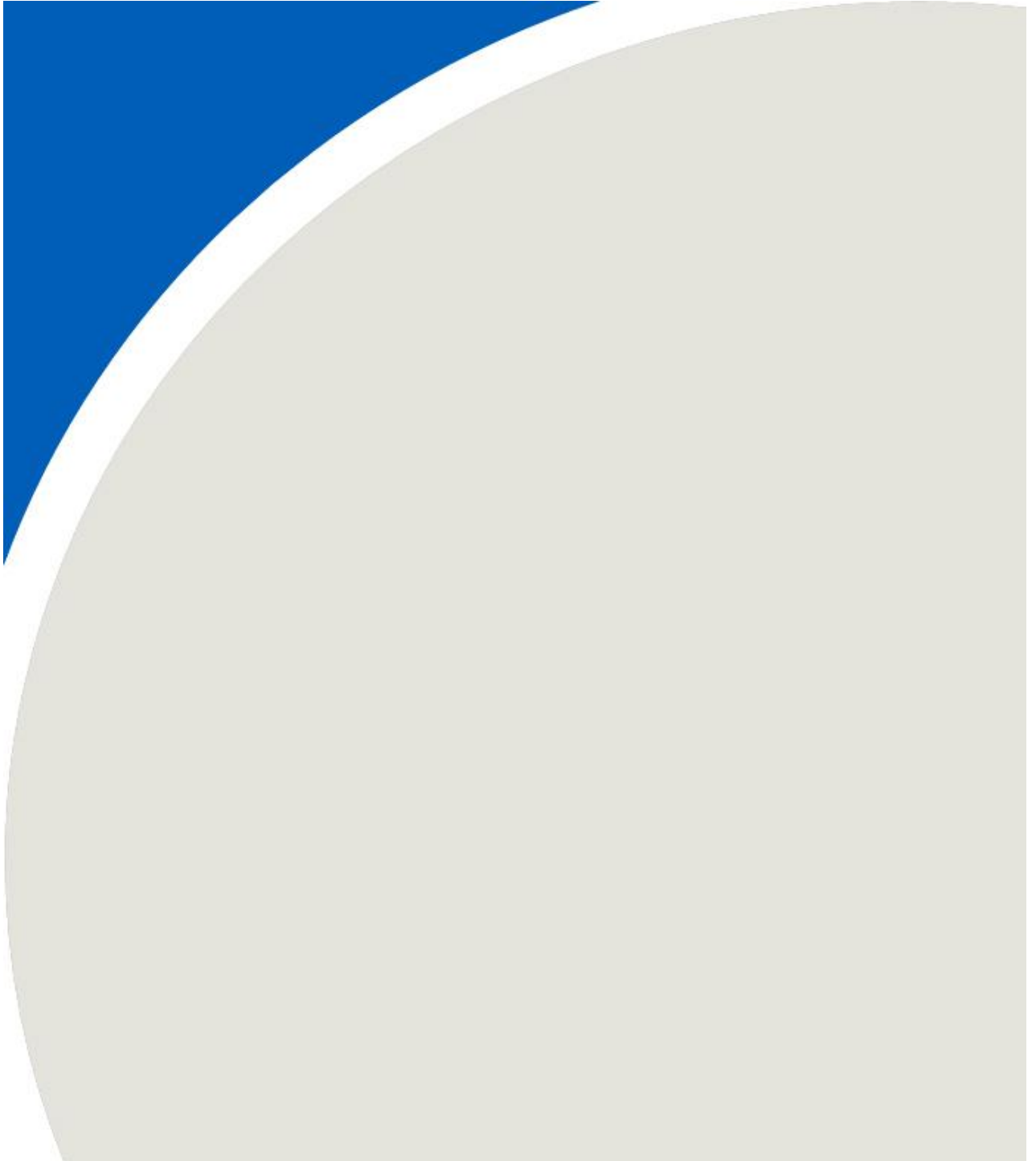
Blank spaces indicate missing data

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	dir (10s)	nd Spd (km	Weather	Weather Exclude
2021-Sep-07 03:00	43.4	42.1	39.2	48.1	50.6	10.2	98	35	4		TRUE
2021-Sep-07 04:00	41.7	42.2	38.7	42.4	50.7	11	96	29	8		TRUE
2021-Sep-07 05:00	43.5	45.9	40.9	43.4	51.1	10.9	99	8	4		TRUE
2021-Sep-07 06:00	49.0	47.6	45.9	47.5	52.1	9.7	99	3	8		TRUE
2021-Sep-07 07:00	53.1	48.8	50.1	57.3	52.1	13.6	93		0		FALSE
2021-Sep-07 08:00	52.3	47.4	47.9	54.8	51.4	17.2	75	22	5		FALSE
2021-Sep-07 09:00	55.5	45.7	56.0	60.5	51.7	19.3	65	17	5		FALSE
2021-Sep-07 10:00	54.6	49.9	53.8	58.1	52.0	21.1	59	19	13		FALSE
2021-Sep-07 11:00	70.2	58.3	50.8	53.6	58.4	21.3	59	14	15		FALSE
2021-Sep-07 12:00	64.7	56.8	48.7	51.4	57.2	21.9	64	15	9		FALSE
2021-Sep-07 13:00	58.9	50.5	58.6	61.4	50.9	22.2	63	13	18		FALSE
2021-Sep-07 14:00	54.3	53.5	52.0	53.1	51.9	23.1	56	13	15		FALSE
2021-Sep-07 15:00	58.2	50.2	53.4	57.1	52.7	23.3	53	13	15		FALSE
2021-Sep-07 16:00	55.1	54.4	54.0	55.6	48.9	22.7	59	12	21		TRUE
2021-Sep-07 17:00	52.5	52.3	50.9	52.5	49.7	22.1	63	11	22		TRUE
2021-Sep-07 18:00	52.9	51.0	52.4	55.7	48.8	20.9	72	11	24		TRUE
2021-Sep-07 19:00	61.4	67.7	65.3	62.2	66.8	16.9	98	27	11	Rain	TRUE
2021-Sep-07 20:00	47.8	49.4	53.4	49.4	48.3	16.3	96	26	9	Rain	TRUE
2021-Sep-07 21:00	46.8	50.0	50.3	49.8	48.6	16.2	100	13	8	Rain	TRUE
2021-Sep-07 22:00										Thunderstorms,	
	51.0	52.9	54.3	53.4	51.3	17.1	100	24	9	Heavy Rain, Fog	TRUE
2021-Sep-07 23:00	60.4	62.7	62.5	61.7	67.1	16.7	100	14	11	Moderate Rain, Fog	TRUE
2021-Sep-08 00:00	55.0	56.0	59.3	56.7	57.0	17.3	100	13	9	Heavy Rain, Fog	TRUE
2021-Sep-08 01:00	52.8	53.3	56.8	54.7	53.0	17.6	100	14	9		TRUE
2021-Sep-08 02:00										Thunderstorms,	
	62.6	61.3	67.1	64.5	63.5	17.7	100	11	17	Moderate Rain, Fog	TRUE
2021-Sep-08 03:00	62.7	63.0	65.6	63.5	65.8	16.4	99	23	9	Thunderstorms, Rain	TRUE
2021-Sep-08 04:00	55.6	53.5	58.9	56.5	52.8	16.2	100		4	Rain	TRUE
2021-Sep-08 05:00	50.2	51.3	54.6	52.9	49.8	15.9	100	36	5		TRUE
2021-Sep-08 06:00	46.9	47.6	48.9	50.4	44.4	16.2	100		4	Fog	TRUE
2021-Sep-08 07:00	48.7	47.8	48.9	51.2	45.9	16.5	100		4	Fog	TRUE
2021-Sep-08 08:00	56.7	46.6	54.4	64.6	47.9	18	100	21	8	Fog	TRUE
2021-Sep-08 09:00	57.6	45.2	48.8	51.5	46.0	19	96	21	9		TRUE
2021-Sep-08 10:00		45.6	48.9	67.9	47.7	20.5	81	20	15		FALSE
2021-Sep-08 11:00		52.3	48.1	52.0	52.8	22.1	73	21	17		FALSE
2021-Sep-08 12:00		56.4	49.8	54.5	58.8	22.3	76	19	21		TRUE
2021-Sep-08 13:00	52.6	61.6	51.2	54.2	62.8	22.4	77	20	28		TRUE
2021-Sep-08 14:00	53.3	55.6	56.6	54.3	57.9	24.1	65	20	26		TRUE
2021-Sep-08 15:00	55.8	51.7	52.5	54.8	50.3	23.3	68	22	26		TRUE
2021-Sep-08 16:00	56.3	51.0	52.5	56.6	51.7	25.3	36	27	28		TRUE
2021-Sep-08 17:00	53.8	49.6	51.3	52.6	52.5	24.4	38	27	24		TRUE
2021-Sep-08 18:00	49.9	50.1	49.6	52.9	51.8	22.9	43	27	18		FALSE
2021-Sep-08 19:00	48.7	50.5	48.0	49.6	50.2	20.3	55	28	11		FALSE
2021-Sep-08 20:00	49.0	48.0	48.5	51.3	49.2	18.8	62	31	8		FALSE
2021-Sep-08 21:00	48.2	49.1	47.1	50.2	48.7	16.3	80		4		FALSE
2021-Sep-08 22:00	48.4	48.9	46.6	49.8	48.5	19.2	61	27	9		FALSE
2021-Sep-08 23:00	47.5	48.2	45.0	50.4	46.1	17.7	72	31	9		FALSE
2021-Sep-09 00:00	46.2	46.7	43.4	47.8	43.1	18	69	25	8		FALSE
2021-Sep-09 01:00	44.5	42.0	41.3	47.2	42.4	16.4	77	25	5		FALSE
2021-Sep-09 02:00	43.5	40.8	39.1	46.1	42.2	14.5	85		0		FALSE
2021-Sep-09 03:00	42.6	41.0	38.9	45.6	42.0	12.9	95	29	4		FALSE
2021-Sep-09 04:00	41.9	41.5	40.1	45.2	42.4	12.5	96	30	5		TRUE
2021-Sep-09 05:00	43.2	45.9	41.7	46.1	43.7	12.2	100		0		TRUE
2021-Sep-09 06:00	46.0	46.8	46.0	51.2	47.3	11.7	100	2	4		TRUE
2021-Sep-09 07:00	48.4	49.4	45.9	49.5	46.4	14.1	94		0		FALSE
2021-Sep-09 08:00	47.6	47.9	47.3	49.0	46.6	16.9	79	25	15		FALSE
2021-Sep-09 09:00	47.2	43.6	47.9	51.4	46.6	18.7	71	25	21		TRUE
2021-Sep-09 10:00	49.9	46.4	50.3	55.4	48.7	19.1	69	28	15		FALSE
2021-Sep-09 11:00	48.6	49.7	56.4	52.6	48.5	20.1	66	28	13		FALSE
2021-Sep-09 12:00	47.9	49.5	48.3	52.7	49.0	18.7	72	33	18		FALSE
2021-Sep-09 13:00	48.5	54.2	56.4	51.0	50.3	21	62	34	21		TRUE
2021-Sep-09 14:00	49.1	51.2	49.0	53.5	49.9	20.9	56	32	28		TRUE
2021-Sep-09 15:00	48.7	53.9	51.0	64.4	51.8	20.3	56	34	21		TRUE
2021-Sep-09 16:00	48.9	52.0	49.0	65.0	49.7	20.3	56	34	24		TRUE
2021-Sep-09 17:00	59.6	50.2	48.4	52.7	50.3	19.1	57	32	22		TRUE
2021-Sep-09 18:00	56.0	49.4	47.5	47.8	50.4	18.1	64	32	18		FALSE
2021-Sep-09 19:00	46.3	48.6	47.1	51.9	49.0	16.8	70	33	13		FALSE
2021-Sep-09 20:00	45.8	48.7	45.9	46.0	49.2	15.4	77	30	8		FALSE
2021-Sep-09 21:00	48.2	48.1	44.6	52.1	49.6	14.2	82	32	9		FALSE
2021-Sep-09 22:00	46.3	46.9	43.8	47.7	48.6	14.1	84	33	9		FALSE
2021-Sep-09 23:00	46.2	47.0	45.0	47.2	47.6	12.8	89	33	5		FALSE
2021-Sep-10 00:00	44.8	44.3	41.8	45.7	45.8	13.4	92	35	8		FALSE

Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	Dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Sep-10 01:00	41.3	41.7	38.6	44.4	43.4	12.2	95	32	8		FALSE
2021-Sep-10 02:00	40.8	41.2	38.0	44.2	43.2	12.7	95	34	9		FALSE
2021-Sep-10 03:00	40.8	41.5	37.0	44.3	42.8	13	95	34	9		FALSE
2021-Sep-10 04:00	40.8	42.1	37.4	44.5	42.9	12.4	93	35	11		FALSE
2021-Sep-10 05:00	42.4	46.3	40.8	44.7	44.6	12.3	92	35	11		FALSE
2021-Sep-10 06:00	44.4	47.9	43.1	46.8	46.9	10.7	96	35	8		TRUE
2021-Sep-10 07:00	47.0	49.5	45.6	47.3	48.7	13.6	87	35	8		FALSE
2021-Sep-10 08:00	47.0	49.8	45.9	49.4	49.0	16.5	78	34	13		FALSE
2021-Sep-10 09:00	46.1	46.5	46.0	50.1	47.7	18.6	60	34	11		FALSE
2021-Sep-10 10:00	47.1	46.8	47.6	62.6	46.7	19.9	54	29	8		FALSE
2021-Sep-10 11:00	48.9	48.4	55.4	52.3	47.5	21.1	45	26	9		FALSE
2021-Sep-10 12:00	48.7	46.7	53.1	52.6	71.6	21.1	45	30	13		FALSE
2021-Sep-10 13:00	51.6	48.3	47.8	49.9	49.4	20.1	58	21	17		FALSE
2021-Sep-10 14:00	50.0	46.5	48.1	54.4	50.6	21.4	45	26	18		FALSE
2021-Sep-10 15:00	59.7	50.4	67.6	52.1	53.9	23.3	39	26	18		FALSE
2021-Sep-10 16:00	55.3	51.8	57.9	56.1	54.7	21.6	51	25	13		FALSE
2021-Sep-10 17:00	49.5	48.3	47.7	53.6	49.7	21.7	40	30	21		TRUE
2021-Sep-10 18:00	48.5	48.8	47.1	57.8	49.2	20.1	47	32	13		FALSE
2021-Sep-10 19:00	47.6	48.6	45.7	60.5	48.7	16.6	64		0		FALSE
2021-Sep-10 20:00	48.8	49.7	45.0	59.0	52.8	14.8	72	34	8		FALSE
2021-Sep-10 21:00	50.1	50.5	47.3	54.6	52.4	13.2	81	34	5		FALSE
2021-Sep-10 22:00	47.7	49.7	48.4	48.5	52.4	13.2	80		0		FALSE
2021-Sep-10 23:00	45.8	46.8	44.2	45.9	46.1	11.3	88	34	4		FALSE
2021-Sep-11 00:00	46.1	45.1	44.7	45.4	48.1	11.1	94		0		FALSE
2021-Sep-11 01:00	51.2	45.2	42.2	44.6	46.2	10.5	94	36	4		FALSE
2021-Sep-11 02:00	48.2	43.7	42.9	45.9	45.7	9.9	98	2	5		TRUE
2021-Sep-11 03:00	44.3	43.8	40.7	49.5	45.1	9.3	98	2	4		TRUE
2021-Sep-11 04:00	44.6	43.3	40.9	49.6	44.6	10.3	96	35	4		TRUE
2021-Sep-11 05:00	43.7	45.8	41.0	45.6	46.0	9.3	98	36	8		TRUE
2021-Sep-11 06:00	45.0	46.3	43.0	45.8	45.7	10.8	97	3	4		TRUE
2021-Sep-11 07:00	46.8	47.6	44.1	46.8	46.3	12.9	96		0		TRUE
2021-Sep-11 08:00	50.4	48.6	48.3	53.7	48.4	15.9	77	10	5		FALSE
2021-Sep-11 09:00	48.1	46.7	47.0	48.0	47.5	19.9	74	21	9		FALSE
2021-Sep-11 10:00	47.2	55.8	48.4	48.6	56.8	20.8	71	21	24		TRUE
2021-Sep-11 11:00	51.1	57.4	51.4	51.6	58.7	22.3	69	21	24		TRUE
2021-Sep-11 12:00	56.1	60.7	55.0	55.3	64.5	24	60	21	26		TRUE
2021-Sep-11 13:00	56.5	57.3	51.9	54.4	61.2	24	64	20	26		TRUE
2021-Sep-11 14:00	53.5	56.8	57.5	53.2	54.7	24.2	58	20	28		TRUE
2021-Sep-11 15:00	53.8	58.3	57.8	55.5	57.3	24.1	55	21	37		TRUE
2021-Sep-11 16:00	53.9	59.8	55.3	56.5	62.2	23.4	57	21	30		TRUE
2021-Sep-11 17:00	52.6	55.1	53.6	57.0	55.0	22.8	57	21	26		TRUE
2021-Sep-11 18:00	51.5	63.4	57.2	56.9	55.1	22.1	61	21	18		FALSE
2021-Sep-11 19:00	52.3	53.1	50.4	59.9	56.7	21.5	65	20	15		FALSE
2021-Sep-11 20:00	48.8	51.8	48.8	58.6	51.2	21.8	65	21	17		FALSE
2021-Sep-11 21:00	47.8	48.7	47.3	56.6	47.4	21.2	69	21	13		FALSE
2021-Sep-11 22:00	47.4	50.8	46.8	59.2	46.7	21.2	70	22	22		TRUE
2021-Sep-11 23:00	47.8	50.4	47.4		46.6	20.9	73	22	22		TRUE
2021-Sep-12 00:00	49.5	49.6	48.8		49.2	20.6	74	23	17		FALSE
2021-Sep-12 01:00	57.7	44.3	51.6		45.5	19.3	77	23	8		FALSE
2021-Sep-12 02:00	46.3	48.2	45.6		50.1	19.5	78	24	5		FALSE
2021-Sep-12 03:00	44.8	43.0	44.0		45.5	20.1	79	24	8		FALSE
2021-Sep-12 04:00	44.3	45.0	41.2		45.6	20.2	82	26	8		FALSE
2021-Sep-12 05:00	43.7	44.5	39.9		43.8	19.3	86	28	8		FALSE
2021-Sep-12 06:00	42.8	45.0	40.6		44.1	19.6	76	26	8		FALSE
2021-Sep-12 07:00	48.1	45.3	43.6		44.5	19.2	75	30	5		FALSE
2021-Sep-12 08:00	52.6	44.7	49.1		45.7	19.4	70	26	8		FALSE
2021-Sep-12 09:00	48.6	45.1	50.3		48.7	20.6	59	32	13		FALSE
2021-Sep-12 10:00	45.2	45.1	46.7		45.3	20.9	57	31	11	Rain	TRUE
2021-Sep-12 11:00	48.1	46.5	46.0		52.6	19.9	60	24	5	Rain	TRUE
2021-Sep-12 12:00	52.2	50.7	50.1		50.6	19.4	67	24	9		FALSE
2021-Sep-12 13:00	48.2	45.7	47.1		47.6	22.1	51	31	9		FALSE
2021-Sep-12 14:00	51.0	47.6	50.1		46.3	23.3	47	30	8		FALSE
2021-Sep-12 15:00	47.8	50.2	46.9		49.8	24.1	38	33	11		FALSE
2021-Sep-12 16:00	47.7	48.4	45.7		48.3	24.1	37	32	11		FALSE
2021-Sep-12 17:00	51.1	48.4	47.5		54.1	22.5	44	34	11		FALSE
2021-Sep-12 18:00	52.5	48.1	46.0		48.8	20.9	53	34	13		FALSE
2021-Sep-12 19:00	47.1	48.8	54.7		48.0	19.9	56		5		FALSE
2021-Sep-12 20:00	47.1	48.3	42.8		46.9	19.3	65		4		FALSE
2021-Sep-12 21:00	46.1	47.3	41.6		46.4	18.6	71	35	8		FALSE
2021-Sep-12 22:00	46.0	47.4	40.9		47.0	17.8	74	33	9		FALSE
2021-Sep-12 23:00	46.4	46.3	42.5		45.0	17	82	35	8	Moderate Rain	TRUE
2021-Sep-13 00:00	51.9	52.8	53.7		51.8	15.7	92	1	8	Rain, Fog	TRUE

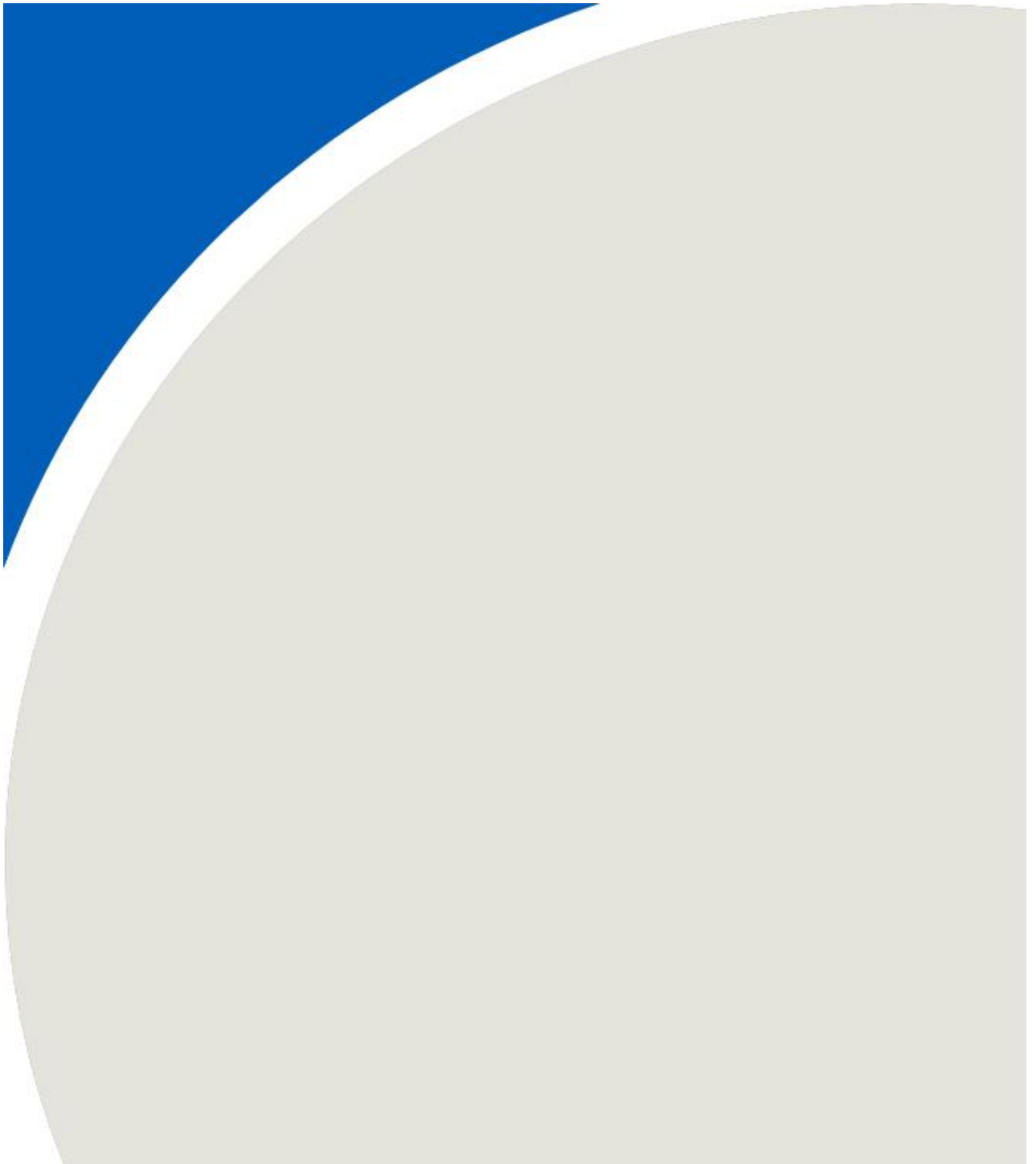
Date_Time	wld_Leq	rev_Leq	jun_Leq	bes_Leq	bar_Leq	Temp (°C)	rel Hum (%)	dir (10s)	nd Spd (km)	Weather	Weather Exclude
2021-Sep-13 01:00	44.4	42.2	44.5		45.2	15.3	97	31	8		TRUE
2021-Sep-13 02:00	41.8	40.5	42.0		44.7	14.6	99	27	5		TRUE
2021-Sep-13 03:00	42.7	39.5	40.0		44.8	13.1	100	35	4		TRUE
2021-Sep-13 04:00	42.7	39.8	41.3		45.2	12.1	100		0	Fog	TRUE
2021-Sep-13 05:00	42.5	45.0	41.4		45.9	12.1	100		0		TRUE
2021-Sep-13 06:00	44.8	46.5	43.5		47.7	10.8	100	34	4		TRUE
2021-Sep-13 07:00	55.0	48.5	49.4		49.8	12.6	100	31	4		TRUE
2021-Sep-13 08:00	50.9	50.2	47.6		51.2	16.1	88	30	9		FALSE
2021-Sep-13 09:00	50.4	47.2	46.1		49.3	19	64	30	17		FALSE
2021-Sep-13 10:00	55.3	46.9	51.9		49.8	19.5	60	27	15		FALSE
2021-Sep-13 11:00	51.1	48.6	49.2		50.5	20.4	55	29	13		FALSE
2021-Sep-13 12:00	53.7	50.9	50.8		54.2	20.7	58	33	17		FALSE
2021-Sep-13 13:00	65.8	50.3			54.8	21	61	19	8		FALSE
2021-Sep-13 14:00	51.9	56.2			58.6	21	57	23	18		FALSE
2021-Sep-13 15:00		56.2			57.9	20.5	61	18	9		FALSE
2021-Sep-13 16:00		55.7				20.4	64	18	11		FALSE
2021-Sep-13 17:00		45.5				20	68	11	8		FALSE

