

To: Development Services Committee

From: Warren Munro, HBA, RPP, Commissioner,  
Development Services Department

Report Number: DS-19-128

Date of Report: June 19, 2019

Date of Meeting: June 24, 2019

Subject: Oshawa Executive Airport Air Quality and Noise Study

File: F-2510

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## **1.0 Purpose**

The purpose of this report is to respond to the following direction related to the updated Business Plan for the Oshawa Executive Airport:

“That the consultant’s proposals for the updated Air Quality Assessment Study and Noise Study be presented to Council for review.”

Two consultants proposals for the updated Air Quality Assessment and Noise Study have been submitted: one by RWDI and the other by GTA Environmental. The Commissioner of Development Services intends to select RWDI as the preferred consultant based on its proposal including experience.

Attachment 1 shows the location of the proposed air quality monitoring units and noise monitoring units.

Attachment 2 is a copy of a proposal to undertake an Environmental Air Quality and Noise Survey at the Oshawa Executive Airport dated June 6, 2019 submitted by RWDI.

Attachment 3 is a copy of a proposal to undertake an Air Quality and Noise Monitoring Study at the Oshawa Executive Airport dated June 3, 2019 submitted by GTA Environmental.

## **2.0 Recommendation**

That the Development Services Committee recommend to City Council:

That Report DS-19-128 dated June 19, 2019 concerning proposals for an Air Quality Assessment and Noise Study at the Oshawa Executive Airport be received for information.

### **3.0 Executive Summary**

Not applicable.

### **4.0 Input From Other Sources**

The following have been consulted in the preparation of this Report:

- Airport Manager
- Manager, Purchasing Services

### **5.0 Analysis**

The current Oshawa Executive Airport Business Plan covers the period from 2015 to 2019.

The Business Plan includes an air quality assessment based on the maximum projected annual aircraft movements of 102,345. This number of aircraft movements is based on the assumption that the Buttonville Airport would close. The Buttonville airport has not closed and it is unclear how long it will remain in operation. The 2018 annual aircraft movements at the Oshawa Executive Airport were 78,363.

The Business Plan also includes a Noise Exposure Forecast, which identifies a range of noise impacts around the airport. Both the air quality assessment and the Noise Exposure Forecast were an academic exercise based on industry-accepted forecast modeling tools and did not include air quality or noise monitoring based upon actual aircraft movements.

In December 2017, Council directed that as part of the update to the 2015-2019 Oshawa Executive Airport Business Plan an updated air quality assessment study be undertaken and that the airport's noise and traffic management plan be reviewed.

On May 21, 2019, Council directed that the consultants' proposals for the updated Air Quality Assessment Study and Noise Study be presented to Council for review.

The air quality and noise monitoring would take place immediately beyond the threshold for Runway 30, Runway 12, Runway 05 and Runway 23 (see Attachment 1). The air quality and noise monitoring would take place for a 60 day period commencing on or about July 1, 2019. July and August are two of the busiest aircraft traffic months at the airport.

Two proposals to undertake the air quality assessment and noise study have been received: one from RWDI (see Attachment 2) and the other by GTA Environmental (see Attachment 3). The Commissioner of Development Services intends to select the firm of RWDI to undertake the Study based on its proposal including its extensive experience.

The air quality assessment would measure Total Suspended Particulate (TSP) along with lead and nitrogen dioxide. Each of these would then be compared to the Ministry of Environment Conservation and Parks Ambient Air Quality Criteria. The air quality assessment results would also be modeled to reflect the maximum aircraft movements forecast as part of the update to the Airport Business Plan.

The noise monitoring will gather aircraft traffic related noise data for the duration of the study period. The data will then be compared to aircraft movement data to identify trends in noise relating to volume, duration, movement type and aircraft type. The trends in noise will then be used to assist in the potential development of new noise and traffic management strategies targeted to help reduce the impact of aircraft noise. The data will also be used to assist in the update to the Noise Exposure Forecast.

## **6.0 Financial Implications**

The cost of the RWDI study is \$69,800 plus HST. In addition to the cost of the study the airport needs to provide power at each of the four locations at a cost of approximately \$10,000. The 2019 airport budget includes \$100,000 for work related to the update to the Airport Business Plan.

## **7.0 Relationship to the Oshawa Strategic Plan**

This Report advances the Accountable Leadership and Environmental Responsibility goals of the Oshawa Strategic Plan.