APPENDIX B



Date (7am-7pm)	Woodlea LEQ (day)	Revelstoke LEQ (day)	Juniper LEQ(day)	Bessborough LEQ (day)	Barbados LEQ (day)
2021-Jul-06	52.2	49.9	47.9	49.8	47.2
2021-Jul-07		51.1	51.7	55.4	42.6
2021-Jul-08		45.9	50.7	47.7	41
2021-Jul-09		44.1	47.9	48.8	54.5
2021-Jul-10					
2021-Jul-11	54.8	48.8	49.5	55.7	41.9
2021-Jul-12	62.2	50	54.6	55.5	46.9
2021-Jul-13	49.3	47	50.2	50.1	46.8
2021-Jul-14	49.9	55.8	50.8	54.4	52.3
2021-Jul-15	51.8	57.6	57.3	55.8	59.5
2021-Jul-16	50.7	51.4	60.2	53.7	64.4
2021-Jul-17		47.8	46.7	48.9	48.2
2021-Jul-18		51.9	54.2	53.9	52.1
2021-Jul-19	45.6	57.1	47.3	51.6	52
2021-Jul-20	49.8	53	60	51.3	53.6
2021-Jul-21	48.4	51.1	54.4	53.2	60
2021-Jul-22		52.4	53.4	53.9	56.7
2021-Jul-23	49.6	55.3	49.5	50.1	65.4
2021-Jul-24	54	47.5	54.2	54.8	54.6
2021-Jul-25	45.6	53.5	46.3	52	57.8
2021-Jul-26	43.3	53.1	58.3	51.9	61.9
2021-Jul-27	48.1	45.2	44.8	50.4	59.1
2021-Jul-28	57.1	51.6	55	59.7	52.8
2021-Jul-29	52.2	44.1	47.1	55	69.1
2021-Jul-30	49.1	46.8	47.1	50.8	52.8
2021-Jul-31	45.6	41.2	46.9	53.8	48.9
2021-Aug-01			44.5	48.2	
2021-Aug-02			49.7	50.1	
2021-Aug-03			58.1	52.9	
2021-Aug-04	54.3	48.7	50.1	58.3	53.3
2021-Aug-05	56	47.9		58.8	53.2
2021-Aug-06	52.1	54.2		53.4	58
2021-Aug-07	50.4	47.8		48.1	53.1
2021-Aug-08	52.9	56.1	50.2	55.6	55
2021-Aug-09	59.5	52.1	52.8	58.7	56.1
2021-Aug-10	51.5	49.4	48.8	52.6	55.9
2021-Aug-11	48.4	50	48.7	49.5	55.1
2021-Aug-12	52.2	53.5	58.5	52.2	56.9
2021-Aug-13	53.4	55.8	56.3	54.6	57.1
2021-Aug-14	48.6	56.1	53.6	50.2	53.5
2021-Aug-15	56.3	52	53.9	57.5	52.8
2021-Aug-16	54.9	55.9	53.6	57.3	51.4
2021-Aug-17	52.3	52.4	49.5	54.3	51.9
2021-Aug-18	53.1	53.6	57.2	56	54.6
2021-Aug-19	50.8	55.2	52	54.8	56.9
2021-Aug-20	53.4	55.9	52.8	53.7	62.1
2021-Aug-21	56.5	53.1	53.2	59.8	48.4
2021-Aug-22	52.4	61.8	57.8	54.3	48.1
2021-Aug-23	50.7	55.1	59.9	52.7	51.5
2021-Aug-24	51.1	56.8	52.6	56.3	56.8
2021-Aug-25	52.3	67.4	51.4	52.4	58.4
2021-Aug-26	51.6	57.1	53.4	54.1	55
2021-Aug-27	57.5	55.5	56.3	58	60.3
2021-Aug-28	57.5	54.6	55.8	58.1	55.2
2021-Aug-29	51.6	54	51.8	53.7	54.9
2021-Aug-30	61.1	56.5	55.8	54.8	56.9
2021-Aug-31	50.1	52.7	53.5	51	54
2021-Sep-01	50.4	51.4	56.2	51.8	53.1
2021-Sep-02	48.4	48.7	45.5	47.4	51.9
2021-Sep-03	50.4	59.7	49.6	50.9	54
2021-Sep-04	56.2	50.4	56	57.9	52.2
2021-Sep-05	52.1	49.9	48.8	51.1	56.3
2021-Sep-06	51.9	48.8	49.8	49.8	53.2
2021-Sep-07	62.5	53.1	53.7	56.3	54
2021-Sep-08		49.7	48.4	59.4	50.4
2021-Sep-09	50	48.7	49.9	50.3	48.7
2021-Sep-10	51.9	49	57.2	54.7	60.6
2021-Sep-11	50.1	56.6	51.7	55.7	52.6
2021-Sep-12	49.8	48	48.8		48.9
2021-Sep-13	58.4	52.7	49.6		54.6

APPENDIX C



Date	Itinerant Arrival	Itinerant Departure	Itinerant Total	Local Total	Overall Total (Itinerant + Local)	Prevelant Runway Used	RWY 12	RWY 30	RWY 23	RWY 05	99s	Notes
07/06/2021	75	82	157	76	233	Rwy 30/23						
07/07/2021	84	79	163	38	201	Rwy 30/12/05						
07/08/2021	8	4	12	2	14	Rwy 12						
07/09/2021	6	10	16	4	20	Rwy 30						
07/10/2021	175	184	359	114	473	Rwy 12/05/23	204	16	108	122		23 05 - 11z to 15z 12 - 15z to 23z
07/11/2021	137	130	267	150	417	Rwy 12/30	373	26	0	0		18 all day rwy 12
07/12/2021	98	84	182	112	294	Rwy 12/05						
07/13/2021	15	12	27	0	27	Rwy 12						
07/14/2021	115	121	236	122	358	Rwy 23/30/12						
07/15/2021	105	87	192	82	274	Rwy 23						
07/16/2021	146	144	290	102	392	Rwy 05/30						
07/17/2021	66	66	132	52	184	Rwy 05/12/30						
07/18/2021	119	108	227	189	416	Rwy 12/30/23	176	124	61	31		24 12 - 14z to 19z 30 - varies
07/19/2021	94	92	186	78	264	Rwy 30						
07/20/2021	53	52	105	65	170	Rwy 23/30						
07/21/2021	153	165	318	98	416	Rwy 30	0	392	0	0		24 all day rwy 30
07/22/2021	174	171	345	88	433	Rwy 30	0	413	0	0		20 all day rwy 30
07/23/2021	179	185	364	130	494	Rwy 23/30	5	218	235	0		36 23 - 16z to 24z 30 - 11z to 16z
07/24/2021	73	65	138	54	192	Rwy 12/23/30						
07/25/2021	102	100	202	114	316	Rwy 23/30						
07/26/2021	177	165	342	144	486	Rwy 30/23	1	258	209	0		18 23 - 15z to 22z 30 - 11z to 15z
07/27/2021	43	42	85	50	135	Rwy 30						
07/28/2021	177	185	362	88	450	Rwy 12	382	50	2	0		16 majority 12
07/29/2021	29	24	53	28	81	Rwy 12						
07/30/2021	75	82	157	62	219	Rwy 30						
07/31/2021	96	100	196	110	306	Rwy 30/23/12						
08/01/2021	8	5	13	18	31	Rwy 30						
08/02/2021	120	121	241	26	267	Rwy 30/23						
08/03/2021	146	146	292	168	460	Rwy 23/30/12	22	44	366	0		28 majority 23
08/04/2021	216	205	421	114	535	Rwy 12/23/30	261	175	57	0		42 12- 15z to 24z 30 - 11z to 15z
08/05/2021	169	172	341	170	511	Rwy 12/30	381	100	0	0		30 majority 12, 30 - 11z to 15z
08/06/2021	154	151	305	146	451	Rwy 23/12/30	94	50	287	0		20 majority 23, 12 - 22z to 24z
08/07/2021	72	61	133	54	187	Rwy 30/12						
08/08/2021	55	54	109	68	177	Rwy 23/12						
08/09/2021	124	125	249	112	361	Rwy 23/12						
08/10/2021	35	36	71	50	121	Rwy 12						
08/11/2021	7	8	15	42	57	Rwy 23						
08/12/2021	38	32	70	66	136	Rwy 23/30						
Date	Itinerant Arrival	Itinerant Departure	Itinerant Total	Local Total	Overall Total (Itinerant + Local)	Prevelant Runway Used	RWY 12	RWY 30	RWY 23	RWY 05	99s	Notes
08/13/2021	40	39	79	36	115	Rwy 23/30						
08/14/2021	170	171	341	104	445	Rwy 30	0	429	0	4		12 all day rwy 30
08/15/2021	147	142	289	100	389	Rwy 12/30						
08/16/2021	151	160	311	150	461	Rwy 12	437	20	0	0		4 all day rwy 12
08/17/2021	52	45	97	62	159	Rwy 12						
08/18/2021	26	22	48	16	64	Rwy 12						
08/19/2021	106	106	212	54	266	Rwy 30/12						

Date	Itinerant Arrival	Itinerant Departure	Itinerant Total	Local Total	Overall Total (Itinerant + Local)	Prevalant Runway Used	RWY 12	RWY 30	RWY 23	RWY 05	99s	Notes
08/20/2021	159	163	322	98	420	Rwy 30/23	18	286	78	22	16	majority 30
08/21/2021	133	127	260	118	378	Rwy 12/30	304	50	0	4	20	majority 12
08/22/2021	124	117	241	138	379	Rwy 30/12	119	211	15	2	32	12 - 18z to 22z
08/23/2021	120	112	232	112	344	Rwy 30	0	330	0	0	14	all day rwy 30
08/24/2021	170	169	339	132	471	Rwy 23/12/30	17	171	267	0	16	23 -16z to 24z
08/25/2021	129	124	253	160	413	Rwy 23/12/30	28	32	329	2	22	majority 23
08/26/2021	108	105	213	62	275	Rwy 23/30						
08/27/2021	168	171	339	154	493	Rwy 12	405	9	2	47	30	majority 12 all day
08/28/2021	118	112	230	112	342	Rwy 12	315	0	2	3	22	all day rwy 12
08/29/2021	15	13	28	22	50	Rwy 23						
08/30/2021	147	160	307	50	357	Rwy 30/23	2	285	57	1	12	majority 30
08/31/2021	160	161	321	116	437	Rwy 30	1	415	3	0	18	all day rwy 30
09/01/2021	165	161	326	142	468	Rwy 05/30/12	24	58	0	364	22	majority 05
09/02/2021	95	95	190	70	260	Rwy 30						
09/03/2021	141	143	284	86	370	Rwy 30/05	1	289	19	53	8	majority 30
09/04/2021	141	138	279	82	361	Rwy 12/30	250	77	14	2	18	majority 12
09/05/2021	45	44	89	10	99	Rwy 12/30	61	28	4	2	4	
09/06/2021	28	24	52	6	58	Rwy 30						
09/07/2021	95	95	190	78	268	Rwy 12/30/23						
09/08/2021	49	57	106	60	166	Rwy 23/30						
09/09/2021	81	78	159	120	279	Rwy 30						
09/10/2021	122	133	255	154	409	Rwy 30						
09/11/2021	96	90	186	84	270	Rwy 23/30						
09/12/2021	37	31	68	32	100	Rwy 30						

Appendix D - 2021 Air Quality Study

OSHAWA EXECUTIVE AIRPORT

OSHAWA, ONTARIO

AMBIENT AIR QUALITY MONITORING

RWDI # 2104007

January 2, 2022

SUBMITTED TO

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GLOSSARY

TSP	Total Suspended Particulate - Multiple source pollutant from combustion and general background dust.
Pb	Lead - Multiple source pollutant from combustion of leaded gasoline, industrial sources and general background dust.
AAQC	Ambient Air Quality Criteria - Guideline levels set for various pollutants by the Ontario Ministry of Environment Conservation and Parks. The guidelines may be for different averaging periods, e.g. 24-hr, annual.
MECP	Ontario Ministry of Environment Conservation and Parks (formerly the Ministry of the Environment).
NO ₂	Nitrogen Dioxide - Multiple source pollutant from combustion sources and photochemical reactions.



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1 BACKGROUND

RWDI was retained by Oshawa Executive Airport to complete Air Quality and Noise monitoring programs at the Airport. The monitoring was undertaken as an investigation into current conditions. The monitoring took place at five locations in the neighborhood surrounding the airport between July 8 and September 10 of 2021.

The five locations for the air quality monitoring were selected to be in the neighborhood surrounding the airport. Based on our experience and on the numerical dispersion modelling done previously, these locations will likely yield concentrations that are representative of any aircraft related pollutants impacting the surrounding community. The specific locations chosen were selected in consultation with the Oshawa Executive Airport, the City of Oshawa staff and the residents living at the addresses selected for monitoring.

The air quality monitoring locations are shown in Figure 1.

The air pollutants of concern were total suspended particulate (TSP) and airborne lead (Pb). In this case there was also a concern with combustion by products. Therefore, concentrations of Nitrogen dioxide (NO₂) were also examined.

Meteorological measurements were collected from the Environment Canada station located on-site.

1.1 Community Location Notes

Throughout this report, the locations are referenced by the home addresses. Samplers 1A/1B were located at Deer Valley Park, 2A/2B at Bermuda Park, 3A/3B at Woodlea Crescent, 4A/4B at Sommerville Street and 5A/5B at Marigold Avenue. All the monitoring locations were selected to be under the active flight paths that are used regularly. The locations were spread throughout the surrounding community ranging from east to southwest of the airport. The five locations were selected so that the impacts of different flight paths could all be captured and assessed.

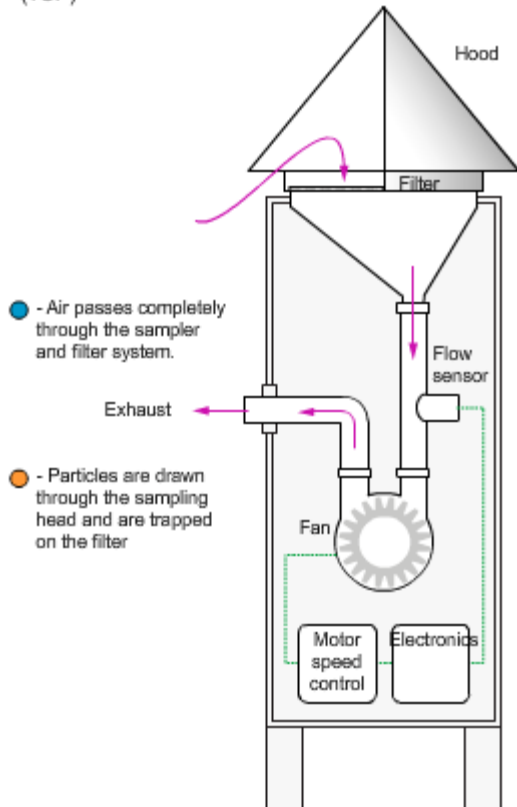
2 METHODOLOGY

PARTICULATE MATTER/LEAD

RWDI used standard Hi- Volume Air Samplers (Hi-Vols) for total suspended particulate and lead. The samples were collected on pre-weighed quartz filters. The filters were conditioned and weighed before and after sampling to determine mass gain (TSP concentration) and an aliquot of the filters were extracted and analyzed using atomic absorption techniques to determine lead concentrations. All sampling and analytical techniques complied with the Ministry of Environment's Operations Manual for Air Quality Sampling and USEPA Method IO-2.

There was a desire for a large amount of data and therefore 24-hour samples were collected every other day.

High volume sampler
for Total Suspended Particulates
(TSP)



Schematic



Photograph

Figure 2.1: Hi- Volume Air Sampler

Field sampling parameters and analytical results were tabulated in a spreadsheet to calculate volumes and concentrations.

NITROGEN DIOXIDE

In addition to the particulate and lead monitoring, there was a desire to complete monitoring for Nitrogen Dioxide (NO₂) at the location. The monitoring was completed with passive air samplers. The samplers were installed at the same locations as the particulate samples and took two sets of single, one-month long integrated samples. This method is used in several jurisdictions within North America by regulatory agencies. It requires no shelters or power and provides a good indication of potential impacts. The ambient air diffuses across a special membrane to react with the sample media. The samples were sent to Maxxam Laboratories in Edmonton, Alberta to be analyzed.

Once the mass of pollutant in the media is determined, the average concentration of pollutant in the air, over a one-month period, is calculated from the known diffusion rate.



Figure 2.2: Passive Air Samples

Wind speed and direction data has been compiled from the Environment Canada station located at the Oshawa Executive Airport and was used for interpretation of the air quality sampling results as required.

ONTARIO AMBIENT AIR QUALITY CRITERIA

Ontario ambient air quality criteria are detailed in Ontario Regulation 419 and are presented in the Table below.

Pollutant	24 Hour AAQC s
TSP	120
Lead*	0.5
NO ₂	200

*There is also a 30-day guideline (0.2 µg/m³) for lead which is based on an arithmetic average of lead taken at 6-day intervals which was not considered applicable for this program.



3 RESULTS

3.1 Total Suspended Particulate and Lead Monitoring Results

The detailed results of the monitoring are shown in the Tables section and are summarized in Table 3.1.1 below. The table shows the average of all Daily (24-hr) samples as well as the maximum Daily (24-hr) samples for each location. The locations of the samplers are shown in the Figure 1.

Table 3.1.1 Summary Table of TSP and Pb Results, July 8 to September 10, 2021

	Deer Valley Park Concentration ($\mu\text{g}/\text{m}^3$)	Bermuda Park Concentration ($\mu\text{g}/\text{m}^3$)	197 Woodlea Concentration ($\mu\text{g}/\text{m}^3$)	781 Sommerville Concentration ($\mu\text{g}/\text{m}^3$)	171 Marigold Concentration ($\mu\text{g}/\text{m}^3$)	Combined ($\mu\text{g}/\text{m}^3$)	AAQC ($\mu\text{g}/\text{m}^3$)
Average Daily TSP	20.3	23.4	19.1	19.1	20.3	20.5	120
50 th Percentile of TSP	19.1	22.0	16.8	18.5	16.8	19.0	120
Maximum Daily TSP	44.2	51.0	44.2	44.7	56.7	56.7	120
Average Daily Lead	0.0022	0.0024	0.0021	0.0020	0.0019	0.0021	0.5
Maximum Daily Lead	0.0096	0.0108	0.0088	0.0066	0.0054	0.0108	0.5
Number of Samples	29	33	31	33	29	155	-

*There were no exceedances of the Ontario Ambient Air Quality Criteria (AAQC). Though the 30-day lead standard of $0.2 \mu\text{g}/\text{m}^3$ is not necessarily applicable, it was mentioned in the public meeting. Clearly the lead values are all below that criterion also.

3.2 Passive Gaseous Measurements

All the analytical results for the passive gaseous measurements are included in Appendix B. The results are summarized in Table 3.2.1.

Table 3.2.1 Nitrogen Dioxide Results (NO_2 ($\mu\text{g}/\text{m}^3$))

	Deer Valley Park	Bermuda Park	197 Woodlea	781 Sommerville	171 Marigold	AAQC	AAQC
6 Jul - 4 Aug	1.4	1.0	1.2	1.2	1.2	-	-
4 Aug - 7 Sep	1.3	1.1	1.2	1.0	1.0	-	-
24-hour	-	-	-	-	-	200	-
Annual	-	-	-	-	-	-	34

Notes: AAQC denotes Ontario Ambient Air Quality Criteria

*There is no MECP Annual criterion for NO_2 . The value shown here is the Environment Canada CAAQS.

None of the measured concentrations were in excess of guideline values.



3.3 Comparison with Predicted Results

An air quality impact assessment was undertaken during 2015¹. The examined scenario utilized an annual average aircraft movement of 102,000 movements. The table below presents the measured results in conjunction with the modelled scenario for the parameters that overlapped between both studies.

Table 3.3.1 Comparison of Modelled and Measured Values

Pollutant	Averaging Period	Modelled Results ($\mu\text{g}/\text{m}^3$)	Measured ($\mu\text{g}/\text{m}^3$)
NO₂	24-Hour	41	1.4 (1-month)
Pb	24-Hour	0.4	0.0108

3.4 Comparison with Typical Concentrations

In order to put the measured results in context, data from other monitoring surveys was examined. The MECP does not maintain the monitoring network that it once did, so monitoring results from other sources have also been incorporated.

3.4.1 Nitrogen Dioxide Comparison with MECP Durham College Results

The MECP maintains an air quality monitoring station at the Durham College campus located at 2000 Simcoe Street North in Oshawa that continuously measures Nitrogen Dioxide. The latest year of data available is from 2017².

Annual Average NO₂ Concentration (Oshawa MECP 2017)	12.5 $\mu\text{g}/\text{m}^3$
Average NO₂ Concentration (Oshawa Executive Airport 2019)	2.5 $\mu\text{g}/\text{m}^3$
Average NO₂ Concentration (Oshawa Executive Airport 2021)	1.2 $\mu\text{g}/\text{m}^3$

The average of all measurements taken over the Summer of 2021 was less than the annual averages recorded during the 2019 monitoring program and at Durham College during 2017.

3.4.2 Suspended Particulate Comparison with Environment Canada Results

The MECP has not maintained air quality monitoring stations for total suspended particulate since the early 2000's. Environment Canada still maintains a network for suspended particulate monitoring. The most recent year that data is available for is 2016. The two most applicable sites are the stations located in West Toronto and The Experimental Farm in Simcoe. The samples were collected using High-Volume Air Samplers in the same manner as was completed in the Oshawa Executive Airport study

¹ Oshawa Municipal Airport, Oshawa, Ontario, Final Report, Air Quality Assessment. RWDI #1400980, April 10, 2015

² Air Quality Monitoring in Ontario 2017 Report, Ontario Ministry of Environment Conservation and Parks



	Average	Maximum
TSP Concentration (Simcoe Experimental Farm 2016)	37 µg/m³	136 µg/m³
TSP Concentration (West Toronto 2016)	32 µg/m³	59 µg/m³
TSP Concentration (Oshawa Executive Airport 2019)	16 µg/m³	41 µg/m³
TSP Concentration (Oshawa Executive Airport 2021)	21 µg/m³	57 µg/m³

The average and maximum of all measurements taken over the Summer of 2021 were less than the averages and maximums recorded at both of the Environment Canada Stations but slightly higher than what was measured during the 2019 monitoring program.

3.4.3 Airborne Lead Comparison

The MECP has not maintained air quality monitoring stations for airborne lead since the early 2000's. The most recent year that data is available for is 2001. The 2021 airport data was much lower than what was measured in 2019 and also the data measured in 2001 by the MECP.

Average Lead Concentration (Oshawa Executive Airport 2019)	0.011 µg/m³
Average Lead Concentration (Oshawa Executive Airport 2021)	0.002 µg/m³

4 DISCUSSION

The monitoring program was completed entirely within the busy summer season. The monitoring showed very low levels of all pollutants. All measured pollutants were below the Ontario Ambient Air Quality Criteria.

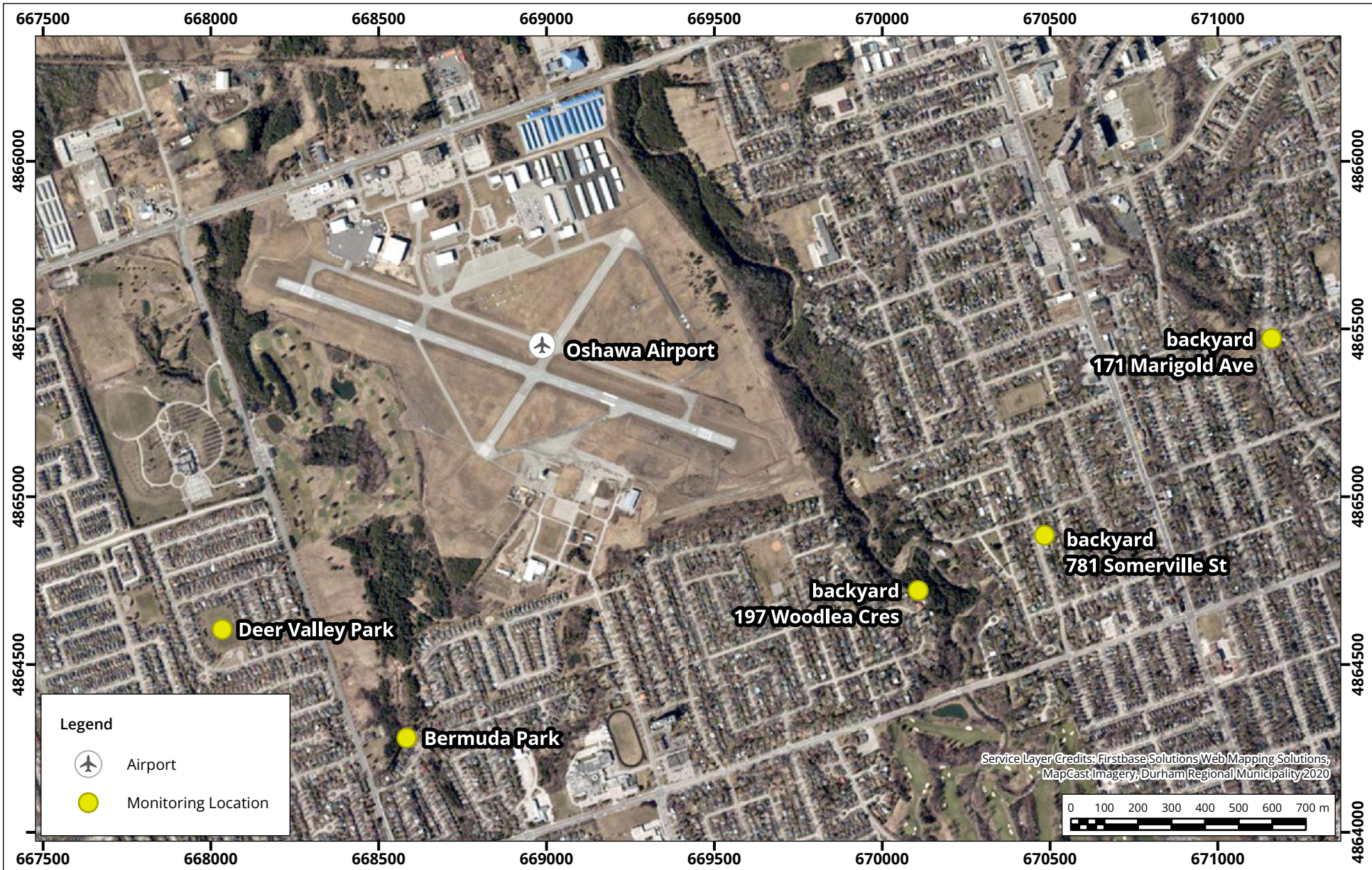
The low-level results did not show any significant differences between the different stations which would suggest that the greatest impact on air quality was the general background levels.

The data collected at the Oshawa Executive Airport was generally lower than the most comparable data available.

The comparison of the modelled and measured results showed that the modelling assumptions were conservative and higher than the measured values. This comparison however is based on limited data.

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FIGURES



Oshawa Airport Air Quality Monitoring Program July 8 to September 10, 2021 - Monitoring Locations

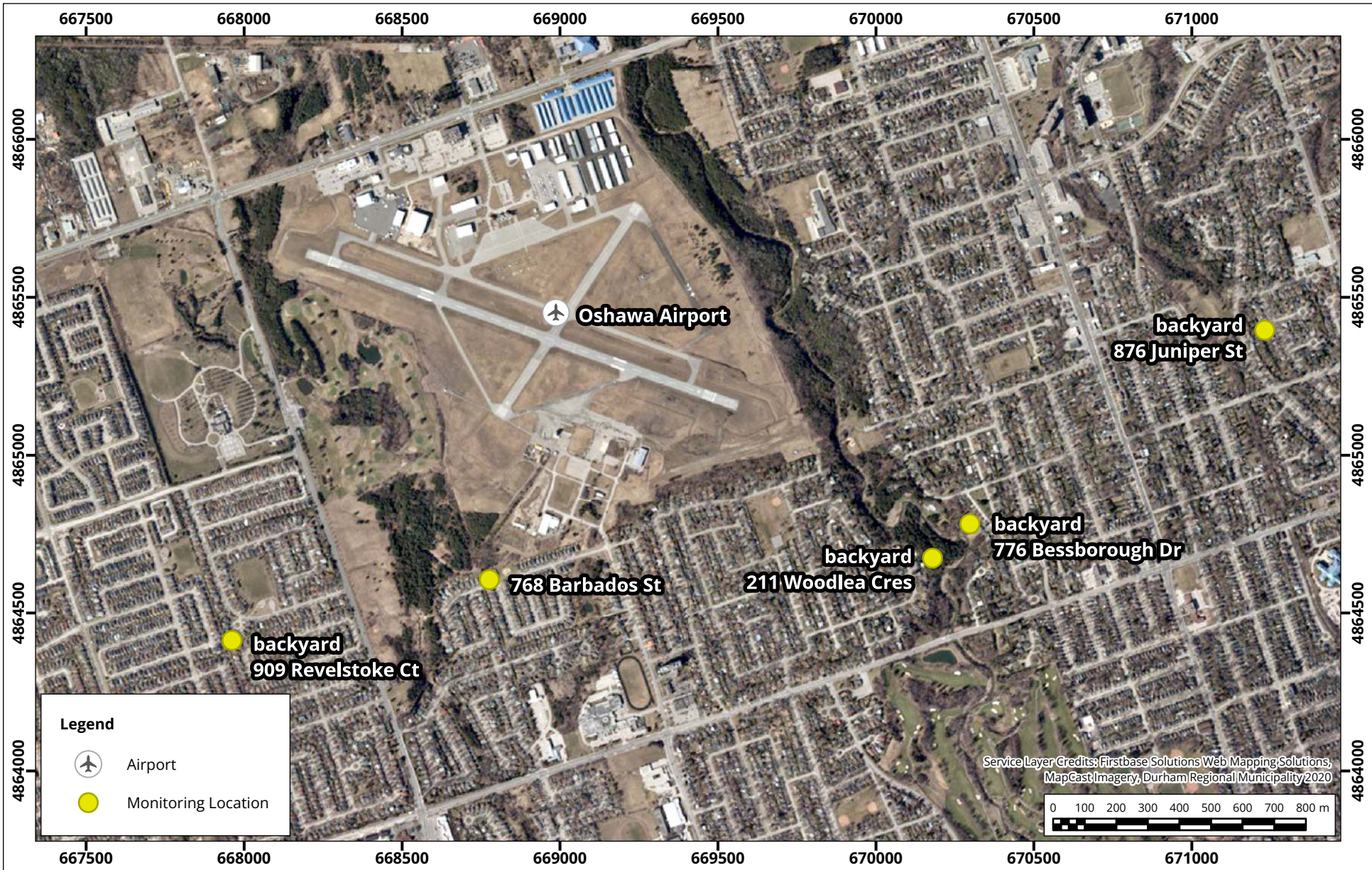
Map Projection: NAD 1983 UTM Zone 17N
Oshawa Airport Air Quality - Oshawa, ON



Drawn by: RL	Figure: 1
Approx. Scale: 1:16,000	
Date Revised: Oct 13, 2021	



Project #: 2104007



Oshawa Airport Noise Monitoring Program July 7 to September 13, 2021

Map Projection: NAD 1983 UTM Zone 17N
Oshawa Airport Air Quality - Oshawa, ON



Drawn by: RL | Figure: 2

Approx. Scale: 1:17,000

Date Revised: Oct 13, 2021

Project #: 2104007



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APPENDIX A

Location.	Hivol	Date installed	Sample Date	Filter Number	Timer on	Timer Off	Sample Duration (hrs)	Sample Volume	Mass Gain (mg)	Pb Mass (ug)	TSP Conc (ug/m3)	Pb Conc (ug/m3)	Notes	
Deer Valley Park	1A	7-Jul	8-Jul	21033147	2090.05	2098.29	8.24	560.32	ND	ND	ND	ND	0.0010	Short Sample GFI blown
Bermuda Park	2A	7-Jul	8-Jul	21033148	8327.84	8351.41	23.57	1602.76	19.7	ND	12.3	ND	0.0010	
197 Woodlea	3A	6-Jul	8-Jul	21033142	1555.62	1580.3	24.68	1678.24	17.5	ND	10.4	ND	0.0010	
781 Sommerville	4A	7-Jul	8-Jul	21033144	10147.01	10170.52	23.51	1598.68	9.1	ND	5.7	ND	0.0010	
171 Marigold	5A	6-Jul	8-Jul	21033185	6599.19	6622.77	23.58	1603.44	13.1	ND	8.2	ND	0.0010	
Deer Valley Park	1B	7-Jul	10-Jul	No Sample			0	0					0.0000	No Sample - Blown GFI
Bermuda Park	2B	7-Jul	10-Jul	21033149	1371.22	1394.3	23.08	1569.44	24.6	4.6	15.7	0.0029	0.0029	
197 Woodlea	3B	6-Jul	10-Jul	21033143	9837.04	9860	22.96	1561.28	19	ND	12.2	ND	0.0010	
781 Sommerville	4B	7-Jul	10-Jul	21033145	1923.9	1946.91	23.01	1564.68	29.7	5.5	19.0	0.0035	0.0035	
171 Marigold	5B	7-Jul	10-Jul	21033186	3893.87	3915.81	21.94	1491.92	17.9	ND	12.0	ND	0.0010	
Deer Valley Park	1A	11-Jul	12-Jul	21033179	2098.29	2121.46	23.17	1575.56	19.8	3.9	12.6	0.0025	0.0025	
Bermuda Park	2A	11-Jul	12-Jul	21033175	8351.41	8375.67	24.26	1649.68	28.5	3	17.3	0.0018	0.0018	
197 Woodlea	3A	11-Jul	12-Jul	21033183	1580.3	1602.86	22.56	1534.08	19.8	ND	12.9	ND	0.0010	
781 Sommerville	4A	11-Jul	12-Jul	21033178	10170.52	10193.9	23.38	1589.84	10.6	ND	6.7	ND	0.0010	
171 Marigold	5A	11-Jul	12-Jul	21033181	6622.77	6646.07	23.3	1584.4	23.5	3.7	14.8	0.0023	0.0023	
Deer Valley Park	1B	7-Jul	12-Jul	21033146	3739.19	3763.26	24.07	1636.76	13.6	ND	8.3	ND	0.0010	
Bermuda Park	2B	11-Jul	14-Jul	21033176	1394.3	1416.07	21.77	1480.36	32.3	ND	21.8	ND	0.0010	
197 Woodlea	3B	11-Jul	14-Jul	21033184	9860	9884.08	24.08	1637.44	25.4	5.5	15.5	0.0034	0.0034	
781 Sommerville	4B	11-Jul	14-Jul	21033177	1946.91	1970.35	23.44	1593.92	31	6.2	19.4	0.0039	0.0039	
171 Marigold	5B	11-Jul	14-Jul	21033182	3915.81	3938.92	23.11	1571.48	23.1	3.5	14.7	0.0022	0.0022	
Deer Valley Park	1A	15-Jul	16-Jul	21060901	2121.46	2145.41	23.95	1628.6	27.5	6.5	16.9	0.0040	0.0040	
Bermuda Park	2A	15-Jul	16-Jul	21060921	8375.67	8399.29	23.62	1606.16	35.3	7.4	22.0	0.0046	0.0046	
197 Woodlea	3A	15-Jul	16-Jul	21060923	1602.86	1626.22	23.36	1588.48	25	4.2	15.7	0.0026	0.0026	
781 Sommerville	4A	15-Jul	16-Jul	21060919	10193.9	10217.25	23.35	1587.8	21.9	ND	13.8	ND	0.0010	
171 Marigold	5A	15-Jul	16-Jul	21060918	6646.07	6670.07	24	1632	24	ND	14.7	ND	0.0010	
Deer Valley Park	1B	15-Jul	18-Jul	21060900	3763.26	3785.92	22.66	1540.88	32.7	3.6	21.2	0.0023	0.0023	
Bermuda Park	2B	15-Jul	18-Jul	21060922	1416.07	1439.03	22.96	1561.28	42.7	3.1	27.3	0.0020	0.0020	
197 Woodlea	3B	15-Jul	18-Jul	21060924	9884.08	9908.12	24.04	1634.72	17.6	ND	10.8	ND	0.0010	
781 Sommerville	4B	15-Jul	18-Jul	21060920	1970.35	1993.93	23.58	1603.44	36.2	5.6	22.6	0.0035	0.0035	
171 Marigold	5B	15-Jul	18-Jul	21060916	3938.92	3961.48	22.56	1534.08	39.3	6.1	25.6	0.0040	0.0040	
Deer Valley Park	1A	19-Jul	20-Jul	21060917	2145.41	2168.37	22.96	1561.28	69	ND	44.2	ND	0.0010	
Bermuda Park	2A	19-Jul	20-Jul	21060905	8399.29	8423.44	24.15	1642.2	83.8	ND	51.0	ND	0.0010	
197 Woodlea	3A	19-Jul	20-Jul	21060914	1626.22	1649.6	23.38	1589.84	70	3.2	44.0	0.0020	0.0020	
781 Sommerville	4A	19-Jul	20-Jul	21060911	10217.25	10240.18	22.93	1559.24	67.9	ND	43.5	ND	0.0010	
171 Marigold	5A	19-Jul	20-Jul	21060913	6670.07	6693.53	23.46	1595.28	90.5	3.3	56.7	0.0021	0.0021	
Deer Valley Park	1B	19-Jul	22-Jul	21060902	3785.92	3809.53	23.61	1605.48	30.5	ND	19.0	ND	0.0010	
Bermuda Park	2B	19-Jul	22-Jul	21060904	1439.03	1462.68	23.65	1608.2	29	ND	18.0	ND	0.0010	
197 Woodlea	3B	19-Jul	22-Jul	21060915	no sample	9931.79							0.0000	
781 Sommerville	4B	19-Jul	22-Jul	21060912	1993.93	2017.42	23.49	1597.32	20.6	ND	12.9	ND	0.0010	
171 Marigold	5B	19-Jul	22-Jul	21060906	3961.48	3983.68	22.2	1509.6	25.7	ND	17.0	ND	0.0010	
Deer Valley Park	1A	23-Jul	24-Jul	21060778	2168.37	2191.83	23.46	1595.28	31.1	4.1	19.5	0.0026	0.0026	
Bermuda Park	2A	23-Jul	24-Jul	21060779	8423.44	8447.7	24.26	1649.68	31.2	4.3	18.9	0.0026	0.0026	

Location.	Hivol	Date installed	Sample Date	Filter Number	Timer on	Timer Off	Sample Duration (hrs)	Sample Volume	Mass Gain (mg)	Pb Mass (ug)	TSP Conc (ug/m3)	Pb Conc (ug/m3)	Notes	
197 Woodlea	3A	23-Jul	24-Jul	21060936	1649.6	1672.4	22.8	1550.4	26.1	ND	16.8	ND	0.0010	
781 Sommerville	4A	23-Jul	24-Jul	21060933	10240.18	10262.65	22.47	1527.96	24.2	ND	15.8	ND	0.0010	
171 Marigold	5A	23-Jul	24-Jul	21060934	6693.53	6715.01	21.48	1460.64	32.7	ND	22.4	ND	0.0010	
Deer Valley Park	1B	23-Jul	26-Jul	21060777	3809.53	3832.8	23.27	1582.36	62.2	3	39.3	0.0019	0.0019	
Bermuda Park	2B	23-Jul	26-Jul	21060925	1462.68	1486.64	23.96	1629.28	80.4	ND	49.3	ND	0.0010	
197 Woodlea	3B	19-Jul	26-Jul	21060915	9931.79	9955.91	24.12	1640.16	72.5	4.3	44.2	0.0026	0.0026	
781 Sommerville	4B	23-Jul	26-Jul	21060935	2017.42	2040	22.58	1535.44	68.6	ND	44.7	ND	0.0010	
171 Marigold	5B	23-Jul	26-Jul	21060931	3983.68	4005.71	22.03	1498.04	ND	ND	ND	ND	0.0010	
Deer Valley Park	1A	27-Jul	28-Jul	21060926	2191.83	2213.73	21.9	1489.2	21.2	ND	14.2	ND	0.0010	
Bermuda Park	2A	27-Jul	28-Jul	21060908	8447.7	8472.64	24.94	1695.92	25.3	5.6	14.9	0.0033	0.0033	
197 Woodlea	3A	27-Jul	28-Jul	21060909	1672.4	1695.92	23.52	1599.36	31.8	ND	19.9	ND	0.0010	
781 Sommerville	4A	27-Jul	28-Jul	21060928	10262.65	10285.67	23.02	1565.36	18.9	ND	12.1	ND	0.0010	
171 Marigold	5A	27-Jul	28-Jul	21060929	6715.01	No Sample	Power disconnect						0.0000	
Deer Valley Park	1B	27-Jul	30-Jul	21060903	3832.8	3855.57	22.77	1548.36	12.1	ND	7.8	ND	0.0010	
Bermuda Park	2B	27-Jul	30-Jul	21060907	1486.64	1509.71	23.07	1568.76	29.2	ND	18.6	ND	0.0010	
197 Woodlea	3B	27-Jul	30-Jul	21060910	9955.91	9979.24	23.33	1586.44	17.6	4.3	11.1	0.0027	0.0027	
781 Sommerville	4B	27-Jul	30-Jul	21060927	2040	2065.31	25.31	1721.08	30.1	4.9	17.5	0.0028	0.0028	
171 Marigold	5B	27-Jul	30-Jul	21060930	4005.71	No Sample	Power disconnect		33.4	4.6			0.0000	
Deer Valley Park	1A	31-Jul	1-Aug	21070992	2213.73	2238.26	24.53	1668.04	13.4	ND	8.0	ND	0.0010	
Bermuda Park	2A	31-Jul	1-Aug	21070994	8472.64	8496.65	24.01	1632.68	17.8	ND	10.9	ND	0.0010	
197 Woodlea	3A	31-Jul	1-Aug	21071401	1695.92	1718.91	22.99	1563.32	13.7	ND	8.8	ND	0.0010	
781 Sommerville	4A	31-Jul	1-Aug	21071404	10285.67	10307.44	21.77	1480.36	15	ND	10.1	ND	0.0010	
171 Marigold	5A	31-Jul	1-Aug	21060929	6715.01	6737.85	22.84	1553.12	16.4	ND	10.6	ND	0.0010	
Deer Valley Park	1B	31-Jul	3-Aug	21070991	3855.57	3878.95	23.38	1589.84	29.3	ND	18.4	ND	0.0010	
Bermuda Park	2B	31-Jul	3-Aug	21071400	1509.71	1533.24	23.53	1600.04	36.3	ND	22.7	ND	0.0010	
197 Woodlea	3B	31-Jul	3-Aug	21070993	9979.24	10002.04	22.8	1550.4	32.4	3.3	20.9	0.0021	0.0021	
781 Sommerville	4B	31-Jul	3-Aug	21071405	2065.31	2089.49	24.18	1644.24	34.4	6.6	20.9	0.0040	0.0040	
171 Marigold	5B	31-Jul	3-Aug	21060930	4005.71	4029.56	23.85	1621.8	72.8	ND	44.9	ND	0.0010	
Deer Valley Park	1A	4-Aug	5-Aug	21071406	2238.26	2264.074	25.814	1755.352	41.6	10	23.7	0.0057	0.0057	
Bermuda Park	2A	4-Aug	5-Aug	21071408	8496.65	8520.09	23.44	1593.92	39.4	11.3	24.7	0.0071	0.0071	
197 Woodlea	3A	4-Aug	5-Aug	21071410	1718.91	1742.69	23.78	1617.04	34.7	5.6	21.5	0.0035	0.0035	
781 Sommerville	4A	4-Aug	5-Aug	21071412	10307.44	10330.82	23.38	1589.84	32.7	ND	20.6	ND	0.0010	
171 Marigold	5A	4-Aug	5-Aug	21071414	6737.85	6761.45	23.6	1604.8	41.3	3.8	25.7	0.0024	0.0024	
Deer Valley Park	1B	4-Aug	7-Aug	21071407	3878.95	3893.4	14.45	982.6	28.5	3	29.0	0.0031	0.0031	part sample gfi blown paret samp
Bermuda Park	2B	4-Aug	7-Aug	21071409	1533.24	1557.57	24.33	1654.44	43.9	4.3	26.5	0.0026	0.0026	
197 Woodlea	3B	4-Aug	7-Aug	21071411	10002.04	10026.05	24.01	1632.68	37.8	5.4	23.2	0.0033	0.0033	
781 Sommerville	4B	4-Aug	7-Aug	21071413	2089.49	2112.42	22.93	1559.24	40.2	6.6	25.8	0.0042	0.0042	
171 Marigold	5B	4-Aug	7-Aug	21071415	4029.56	4052.35	22.79	1549.72	35.4	4.6	22.8	0.0030	0.0030	
Deer Valley Park	1A	8-Aug	9-Aug	21071430	2264.074	2287.42	23.346	1587.528	54	10.4	34.0	0.0066	0.0066	
Bermuda Park	2A	8-Aug	9-Aug	21071433	8520.09	8544.34	24.25	1649	60.1	8.6	36.4	0.0052	0.0052	
197 Woodlea	3A	8-Aug	9-Aug	21071450	1742.69	1764.82	22.13	1504.84	46.7	7.5	31.0	0.0050	0.0050	
781 Sommerville	4A	8-Aug	9-Aug	21071456	10330.82	10352.94	22.12	1504.16	43.6	5.8	29.0	0.0039	0.0039	