Warren Munro, HBA, RPP, Commissioner,  
Development Services Department

Title: Noise & Air Quality Unit Locations  
Subject: Oshawa Executive Airport Air Quality and Noise Study  
File: F-2510

City of Oshawa  
Development Services Department



# PROPOSAL



## Oshawa Airport Air Quality and Noise Monitoring

OSHAWA, ONTARIO

### AIR QUALITY & NOISE MEASUREMENT PROPOSAL

RWDI #190606JD

June 6, 2019

#### SUBMITTED TO

**Stephen Wilcox, A.A.E.**

Airport Manager

[swilcox.oshawa.ca](mailto:swilcox.oshawa.ca)

#### SUBMITTED BY

**John DeYoe, d.E.T., B.A.**

Senior Consultant / Principal

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# PROPOSAL

Dear Stephen,

In response to your recent enquiries regarding ambient air quality and noise monitoring at the Oshawa Executive Airport site, we are pleased to submit this proposal. RWDI has performed thousands of air quality and noise projects.

Thank you for the opportunity to present this proposal. Should you have any questions or require additional information on any aspect of this proposed work, feel free to give me a call at 1-519-823-1311 x 2258. We look forward to working with you on this project.

Yours very truly,

A handwritten signature in black ink, appearing to read 'John DeYoe', with a stylized flourish at the end.

John DeYoe, B.A.  
Project Director / Principal

JD

# PROPOSAL

## SCOPE OF WORK

Total Aviation and Airport Solutions (TAAS) has contacted RWDI to complete an ambient air quality monitoring and noise program at the Oshawa Airport. TAAS is planning to conduct air quality and noise monitoring at four locations. Three locations will be in the area surrounding the airport or near the ends of runways. One monitoring location will be located on the airport property near the terminal. The monitoring results will be compared to specific requirements relating to air quality as outlined in the Ministry of Environment Conservation and Parks (MECP) Ambient Air Quality Criteria (AAQC). The proposed monitoring would take place from early July to early September for a 2-month period. The monitoring stations will consist of High-Volume Air Samplers (Hi-Vol) for Total Suspended Particulate (TSP) which will also capture the airborne lead portion. The sampling stations will also have passive samplers for nitrogen dioxide. The TSP/lead samples will be taken for a 24-hour duration, once every other day. The passive nitrogen dioxide samples are one month in duration.

### ***Air Quality Parameters***

The parameters examined in the Environmental Assessment (EA) are listed below:

Pollutant	Averaging Period	AAQC ( $\mu\text{g}/\text{m}^3$ )
Total Suspended Particulate (TSP)	24-hour	120
	Annual	60
Lead	24-hour	0.5
	30-day	0.2
Nitrogen dioxide ( $\text{NO}_2$ )	1-hour	400
	24-hour	200

### ***Noise Parameters***

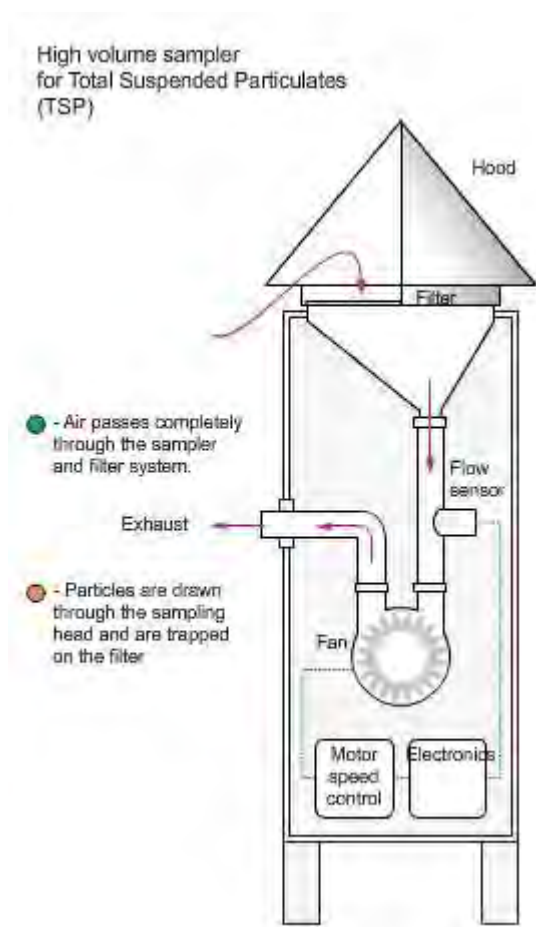
Class 2 Limit	Time of Day	Exclusion Limit (dBA)
One-Hour LEQ	700- 1900	50
	1900-700	45

Assuming Classification as a Class 2 area. Simplified limit. Equivalent Sound Level (LEQ).