Location.	Hivol	Date installed	Sample Date	Filter Number	Timer on	Timer Off	Sample Duration (hrs)	Sample Volume	Mass Gain (mg)	Pb Mass (ug)	TSP Conc (ug/m3)	Pb Conc (ug/m3)	Notes
171 Marigold	5A	8-Aug	9-Aug	21071453	6761.45	6783.6	22.15	1506.2	49.3	6	32.7	0.0040	0.0040
Deer Valley Park	1B	8-Aug	11-Aug	21071431	3893.4	3916.55	23.15	1574.2	34	ND	21.6	ND	0.0010
Bermuda Park	2B	8-Aug	11-Aug	21071432	1557.57	1581.23	23.66	1608.88	48.5	ND	30.1	ND	0.0010
197 Woodlea	3B	8-Aug	11-Aug	21071451	10026.05	10049.95	23.9	1625.2	35.2	ND	21.7	ND	0.0010
781 Sommerville	4B	8-Aug	11-Aug	21071455	2112.42	2135.99	23.57	1602.76	33.8	ND	21.1	ND	0.0010
171 Marigold	5B	8-Aug	11-Aug	21071452	4052.35	4075.49	23.14	1573.52	35	ND	22.2	ND	0.0010
Deer Valley Park	1A	12-Aug	13-Aug	21071466	2287.42	2313	25.58	1739.44	36.6	4.9	21.0	0.0028	0.0028
Bermuda Park	2A	12-Aug	13-Aug	21071469	8544.34	8568.02	23.68	1610.24	59.7	4.6	37.1	0.0029	0.0029
197 Woodlea	3A	12-Aug	13-Aug	21071462	1764.82	1788	23.18	1576.24	33.9	5.4	21.5	0.0034	0.0034
781 Sommerville	4A	12-Aug	13-Aug	21071465	10352.94	10377.23	24.29	1651.72	35.1	5.6	21.3	0.0034	0.0034
171 Marigold	5A	12-Aug	13-Aug	21071460	6783.6	6807.3	23.7	1611.6	37.1	4.8	23.0	0.0030	0.0030
Deer Valley Park	1B	12-Aug	15-Aug	21071467	3916.55	3939.8	23.25	1581	11.8	3.7	7.5	0.0023	0.0023
Bermuda Park	2B	12-Aug	15-Aug	21071468	1581.23	1604.85	23.62	1606.16	23	3.2	14.3	0.0020	0.0020
197 Woodlea	3B	12-Aug	15-Aug	21071463	10049.95	10075.44	25.49	1733.32	18.1	ND	10.4	ND	0.0010
781 Sommerville	4B	12-Aug	15-Aug	21071464	2135.99	2160.11	24.12	1640.16	17.7	ND	10.8	ND	0.0010
171 Marigold	5B	12-Aug	15-Aug	21071461	4075.49	4097.13	21.64	1471.52	13.5	ND	9.2	ND	0.0010
Deer Valley Park	1A	16-Aug	17-Aug	21071434	2313	2335.523	22.523	1531.564	26	4.1	17.0	0.0027	0.0027
Bermuda Park	2A	16-Aug	17-Aug	21071437	8568.02	8592.73	24.71	1680.28	41.2	ND	24.5	ND	0.0010
197 Woodlea	3A	16-Aug	17-Aug	21071439	1788	1810.71	22.71	1544.28	21.8	ND	14.1	ND	0.0010
781 Sommerville	4A	16-Aug	17-Aug	21071440	10377.23	10401.72	24.49	1665.32	22.9	ND	13.8	ND	0.0010
171 Marigold	5A	16-Aug	17-Aug	21071443	6807.3	6830.39	23.09	1570.12	22.5	4.1	14.3	0.0026	0.0026
Deer Valley Park	1B	16-Aug	19-Aug	21071435	3939.8	3963.67	23.87	1623.16	36.8	ND	22.7	ND	0.0010
Bermuda Park	2B	16-Aug	19-Aug	21071436	1604.85	1628.27	23.42	1592.56	30.4	ND	19.1	ND	0.0010
197 Woodlea	3B	16-Aug	19-Aug	21071438	10075.44	10099.84	24.4	1659.2	23.7	ND	14.3	ND	0.0010
781 Sommerville	4B	16-Aug	19-Aug	21071441	2160.11	2183.67	23.56	1602.08	62.6	3.3	39.1	0.0021	0.0021
171 Marigold	5B	16-Aug	19-Aug	21071442	4097.13	4120.24	23.11	1571.48	25.4	ND	16.2	ND	0.0010
Deer Valley Park	1A	20-Aug	21-Aug	21071445	2335.53	2359.02	23.49	1597.32	30.7	5.6	19.2	0.0035	0.0035
Bermuda Park	2A	20-Aug	21-Aug	21071449	8592.73	8616.12	23.39	1590.52	36.7	4.2	23.1	0.0026	0.0026
197 Woodlea	3A	20-Aug	21-Aug	21071457	1810.71	1833.51	22.8	1550.4	34.1	ND	22.0	ND	0.0010
781 Sommerville	4A	20-Aug	21-Aug	21070973	10401.72	10423.22	21.5	1462	27.1	3	18.5	0.0021	0.0021
171 Marigold	5A	20-Aug	21-Aug	21070975	6830.39	6855.19	24.8	1686.4	34	6	20.2	0.0036	0.0036
Deer Valley Park	1B	20-Aug	23-Aug	21071444	3963.67	3987.54	23.87	1623.16	41.8	ND	25.8	ND	0.0010
Bermuda Park	2B	20-Aug	23-Aug	21071448	1628.27	1651.72	23.45	1594.6	38.5	ND	24.1	ND	0.0010
197 Woodlea	3B	20-Aug	23-Aug	21071458	10099.84	10124.09	24.25	1649	32.6	3.8	19.8	0.0023	0.0023
781 Sommerville	4B	20-Aug	23-Aug	21070971	2183.67	2206.09	22.42	1524.56	35.8	ND	23.5	ND	0.0010
171 Marigold	5B	20-Aug	23-Aug	21070974	4120.24	4143.21	22.97	1561.96	33.7	ND	21.6	ND	0.0010
Deer Valley Park	1A	24-Aug	25-Aug	21070982	2359.02	2383.1	24.08	1637.44	54.4	15.8	33.2	0.0096	0.0096
Bermuda Park	2A	24-Aug	25-Aug	21070980	8616.12	8640.25	24.13	1640.84	55.5	11.9	33.8	0.0073	0.0073
197 Woodlea	3A	24-Aug	25-Aug	21070977	1833.51	1857.35	23.84	1621.12	47.9	14.2	29.5	0.0088	0.0088
781 Sommerville	4A	24-Aug	25-Aug	21070979	10423.22	10447.19	23.97	1629.96	38.7	10.7	23.7	0.0066	0.0066
171 Marigold	5A	24-Aug	25-Aug	21070983	6855.19	6878.75	23.56	1602.08	48.7	8.6	30.4	0.0054	0.0054
Deer Valley Park	1B	26-Aug	27-Aug	21070988	3987.54	4011.24	23.7	1611.6	32.3	ND	20.0	ND	0.0010

Location.	Hivol	Date installed	Sample Date	Filter Number	Timer on	Timer Off	Sample Duration (hrs)	Sample Volume	Mass Gain (mg)	Pb Mass (ug)	TSP Conc (ug/m3)	Pb Conc (ug/m3)	Notes
Bermuda Park	2B	26-Aug	27-Aug	21070998	1651.72	1675.53	23.81	1619.08	49.9	ND	30.8	ND	0.0010
197 Woodlea	3B	26-Aug	27-Aug	21070976	10124.09	10147.83	23.74	1614.32	35.1	ND	21.7	ND	0.0010
781 Sommerville	4B	26-Aug	27-Aug	21070978	2206.09	2228.09	22	1496	26.6	ND	17.8	ND	0.0010
171 Marigold	5B	26-Aug	27-Aug	21070984	4143.21	4166.04	22.83	1552.44	40.8	ND	26.3	ND	0.0010
Deer Valley Park	1A	28-Aug	29-Aug	21070987	2383.1	2406.15	23.05	1567.4	28.5	4.4	18.2	0.0028	0.0028
Bermuda Park	2A	28-Aug	29-Aug	21070985	8640.25	8663.68	23.43	1593.24	43.8	4.7	27.5	0.0029	0.0029
197 Woodlea	3A	28-Aug	29-Aug	21070989	1857.35	1880.57	23.22	1578.96	35.6	4.1	22.5	0.0026	0.0026
781 Sommerville	4A	28-Aug	29-Aug	21071459	10447.19	10470.06	22.87	1555.16	33.2	4.1	21.3	0.0026	0.0026
171 Marigold	5A	28-Aug	29-Aug	21070990	6878.75	6901.97	23.22	1578.96	36.8	6.3	23.3	0.0040	0.0040
Deer Valley Park	1A	30-Aug	31-Aug	21073019	2406.15	2429.25	23.1	1570.8	23.8	ND	15.2	ND	0.0010
Bermuda Park	2A	30-Aug	31-Aug	21073020	8663.68	8687.16	23.48	1596.64	26.2	ND	16.4	ND	0.0010
197 Woodlea	3A	30-Aug	31-Aug	21073024	1880.57	1904.29	23.72	1612.96	27	ND	16.7	ND	0.0010
781 Sommerville	4A	30-Aug	31-Aug	21073026	10470.06	10493.38	23.32	1585.76	22.2	ND	14.0	ND	0.0010
171 Marigold	5A	30-Aug	31-Aug	21073023	6901.97	6925.25	23.28	1583.04	19.2	5.5	12.1	0.0035	0.0035
Deer Valley Park	1B	30-Aug	2-Sep	21073018	4011.24	4014.25	3.01	204.68					bad sample loose timer clip
Bermuda Park	2B	30-Aug	2-Sep	21073021	1675.53	1698.17	22.64	1539.52	19.8	ND	12.9	ND	0.0010
197 Woodlea	3B	30-Aug	2-Sep	21073022	10147.83	10172.37	24.54	1668.72	23.3	ND	14.0	ND	0.0010
781 Sommerville	4B	30-Aug	2-Sep	21073025	2228.09	2252.46	24.37	1657.16	22.5	ND	13.6	ND	0.0010
171 Marigold	5B	30-Aug	2-Sep	21073027	4166.04	4188.22	22.18	1508.24	20.9	5.6	13.9	0.0037	0.0037
Deer Valley Park	1A	3-Sep	4-Sep	21070972	2429.25	2453.12	23.87	1623.16	20	4.6	12.3	0.0028	0.0028
Bermuda Park	2A	3-Sep	4-Sep	9904634	8687.16	8711.51	24.35	1655.8	23.7	5	14.3	0.0030	0.0030
197 Woodlea	3A	3-Sep	4-Sep	9904631	1904.29	1927.25	22.96	1561.28	38	3.4	24.3	0.0022	0.0022
781 Sommerville	4A	3-Sep	4-Sep	9904629	10493.38	10516.36	22.98	1562.64	15.3	ND	9.8	ND	0.0010
171 Marigold	5A	3-Sep	4-Sep	21073028	6925.25	6949.59	24.34	1655.12	14.6	ND	8.8	ND	0.0010
Deer Valley Park	1B	3-Sep	6-Sep	21070986	4014.25	4037.2	22.95	1560.6	13.6	ND	8.7	ND	0.0010
Bermuda Park	2B	3-Sep	6-Sep	9904633	1698.17	1722	23.83	1620.44	16.5	ND	10.2	ND	0.0010
197 Woodlea	3B	3-Sep	6-Sep	9904632	10172.37	10196.35	23.98	1630.64	16.1	ND	9.9	ND	0.0010
781 Sommerville	4B	3-Sep	6-Sep	9904630	2252.46	2275.95	23.49	1597.32	13.8	4.5	8.6	0.0028	0.0028
171 Marigold	5B	3-Sep	6-Sep	21073029	4188.22	4211.96	23.74	1614.32	25.2	ND	15.6	ND	0.0010
Deer Valley Park	1A	7-Sep	8-Sep	21073088	2453.12	2478.25	25.13	1708.84	21.8	ND	12.8	ND	0.0010
Bermuda Park	2A	7-Sep	8-Sep	21073090	8711.51	8735.79	24.28	1651.04	49.4	ND	29.9	ND	0.0010
197 Woodlea	3A	7-Sep	8-Sep	21073092	1927.25	1950.6	23.35	1587.8	17.2	8	10.8	0.0050	0.0050
781 Sommerville	4A	7-Sep	8-Sep	21073098	10516.36	10541.03	24.67	1677.56	23.5	3	14.0	0.0018	0.0018
171 Marigold	5A	7-Sep	8-Sep	21073096	6949.59	6973	23.41	1591.88	26.3	ND	16.5	ND	0.0010
Deer Valley Park	1B	7-Sep	10-Sep	21073089	4037.2	4061.38	24.18	1644.24	60.1	ND	36.6	ND	0.0010
Bermuda Park	2B	7-Sep	10-Sep	21073091	1722	1746.04	24.04	1634.72	25.6	17.7	15.7	0.0108	0.0108
197 Woodlea	3B	7-Sep	10-Sep	21073093	10196.35	10220.9	24.55	1669.4	ND	ND	ND	ND	0.0010
781 Sommerville	4B	7-Sep	10-Sep	21073097	2275.95	2299.6	23.65	1608.2	32.2	3.4	20.0	0.0021	0.0021
171 Marigold	5B	7-Sep	10-Sep	21073095	4211.96	4234.8	22.84	1553.12	18	ND	11.6	ND	0.0010

A large decorative graphic on the left side of the page, featuring a blue triangle at the top left corner and a large, light beige circular shape that overlaps the triangle and extends across the page.

APPENDIX B



Your Project #: FILTER PROOFING
Your C.O.C. #: n/a

Attention: Frank Mo

Burlington Proofing
Burlington Lab
5555 North Service Rd
Burlington, ON
CANADA L7L 5H7

Report Date: 2020/10/14
Report #: R6370073
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: COM3937

Received: 2020/08/31, 16:22

Sample Matrix: Filter
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Metals on Hi-Vol Filter (6010Cmod)	1	2020/09/02	2020/09/03	CAM SOP-00408	EPA 6010D m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.



Your Project #: FILTER PROOFING
Your C.O.C. #: n/a

Attention: Frank Mo

Burlington Proofing
Burlington Lab
5555 North Service Rd
Burlington, ON
CANADA L7L 5H7

Report Date: 2020/10/14
Report #: R6370073
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: COM3937

Received: 2020/08/31, 16:22

Encryption Key



**AUTHORIZED REPORT
RAPPORT AUTORISÉ**

Bureau Veritas Laboratories

14 Oct 2020 17:59:57

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Marinela Sim, Project Manager

Email: Marinela.Sim@bvlab.com

Phone# (905)817-5828

=====

This report has been generated and distributed using a secure automated process.

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



ELEMENTS BY ICP-AES (FILTER)

BV Labs ID		NMX021			
Sampling Date					
COC Number		n/a			
	UNITS	Lot#17137057	RDL	MDL	QC Batch
Aluminum (Al)	ug	623	50	N/A	6923446
Antimony (Sb)	ug	<10	10	N/A	6923446
Arsenic (As)	ug	<6.0	6.0	1.2	6923446
Barium (Ba)	ug	3.3	1.0	N/A	6923446
Beryllium (Be)	ug	<1.0	1.0	N/A	6923446
Bismuth (Bi)	ug	<6.0	6.0	N/A	6923446
Boron (B)	ug	219	6.0	N/A	6923446
Cadmium (Cd)	ug	<2.0	2.0	0.40	6923446
Calcium (Ca)	ug	1990	50	N/A	6923446
Chromium (Cr)	ug	<5.0	5.0	0.40	6923446
Cobalt (Co)	ug	<2.0	2.0	0.40	6923446
Copper (Cu)	ug	<5.0	5.0	0.40	6923446
Iron (Fe)	ug	<50	50	1.0	6923446
Lead (Pb)	ug	<3.0	3.0	0.60	6923446
Magnesium (Mg)	ug	567	50	N/A	6923446
Manganese (Mn)	ug	<1.0	1.0	0.20	6923446
Molybdenum (Mo)	ug	<3.0	3.0	N/A	6923446
Nickel (Ni)	ug	<3.0	3.0	0.60	6923446
Phosphorus (P)	ug	<25	25	N/A	6923446
Potassium (K)	ug	580	100	N/A	6923446
Selenium (Se)	ug	<10	10	2.0	6923446
Silicon (Si)	ug	212	10	N/A	6923446
Silver (Ag)	ug	<5.0	5.0	N/A	6923446
Sodium (Na)	ug	19100	50	N/A	6923446
Strontium (Sr)	ug	4.1	1.0	N/A	6923446
Sulphur (S)	ug	<25	25	5.0	6923446
Thallium (Tl)	ug	<10	10	N/A	6923446
Tin (Sn)	ug	<10	10	N/A	6923446
Titanium (Ti)	ug	16	10	N/A	6923446
Vanadium (V)	ug	<5.0	5.0	0.40	6923446
Zinc (Zn)	ug	<5.0	5.0	1.0	6923446
Zirconium (Zr)	ug	<5.0	5.0	N/A	6923446
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable					



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GENERAL COMMENTS

Results relate only to the items tested.



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Report Date: 2020/10/14

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Client Project #: FILTER PROOFING

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6923446	APT	Matrix Spike	Aluminum (Al)	2020/09/03		NC	%	75 - 125
			Antimony (Sb)	2020/09/03		102	%	75 - 125
			Arsenic (As)	2020/09/03		106	%	75 - 125
			Barium (Ba)	2020/09/03		98	%	75 - 125
			Beryllium (Be)	2020/09/03		100	%	75 - 125
			Bismuth (Bi)	2020/09/03		104	%	75 - 125
			Boron (B)	2020/09/03		97	%	75 - 125
			Cadmium (Cd)	2020/09/03		105	%	75 - 125
			Calcium (Ca)	2020/09/03		113	%	75 - 125
			Chromium (Cr)	2020/09/03		97	%	75 - 125
			Cobalt (Co)	2020/09/03		101	%	75 - 125
			Copper (Cu)	2020/09/03		100	%	75 - 125
			Iron (Fe)	2020/09/03		101	%	75 - 125
			Lead (Pb)	2020/09/03		103	%	75 - 125
			Magnesium (Mg)	2020/09/03		102	%	75 - 125
			Manganese (Mn)	2020/09/03		97	%	75 - 125
			Molybdenum (Mo)	2020/09/03		102	%	75 - 125
			Nickel (Ni)	2020/09/03		102	%	75 - 125
			Phosphorus (P)	2020/09/03		108	%	75 - 125
			Potassium (K)	2020/09/03		101	%	75 - 125
			Selenium (Se)	2020/09/03		108	%	75 - 125
			Silicon (Si)	2020/09/03		NC	%	75 - 125
			Silver (Ag)	2020/09/03		99	%	75 - 125
			Sodium (Na)	2020/09/03		99	%	75 - 125
			Strontium (Sr)	2020/09/03		100	%	75 - 125
			Sulphur (S)	2020/09/03		118	%	75 - 125
			Thallium (Tl)	2020/09/03		104	%	75 - 125
			Tin (Sn)	2020/09/03		105	%	75 - 125
			Titanium (Ti)	2020/09/03		101	%	75 - 125
			Vanadium (V)	2020/09/03		96	%	75 - 125
			Zinc (Zn)	2020/09/03		103	%	75 - 125
			Zirconium (Zr)	2020/09/03		97	%	75 - 125
			6923446	APT	RPD	Aluminum (Al)	2020/09/03	0
Antimony (Sb)	2020/09/03	1.8					%	20
Arsenic (As)	2020/09/03	1.3					%	20
Barium (Ba)	2020/09/03	0.41					%	20
Beryllium (Be)	2020/09/03	0.40					%	20
Bismuth (Bi)	2020/09/03	0.096					%	20
Boron (B)	2020/09/03	1.0					%	20
Cadmium (Cd)	2020/09/03	0.67					%	20
Calcium (Ca)	2020/09/03	20					%	20
Chromium (Cr)	2020/09/03	0					%	20
Cobalt (Co)	2020/09/03	0.70					%	20
Copper (Cu)	2020/09/03	2.7					%	20
Iron (Fe)	2020/09/03	3.5					%	20
Lead (Pb)	2020/09/03	1.1					%	20
Magnesium (Mg)	2020/09/03	7.5					%	20
Manganese (Mn)	2020/09/03	1.0					%	20
Molybdenum (Mo)	2020/09/03	0.20					%	20
Nickel (Ni)	2020/09/03	0.98					%	20
Phosphorus (P)	2020/09/03	1.2		%	20			
Potassium (K)	2020/09/03	0.099		%	20			
Selenium (Se)	2020/09/03	0.46		%	20			