# PROPOSAL

## **Particulate Matter/Lead**

We are proposing to use standard Hi- Volume Air Samplers (Hi-Vols) for particulate and lead. We are also proposing to monitor Total Suspended Particulate (TSP) using one of these instruments. The samples will be collected on pre-weighed quartz filters. The filters will be conditioned and weighed after sampling to determine mass gain (TSP concentration) and an aliquot of the filter will be extracted and analyzed using atomic absorption techniques to determine lead concentrations. All sampling and analytical techniques will comply with the Ministry of Environment's Operations Manual for Air Quality Sampling and USEPA Method IO-2.



**Schematic**



**Photograph**

**Hi- Volume Air Sampler**



# PROPOSAL

## ***Gaseous Pollutants***

In addition to the particulate monitoring, we will complete monitoring for Nitrogen dioxide (NO<sub>2</sub>) at the monitoring locations. The monitoring is proposed to be completed with passive air samplers. The samplers will be installed and will take a single one-month long integrated sample. This method is used in several locations in North America and Europe. 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 will be 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.



**Passive Air Samples**

## ***Meteorological Measurements***

Wind speed and direction data will be compiled from the data collected at the airport for interpretation of the air quality sampling results.

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## **Noise Measurements**

Sound level measurements will be recorded with either Bruel & Kjaer or Larson Davis instrument fitted with a Class 1 microphone. The instrument will record one-hour LEQ values for the duration of the project.

*Definition: Equivalent Sound Level (LEQ): An energy-average sound level taken over a specified period of time. It represents the average sound pressure encountered for the period. The time period is often added as a suffix to the label (i.e.,  $L_{eq}(24)$  for the 24-hour equivalent sound level).  $L_{eq}$  is usually A-weighted. An  $L_{eq}$  value expressed in dBA is a good, single value descriptor of the annoyance of noise.*

RWDI will supply more sophisticated sound level meters that will also record sound if there any periods are above the guideline values. This will allow us to determine if elevated levels are related to airport or non-airport activities. If the measurements reveal levels that are above guideline values the audio recordings for those periods will be reviewed.

The records of aircraft movements during the monitoring period will also be gathered. The movements will be compared to levels assumed for the Environmental Assessment to compare measured data with the predictive modelling that RWDI completed previously. The levels will also be compared to NPC-300 guideline values.

## **Measurement Locations**

One air quality and one noise station will be installed near the terminal building by the north apron. The other locations will be on the flight paths near the end of the runways along flight paths. In terms of air quality and noise, the greatest impacts from aircraft is near the end of the runways. If levels impacts are within guideline value at those locations, they will be lower at other points. The locations currently proposed, other than the north apron, are near the threshold of runway 05, near the threshold of runway 12 and near the threshold of runway 30. The noise and air quality stations should be separated by roughly 100 metres so that the noise from the air sampling does not interfere with the noise measurements.

## **Schedule**

RWDI can begin monitoring within two weeks of authorization. RWDI will have equipment on standby so that the sampling can start on the first week of July.

A report will be issued at the conclusion of the monitoring though updated results will be sent on an on-going basis via email. The report will contain summaries of measured data, comparison to Ambient Air Quality Criteria and noise guidelines, graphics showing instrument location and details regarding conditions during the measurement will also be included. The report will contain all measured data in tabular for and will contain analysis of pollutant concentrations with meteorological conditions. The report will also contain a comparison to predicted levels from the EA report.

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## BUDGET

RWDI's fixed fee cost for completing the scope of work as defined \$69,800, which includes professional fees and expenses but is exclusive of applicable taxes.

### Expenses

Hi-Vols (8) @ \$300/month	\$4,800
Passives	\$700
Travel	\$3,200
Laboratory (10% blanks)	\$14,200
Hardware	\$1,200
Sound Level Meters	\$5,600
Total Expenses	\$29,700

### Fees

Startup - site selection	\$3,800
Bench test/ Install	\$8,700
Sampling	\$10,100
Data Management/Analysis/Updates	\$7,700
Reporting	\$9,800
Total Fees	\$40,100

<b>TOTAL COST</b>	<b>\$69,800</b>
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# PROPOSAL

## WORKING WITH RWDI



### THE PEOPLE

RWDI is an environmental and engineering consultancy located in Guelph, Ontario. RWDI enjoys a trusted 45-year reputation for our deep knowledge and sophisticated technology solutions for wind engineering and environmental projects. From offices in Canada, United States of America, England, India and Asia, our consultants meet the world's most complex air quality and noise challenges with experience, knowledge and superior service.