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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Silicon (Si)	2020/09/03	0		%	20
			Silver (Ag)	2020/09/03	3.1		%	20
			Sodium (Na)	2020/09/03	0.81		%	20
			Strontium (Sr)	2020/09/03	0		%	20
			Sulphur (S)	2020/09/03	3.8		%	20
			Thallium (Tl)	2020/09/03	0.48		%	20
			Tin (Sn)	2020/09/03	0.57		%	20
			Titanium (Ti)	2020/09/03	0.20		%	20
			Vanadium (V)	2020/09/03	0.10		%	20
			Zinc (Zn)	2020/09/03	2.1		%	20
			Zirconium (Zr)	2020/09/03	1.6		%	20
			Aluminum (Al)	2020/09/03	1.7		%	20
			Antimony (Sb)	2020/09/03	2.5		%	20
			Arsenic (As)	2020/09/03	0.099		%	20
			Barium (Ba)	2020/09/03	0.42		%	20
			Beryllium (Be)	2020/09/03	1.4		%	20
			Bismuth (Bi)	2020/09/03	0.79		%	20
			Boron (B)	2020/09/03	1.4		%	20
			Cadmium (Cd)	2020/09/03	0.88		%	20
			Calcium (Ca)	2020/09/03	1.9		%	20
			Chromium (Cr)	2020/09/03	1.2		%	20
			Cobalt (Co)	2020/09/03	0.81		%	20
			Copper (Cu)	2020/09/03	0.52		%	20
			Iron (Fe)	2020/09/03	2.4		%	20
			Lead (Pb)	2020/09/03	0.89		%	20
			Magnesium (Mg)	2020/09/03	2.1		%	20
			Manganese (Mn)	2020/09/03	1.8		%	20
			Molybdenum (Mo)	2020/09/03	0.79		%	20
			Nickel (Ni)	2020/09/03	0.90		%	20
			Phosphorus (P)	2020/09/03	1.2		%	20
			Potassium (K)	2020/09/03	0		%	20
			Selenium (Se)	2020/09/03	2.1		%	20
			Silicon (Si)	2020/09/03	1.5		%	20
			Silver (Ag)	2020/09/03	1.7		%	20
			Sodium (Na)	2020/09/03	1.5		%	20
			Strontium (Sr)	2020/09/03	1.1		%	20
			Sulphur (S)	2020/09/03	0.96		%	20
			Thallium (Tl)	2020/09/03	0.097		%	20
			Tin (Sn)	2020/09/03	1.2		%	20
			Titanium (Ti)	2020/09/03	1.8		%	20
			Vanadium (V)	2020/09/03	1.5		%	20
			Zinc (Zn)	2020/09/03	1.6		%	20
			Zirconium (Zr)	2020/09/03	1.5		%	20
			Arsenic (As)	2020/09/03	NC		%	20
			Cadmium (Cd)	2020/09/03	NC		%	20
			Chromium (Cr)	2020/09/03	NC		%	20
			Cobalt (Co)	2020/09/03	NC		%	20
			Copper (Cu)	2020/09/03	0.77		%	20
			Iron (Fe)	2020/09/03	4.0		%	20
			Lead (Pb)	2020/09/03	13		%	20
			Manganese (Mn)	2020/09/03	4.2		%	20
			Nickel (Ni)	2020/09/03	NC		%	20
			Selenium (Se)	2020/09/03	NC		%	20



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BV Labs Job #: COM3937
Report Date: 2020/10/14

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Client Project #: FILTER PROOFING

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6923446	APT	Spiked Blank	Vanadium (V)	2020/09/03	NC		%	20
			Zinc (Zn)	2020/09/03	1.4		%	20
			Aluminum (Al)	2020/09/03		92	%	85 - 115
			Antimony (Sb)	2020/09/03		97	%	66 - 107
			Arsenic (As)	2020/09/03		101	%	85 - 115
			Barium (Ba)	2020/09/03		96	%	85 - 115
			Beryllium (Be)	2020/09/03		99	%	85 - 115
			Bismuth (Bi)	2020/09/03		102	%	85 - 115
			Boron (B)	2020/09/03		97	%	85 - 115
			Cadmium (Cd)	2020/09/03		102	%	85 - 115
			Calcium (Ca)	2020/09/03		97	%	85 - 115
			Chromium (Cr)	2020/09/03		95	%	85 - 115
			Cobalt (Co)	2020/09/03		99	%	85 - 115
			Copper (Cu)	2020/09/03		97	%	85 - 115
			Iron (Fe)	2020/09/03		97	%	85 - 115
			Lead (Pb)	2020/09/03		102	%	85 - 115
			Magnesium (Mg)	2020/09/03		95	%	85 - 115
			Manganese (Mn)	2020/09/03		96	%	85 - 115
			Molybdenum (Mo)	2020/09/03		101	%	85 - 115
			Nickel (Ni)	2020/09/03		100	%	85 - 115
			Phosphorus (P)	2020/09/03		105	%	85 - 115
			Potassium (K)	2020/09/03		96	%	85 - 115
			Selenium (Se)	2020/09/03		107	%	85 - 115
			Silicon (Si)	2020/09/03		98	%	85 - 115
			Silver (Ag)	2020/09/03		99	%	85 - 115
			Sodium (Na)	2020/09/03		94	%	85 - 115
			Strontium (Sr)	2020/09/03		99	%	85 - 115
Sulphur (S)	2020/09/03		105	%	85 - 115			
Thallium (Tl)	2020/09/03		103	%	85 - 115			
Tin (Sn)	2020/09/03		103	%	85 - 115			
Titanium (Ti)	2020/09/03		100	%	85 - 115			
Vanadium (V)	2020/09/03		96	%	85 - 115			
Zinc (Zn)	2020/09/03		100	%	85 - 115			
Zirconium (Zr)	2020/09/03		99	%	85 - 115			
6923446	APT	Method Blank	Aluminum (Al)	2020/09/03	<50		ug	
			Antimony (Sb)	2020/09/03	<10		ug	
			Arsenic (As)	2020/09/03	<6.0		ug	
			Barium (Ba)	2020/09/03	<1.0		ug	
			Beryllium (Be)	2020/09/03	<1.0		ug	
			Bismuth (Bi)	2020/09/03	<6.0		ug	
			Boron (B)	2020/09/03	<6.0		ug	
			Cadmium (Cd)	2020/09/03	<2.0		ug	
			Calcium (Ca)	2020/09/03	<50		ug	
			Chromium (Cr)	2020/09/03	<5.0		ug	
			Cobalt (Co)	2020/09/03	<2.0		ug	
			Copper (Cu)	2020/09/03	<5.0		ug	
			Iron (Fe)	2020/09/03	<50		ug	
			Lead (Pb)	2020/09/03	<3.0		ug	
			Magnesium (Mg)	2020/09/03	<50		ug	
			Manganese (Mn)	2020/09/03	<1.0		ug	
			Molybdenum (Mo)	2020/09/03	<3.0		ug	
Nickel (Ni)	2020/09/03	<3.0		ug				
Phosphorus (P)	2020/09/03	<25		ug				



QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Potassium (K)	2020/09/03	<100		ug	
			Selenium (Se)	2020/09/03	<10		ug	
			Silicon (Si)	2020/09/03	<10		ug	
			Silver (Ag)	2020/09/03	<5.0		ug	
			Sodium (Na)	2020/09/03	<50		ug	
			Strontium (Sr)	2020/09/03	<1.0		ug	
			Sulphur (S)	2020/09/03	<25		ug	
			Thallium (Tl)	2020/09/03	<10		ug	
			Tin (Sn)	2020/09/03	<10		ug	
			Titanium (Ti)	2020/09/03	<10		ug	
			Vanadium (V)	2020/09/03	<5.0		ug	
			Zinc (Zn)	2020/09/03	<5.0		ug	
			Zirconium (Zr)	2020/09/03	<5.0		ug	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU
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BV Labs Job #: COM3937
Report Date: 2020/10/14

Burlington Proofing
Client Project #: FILTER PROOFING

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

A handwritten signature in black ink, appearing to read 'John Bowman', written over a horizontal line.

John Bowman, Supervisor, Metals Group

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Your P.O. #: 2104007
 Your Project #: 2104007
 Site Location: OSHAWA
 Your C.O.C. #: 43259

Attention: John DeYoe

RWDI Air Inc
 600 Southgate Drive
 Guelph, ON
 CANADA N1G 4P6

Report Date: 2021/07/27
 Report #: R6738434
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1J7799

Received: 2021/07/15, 17:32

Sample Matrix: Filter
 # Samples Received: 20

Analyses	Date		Laboratory Method	Analytical Method	
	Quantity	Extracted			Analyzed
Total Metals on Hi-Vol Filter (6010Cmod)	20	2021/07/23	2021/07/23	CAM SOP-00408	EPA 6010D m
Particulates on Filter (Method IO-3.1)	20	2021/07/19	2021/07/19	CAM SOP-00942	Method IO-3.1

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.



Your P.O. #: 2104007
Your Project #: 2104007
Site Location: OSHAWA
Your C.O.C. #: 43259

Attention: John DeYoe

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2021/07/27
Report #: R6738434
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1J7799

Received: 2021/07/15, 17:32

Encryption Key



**AUTHORIZED REPORT
RAPPORT AUTORISÉ**

Bureau Veritas
27 Jul 2021 12:07:26

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, CET LEAD-Air Toxics, Source Evaluation
Email: Clayton.Johnson@bureauveritas.com
Phone# (905)817-5769

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VERITAS

BV Labs Job #: C1J7799
Report Date: 2021/07/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007

RESULTS OF ANALYSES OF FILTER

BV Labs ID		QCO256	QCO257	QCO258	QCO259	QCO260	QCO261	QCO262		
Sampling Date										
COC Number		43259	43259	43259	43259	43259	43259	43259		
	UNITS	21033182	21033181	21033177	21033179	21033175	21033176	21033183	RDL	QC Batch
Particulate Weight on Filter	mg	23.1 (1)	23.5 (1)	31.0 (1)	19.8 (1)	28.5 (1)	32.3 (1)	19.8 (1)	5.0	7470120
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) FNF Filter not folded										

BV Labs ID		QCO263	QCO264	QCO265	QCO266	QCO267	QCO268	QCO269		
Sampling Date										
COC Number		43259	43259	43259	43259	43259	43259	43259		
	UNITS	21033178	21033184	21033146	21033148	21033147	21033180	21033186	RDL	QC Batch
Particulate Weight on Filter	mg	10.6 (1)	25.4 (1)	13.6 (1)	19.7 (1)	ND (1)	ND	17.9 (1)	5.0	7470120
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected (1) FNF Filter not folded										

BV Labs ID		QCO270	QCO271	QCO272	QCO273	QCO274	QCO275		
Sampling Date									
COC Number		43259	43259	43259	43259	43259	43259		
	UNITS	21033145	21033143	21033149	21033185	21033144	21033142	RDL	QC Batch
Particulate Weight on Filter	mg	29.7 (1)	19.0 (1)	24.6 (1)	13.1 (1)	9.1 (1)	17.5 (1)	5.0	7470120
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) FNF Filter not folded									



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VERITAS

BV Labs Job #: C1J7799
Report Date: 2021/07/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007

ELEMENTS BY ICP-AES (FILTER)

BV Labs ID		QCO256	QCO257	QCO258	QCO259	QCO260	QCO261	QCO262		
Sampling Date										
COC Number		43259	43259	43259	43259	43259	43259	43259		
	UNITS	21033182	21033181	21033177	21033179	21033175	21033176	21033183	RDL	QC Batch
Lead (Pb)	ug	3.5	3.7	6.2	3.9	3.0	ND	ND	3.0	7479478
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected										

BV Labs ID		QCO263	QCO264	QCO265	QCO266	QCO267	QCO268	QCO269		
Sampling Date										
COC Number		43259	43259	43259	43259	43259	43259	43259		
	UNITS	21033178	21033184	21033146	21033148	21033147	21033180	21033186	RDL	QC Batch
Lead (Pb)	ug	ND	5.5	ND	ND	ND	ND	ND	3.0	7479478
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected										

BV Labs ID		QCO270	QCO271	QCO272	QCO273	QCO274	QCO275		
Sampling Date									
COC Number		43259	43259	43259	43259	43259	43259		
	UNITS	21033145	21033143	21033149	21033185	21033144	21033142	RDL	QC Batch
Lead (Pb)	ug	5.5	ND	4.6	ND	ND	ND	3.0	7479478
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected									



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BV Labs Job #: C1J7799
Report Date: 2021/07/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007

TEST SUMMARY

BV Labs ID: QCO256
Sample ID: 21033182
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO257
Sample ID: 21033181
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO257 Dup
Sample ID: 21033181
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John

BV Labs ID: QCO258
Sample ID: 21033177
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO259
Sample ID: 21033179
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO260
Sample ID: 21033175
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI



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VERITAS

BV Labs Job #: C1J7799
Report Date: 2021/07/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007

TEST SUMMARY

BV Labs ID: QCO261
Sample ID: 21033176
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO262
Sample ID: 21033183
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO263
Sample ID: 21033178
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO264
Sample ID: 21033184
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO265
Sample ID: 21033146
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO266
Sample ID: 21033148
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI



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VERITAS

BV Labs Job #: C1J7799
Report Date: 2021/07/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007

TEST SUMMARY

BV Labs ID: QCO267
Sample ID: 21033147
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO268
Sample ID: 21033180
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO269
Sample ID: 21033186
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO270
Sample ID: 21033145
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO271
Sample ID: 21033143
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO272
Sample ID: 21033149
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI



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VERITAS

BV Labs Job #: C1J7799
Report Date: 2021/07/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007

TEST SUMMARY

BV Labs ID: QCO273
Sample ID: 21033185
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO274
Sample ID: 21033144
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI

BV Labs ID: QCO275
Sample ID: 21033142
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7479478	2021/07/23	2021/07/23	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7470120	2021/07/19	2021/07/19	Theodora LI



**BUREAU
VERITAS**

BV Labs Job #: C1J7799
Report Date: 2021/07/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007

GENERAL COMMENTS

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: C1J7799
Report Date: 2021/07/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
7479478	JOH	Matrix Spike(QCO257)	Lead (Pb)	2021/07/23		84	%	75 - 125
7479478	JOH	MS/MSD RPD	Lead (Pb)	2021/07/23	0.12		%	20
7479478	JOH	Spiked Blank	Lead (Pb)	2021/07/23		97	%	85 - 115
7479478	JOH	RPD	Lead (Pb)	2021/07/23	0.41		%	20
7479478	JOH	Method Blank	Lead (Pb)	2021/07/23	ND,		ug	
					RDL=3.0			
7479478	JOH	RPD - Sample/Sample Dup	Lead (Pb)	2021/07/23	17		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.



BUREAU
VERITAS

BV Labs Job #: C1J7799
Report Date: 2021/07/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Brenda Moore

Brenda Moore, Team Lead, Inorganic

John Bowman

John Bowman, Supervisor, Metals Group

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AIR

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Phone: (905) 817-5700
Fax: (905) 817-5777

43259

CAM FCD-01302 /3

Page ___ of ___

ANALYSIS REQUESTED

CLIENT INFORMATION

Company Name: RWDI
Project Manager: John DeYoe
e-mail: JD@RWDI.COM
Address: 600 Southgate Dr
Guelph ON

Phone: 519 835 0961 Fax: 519 8231 3116
Sampled by: JDeYoe

Mass Gain
Lead (Pb)

SECTION

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time															
2103318	1600	40cfm																	
21033182, 81, 77, 79, 75, 76	↓	↓			✓	✓													
83, 78, 84, 46, 48, 47, 80	↓	↓			✓	✓													
86, 45, 43, 49, 85, 44, 42	↓	↓			✓	✓													

15-Jul-21 17:32

Clayton Johnson



C1J7799

VBV

AIR-RmTmp

TAT Requirement

STD 10 Business day
Rush 5 Business day *
Rush 2 Business day *
* need approval from Bureau Veritas

PROJECT INFORMATION

Project #: 2104007
Name: OSHAWA
PO #: 2104007
BV Quote #: P.OH
BV Contact: C. Johnston

REPORTING REQUIREMENTS

Summary Report only
EDD
Regulation _____

Notes

Please note if these samples are "Industrial Hygiene" samples
If submitting dustfall samples, please indicate the diameter of the
jar opening in cm.

PROJECT SPECIFIC COMMENTS

Client Signature: [Signature]
Affiliation: _____
Date/Time: July 16, 17:30

Received by: VIDHI BHASKAR
Affiliation: _____
Date/Time: 2021/07/15 17:30

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COC-1031 (11/2019)



Your P.O. #: 2104007-1000
 Your Project #: 2104007
 Site Location: OSHAWA
 Your C.O.C. #: n/a

Attention: John DeYoe

RWDI Air Inc
 600 Southgate Drive
 Guelph, ON
 CANADA N1G 4P6

Report Date: 2021/08/06
 Report #: R6753049
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1K8717

Received: 2021/07/26, 14:47

Sample Matrix: Filter
 # Samples Received: 20

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Total Metals on Hi-Vol Filter (6010Cmod)	20	2021/07/30	2021/08/05	CAM SOP-00408	EPA 6010D m
Particulates on Filter (Method IO-3.1)	20	2021/07/29	2021/07/29	CAM SOP-00942	Method IO-3.1

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.



Your P.O. #: 2104007-1000
Your Project #: 2104007
Site Location: OSHAWA
Your C.O.C. #: n/a

Attention: John DeYoe

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2021/08/06
Report #: R6753049
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1K8717

Received: 2021/07/26, 14:47

Encryption Key



**AUTHORIZED REPORT
RAPPORT AUTORISÉ**

Bureau Veritas
06 Aug 2021 12:25:42

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, CET LEAD-Air Toxics, Source Evaluation
Email: Clayton.Johnson@bureauveritas.com
Phone# (905)817-5769

=====
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BUREAU
VERITAS

BV Labs Job #: C1K8717
Report Date: 2021/08/06

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007-1000

RESULTS OF ANALYSES OF FILTER

BV Labs ID		QEW138	QEW139	QEW140	QEW141	QEW142	QEW143	QEW144		
Sampling Date		2021/07/16	2021/07/18	2021/07/20	2021/07/22	2021/07/16	2021/07/18	2021/07/20		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21060901	21060900	21060917	21060902	21060921	21060922	21060905	RDL	QC Batch
Particulate Weight on Filter	mg	27.5	32.7	69.0 (1)	30.5 (1)	35.3 (1)	42.7 (1)	83.8 (1)	5.0	7490383
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) FNF Filter not folded										

BV Labs ID		QEW145	QEW146	QEW147	QEW148	QEW149	QEW150	QEW151		
Sampling Date		2021/07/22	2021/07/16	2021/07/18	2021/07/20	2021/07/16	2021/07/18	2021/07/20		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21060904	21060923	21060924	21060914	21060919	21060920	21060911	RDL	QC Batch
Particulate Weight on Filter	mg	29.0 (1)	25.0 (1)	17.6 (1)	70.0 (1)	21.9 (1)	36.2 (1)	67.9 (1)	5.0	7490383
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) FNF Filter not folded										

BV Labs ID		QEW152	QEW153	QEW154	QEW155	QEW156	QEW157		
Sampling Date		2021/07/22	2021/07/16	2021/07/18	2021/07/20	2021/07/22			
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21060912	21060918	21060916	21060913	21060906	21060932	RDL	QC Batch
Particulate Weight on Filter	mg	20.6 (1)	24.0 (1)	39.3 (1)	90.5 (1)	25.7 (1)	ND	5.0	7490383
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected (1) FNF Filter not folded									



ELEMENTS BY ICP-AES (FILTER)

BV Labs ID		QEW138	QEW139	QEW140	QEW141	QEW142	QEW143	QEW144		
Sampling Date		2021/07/16	2021/07/18	2021/07/20	2021/07/22	2021/07/16	2021/07/18	2021/07/20		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21060901	21060900	21060917	21060902	21060921	21060922	21060905	RDL	QC Batch
Lead (Pb)	ug	6.5	3.6	ND	ND	7.4	3.1	ND	3.0	7492920
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected										

BV Labs ID		QEW145	QEW146	QEW147	QEW148	QEW149	QEW150	QEW151		
Sampling Date		2021/07/22	2021/07/16	2021/07/18	2021/07/20	2021/07/16	2021/07/18	2021/07/20		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21060904	21060923	21060924	21060914	21060919	21060920	21060911	RDL	QC Batch
Lead (Pb)	ug	ND	4.2	ND	3.2	ND	5.6	ND	3.0	7492920
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected										

BV Labs ID		QEW152	QEW153	QEW154	QEW155	QEW156	QEW157		
Sampling Date		2021/07/22	2021/07/16	2021/07/18	2021/07/20	2021/07/22			
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21060912	21060918	21060916	21060913	21060906	21060932	RDL	QC Batch
Lead (Pb)	ug	ND	ND	6.1	3.3	ND	ND	3.0	7492920
RDL = Reportable Detection Limit QC Batch = Quality Control Batch ND = Not detected									



BUREAU
VERITAS

BV Labs Job #: C1K8717
Report Date: 2021/08/06

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007-1000

TEST SUMMARY

BV Labs ID: QEW138
Sample ID: 21060901
Matrix: Filter

Collected: 2021/07/16
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW139
Sample ID: 21060900
Matrix: Filter

Collected: 2021/07/18
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW139 Dup
Sample ID: 21060900
Matrix: Filter

Collected: 2021/07/18
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel

BV Labs ID: QEW140
Sample ID: 21060917
Matrix: Filter

Collected: 2021/07/20
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW141
Sample ID: 21060902
Matrix: Filter

Collected: 2021/07/22
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW142
Sample ID: 21060921
Matrix: Filter

Collected: 2021/07/16
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI



BUREAU
VERITAS

BV Labs Job #: C1K8717
Report Date: 2021/08/06

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007-1000

TEST SUMMARY

BV Labs ID: QEW143
Sample ID: 21060922
Matrix: Filter

Collected: 2021/07/18
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW144
Sample ID: 21060905
Matrix: Filter

Collected: 2021/07/20
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW145
Sample ID: 21060904
Matrix: Filter

Collected: 2021/07/22
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW146
Sample ID: 21060923
Matrix: Filter

Collected: 2021/07/16
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW147
Sample ID: 21060924
Matrix: Filter

Collected: 2021/07/18
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW148
Sample ID: 21060914
Matrix: Filter

Collected: 2021/07/20
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI



BUREAU
VERITAS

BV Labs Job #: C1K8717
Report Date: 2021/08/06

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007-1000

TEST SUMMARY

BV Labs ID: QEW149
Sample ID: 21060919
Matrix: Filter

Collected: 2021/07/16
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW150
Sample ID: 21060920
Matrix: Filter

Collected: 2021/07/18
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW151
Sample ID: 21060911
Matrix: Filter

Collected: 2021/07/20
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW152
Sample ID: 21060912
Matrix: Filter

Collected: 2021/07/22
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW153
Sample ID: 21060918
Matrix: Filter

Collected: 2021/07/16
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW154
Sample ID: 21060916
Matrix: Filter

Collected: 2021/07/18
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI



BUREAU
VERITAS

BV Labs Job #: C1K8717
Report Date: 2021/08/06

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007-1000

TEST SUMMARY

BV Labs ID: QEW155
Sample ID: 21060913
Matrix: Filter

Collected: 2021/07/20
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW156
Sample ID: 21060906
Matrix: Filter

Collected: 2021/07/22
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI

BV Labs ID: QEW157
Sample ID: 21060932
Matrix: Filter

Collected:
Shipped:
Received: 2021/07/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7492920	2021/07/30	2021/08/05	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7490383	2021/07/29	2021/07/29	Theodora LI



**BUREAU
VERITAS**

BV Labs Job #: C1K8717
Report Date: 2021/08/06

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007-1000

GENERAL COMMENTS

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: C1K8717
Report Date: 2021/08/06

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007-1000

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
7492920	APT	Matrix Spike(QEW139)	Lead (Pb)	2021/08/05		88	%	75 - 125
7492920	APT	MS/MSD RPD	Lead (Pb)	2021/08/05	15		%	20
7492920	APT	Spiked Blank	Lead (Pb)	2021/08/05		96	%	85 - 115
7492920	APT	RPD	Lead (Pb)	2021/08/05	0.42		%	20
7492920	APT	Method Blank	Lead (Pb)	2021/08/05	ND, RDL=3.0		ug	
7492920	APT	RPD - Sample/Sample Dup	Lead (Pb)	2021/08/05	12		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.