Additional details on company experience and Resumes are provided in the, attachments.

RWDI has completed thousands of air quality assessments. John DeYoe will act as project manager and senior specialist on the project. Other RWDI staff will help as required.

# PROPOSAL

## LETTER OF AGREEMENT

We hereby authorize Rowan Williams Davies & Irwin Inc. (RWDI) to provide the services outlined in this proposal, reference #190606JD, dated June 6, 2019 This Letter of Agreement together with the terms noted in the proposal constitutes the entire agreement. Please initial the options you would like to authorize. No other agreement shall take precedence unless agreed to by both parties in writing.

_____ Name (Please Print)	_____ Company
_____ Title	_____ Date
_____ Signature (I am authorized to bind this corporation)	

*RWDI and the Client agree that this Proposal may be communicated and/or accepted by email or facsimile transmission and that the said communication and/or acceptance shall be legal and binding upon RWDI and the Client. RWDI and the Client further agree that reproductions of signatures by telecommunications will be treated as original signatures.*

# PROPOSAL

RWDI aims to accommodate. If you require this document in a different format in order to aid accessibility, please contact the sender of this document, email [solutions@rwdi.com](mailto:solutions@rwdi.com) or call +1.519.823.1311

# PROPOSAL

## SUPPLIER PROFILE

### CORPORATE BACKGROUND

The RWDI Group of Companies is an international consulting engineering company, specializing in environmental and wind engineering. Founded in 1972, we have a trusted reputation for delivering understandable and useful results to a wide variety of clients, including government agencies, architects/ engineers, and industry. The RWDI Group of Companies employs over 300 professional engineers, scientists, and technologists that are focused on excellence, accountability and responsiveness in all that we do.

RWDI AIR Inc. (RWDI) is part of the RWDI Group of Companies, which enjoys a trusted 46-year reputation for our deep knowledge and sophisticated technology solutions for complex environmental and engineering problems. RWDI is 100 % owned by the RWDI Group of Companies and both companies are private corporations that are headquartered in Guelph, Ontario.

RWDI is one of Canada's largest air quality modelling and measurement consulting firms, with offices and staff in Guelph, Dartmouth, Windsor, Ottawa, Calgary, Victoria, Vancouver, and Thunder Bay. RWDI's proven track record and years of permitting work have built an excellent reputation with clients and regulatory agencies across Canada and around the world. Numerical modelling and ambient monitoring have been core competencies at RWDI for over 25 years.

Our resources include a full suite of state-of-the-science air quality modelling software, specialized ambient and stack testing measurement equipment, our extensive reference library, and of course, our versatile expert staff that are specialized in air quality modelling and monitoring. Company Brochures are included in **Appendix A**.

With our extensive knowledge of meteorology, industrial processes, atmospheric chemistry, and regulatory guidelines, we provide another level of service that few competitors can match. We understand that our clients not only require accurate measurements, but also that the data is interpreted and communicated back to the client in an appropriate manner. Public presentation of results is another client service RWDI provides and ambient monitoring is one of the most credible demonstrations of compliance for open houses, public liaison committees, etc.

RWDI's extensive experience allows us to provide the results our clients' need, from simple permitting and approvals through extensive sampling programs and monitoring networks, public presentations and expert witness testimony. We pride ourselves on our ability to provide you with easy to understand data and advice - ... complicated issues made simple .

# PROPOSAL

## BC HYDRO SITE C RESERVOIR

### 2009 TO PRESENT

RWDI installed and is maintaining a network of four ambient air quality stations and six meteorological stations for BC Hydro's Site C Clean Energy Project. The network has been upgraded and modified to align with changing regulatory requirements. The Site C monitoring network was initially installed to collect baseline data to be used in the environmental effects assessment for the proposed project. RWDI was retained to continue operation/maintenance of the monitoring network, and currently provides this service through our partnership with the Halfway River First Nation.

Currently, the main purpose of this network is to monitor the effects of project construction on air quality as it relates to protecting the health of surrounding communities, including First Nations. As such, the analyzers are maintained and audited to BC Ministry of the Environment standards, and data is shared for use on the BC MOE's near real time air quality data portal, which is accessible to the public. Climate/meteorological data is also being collected for baseline purposes, to compare with data to be collected once the dam is in place, to determine the effects of the reservoir on local microclimate, which is an important consideration for agriculture in the area.

The network currently consists of ten monitoring stations in the Fort St. John and surrounding area. Station data is collected on a continuous basis for the following parameters:

- particulate matter including PM<sub>10</sub> and PM<sub>2.5</sub>;
- gases including NO<sub>x</sub>, SO<sub>2</sub> and CO; and
- climate/meteorological parameters including wind speed, wind direction, air temperature, precipitation, relative humidity, barometric pressure, all solar radiation components, turbulent flux, visibility, soil temperature, soil moisture and soil heat flux.

RWDI utilizes local staff in Fort St. John, and the RWDI Vancouver and Calgary offices and our in-house remote diagnostics/repair system ("Hornet") to efficiently and effectively troubleshoot and administer repairs, to allow for maximum analyzer up time.

The data is collected remotely, reviewed and validated. Both live and validated datasets are available for client viewing on RWDI's Envision data portal. Current data completeness is typically above 90% which is well above the required 75% minimum. The live data is also used with RWDI's Envision alerting system, which is programmed to send a text or email alert to BC Hydro and the construction contractors if particulate or gas levels are approaching allowable ambient objectives. Annual reports are created that summarize all of the readings taken each year and provide a discussion with respect to compliance and annual trends.



# PROPOSAL



Example of Site C meteorological station



Example of Site C gas monitors

**RESOLUTE FOREST PRODUCTS INC. – THUNDER BAY, ON**

# PROPOSAL

2003 TO PRESENT



RWDI was initially retained by Bowater Canadian Forest Products (now Resolute Forest Products Inc.) to manage budget requirements, final siting details and data management options for two ambient air quality monitoring stations to be operated by Bowater in Thunder Bay. Bowater and RWDI entered into a 10-year agreement whereby RWDI would be responsible for the procurement and commissioning of the two new ambient stations, and the routine maintenance and calibration of the instruments within the stations. Furthermore, RWDI is responsible for data acquisition, quality control and quality assurance as they relate to the data handling and any required reporting (e.g., quarterly, annual, etc.).

The following parameters are currently being sampled continuously as part of the monitoring network (not all parameters sampled at both locations):

- total reduced sulphur;
- respirable particulate matter  $PM_{2.5}$ ;
- wind speed/direction;
- ambient temperature;
- incoming solar radiation;
- relative humidity; and
- barometric pressure.

Non-continuous samples for total suspended particulate matter (TSP) are also obtained at both locations.

# PROPOSAL

The equipment is housed in pre-fabricated stations. All monitoring equipment was bench tested in our Guelph office prior to shipment to Thunder Bay for installation. RWDI also participated in the negotiation and acquisition of land required for the ambient stations and made arrangements for site preparations including building pad installation, line power and telephone hook-ups, and site security. Each station was pre-assembled in Guelph to ensure that all equipment was operating correctly. After the installation of the stations on the sites, RWDI staff commissioned the air quality and meteorological equipment and conducted the preliminary calibrations required for the monitoring equipment. RWDI staff conduct weekly station inspections and monthly calibrations at the two sites.

Through the course of completing several large scale ambient monitoring programs, RWDI has developed a system of QA/QC procedures that ensure a high rate of data recovery and ensure the accuracy of the results. Many of these procedures have their basis in the reference sampling and monitoring methodologies stipulated in reference methods from monitoring and reporting programs. The Thunder Bay monitoring program follows the requirements outlined in the MOE's Operations Manual for Air Quality Monitoring in Ontario, dated March 2008. The stations are audited by the MOECC on a quarterly basis. The station uptime is currently running at better than 90%.

One minute, five minute and hourly average readings from both stations are downloaded daily from a host computer located in Thunder Bay. Daily zero/span values from the previous night are reviewed to ensure that the analysers are operating within tolerances. Data is processed monthly. Reports are generated on a quarterly and annual basis and include percentile summaries, data trends, wind and pollution roses (frequency plots), and comparison to applicable ambient air quality objectives and ON risk standards.