BUREAU
VERITAS

BV Labs Job #: C1K8717
Report Date: 2021/08/06

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA
Your P.O. #: 2104007-1000

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Brenda Moore

Brenda Moore, Team Lead, Inorganic

John Bowman

John Bowman, Supervisor, Metals Group

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AIR



6740 Campobello Rd
Mississauga Ontario, L5N 2L8
www.bvlabs.com

Toll Free: 1-800-668-0639
Phone: (905) 817-5700
Fax: (905) 817-5777

CHAIN OF CUSTODY FORM - AIR

CAM FCD-01302 /3

1 of 1

ANALYSIS REQUESTED

CLIENT INFORMATION

Company Name: RWDI

Project Manager: John DeYoe

e-mail: JD@RWDI.COM

Address: 600 Southgate Dr. Guelph, ON

Phone: 519 835 0961 Fax: _____

Sampled by: JD

Mass Gain on Filters
Lead (Pb)

SECTION

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time														
21060901	21060921	21060923	21060919	21060918	1600	40 cfm	16-Jul	12am	✓	✓								
21060900	21060922	21060924	21060920	21060916	1600	40 cfm	18-Jul	12am	✓	✓								
21060917	21060905	21060914	21060911	21060913	1600	40 cfm	20-Jul	12am	✓	✓								
21060902	21060904	21060915	21060912	21060906	1600	40 cfm	22-Jul	12am	✓	✓								
<u>21060932</u>					<u>x</u>	<u>x</u>				✓	✓							

TAT Requirement

- STD 10 Business day
- Rush 5 Business day *
- Rush 2 Business day *

* need approval from Bureau Veritas

PROJECT INFORMATION

Project #: 2104007
 Name: OSHAWA
 PO #: 2104007-1000
 BV Quote #: ASTER Petro
 BV Contact: _____

REPORTING REQUIREMENTS

- Summary Report only
- EDD
- Regulation

Notes

Please note if these samples are "Industrial Hygiene" samples if submitting dustfall samples, please indicate the diameter of the jar opening in cm.

PROJECT SPECIFIC COMMENTS

Client Signature: [Signature]
 Affiliation: _____
 Date/Time: July 26

Received by: [Signature]
 Affiliation: _____
 Date/Time: July 26 1914

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26-Jul-21 14:47
 Clayton Johnson
 C1K8717
 VSE AID DmTm



Your P.O. #: 2104007-1000
 Your Project #: 2104007
 Site Location: OSHAWA AIRPORT
 Your C.O.C. #: n/a

Attention: John DeYoe

RWDI Air Inc
 600 Southgate Drive
 Guelph, ON
 CANADA N1G 4P6

Report Date: 2021/08/17
 Report #: R6768856
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1L7947

Received: 2021/08/04, 09:55

Sample Matrix: Filter
 # Samples Received: 20

Analyses	Date		Laboratory Method	Analytical Method	
	Quantity	Extracted			Analyzed
Total Metals on Hi-Vol Filter (6010Cmod)	20	2021/08/16	2021/08/16	CAM SOP-00408	EPA 6010D m
Particulates on Filter (Method IO-3.1)	20	2021/08/05	2021/08/05	CAM SOP-00942	Method IO-3.1

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.



Your P.O. #: 2104007-1000
Your Project #: 2104007
Site Location: OSHAWA AIRPORT
Your C.O.C. #: n/a

Attention: John DeYoe

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2021/08/17
Report #: R6768856
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1L7947

Received: 2021/08/04, 09:55

Encryption Key



**AUTHORIZED REPORT
RAPPORT AUTORISÉ**

Bureau Veritas
17 Aug 2021 13:27:14

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, CET LEAD-Air Toxics, Source Evaluation
Email: Clayton.Johnson@bureauveritas.com
Phone# (905)817-5769

=====
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BV Labs Job #: C1L7947
Report Date: 2021/08/17

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

RESULTS OF ANALYSES OF FILTER

BV Labs ID		QGW175	QGW176	QGW177	QGW178	QGW179	QGW180	QGW181		
Sampling Date		2021/07/24	2021/07/26	2021/07/28	2021/07/30	2021/07/24	2021/07/26	2021/07/28		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21060778	21060777	21060926	21060903	21060779	21060925	21060908	RDL	QC Batch
Particulate Weight on Filter	mg	31.1 (1)	62.2 (2)	21.2 (2)	12.1 (2)	31.2 (2)	80.4 (2)	25.3 (2)	5.0	7503308

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) FNF Filter not folded
FT Filter torn
(2) FNF Filter not folded

BV Labs ID		QGW182	QGW183	QGW184	QGW185	QGW186	QGW187	QGW188		
Sampling Date		2021/07/30	2021/07/24	2021/07/26	2021/07/28	2021/07/30	2021/07/24	2021/07/26		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21060907	21060936	21060915	21060909	21060910	21060933	21060935	RDL	QC Batch
Particulate Weight on Filter	mg	29.2 (1)	26.1 (1)	72.5 (1)	31.8 (1)	17.6 (1)	24.2 (1)	68.6 (1)	5.0	7503308

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) FNF Filter not folded

BV Labs ID		QGW189	QGW190	QGW191	QGW192	QGW193	QGW194		
Sampling Date		2021/07/28	2021/07/30	2021/07/24	2021/07/26				
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21060928	21060927	21060934	21060931	21071402	21071403	RDL	QC Batch
Particulate Weight on Filter	mg	18.9 (1)	30.1 (1)	32.7 (1)	72.8 (1)	ND (1)	ND (1)	5.0	7503308

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) FNF Filter not folded



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VERITAS

BV Labs Job #: C1L7947
Report Date: 2021/08/17

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

ELEMENTS BY ICP-AES (FILTER)

BV Labs ID		QGW175	QGW176	QGW177	QGW178	QGW179	QGW180	QGW181		
Sampling Date		2021/07/24	2021/07/26	2021/07/28	2021/07/30	2021/07/24	2021/07/26	2021/07/28		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21060778	21060777	21060926	21060903	21060779	21060925	21060908	RDL	QC Batch
Lead (Pb)	ug	4.1	3.0	ND	ND	4.3	ND	5.6	3.0	7521461

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

BV Labs ID		QGW182	QGW183	QGW184	QGW185	QGW186	QGW187	QGW188		
Sampling Date		2021/07/30	2021/07/24	2021/07/26	2021/07/28	2021/07/30	2021/07/24	2021/07/26		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21060907	21060936	21060915	21060909	21060910	21060933	21060935	RDL	QC Batch
Lead (Pb)	ug	ND	ND	4.3	ND	4.3	ND	ND	3.0	7521461

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

BV Labs ID		QGW189	QGW190	QGW191	QGW192	QGW193	QGW194		
Sampling Date		2021/07/28	2021/07/30	2021/07/24	2021/07/26				
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21060928	21060927	21060934	21060931	21071402	21071403	RDL	QC Batch
Lead (Pb)	ug	ND	4.9	ND	ND	ND	ND	3.0	7521461

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected



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VERITAS

BV Labs Job #: C1L7947
Report Date: 2021/08/17

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QGW175
Sample ID: 21060778
Matrix: Filter

Collected: 2021/07/24
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW176
Sample ID: 21060777
Matrix: Filter

Collected: 2021/07/26
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW176 Dup
Sample ID: 21060777
Matrix: Filter

Collected: 2021/07/26
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John

BV Labs ID: QGW177
Sample ID: 21060926
Matrix: Filter

Collected: 2021/07/28
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW178
Sample ID: 21060903
Matrix: Filter

Collected: 2021/07/30
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW179
Sample ID: 21060779
Matrix: Filter

Collected: 2021/07/24
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI



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BV Labs Job #: C1L7947
Report Date: 2021/08/17

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QGW180
Sample ID: 21060925
Matrix: Filter

Collected: 2021/07/26
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW181
Sample ID: 21060908
Matrix: Filter

Collected: 2021/07/28
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW182
Sample ID: 21060907
Matrix: Filter

Collected: 2021/07/30
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW183
Sample ID: 21060936
Matrix: Filter

Collected: 2021/07/24
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW184
Sample ID: 21060915
Matrix: Filter

Collected: 2021/07/26
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW185
Sample ID: 21060909
Matrix: Filter

Collected: 2021/07/28
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI



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BV Labs Job #: C1L7947
Report Date: 2021/08/17

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QGW186
Sample ID: 21060910
Matrix: Filter

Collected: 2021/07/30
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW187
Sample ID: 21060933
Matrix: Filter

Collected: 2021/07/24
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW188
Sample ID: 21060935
Matrix: Filter

Collected: 2021/07/26
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW189
Sample ID: 21060928
Matrix: Filter

Collected: 2021/07/28
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW190
Sample ID: 21060927
Matrix: Filter

Collected: 2021/07/30
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW191
Sample ID: 21060934
Matrix: Filter

Collected: 2021/07/24
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI



BUREAU
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BV Labs Job #: C1L7947
Report Date: 2021/08/17

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QGW192
Sample ID: 21060931
Matrix: Filter

Collected: 2021/07/26
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW193
Sample ID: 21071402
Matrix: Filter

Collected:
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI

BV Labs ID: QGW194
Sample ID: 21071403
Matrix: Filter

Collected:
Shipped:
Received: 2021/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521461	2021/08/16	2021/08/16	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7503308	2021/08/05	2021/08/05	Theodora LI



**BUREAU
VERITAS**

BV Labs Job #: C1L7947
Report Date: 2021/08/17

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

GENERAL COMMENTS

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: C1L7947
Report Date: 2021/08/17

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
7521461	JOH	Matrix Spike(QGW176)	Lead (Pb)	2021/08/16		105	%	75 - 125
7521461	JOH	MS/MSD RPD	Lead (Pb)	2021/08/16	0.47		%	20
7521461	JOH	Spiked Blank	Lead (Pb)	2021/08/16		105	%	85 - 115
7521461	JOH	RPD	Lead (Pb)	2021/08/16	0.19		%	20
7521461	JOH	Method Blank	Lead (Pb)	2021/08/16	ND, RDL=3.0		ug	
7521461	JOH	RPD - Sample/Sample Dup	Lead (Pb)	2021/08/16	0.80		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.



BUREAU
VERITAS

BV Labs Job #: C1L7947
Report Date: 2021/08/17

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Brenda Moore

Brenda Moore, Team Lead, Inorganic

John Bowman

John Bowman, Supervisor, Metals Group

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AIR



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Mississauga Ontario L5N 2L8
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Toll Free: 1-800-668-0639
Phone: (905) 817-5700
Fax: (905) 817-5777

CHAIN OF CUSTODY FORM - AIR

CAM FCD-01302 /3

Page 1 of 1

CLIENT INFORMATION	Company Name: <u>RWDI</u>					TSP	Mass Gain	Lead (Pb)	ANALYSIS REQUESTED																			
	Project Manager: <u>John DeYoe</u>																											
	e-mail: <u>jd@rwdi</u>																											
	Address: <u>600 Southgate Drive, Guelph, ON</u>																											
SECTION	Phone: <u>519 835 0961</u> Fax: <u>519 823 1316</u>																											
	Sampled by: <u>j.deyoe</u>																											

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time																									
21060778	21060779	21060936	21060933	21060934	1600	40 cfm	24-Jul			x	x																		
21060777	21060925	21060915	21060935	21060931	1600	40 cfm	26-Jul			x	x																		
21060926	21060908	21060909	21060928		1600	40 cfm	28-Jul			x	x																		
21060903	21060907	21060910	21060927		1600	40 cfm	30-Jul			x	x																		
21071402	21071403									x	x																		

TAT Requirement STD 10 Business day <input checked="" type="checkbox"/> Rush 5 Business day * <input type="checkbox"/> Rush 2 Business day * <input type="checkbox"/> * need approval from Bureau Veritas	PROJECT INFORMATION Project #: <u>2104007</u> Name: <u>Oshawa Airport</u> PO #: <u>2104007-1000</u> BV Quote #: <u>as per Petro Oh</u> BV Contact: <u>C. Johnston</u>	REPORTING REQUIREMENTS Summary Report only <input type="checkbox"/> EDD <input type="checkbox"/> Regulation _____	Notes Please note if these samples are "Industrial Hygiene" samples if submitting dustfall samples, please indicate the diameter of the jar opening in cm. PROJECT SPECIFIC COMMENTS <u>Hi Vol Filter</u>
--	---	---	--

Client Signature: [Signature] Received by: [Signature]
 Affiliation: _____ Affiliation: _____
 Date/Time: Aug 4 / 21 Date/Time: 09:55

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04-Aug-21 09:55
 Clayton Johnson
 CIL7947



Your P.O. #: 2104007-1000
 Your Project #: 2104007
 Site Location: OSHAWA AIRPORT
 Your C.O.C. #: N/A

Attention: John DeYoe

RWDI Air Inc
 600 Southgate Drive
 Guelph, ON
 CANADA N1G 4P6

Report Date: 2021/08/18
 Report #: R6770033
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1M1874

Received: 2021/08/06, 12:28

Sample Matrix: Filter
 # Samples Received: 10

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Total Metals on Hi-Vol Filter (6010Cmod)	10	2021/08/16	2021/08/17	CAM SOP-00408	EPA 6010D m
Particulates on Filter (Method IO-3.1)	10	2021/08/11	2021/08/11	CAM SOP-00942	Method IO-3.1

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.



Your P.O. #: 2104007-1000
Your Project #: 2104007
Site Location: OSHAWA AIRPORT
Your C.O.C. #: N/A

Attention: John DeYoe

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2021/08/18
Report #: R6770033
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1M1874

Received: 2021/08/06, 12:28

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Bureau Veritas
18 Aug 2021 08:41:26

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, CET LEAD-Air Toxics, Source Evaluation
Email: Clayton.Johnson@bureauveritas.com
Phone# (905)817-5769

=====

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BUREAU
VERITAS

BV Labs Job #: C1M1874
Report Date: 2021/08/18

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

RESULTS OF ANALYSES OF FILTER

BV Labs ID		QHR367	QHR368	QHR369	QHR370	QHR371	QHR372	QHR373		
Sampling Date		2021/08/01	2021/08/01	2021/08/01	2021/08/01	2021/08/01	2021/08/03	2021/08/03		
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	21070992	21070994	21071401	21071404	21060929	21070991	21071400	RDL	QC Batch
Particulate Weight on Filter	mg	13.4 (1)	17.8 (1)	13.7 (1)	15.0 (1)	16.4 (1)	29.3 (1)	36.3 (1)	5.0	7513223

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) FNF Filter not folded

BV Labs ID		QHR374	QHR375	QHR376		
Sampling Date		2021/08/03	2021/08/03	2021/08/03		
COC Number		N/A	N/A	N/A		
	UNITS	21070993	21071405	21060930	RDL	QC Batch
Particulate Weight on Filter	mg	32.4 (1)	34.4 (1)	33.4 (1)	5.0	7513223

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) FNF Filter not folded



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VERITAS

BV Labs Job #: C1M1874
Report Date: 2021/08/18

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

ELEMENTS BY ICP-AES (FILTER)

BV Labs ID		QHR367	QHR368	QHR369	QHR370	QHR371	QHR372	QHR373		
Sampling Date		2021/08/01	2021/08/01	2021/08/01	2021/08/01	2021/08/01	2021/08/03	2021/08/03		
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	21070992	21070994	21071401	21071404	21060929	21070991	21071400	RDL	QC Batch
Lead (Pb)	ug	ND	ND	ND	ND	ND	ND	ND	3.0	7521463

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

BV Labs ID		QHR374	QHR375	QHR376		
Sampling Date		2021/08/03	2021/08/03	2021/08/03		
COC Number		N/A	N/A	N/A		
	UNITS	21070993	21071405	21060930	RDL	QC Batch
Lead (Pb)	ug	3.3	6.6	4.6	3.0	7521463

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



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VERITAS

BV Labs Job #: C1M1874
Report Date: 2021/08/18

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QHR367
Sample ID: 21070992
Matrix: Filter

Collected: 2021/08/01
Shipped:
Received: 2021/08/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521463	2021/08/16	2021/08/17	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7513223	2021/08/11	2021/08/11	Theodora LI

BV Labs ID: QHR368
Sample ID: 21070994
Matrix: Filter

Collected: 2021/08/01
Shipped:
Received: 2021/08/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521463	2021/08/16	2021/08/17	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7513223	2021/08/11	2021/08/11	Theodora LI

BV Labs ID: QHR369
Sample ID: 21071401
Matrix: Filter

Collected: 2021/08/01
Shipped:
Received: 2021/08/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521463	2021/08/16	2021/08/17	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7513223	2021/08/11	2021/08/11	Theodora LI

BV Labs ID: QHR370
Sample ID: 21071404
Matrix: Filter

Collected: 2021/08/01
Shipped:
Received: 2021/08/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521463	2021/08/16	2021/08/17	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7513223	2021/08/11	2021/08/11	Theodora LI

BV Labs ID: QHR371
Sample ID: 21060929
Matrix: Filter

Collected: 2021/08/01
Shipped:
Received: 2021/08/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521463	2021/08/16	2021/08/17	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7513223	2021/08/11	2021/08/11	Theodora LI

BV Labs ID: QHR372
Sample ID: 21070991
Matrix: Filter

Collected: 2021/08/03
Shipped:
Received: 2021/08/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521463	2021/08/16	2021/08/17	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7513223	2021/08/11	2021/08/11	Theodora LI



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VERITAS

BV Labs Job #: C1M1874
Report Date: 2021/08/18

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QHR373
Sample ID: 21071400
Matrix: Filter

Collected: 2021/08/03
Shipped:
Received: 2021/08/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521463	2021/08/16	2021/08/17	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7513223	2021/08/11	2021/08/11	Theodora LI

BV Labs ID: QHR374
Sample ID: 21070993
Matrix: Filter

Collected: 2021/08/03
Shipped:
Received: 2021/08/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521463	2021/08/16	2021/08/17	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7513223	2021/08/11	2021/08/11	Theodora LI

BV Labs ID: QHR375
Sample ID: 21071405
Matrix: Filter

Collected: 2021/08/03
Shipped:
Received: 2021/08/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521463	2021/08/16	2021/08/17	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7513223	2021/08/11	2021/08/11	Theodora LI

BV Labs ID: QHR376
Sample ID: 21060930
Matrix: Filter

Collected: 2021/08/03
Shipped:
Received: 2021/08/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7521463	2021/08/16	2021/08/17	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7513223	2021/08/11	2021/08/11	Theodora LI



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VERITAS**

BV Labs Job #: C1M1874
Report Date: 2021/08/18

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

GENERAL COMMENTS

Results relate only to the items tested.



QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
7521463	JOH	Matrix Spike	Lead (Pb)	2021/08/17		96	%	75 - 125
7521463	JOH	MS/MSD RPD	Lead (Pb)	2021/08/17	0.63		%	20
7521463	JOH	Spiked Blank	Lead (Pb)	2021/08/17		101	%	85 - 115
7521463	JOH	RPD	Lead (Pb)	2021/08/17	0.69		%	20
7521463	JOH	Method Blank	Lead (Pb)	2021/08/17	ND, RDL=3.0		ug	
7521463	JOH	RPD - Sample/Sample Dup	Lead (Pb)	2021/08/17	6.9		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.



BUREAU
VERITAS

BV Labs Job #: C1M1874
Report Date: 2021/08/18

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Brenda Moore

Brenda Moore, Team Lead, Inorganic

John Bowman

John Bowman, Supervisor, Metals Group

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AIR



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Toll Free: 1-800-668-0639
Phone: (905) 817-5700
Fax: (905) 817-5777

CHAIN OF CUSTODY FORM - AIR

CAM FCD-01302 /3

Page ____ of ____

ANALYSIS REQUESTED

CLIENT INFORMATION	Company Name: <u>RWDI</u>					Mass Gain	Lead (Pb)													
	Project Manager: <u>John DeYoe</u>																			
	e-mail: <u>jd@rwdi</u>																			
	Address: <u>600 Southgate Drive, Guelph, ON</u>																			
SECTION	Phone: <u>519 835 0961</u> Fax: <u>519 823 1316</u>					(TSP)														
	Sampled by: <u>j deyoe</u>																			
Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time																
21070992	21070994	21071401	21071404	21060929	1600	40 cfm	1-Aug			x	x									
21070991	21071400	21070993	21071405	21060930	1600	40 cfm	3-Aug			x	x									

06-Aug-21 12:28
 Clayton Johnson

C1M1874
 ATM AIR-RmTmp

TAT Requirement	PROJECT INFORMATION	REPORTING REQUIREMENTS	Notes
STD 10 Business day <input checked="" type="checkbox"/> Rush 5 Business day * <input type="checkbox"/> Rush 2 Business day * <input type="checkbox"/> * need approval from Bureau Veritas	Project #: <u>2104007</u> Name: <u>Oshawa Airport</u> PO #: <u>2104007-1000</u> BV Quote #: <u>as per Petro Oh</u> BV Contact: <u>C Johnston</u>	Summary Report only <input type="checkbox"/> EDD <input type="checkbox"/> Regulation _____	Please note if these samples are "Industrial Hygiene" samples If submitting dustfall samples, please indicate the diameter of the jar opening in cm. PROJECT SPECIFIC COMMENTS <u>Hi Vol Filter</u>
Client Signature: Affiliation: _____ Date/Time: <u>Aug 6/21</u>	Received by: Affiliation: _____ Date/Time: <u>08/06/21 12:28</u>		

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Your P.O. #: 2104007-1000
 Your Project #: 2104007
 Site Location: OSHAWA AIRPORT
 Your C.O.C. #: n/a

Attention: John DeYoe

RWDI Air Inc
 600 Southgate Drive
 Guelph, ON
 CANADA N1G 4P6

Report Date: 2021/08/27
 Report #: R6784815
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1N1436

Received: 2021/08/16, 10:46

Sample Matrix: Filter
 # Samples Received: 20

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Total Metals on Hi-Vol Filter (6010Cmod)	20	2021/08/24	2021/08/26	CAM SOP-00408	EPA 6010D m
Particulates on Filter (Method IO-3.1)	20	2021/08/17	2021/08/17	CAM SOP-00942	Method IO-3.1

Remarks:

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All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.