# PROPOSAL

## HOLCIM (CANADA) INC. – MISSISSAUGA, ON

### 2014 TO PRESENT



RWDI was retained by Holcim (Canada) Inc. to select ambient monitoring locations, complete siting requirements, complete the commissioning, day-to-day operations, all calibrations, manage ON MOE audits and data management for two ambient air quality monitoring stations. Holcim voluntarily completed the program in order to assist with the collection of current state ambient monitoring data at their cement facility. RWDI also provides advice and participates in meetings with the ON MOE regarding the stations, and reporting and address any technical aspects related to the project.

RWDI was responsible for the procurement and commissioning of the two new ambient stations, routine maintenance, and calibration of the instruments. Furthermore, RWDI is responsible for data acquisition, quality control and quality assurance as they relate to the data handling and also any required reporting (e.g., quarterly, annual, etc.).

The following parameters are currently being sampled continuously and periodically (not all parameters sampled at both locations):

- carbon monoxide;
- oxides of nitrogen (NO/NO<sub>x</sub>/NO<sub>2</sub>);
- sulphur dioxide;
- respirable particulate matter;
- wind speed/direction;
- ambient temperature;
- relative humidity;
- inhalable particulate matter (PM<sub>10</sub>)
- volatile organic compounds;
- ammonia;
- hydrogen chloride;

# PROPOSAL

- dioxins and furans); and
- polycyclic aromatic hydrocarbons.

The equipment is housed in pre-fabricated stations. All monitoring equipment was pre-assembled and bench tested in our Guelph office prior to shipment to Mississauga for installation to ensure that all equipment was operating correctly. After the installation of the stations on the sites, RWDI staff commissioned the air quality and meteorological equipment and conducted the preliminary calibrations required for the monitoring equipment. RWDI staff conduct weekly station inspections and monthly calibrations at the two sites.

Through the course of completing several large scale ambient monitoring programs, RWDI has developed a system of QA/QC procedures that ensure a high rate of data recovery and ensure the accuracy of the results. Many of these procedures have their basis in the reference sampling and monitoring methodologies stipulated in reference methods from monitoring and reporting programs. The monitoring program follows the requirements outlined in the MOE's Operations Manual for Air Quality Monitoring in Ontario. The stations are audited by the MOE on a quarterly basis. The station uptime is currently running at better than 90%.

One minute average and hourly average readings from both stations are downloaded daily from our offices in Guelph. Daily zero/span values from the previous night are reviewed to ensure that the analyzers are operating within tolerances. Data is processed once per month and reports are generated on a quarterly and annual basis and include percentile summaries, data trends, wind and pollution roses (frequency plots), and comparison to applicable ambient air quality objectives and ON risk standards.

## APPENDIX A





# ON SITE MEASUREMENT: AMBIENT AIR QUALITY MONITORING



Executing expertly designed and highly accurate monitoring programs for effective compliance and detailed modeling



We help you understand how complex air quality regulations apply to your operations. With your unique needs in view, we choose a monitoring strategy that is suitable, accurate and efficient. As a trusted partner, we bring the same meticulous care to programs at any scale, whether a one-off measurement program or long-term, multi-site monitoring for large industry. In addition to compliance reporting, our monitoring programs support work in emissions modeling, toxicology and environmental impact assessments.

## Our Service

### Field Sampling, Stations and Networks

We design, build, install, operate and maintain all types of ambient air quality monitoring programs. We provide both the instrumentation and the staff needed to get the job done.

Over the past 30 years, we've conducted hundreds of sampling programs throughout North America and across all categories: stationary and mobile exhausts, dust, odor, and accidental spills and releases. As an independent, reputable source, we have also consulted on monitoring programs worldwide.

We find solutions where others don't, because we understand all aspects of emissions: regulatory frameworks, methodologies, meteorological influences and operational needs. Examples of our solutions include real-time monitoring with automated warning or response systems; long-term, continuous monitoring at large or challenging sites; and customized methods for unique conditions or pollutants.

We take pride in our reputation for delivering impeccable data. Key to that success is our commitment to superior quality control practices. We care deeply about getting it right. Most of the equipment deployed by our field teams is our own, so we know it has been correctly maintained. This equipment pool includes several automated data retrieval systems we've built to maximize the accuracy of data acquisition.

# ON SITE MEASUREMENT: AMBIENT AIR QUALITY MONITORING



## Meteorology

Drawing on our firm's unique meteorological expertise and data resources, we can complement air quality monitoring with meteorological insights. A monitoring program can be designed to include continuous measurement of such conditions as wind speed, wind direction, relative humidity, ambient temperature and solar radiation. Our in-house meteorologists use such measurements to interpret air quality measurements more fully, for example to understand the unique surrounding influences on individual sources.