Your P.O. #: 2104007-1000
Your Project #: 2104007
Site Location: OSHAWA AIRPORT
Your C.O.C. #: n/a

Attention: John DeYoe

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2021/08/27
Report #: R6784815
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1N1436

Received: 2021/08/16, 10:46

Encryption Key



**AUTHORIZED REPORT
RAPPORT AUTORISÉ**

Bureau Veritas
27 Aug 2021 12:41:17

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, CET LEAD-Air Toxics, Source Evaluation
Email: Clayton.Johnson@bureauveritas.com
Phone# (905)817-5769

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BV Labs Job #: C1N1436
Report Date: 2021/08/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

RESULTS OF ANALYSES OF FILTER

BV Labs ID		QJS152	QJS153	QJS154	QJS155	QJS156	QJS157	QJS158		
Sampling Date		2021/08/05	2021/08/05	2021/08/05	2021/08/05	2021/08/05	2021/08/07	2021/08/07		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071406	21071408	21071410	21071412	21071414	21071407	21071409	RDL	QC Batch
Particulate Weight on Filter	mg	41.6 (1)	39.4 (1)	34.7 (1)	32.7 (1)	41.3 (1)	28.5 (1)	43.9 (1)	5.0	7524722
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) FNF Filter not folded										

BV Labs ID		QJS159	QJS160	QJS161	QJS162	QJS163	QJS164	QJS165		
Sampling Date		2021/08/07	2021/08/07	2021/08/07	2021/08/09	2021/08/09	2021/08/09	2021/08/09		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071411	21071413	21071415	21071430	21071433	21071450	21071456	RDL	QC Batch
Particulate Weight on Filter	mg	37.8 (1)	40.2 (1)	35.4 (1)	54.0	60.1	46.7	43.6	5.0	7524722
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) FNF Filter not folded										

BV Labs ID		QJS166	QJS167	QJS168	QJS169	QJS170	QJS171		
Sampling Date		2021/08/09	2021/08/11	2021/08/11	2021/08/11	2021/08/11	2021/08/11		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071453	21071431	21071432	21071451	21071455	21071452	RDL	QC Batch
Particulate Weight on Filter	mg	49.3	34.0	48.5	35.2	33.8	35.0	5.0	7524722
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									



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VERITAS

BV Labs Job #: C1N1436
Report Date: 2021/08/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

ELEMENTS BY ICP-AES (FILTER)

BV Labs ID		QJS152	QJS153	QJS154	QJS155	QJS156	QJS157	QJS158		
Sampling Date		2021/08/05	2021/08/05	2021/08/05	2021/08/05	2021/08/05	2021/08/07	2021/08/07		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071406	21071408	21071410	21071412	21071414	21071407	21071409	RDL	QC Batch
Lead (Pb)	ug	10.0	11.3	5.6	ND	3.8	3.0	4.3	3.0	7538961

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

BV Labs ID		QJS159	QJS160	QJS161	QJS162	QJS163	QJS164	QJS165		
Sampling Date		2021/08/07	2021/08/07	2021/08/07	2021/08/09	2021/08/09	2021/08/09	2021/08/09		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071411	21071413	21071415	21071430	21071433	21071450	21071456	RDL	QC Batch
Lead (Pb)	ug	5.4	6.6	4.6	10.4	8.6	7.5	5.8	3.0	7538961

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs ID		QJS166	QJS167	QJS168	QJS169	QJS170	QJS171		
Sampling Date		2021/08/09	2021/08/11	2021/08/11	2021/08/11	2021/08/11	2021/08/11		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071453	21071431	21071432	21071451	21071455	21071452	RDL	QC Batch
Lead (Pb)	ug	6.0	ND	ND	ND	ND	ND	3.0	7538961

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected



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VERITAS

BV Labs Job #: C1N1436
Report Date: 2021/08/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QJS152
Sample ID: 21071406
Matrix: Filter

Collected: 2021/08/05
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS153
Sample ID: 21071408
Matrix: Filter

Collected: 2021/08/05
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS153 Dup
Sample ID: 21071408
Matrix: Filter

Collected: 2021/08/05
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel

BV Labs ID: QJS154
Sample ID: 21071410
Matrix: Filter

Collected: 2021/08/05
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS155
Sample ID: 21071412
Matrix: Filter

Collected: 2021/08/05
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS156
Sample ID: 21071414
Matrix: Filter

Collected: 2021/08/05
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI



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VERITAS

BV Labs Job #: C1N1436
Report Date: 2021/08/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QJS157
Sample ID: 21071407
Matrix: Filter

Collected: 2021/08/07
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS158
Sample ID: 21071409
Matrix: Filter

Collected: 2021/08/07
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS159
Sample ID: 21071411
Matrix: Filter

Collected: 2021/08/07
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS160
Sample ID: 21071413
Matrix: Filter

Collected: 2021/08/07
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS161
Sample ID: 21071415
Matrix: Filter

Collected: 2021/08/07
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS162
Sample ID: 21071430
Matrix: Filter

Collected: 2021/08/09
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI



BUREAU
VERITAS

BV Labs Job #: C1N1436
Report Date: 2021/08/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QJS163
Sample ID: 21071433
Matrix: Filter

Collected: 2021/08/09
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS164
Sample ID: 21071450
Matrix: Filter

Collected: 2021/08/09
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS165
Sample ID: 21071456
Matrix: Filter

Collected: 2021/08/09
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS166
Sample ID: 21071453
Matrix: Filter

Collected: 2021/08/09
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS167
Sample ID: 21071431
Matrix: Filter

Collected: 2021/08/11
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS168
Sample ID: 21071432
Matrix: Filter

Collected: 2021/08/11
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI



BUREAU
VERITAS

BV Labs Job #: C1N1436
Report Date: 2021/08/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QJS169
Sample ID: 21071451
Matrix: Filter

Collected: 2021/08/11
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS170
Sample ID: 21071455
Matrix: Filter

Collected: 2021/08/11
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI

BV Labs ID: QJS171
Sample ID: 21071452
Matrix: Filter

Collected: 2021/08/11
Shipped:
Received: 2021/08/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7538961	2021/08/24	2021/08/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7524722	2021/08/17	2021/08/17	Theodora LI



BUREAU
VERITAS

BV Labs Job #: C1N1436
Report Date: 2021/08/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

GENERAL COMMENTS

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: C1N1436
Report Date: 2021/08/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
7538961	APT	Matrix Spike(QS153)	Lead (Pb)	2021/08/26		96	%	75 - 125
7538961	APT	MS/MSD RPD	Lead (Pb)	2021/08/26	2.5		%	20
7538961	APT	Spiked Blank	Lead (Pb)	2021/08/26		102	%	85 - 115
7538961	APT	RPD	Lead (Pb)	2021/08/26	0.20		%	20
7538961	APT	Method Blank	Lead (Pb)	2021/08/26	ND, RDL=3.0		ug	
7538961	APT	RPD - Sample/Sample Dup	Lead (Pb)	2021/08/26	6.6		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.



BUREAU
VERITAS

BV Labs Job #: C1N1436
Report Date: 2021/08/27

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Brenda Moore

Brenda Moore, Team Lead, Inorganic

John Bowman

John Bowman, Supervisor, Metals Group

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AIR



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Mississauga Ontario, L5N 2L8
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Phone: (905) 817-5700
Fax: (905) 817-5777

CHAIN OF CUSTODY FORM - AIR

CAM FCD-01302 /3

Page ___ of ___

ANALYSIS REQUESTED

CLIENT INFORMATION

Company Name: RWDI
Project Manager: John DeYoe
e-mail: jd@rwdi
Address: 600 Southgate Drive, Guelph, ON

SECTION

Phone: 519 835 0961 Fax: 519 823-1316

Sampled by: j deyoe

Mass Gain
Lead (Pb)

(TSP)

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time															
21071406	21071408	21071410	21071412	21071414	1600	40 cfm	5-Aug			x	x								
21071407	21071409	21071411	21071413	21071415	1600	40 cfm	7-Aug			x	x								
21071430	21071433	21071450	21071456	21071453	1600	40 cfm	9-Aug			x	x								
21071431	21071432	21071451	21071455	21071452	1600	40 cfm	11-Aug			x	x								

16-Aug-21 10:46
Clayton Johnson
CIN1436
ATM ATD DmTmm

TAT Requirement

STD 10 Business day
Rush 5 Business day *
Rush 2 Business day *

PROJECT INFORMATION

Project #: 2104007
Name: Oshawa Airport
PO #: 2104007-1000
BV Quote #: as per Petro Oh
BV Contact: C Johnston

REPORTING REQUIREMENTS

Summary Report only
EDD
Regulation _____

Notes
Please note if these samples are "Industrial Hygiene" samples
If submitting dustfall samples, please indicate the diameter of the jar opening in cm.
PROJECT SPECIFIC COMMENTS
Hi Vol Filter

Client Signature: *[Signature]*
Affiliation: RWDI
Date/Time: Aug 16/21

Received by: *[Signature]*
Affiliation: *[Signature]*
Date/Time: 210816 1046

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Your P.O. #: 2104007-1000
 Your Project #: 2104007
 Site Location: OSHAWA AIRPORT
 Your C.O.C. #: n/a

Attention: John DeYoe

RWDI Air Inc
 600 Southgate Drive
 Guelph, ON
 CANADA N1G 4P6

Report Date: 2021/09/14
 Report #: R6809911
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C107431

Received: 2021/08/30, 12:15

Sample Matrix: Filter
 # Samples Received: 35

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Total Metals on Hi-Vol Filter (6010Cmod)	20	2021/09/09	2021/09/13	CAM SOP-00408	EPA 6010D m
Total Metals on Hi-Vol Filter (6010Cmod)	15	2021/09/09	2021/09/09	CAM SOP-00408	EPA 6010D m
Particulates on Filter (Method IO-3.1)	35	2021/09/01	2021/09/01	CAM SOP-00942	Method IO-3.1

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.



Your P.O. #: 2104007-1000
Your Project #: 2104007
Site Location: OSHAWA AIRPORT
Your C.O.C. #: n/a

Attention: John DeYoe

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2021/09/14
Report #: R6809911
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C107431

Received: 2021/08/30, 12:15

Encryption Key



**AUTHORIZED REPORT
RAPPORT AUTORISÉ**

Bureau Veritas
14 Sep 2021 12:52:27

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, CET LEAD-Air Toxics, Source Evaluation
Email: Clayton.Johnson@bureauveritas.com
Phone# (905)817-5769

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BUREAU
VERITAS

BV Labs Job #: C107431
Report Date: 2021/09/14

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

RESULTS OF ANALYSES OF FILTER

BV Labs ID		QMZ394	QMZ395	QMZ396	QMZ397	QMZ399	QMZ400	QMZ402		
Sampling Date		2021/08/13	2021/08/15	2021/08/17	2021/08/19	2021/08/23	2021/08/25	2021/08/13		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071466	21071467	21071434	21071435	21071444	21070982	21071469	RDL	QC Batch
Particulate Weight on Filter	mg	36.6	11.8	26.0	36.8	41.8 (1)	54.4 (1)	59.7	5.0	7554427

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) FNF Filter not folded

BV Labs ID		QMZ403	QMZ404	QMZ406	QMZ407	QMZ408	QMZ409	QMZ410		
Sampling Date		2021/08/17	2021/08/19	2021/08/23	2021/08/25	2021/08/13	2021/08/15	2021/08/17		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071437	21071436	21071448	21070980	21071462	21071463	21071439	RDL	QC Batch
Particulate Weight on Filter	mg	41.2	30.4	38.5 (1)	55.5 (1)	33.9	18.1	21.8	5.0	7554427

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) FNF Filter not folded

BV Labs ID		QMZ411	QMZ412	QMZ413	QMZ414	QMZ415	QMZ416	QMZ417		
Sampling Date		2021/08/19	2021/08/21	2021/08/23	2021/08/25	2021/08/13	2021/08/15	2021/08/17		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071438	21071457	21071458	21070977	21071465	21071464	21071440	RDL	QC Batch
Particulate Weight on Filter	mg	23.7	34.1 (1)	32.6 (1)	47.9 (1)	35.1	17.7	22.9	5.0	7554427

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) FNF Filter not folded

BV Labs ID		QMZ418	QMZ419	QMZ420	QMZ421	QMZ422	QMZ423	QMZ424		
Sampling Date		2021/08/19	2021/08/21	2021/08/23	2021/08/25	2021/08/13	2021/08/15	2021/08/17		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071441	21070973	21070971	21070979	21071460	21071461	21071443	RDL	QC Batch
Particulate Weight on Filter	mg	62.6	27.1 (1)	35.8 (1)	38.7 (2)	37.1	13.5	22.5	5.0	7554427

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) FNF Filter not folded
(2) FNF Filter not folded
FT Filter torn



BUREAU
VERITAS

BV Labs Job #: C107431
Report Date: 2021/09/14

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

RESULTS OF ANALYSES OF FILTER

BV Labs ID		QMZ425	QMZ426	QMZ427	QMZ428	QMZ595	QND994	QND995		
Sampling Date		2021/08/19	2021/08/21	2021/08/23	2021/08/25		2021/08/23	2021/08/23		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071442	21070975	21070974	21070983	21071468	21071445	21071449	RDL	QC Batch
Particulate Weight on Filter	mg	25.4	34.0 (1)	33.7 (1)	48.7 (1)	23.0	30.7 (1)	36.7 (1)	5.0	7554427

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

(1) FNF Filter not folded



BUREAU
VERITAS

BV Labs Job #: C107431
Report Date: 2021/09/14

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

ELEMENTS BY ICP-AES (FILTER)

BV Labs ID		QMZ394	QMZ395	QMZ396	QMZ397	QMZ399	QMZ400	QMZ402		
Sampling Date		2021/08/13	2021/08/15	2021/08/17	2021/08/19	2021/08/23	2021/08/25	2021/08/13		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071466	21071467	21071434	21071435	21071444	21070982	21071469	RDL	QC Batch
Lead (Pb)	ug	4.9	3.7	4.1	ND	ND	15.8	4.6	3.0	7566495

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

BV Labs ID		QMZ403	QMZ404	QMZ406	QMZ407	QMZ408	QMZ409	QMZ410		
Sampling Date		2021/08/17	2021/08/19	2021/08/23	2021/08/25	2021/08/13	2021/08/15	2021/08/17		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071437	21071436	21071448	21070980	21071462	21071463	21071439	RDL	QC Batch
Lead (Pb)	ug	ND	ND	ND	11.9	5.4	ND	ND	3.0	7566495

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

BV Labs ID		QMZ411	QMZ412	QMZ413	QMZ414	QMZ415	QMZ416		
Sampling Date		2021/08/19	2021/08/21	2021/08/23	2021/08/25	2021/08/13	2021/08/15		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071438	21071457	21071458	21070977	21071465	21071464	RDL	QC Batch
Lead (Pb)	ug	ND	ND	3.8	14.2	5.6	ND	3.0	7566495

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

BV Labs ID		QMZ417	QMZ418	QMZ419	QMZ420	QMZ421	QMZ422	QMZ423		
Sampling Date		2021/08/17	2021/08/19	2021/08/21	2021/08/23	2021/08/25	2021/08/13	2021/08/15		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071440	21071441	21070973	21070971	21070979	21071460	21071461	RDL	QC Batch
Lead (Pb)	ug	ND	3.3	3.0	ND	10.7	4.8	ND	3.0	7566498

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

BV Labs ID		QMZ424	QMZ425	QMZ426	QMZ427	QMZ428	QMZ595	QND994		
Sampling Date		2021/08/17	2021/08/19	2021/08/21	2021/08/23	2021/08/25		2021/08/23		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21071443	21071442	21070975	21070974	21070983	21071468	21071445	RDL	QC Batch
Lead (Pb)	ug	4.1	ND	6.0	ND	8.6	3.2	5.6	3.0	7566498

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected



BUREAU
VERITAS

BV Labs Job #: C107431
Report Date: 2021/09/14

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

ELEMENTS BY ICP-AES (FILTER)

BV Labs ID		QND995		
Sampling Date		2021/08/23		
COC Number		n/a		
	UNITS	21071449	RDL	QC Batch
Lead (Pb)	ug	4.2	3.0	7566498
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				



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VERITAS

BV Labs Job #: C107431
Report Date: 2021/09/14

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QMZ394
Sample ID: 21071466
Matrix: Filter

Collected: 2021/08/13
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ395
Sample ID: 21071467
Matrix: Filter

Collected: 2021/08/15
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ395 Dup
Sample ID: 21071467
Matrix: Filter

Collected: 2021/08/15
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel

BV Labs ID: QMZ396
Sample ID: 21071434
Matrix: Filter

Collected: 2021/08/17
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ397
Sample ID: 21071435
Matrix: Filter

Collected: 2021/08/19
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ399
Sample ID: 21071444
Matrix: Filter

Collected: 2021/08/23
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI



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VERITAS

BV Labs Job #: C107431
Report Date: 2021/09/14

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QMZ400
Sample ID: 21070982
Matrix: Filter

Collected: 2021/08/25
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ402
Sample ID: 21071469
Matrix: Filter

Collected: 2021/08/13
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ403
Sample ID: 21071437
Matrix: Filter

Collected: 2021/08/17
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ404
Sample ID: 21071436
Matrix: Filter

Collected: 2021/08/19
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ406
Sample ID: 21071448
Matrix: Filter

Collected: 2021/08/23
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ407
Sample ID: 21070980
Matrix: Filter

Collected: 2021/08/25
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI



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VERITAS

BV Labs Job #: C107431
Report Date: 2021/09/14

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QMZ408
Sample ID: 21071462
Matrix: Filter

Collected: 2021/08/13
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ409
Sample ID: 21071463
Matrix: Filter

Collected: 2021/08/15
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ410
Sample ID: 21071439
Matrix: Filter

Collected: 2021/08/17
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ411
Sample ID: 21071438
Matrix: Filter

Collected: 2021/08/19
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ412
Sample ID: 21071457
Matrix: Filter

Collected: 2021/08/21
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ413
Sample ID: 21071458
Matrix: Filter

Collected: 2021/08/23
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI



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VERITAS

BV Labs Job #: C107431
Report Date: 2021/09/14

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QMZ414
Sample ID: 21070977
Matrix: Filter

Collected: 2021/08/25
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ415
Sample ID: 21071465
Matrix: Filter

Collected: 2021/08/13
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ416
Sample ID: 21071464
Matrix: Filter

Collected: 2021/08/15
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566495	2021/09/09	2021/09/13	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ417
Sample ID: 21071440
Matrix: Filter

Collected: 2021/08/17
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ418
Sample ID: 21071441
Matrix: Filter

Collected: 2021/08/19
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ418 Dup
Sample ID: 21071441
Matrix: Filter

Collected: 2021/08/19
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John



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VERITAS

BV Labs Job #: C107431
Report Date: 2021/09/14

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QMZ419
Sample ID: 21070973
Matrix: Filter

Collected: 2021/08/21
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ420
Sample ID: 21070971
Matrix: Filter

Collected: 2021/08/23
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ421
Sample ID: 21070979
Matrix: Filter

Collected: 2021/08/25
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ422
Sample ID: 21071460
Matrix: Filter

Collected: 2021/08/13
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ423
Sample ID: 21071461
Matrix: Filter

Collected: 2021/08/15
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ424
Sample ID: 21071443
Matrix: Filter

Collected: 2021/08/17
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI



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VERITAS

BV Labs Job #: C107431
Report Date: 2021/09/14

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QMZ425
Sample ID: 21071442
Matrix: Filter

Collected: 2021/08/19
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ426
Sample ID: 21070975
Matrix: Filter

Collected: 2021/08/21
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ427
Sample ID: 21070974
Matrix: Filter

Collected: 2021/08/23
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ428
Sample ID: 21070983
Matrix: Filter

Collected: 2021/08/25
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QMZ595
Sample ID: 21071468
Matrix: Filter

Collected:
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI

BV Labs ID: QND994
Sample ID: 21071445
Matrix: Filter

Collected: 2021/08/23
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI



BUREAU
VERITAS

BV Labs Job #: C107431
Report Date: 2021/09/14

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QND995
Sample ID: 21071449
Matrix: Filter

Collected: 2021/08/23
Shipped:
Received: 2021/08/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7566498	2021/09/09	2021/09/09	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7554427	2021/09/01	2021/09/01	Theodora LI



**BUREAU
VERITAS**

BV Labs Job #: C107431
Report Date: 2021/09/14

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

GENERAL COMMENTS

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: C107431
Report Date: 2021/09/14

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
7566495	APT	Matrix Spike(QMZ395)	Lead (Pb)	2021/09/13		81	%	75 - 125
7566495	APT	MS/MSD RPD	Lead (Pb)	2021/09/13	9.7		%	20
7566495	APT	Spiked Blank	Lead (Pb)	2021/09/13		97	%	85 - 115
7566495	APT	RPD	Lead (Pb)	2021/09/13	3.3		%	20
7566495	APT	Method Blank	Lead (Pb)	2021/09/13	ND, RDL=3.0		ug	
7566495	APT	RPD - Sample/Sample Dup	Lead (Pb)	2021/09/13	6.2		%	20
7566498	JOH	Matrix Spike(QMZ418)	Lead (Pb)	2021/09/09		88	%	75 - 125
7566498	JOH	MS/MSD RPD	Lead (Pb)	2021/09/09	3.2		%	20
7566498	JOH	Spiked Blank	Lead (Pb)	2021/09/09		99	%	85 - 115
7566498	JOH	RPD	Lead (Pb)	2021/09/09	0.30		%	20
7566498	JOH	Method Blank	Lead (Pb)	2021/09/09	ND, RDL=3.0		ug	
7566498	JOH	RPD - Sample/Sample Dup	Lead (Pb)	2021/09/09	13		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.



BUREAU
VERITAS

BV Labs Job #: C107431
Report Date: 2021/09/14

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Brenda Moore

Brenda Moore, Team Lead, Inorganic

John Bowman

John Bowman, Supervisor, Metals Group

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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Fax: (905) 817-5777

CHAIN OF CUSTODY FORM - AIR

CAM FCD-01302 /3

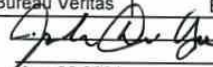
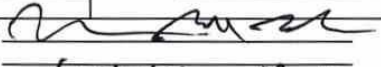
Page ___ of ___

ANALYSIS REQUESTED

CLIENT INFORMATION Company Name: <u>RWDI</u> Project Manager: <u>John DeYoe</u> e-mail: <u>jd@rwdi</u> Address: <u>600 Southgate Drive, Guelph, ON</u> SECTION Phone: <u>519 835 0961</u> Fax: <u>519 823 1316</u> Sampled by: <u>j deyoe</u>				Mass Gain	Lead (Pb)															
				(TSP)																
Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time																
21071466	21071469	21071462	21071465	21071460	1600	40 cfm	13-Aug			x	x									
21071467	21071469	21071463	21071464	21071461	1600	40 cfm	15-Aug			x	x									
21071434	21071437	21071439	21071440	21071443	1600	40 cfm	17-Aug			x	x									
21071435	21071436	21071438	21071441	21071442	1600	40 cfm	19-Aug			x	x									
21071445	21071449	21071457	21070973	21070975	1600	40 cfm	21-Aug			x	x									
21071444	21071448	21071458	21070971	21070974	1600	40 cfm	23-Aug			x	x									
21070982	21070980	21070977	21070979	21070983	1600	40 cfm	25-Aug			x	x									

30-Aug-21 12:15
Clayton Johnson

C107431
 ATM AIR-RmTmp

TAT Requirement STD 10 Business day <input checked="" type="checkbox"/> Rush 5 Business day * <input type="checkbox"/> Rush 2 Business day * <input type="checkbox"/> * need approval from Bureau Veritas	PROJECT INFORMATION Project #: <u>2104007</u> Name: <u>Oshawa Airport</u> PO #: <u>2104007-1000</u> BV Quote #: <u>as per Petro Oh</u> BV Contact: <u>C Johnston</u>	REPORTING REQUIREMENTS Summary Report only <input type="checkbox"/> EDD <input type="checkbox"/> Regulation _____	Notes Please note if these samples are "Industrial Hygiene" samples if submitting dustfall samples, please indicate the diameter of the jar opening in cm. PROJECT SPECIFIC COMMENTS <u>Hi Vol Filter</u>
Client Signature:  Affiliation: _____ Date/Time: <u>Aug 30, 2021</u>	Received by:  Affiliation: _____ Date/Time: <u>Aug 30 12:15</u>		

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Your P.O. #: 2104007-1000
 Your Project #: 2104007
 Site Location: OSHAWA AIRPORT
 Your C.O.C. #: n/a

Attention: John DeYoe

RWDI Air Inc
 600 Southgate Drive
 Guelph, ON
 CANADA N1G 4P6

Report Date: 2021/09/24
 Report #: R6825027
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Q1965

Received: 2021/09/13, 10:16

Sample Matrix: Filter
 # Samples Received: 32

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Total Metals on Hi-Vol Filter (6010Cmod)	32	2021/09/21	2021/09/22	CAM SOP-00408	EPA 6010D m
Particulates on Filter (Method IO-3.1)	32	2021/09/15	2021/09/15	CAM SOP-00942	Method IO-3.1

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.