## RWDI is a valuable partner to clients seeking to...

### Explore Innovations

- Address unique monitoring situations (logistics, pollutants of concern) through expert strategies that win regulators' approval
- Capture the right data at the right time through smart implementation strategies:
  - Real time, web accessible reporting
  - Automated sampling linked to meteorological conditions
  - On demand sampling activated by neighbors or employees

### Create Opportunities

- Size pollution control equipment correctly for actual conditions
- Test the impact of new operating regimes (e.g., new fuels, products)

- Reduce labor costs with real time reporting
- Show that increased production continues to meet limits (depending on jurisdiction)

### Meet Challenges

- Lower reported emissions (or open more operating options) by using methods that avoid accumulation of systematic errors
- Document compliance after operational changes

### Fulfill Expectations

- Meet reporting obligations with highly defensible monitoring plans
- Execute models and long term plans based on data that has been collected in the most thorough and accurate way by conscientious, experienced professionals



# ON SITE MEASUREMENT: AMBIENT AIR QUALITY MONITORING



## How we work

We'll review your site conditions with you in detail and design a monitoring program that will provide results at the appropriate level of accuracy. We bench test all equipment before sending it to your site, provide testing checklists and a quality control plan in advance, and collect data with appropriate quality assurance and quality control. Our reports are clear and easy to understand: They've been refined through years of feedback and continuous improvement. As needed, we include expert recommendations and interpretations, drawing on expertise from throughout our company, to help you make the best use of monitoring data for your planning and operations.

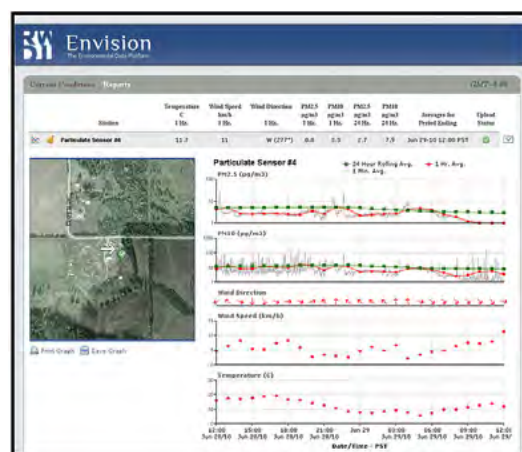
The methodology mandated in regulations sometimes allows a range of implementations, some better than others. If the implementation is not appropriate to your specific conditions, the data may not be adequate to fully demonstrate compliance. An example is a method that uses laboratory detection limits when no pollutant is detected; measuring in this way may return artificially high emissions values. Because we fully understand the science behind both the regulations and the instrumentation, we make the right choices within the scope allowed by law.

### Innovative solutions

Because of our in-depth understanding of testing methodologies and our broad technical resources, we excel at designing advanced solutions for large or challenging projects.

### Real-time monitoring.

For particulate monitoring at a large construction site, we saved the client significant labor and operation costs by installing a real-time monitoring network. Cellular modems post data to the Web, where it can be read by both staff and regulators. When a monitor reaches a specified value, it triggers a camera and an automated email to the site supervisors. The photo and monitored values are sent in the email and posted on a website. The client can immediately determine what caused an alert (e.g., a passing truck vs. wind-blown dust) and adjust operations appropriately. This network also reduces the need to staff each monitoring station continuously.



### Integrated meteorological data.

For hospitals that must test diesel generators monthly, we have installed wind-direction sensors along with warning signals. If wind conditions on the test day will disperse the diesel exhaust in a way that could generate complaints, the device alerts the user. The staff can choose to delay testing and thereby minimize complaints about nuisance odors.

# ON SITE MEASUREMENT: AMBIENT AIR QUALITY MONITORING



## Approved alternative methods.

A client was faced with spending \$350,000 to rebuild a damaged sampling site. We were able to use our understanding of the methodology to propose an alternate location. We satisfied the regulators that the new location would provide acceptable data—and the move cost the client next to nothing while also creating a safer, more accessible work environment.