Your P.O. #: 2104007-1000
Your Project #: 2104007
Site Location: OSHAWA AIRPORT
Your C.O.C. #: n/a

Attention: John DeYoe

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2021/09/24
Report #: R6825027
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Q1965

Received: 2021/09/13, 10:16

Encryption Key

Clayton Johnson
CET LEAD-Air Toxics, Source
Evaluation
24 Sep 2021 15:17:47

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, CET LEAD-Air Toxics, Source Evaluation
Email: Clayton.Johnson@bureauveritas.com
Phone# (905)817-5769

=====
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BV Labs Job #: C1Q1965
Report Date: 2021/09/24

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

RESULTS OF ANALYSES OF FILTER

BV Labs ID		QPZ868	QPZ869	QPZ870	QPZ871	QPZ872	QPZ873	QPZ875		
Sampling Date		2021/08/27	2021/08/29	2021/08/31	2021/09/02	2021/09/04	2021/09/06	2021/08/29		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21070988	21070987	21073019	21073018	21070972	21070986	21070985	RDL	QC Batch
Particulate Weight on Filter	mg	32.3	28.5	26.4	ND (1)	20.0	13.6	43.8	5.0	7578468

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) FNF Filter not folded

BV Labs ID		QPZ876	QPZ877	QPZ878	QPZ879	QPZ880	QPZ881	QPZ882		
Sampling Date		2021/08/31	2021/09/02	2021/09/04	2021/09/06	2021/08/27	2021/08/29	2021/08/31		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21073020	21073021	9904634	9904633	21070976	21070989	21073024	RDL	QC Batch
Particulate Weight on Filter	mg	23.8	26.2	23.7	16.5	35.1	35.6	19.2	5.0	7578468

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs ID		QPZ883	QPZ884	QPZ885	QPZ886	QPZ887	QPZ888	QPZ889		
Sampling Date		2021/09/02	2021/09/04	2021/09/06		2021/08/27	2021/08/29	2021/08/31		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21073022	9904631	9904632	21071446	21070978	21071459	21073026	RDL	QC Batch
Particulate Weight on Filter	mg	19.8	38.0	16.1	ND	26.6	33.2	22.5	5.0	7578468

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

BV Labs ID		QPZ890	QPZ891	QPZ892	QPZ893	QPZ894	QPZ895	QPZ896		
Sampling Date		2021/09/02	2021/09/04	2021/09/06		2021/08/27	2021/08/29	2021/08/31		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21073025	9904629	9904630	21071447	21070984	21070990	21073023	RDL	QC Batch
Particulate Weight on Filter	mg	27.0	15.3	13.8	ND	40.8	36.8	23.3	5.0	7578468

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

BV Labs ID		QPZ897	QQA118	QQA119	QQA121		
Sampling Date		2021/09/02					
COC Number		n/a	n/a	n/a	n/a		
	UNITS	21073027	21073029	21073028	2107098	RDL	QC Batch
Particulate Weight on Filter	mg	22.2	14.6	20.9	49.9	5.0	7578468
RDL = Reportable Detection Limit QC Batch = Quality Control Batch							



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BV Labs Job #: C1Q1965
Report Date: 2021/09/24

RWDI Air Inc
Client Project #: 2104007
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Your P.O. #: 2104007-1000
Sampler Initials: JD

ELEMENTS BY ICP-AES (FILTER)

BV Labs ID		QPZ868	QPZ869	QPZ870	QPZ871	QPZ872	QPZ873	QPZ875		
Sampling Date		2021/08/27	2021/08/29	2021/08/31	2021/09/02	2021/09/04	2021/09/06	2021/08/29		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21070988	21070987	21073019	21073018	21070972	21070986	21070985	RDL	QC Batch
Lead (Pb)	ug	ND	4.4	ND	ND	4.6	ND	4.7	3.0	7589488

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

BV Labs ID		QPZ876	QPZ877	QPZ878	QPZ879	QPZ880	QPZ881	QPZ882		
Sampling Date		2021/08/31	2021/09/02	2021/09/04	2021/09/06	2021/08/27	2021/08/29	2021/08/31		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21073020	21073021	9904634	9904633	21070976	21070989	21073024	RDL	QC Batch
Lead (Pb)	ug	ND	ND	5.0	ND	ND	4.1	5.5	3.0	7589488

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

BV Labs ID		QPZ883	QPZ884	QPZ885	QPZ886	QPZ887	QPZ888		
Sampling Date		2021/09/02	2021/09/04	2021/09/06		2021/08/27	2021/08/29		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21073022	9904631	9904632	21071446	21070978	21071459	RDL	QC Batch
Lead (Pb)	ug	ND	3.4	ND	ND	ND	4.1	3.0	7589488

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

BV Labs ID		QPZ889	QPZ890	QPZ891	QPZ892	QPZ893	QPZ894	QPZ895		
Sampling Date		2021/08/31	2021/09/02	2021/09/04	2021/09/06		2021/08/27	2021/08/29		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	UNITS	21073026	21073025	9904629	9904630	21071447	21070984	21070990	RDL	QC Batch
Lead (Pb)	ug	ND	ND	ND	4.5	ND	ND	6.3	3.0	7589493

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

BV Labs ID		QPZ896	QPZ897	QQA118	QQA119	QQA121		
Sampling Date		2021/08/31	2021/09/02					
COC Number		n/a	n/a	n/a	n/a	n/a		
	UNITS	21073023	21073027	21073029	21073028	2107098	RDL	QC Batch
Lead (Pb)	ug	ND	ND	ND	5.6	ND	3.0	7589493

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.



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BV Labs Job #: C1Q1965
Report Date: 2021/09/24

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QPZ868
Sample ID: 21070988
Matrix: Filter

Collected: 2021/08/27
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ869
Sample ID: 21070987
Matrix: Filter

Collected: 2021/08/29
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ869 Dup
Sample ID: 21070987
Matrix: Filter

Collected: 2021/08/29
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John

BV Labs ID: QPZ870
Sample ID: 21073019
Matrix: Filter

Collected: 2021/08/31
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ871
Sample ID: 21073018
Matrix: Filter

Collected: 2021/09/02
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ872
Sample ID: 21070972
Matrix: Filter

Collected: 2021/09/04
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI



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BV Labs Job #: C1Q1965
Report Date: 2021/09/24

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
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Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QPZ873
Sample ID: 21070986
Matrix: Filter

Collected: 2021/09/06
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ875
Sample ID: 21070985
Matrix: Filter

Collected: 2021/08/29
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ876
Sample ID: 21073020
Matrix: Filter

Collected: 2021/08/31
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ877
Sample ID: 21073021
Matrix: Filter

Collected: 2021/09/02
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ878
Sample ID: 9904634
Matrix: Filter

Collected: 2021/09/04
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ879
Sample ID: 9904633
Matrix: Filter

Collected: 2021/09/06
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI



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BV Labs Job #: C1Q1965
Report Date: 2021/09/24

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QPZ880
Sample ID: 21070976
Matrix: Filter

Collected: 2021/08/27
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ881
Sample ID: 21070989
Matrix: Filter

Collected: 2021/08/29
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ882
Sample ID: 21073024
Matrix: Filter

Collected: 2021/08/31
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ883
Sample ID: 21073022
Matrix: Filter

Collected: 2021/09/02
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ884
Sample ID: 9904631
Matrix: Filter

Collected: 2021/09/04
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ885
Sample ID: 9904632
Matrix: Filter

Collected: 2021/09/06
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI



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VERITAS

BV Labs Job #: C1Q1965
Report Date: 2021/09/24

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QPZ886
Sample ID: 21071446
Matrix: Filter

Collected:
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ887
Sample ID: 21070978
Matrix: Filter

Collected: 2021/08/27
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ888
Sample ID: 21071459
Matrix: Filter

Collected: 2021/08/29
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589488	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ889
Sample ID: 21073026
Matrix: Filter

Collected: 2021/08/31
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589493	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ890
Sample ID: 21073025
Matrix: Filter

Collected: 2021/09/02
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589493	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ890 Dup
Sample ID: 21073025
Matrix: Filter

Collected: 2021/09/02
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589493	2021/09/21	2021/09/22	Jolly John



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BV Labs Job #: C1Q1965
Report Date: 2021/09/24

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QPZ891
Sample ID: 9904629
Matrix: Filter

Collected: 2021/09/04
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589493	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ892
Sample ID: 9904630
Matrix: Filter

Collected: 2021/09/06
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589493	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ893
Sample ID: 21071447
Matrix: Filter

Collected:
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589493	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ894
Sample ID: 21070984
Matrix: Filter

Collected: 2021/08/27
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589493	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ895
Sample ID: 21070990
Matrix: Filter

Collected: 2021/08/29
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589493	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QPZ896
Sample ID: 21073023
Matrix: Filter

Collected: 2021/08/31
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589493	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI



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BV Labs Job #: C1Q1965
Report Date: 2021/09/24

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

TEST SUMMARY

BV Labs ID: QPZ897
Sample ID: 21073027
Matrix: Filter

Collected: 2021/09/02
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589493	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QQA118
Sample ID: 21073029
Matrix: Filter

Collected:
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589493	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QQA119
Sample ID: 21073028
Matrix: Filter

Collected:
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589493	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI

BV Labs ID: QQA121
Sample ID: 2107098
Matrix: Filter

Collected:
Shipped:
Received: 2021/09/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7589493	2021/09/21	2021/09/22	Jolly John
Particulates on Filter (Method IO-3.1)	BAL	7578468	2021/09/15	2021/09/15	Theodora LI



**BUREAU
VERITAS**

BV Labs Job #: C1Q1965
Report Date: 2021/09/24

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

GENERAL COMMENTS

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: C1Q1965
Report Date: 2021/09/24

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
7589488	JOH	Matrix Spike(QPZ869)	Lead (Pb)	2021/09/22		99	%	75 - 125
7589488	JOH	MS/MSD RPD	Lead (Pb)	2021/09/22	0.51		%	20
7589488	JOH	Spiked Blank	Lead (Pb)	2021/09/22		100	%	85 - 115
7589488	JOH	RPD	Lead (Pb)	2021/09/22	0.50		%	20
7589488	JOH	Method Blank	Lead (Pb)	2021/09/22	ND, RDL=3.0		ug	
7589488	JOH	RPD - Sample/Sample Dup	Lead (Pb)	2021/09/22	10		%	20
7589493	JOH	Matrix Spike(QPZ890)	Lead (Pb)	2021/09/22		107	%	75 - 125
7589493	JOH	MS/MSD RPD	Lead (Pb)	2021/09/22	0.094		%	20
7589493	JOH	Spiked Blank	Lead (Pb)	2021/09/22		104	%	85 - 115
7589493	JOH	RPD	Lead (Pb)	2021/09/22	0.19		%	20
7589493	JOH	Method Blank	Lead (Pb)	2021/09/22	ND, RDL=3.0		ug	
7589493	JOH	RPD - Sample/Sample Dup	Lead (Pb)	2021/09/22	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU
VERITAS

BV Labs Job #: C1Q1965
Report Date: 2021/09/24

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000
Sampler Initials: JD

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Brenda Moore

Brenda Moore, Team Lead, Inorganic

John Bowman


John Bowman, Supervisor, Metals Group

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JOB #

CLIENT NAME: *RWD1*

Maxxam Analytics
CAM FCD-01053/2
Page 1 of 1

Internal Sample Receipt Form											
Sample Identification		Date Sampled	Time Sampled	Matrix	# of Bottles	Comments					
1	<i>21073028</i>										
2	<i>21073028</i>										
3	<i>2107038</i>										
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
Received by (Signature & Print):		Date	Time	Cooler ID	Temperature	Custody seal Present		Custody Seal Intact		Ice Present	
						YES	NO	YES	NO	YES	NO
		<i>20/05/18</i>	<i>10:16</i>		<i>-</i>						

AIR



6740 Campobello Rd
Mississauga Ontario, L5N 2L8
www.bvlabs.com

Toll Free: 1-800-668-0639
Phone: (905) 817-5700
Fax: (905) 817-5777

CHAIN OF CUSTODY FORM - AIR

CAM FCD-01302 /3

Page ___ of ___

ANALYSIS REQUESTED

CLIENT INFORMATION

Company Name: RWDI
Project Manager: John DeYoe
e-mail: jd@rwdi
Address: 600 Southgate Drive, Guelph, ON
Phone: 519 835 0961 Fax: 519 823 1316
Sampled by: j deyoe

SECTION

Mass Gain Lead (Pb)

(TSP)

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time														
21070988	21070998	21070976	21070978	21070984	1600	40 cfm	27-Aug			x	x							
21070987	21070985	21070989	21071459	21070990	1600	40 cfm	29-Aug			x	x							
21073019	21073020	21073024	21073026	21073023	1600	40 cfm	31-Aug			x	x							
21073018	21073021	21073022	21073025	21073027	1600	40 cfm	2-Sep			x	x							
21070972	9904634	9904631	9904629	21070928	1600	40 cfm	4-Sep			x	x							
21070986	9904633	9904632	9904630	21070929	1600	40 cfm	6-Sep			x	x							
	21071446	21071447								x	x							

13-Sep-21 10:16
Clayton Johnson
 C1Q1965
ATM ATD PmTmn

TAT Requirement STD 10 Business day <input checked="" type="checkbox"/> Rush 5 Business day * <input type="checkbox"/> Rush 2 Business day * <input type="checkbox"/> * need approval from Bureau Veritas	PROJECT INFORMATION Project #: <u>2104007</u> Name: <u>Oshawa Airport</u> PO #: <u>2104007-1000</u> BV Quote #: <u>as per Petro Oh</u> BV Contact: <u>C Johnston</u>	REPORTING REQUIREMENTS Summary Report only <input type="checkbox"/> EDD <input type="checkbox"/> Regulation: _____	Notes Please note if these samples are "Industrial Hygiene" samples If submitting dustfall samples, please indicate the diameter of the jar opening in cm. PROJECT SPECIFIC COMMENTS <u>Hi Vol Filter</u>
Client Signature: _____ Affiliation: _____ Date/Time: <u>Sept 13, 2021</u>	Received by: Affiliation: _____ Date/Time: <u>20210913 10:16</u> <u>Oshawa</u>		

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Your P.O. #: 2104007-1000
 Your Project #: 2104007
 Site Location: OSHAWA AIRPORT
 Your C.O.C. #: N/A

Attention: John DeYoe

RWDI Air Inc
 600 Southgate Drive
 Guelph, ON
 CANADA N1G 4P6

Report Date: 2021/09/29
 Report #: R6832344
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Q8760

Received: 2021/09/17, 11:12

Sample Matrix: Filter
 # Samples Received: 12

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Total Metals on Hi-Vol Filter (6010Cmod)	12	2021/09/28	2021/09/28	CAM SOP-00408	EPA 6010D m
Particulates on Filter (Method IO-3.1)	12	2021/09/21	2021/09/21	CAM SOP-00942	Method IO-3.1

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.



Your P.O. #: 2104007-1000
Your Project #: 2104007
Site Location: OSHAWA AIRPORT
Your C.O.C. #: N/A

Attention: John DeYoe

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2021/09/29
Report #: R6832344
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Q8760

Received: 2021/09/17, 11:12

Encryption Key



**AUTHORIZED REPORT
RAPPORT AUTORISÉ**

Bureau Veritas
29 Sep 2021 12:39:16

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, CET LEAD-Air Toxics, Source Evaluation
Email: Clayton.Johnson@bureauveritas.com
Phone# (905)817-5769

=====
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BUREAU
VERITAS

BV Labs Job #: C1Q8760
Report Date: 2021/09/29

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000

RESULTS OF ANALYSES OF FILTER

BV Labs ID		QRK085	QRK086	QRK087	QRK088	QRK089	QRK090	QRK091		
Sampling Date		2021/09/08	2021/09/10	2021/09/08	2021/09/10	2021/09/08	2021/09/10			
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	21073088	21073089	21073090	21073091	21073092	21073093	21073094	RDL	QC Batch
Particulate Weight on Filter	mg	25.2	21.8	60.1	49.4	25.6	17.2	ND	5.0	7591040

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

BV Labs ID		QRK092	QRK093	QRK094	QRK095	QRK096		
Sampling Date		2021/09/08	2021/09/10		2021/09/08	2021/09/10		
COC Number		N/A	N/A	N/A	N/A	N/A		
	UNITS	21073098	21073097	21081300	21073096	21073095	RDL	QC Batch
Particulate Weight on Filter	mg	23.5	32.2	ND	26.3	18.0	5.0	7591040

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.



BUREAU
VERITAS

BV Labs Job #: C1Q8760
Report Date: 2021/09/29

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000

ELEMENTS BY ICP-AES (FILTER)

BV Labs ID		QRK085	QRK086	QRK087	QRK088	QRK089	QRK090	QRK091		
Sampling Date		2021/09/08	2021/09/10	2021/09/08	2021/09/10	2021/09/08	2021/09/10			
COC Number		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	UNITS	21073088	21073089	21073090	21073091	21073092	21073093	21073094	RDL	QC Batch
Lead (Pb)	ug	ND	ND	ND	ND	17.7	8.0	ND	3.0	7604271

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

BV Labs ID		QRK092	QRK093	QRK094	QRK095	QRK096		
Sampling Date		2021/09/08	2021/09/10		2021/09/08	2021/09/10		
COC Number		N/A	N/A	N/A	N/A	N/A		
	UNITS	21073098	21073097	21081300	21073096	21073095	RDL	QC Batch
Lead (Pb)	ug	3.0	3.4	ND	ND	ND	3.0	7604271

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.



BUREAU
VERITAS

BV Labs Job #: C1Q8760
Report Date: 2021/09/29

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000

TEST SUMMARY

BV Labs ID: QRK085
Sample ID: 21073088
Matrix: Filter

Collected: 2021/09/08
Shipped:
Received: 2021/09/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7604271	2021/09/28	2021/09/28	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7591040	2021/09/21	2021/09/21	Theodora LI

BV Labs ID: QRK086
Sample ID: 21073089
Matrix: Filter

Collected: 2021/09/10
Shipped:
Received: 2021/09/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7604271	2021/09/28	2021/09/28	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7591040	2021/09/21	2021/09/21	Theodora LI

BV Labs ID: QRK086 Dup
Sample ID: 21073089
Matrix: Filter

Collected: 2021/09/10
Shipped:
Received: 2021/09/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7604271	2021/09/28	2021/09/28	Archana Patel

BV Labs ID: QRK087
Sample ID: 21073090
Matrix: Filter

Collected: 2021/09/08
Shipped:
Received: 2021/09/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7604271	2021/09/28	2021/09/28	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7591040	2021/09/21	2021/09/21	Theodora LI

BV Labs ID: QRK088
Sample ID: 21073091
Matrix: Filter

Collected: 2021/09/10
Shipped:
Received: 2021/09/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7604271	2021/09/28	2021/09/28	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7591040	2021/09/21	2021/09/21	Theodora LI

BV Labs ID: QRK089
Sample ID: 21073092
Matrix: Filter

Collected: 2021/09/08
Shipped:
Received: 2021/09/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7604271	2021/09/28	2021/09/28	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7591040	2021/09/21	2021/09/21	Theodora LI



BUREAU
VERITAS

BV Labs Job #: C1Q8760
Report Date: 2021/09/29

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000

TEST SUMMARY

BV Labs ID: QRK090
Sample ID: 21073093
Matrix: Filter

Collected: 2021/09/10
Shipped:
Received: 2021/09/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7604271	2021/09/28	2021/09/28	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7591040	2021/09/21	2021/09/21	Theodora LI

BV Labs ID: QRK091
Sample ID: 21073094
Matrix: Filter

Collected:
Shipped:
Received: 2021/09/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7604271	2021/09/28	2021/09/28	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7591040	2021/09/21	2021/09/21	Theodora LI

BV Labs ID: QRK092
Sample ID: 21073098
Matrix: Filter

Collected: 2021/09/08
Shipped:
Received: 2021/09/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7604271	2021/09/28	2021/09/28	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7591040	2021/09/21	2021/09/21	Theodora LI

BV Labs ID: QRK093
Sample ID: 21073097
Matrix: Filter

Collected: 2021/09/10
Shipped:
Received: 2021/09/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7604271	2021/09/28	2021/09/28	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7591040	2021/09/21	2021/09/21	Theodora LI

BV Labs ID: QRK094
Sample ID: 21081300
Matrix: Filter

Collected:
Shipped:
Received: 2021/09/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7604271	2021/09/28	2021/09/28	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7591040	2021/09/21	2021/09/21	Theodora LI

BV Labs ID: QRK095
Sample ID: 21073096
Matrix: Filter

Collected: 2021/09/08
Shipped:
Received: 2021/09/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7604271	2021/09/28	2021/09/28	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7591040	2021/09/21	2021/09/21	Theodora LI



BUREAU
VERITAS

BV Labs Job #: C1Q8760
Report Date: 2021/09/29

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000

TEST SUMMARY

BV Labs ID: QRK096
Sample ID: 21073095
Matrix: Filter

Collected: 2021/09/10
Shipped:
Received: 2021/09/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	7604271	2021/09/28	2021/09/28	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	7591040	2021/09/21	2021/09/21	Theodora LI



BUREAU
VERITAS

BV Labs Job #: C1Q8760
Report Date: 2021/09/29

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000

GENERAL COMMENTS

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: C1Q8760
Report Date: 2021/09/29

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
7604271	APT	Matrix Spike(QRK086)	Lead (Pb)	2021/09/28		87	%	75 - 125
7604271	APT	MS/MSD RPD	Lead (Pb)	2021/09/28	6.4		%	20
7604271	APT	Spiked Blank	Lead (Pb)	2021/09/28		98	%	85 - 115
7604271	APT	RPD	Lead (Pb)	2021/09/28	0		%	20
7604271	APT	Method Blank	Lead (Pb)	2021/09/28	ND, RDL=3.0		ug	
7604271	APT	RPD - Sample/Sample Dup	Lead (Pb)	2021/09/28	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU
VERITAS

BV Labs Job #: C1Q8760
Report Date: 2021/09/29

RWDI Air Inc
Client Project #: 2104007
Site Location: OSHAWA AIRPORT
Your P.O. #: 2104007-1000

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Brenda Moore

Brenda Moore, Team Lead, Inorganic

John Bowman

John Bowman, Supervisor, Metals Group

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Fax: (905) 817-5777

CHAIN OF CUSTODY FORM - AIR

CAM FCD-01302 /3

Page ____ of ____

CLIENT INFORMATION							ANALYSIS REQUESTED																			
Company Name: <u>RWDI</u> Project Manager: <u>John DeYoe</u> e-mail: <u>jd@rwdi</u> Address: <u>600 Southgate Drive, Guelph, ON</u> Phone: <u>519 835 0961</u> Fax: <u>519 823 1316</u> Sampled by: <u>j deyoe</u>							Mass Gain	Lead (Pb)	(TSP)																	
Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time																						
21073088 21073090 21073092 21073098 21073096	1600	40 cfm	8-Sep		x	x																				
21073089 21073091 21073093 21073097 21073095	1600	40 cfm	10-Sep		x	x																				
21073094 21081300					x	x																				

TAT Requirement STD 10 Business day <input checked="" type="checkbox"/> Rush 5 Business day * <input type="checkbox"/> Rush 2 Business day * <input type="checkbox"/> <small>* need approval from Bureau Veritas</small>	PROJECT INFORMATION Project #: <u>2104007</u> Name: <u>Oshawa Airport</u> PO #: <u>2104007-1000</u> BV Quote #: <u>as per Petro Oh</u> BV Contact: <u>C Johnston</u>	REPORTING REQUIREMENTS Summary Report only <input type="checkbox"/> EDD <input type="checkbox"/> Regulation _____	Notes <i>Please note if these samples are "Industrial Hygiene" samples If submitting dustfall samples, please indicate the diameter of the jar opening in cm.</i> PROJECT SPECIFIC COMMENTS <u>Hi Vol Filter</u>
Client Signature: _____	Received by: <u>[Signature]</u>		
Affiliation: _____	Affiliation: _____		
Date/Time: <u>Sept 13, 2021</u>	Date/Time: <u>17 Sep 2021 11:12</u>		

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17-Sep-21 11:12
Clayton Johnson

C1Q8760
 VTLH AID B...