## Applications of monitoring programs

- Measure a wide range of contaminants
- Assess compliance
- Validate or calibrate predictive models
- Compare actual to modeled conditions
- Provide results and estimates that are more tangible and less conservative than those indicated by modeling
- Provide estimates where modeling is not an option
- Establish existing or background levels of contaminants
- Establish emission rates for use as inputs to dispersion modeling
- Provide toxicologists with data for predicting environmental exposure
- Provide technical support for environmental impact assessments

## Typical Contaminants

- Criteria Air Contaminants (CACs)
- Sulphur Compounds (SO<sub>2</sub>, H<sub>2</sub>S, TRS)
- Volatile Organic Compounds (VOCs)
- Particulate Matter (Dust, TSP, PM<sub>10</sub>, PM<sub>2.5</sub>)
- Numerous others

## Services

### Measurement

- Design, build, operate and maintain monitoring stations/trailers/networks
- Design and build meteorological stations with remote reporting
- Design and execute monitoring protocols (real time, continuous, long term, short term, meteorology)

### Expertise

- Consult on and interpret regulations
- Negotiate with regulatory agencies
- Supervise monitoring programs
- Develop baseline conditions, potential impact scenarios, and emergency response zones
- Compare measurement to criteria
- Assess cumulative effects
- Recommend mitigation alternatives
- Quantify consequences from accidental releases
- Provide expert testimony

## Sectors

- Aggregates
- Airports
- Chemical and petrochemical
- Forestry, pulp and paper
- Government
- Manufacturing
- Mining and metals
- Oil and gas
- Pharmaceutical and biotechnology
- Power generation
- Transportation and infrastructure
- Vehicle manufacturing
- Waste management

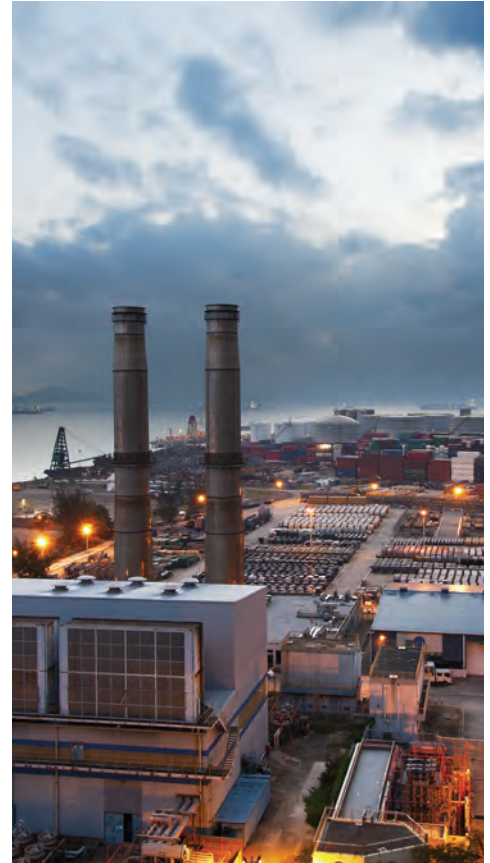
# REGIONAL AIR QUALITY



Evaluating scenarios for emissions regulation and urban planning to identify effective paths to improved air quality



Governing bodies large and small have been regulating air emissions from industry, motor vehicles and other sources for several decades. And municipal planners are increasingly thinking of air quality when planning for urban growth.



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However, regulations and plans must change with the times, to reflect the best new science about air pollution and related technologies. That science is complex. The concentration of air pollutants depends on so many factors: weather patterns, chemical interactions among different pollutants, the type and location of the key emission sources, and so on. In the face of this complexity, government

agencies must decide what, where and how much to regulate. Similarly, municipal planners must decide how best to accommodate future growth of their urban areas without compromising the quality of the air. To arrive at sound plans and policies, to win over stakeholders, and to achieve the goal of improving air quality, decision makers must work from sound science that accounts for all the important factors.

## Our service

We help government agencies evaluate scenarios for reducing emissions and impacts of air pollutants. By applying proposed regulations and urban growth strategies in a computer simulation, we can gauge their effect on regional air quality and pollution patterns. With these results, governments can develop cost-benefit analyses and make science-based decisions on air quality and urban growth and development. We also use such models to help other stakeholders make well-informed responses to government policy decisions.

This work centers on a regional-scale air quality simulation that we can customize to any place in the world. This model takes into account the complex effects of regional weather patterns, topography and chemical interactions among air pollutants. It also reflects the complex spatial distribution of the various emission sources. We use the model as a tool for looking at how much a given strategy for managing emissions within a region will actually improve the air quality there.

Our work is closely informed by current academic research, but our focus is always on our clients' questions and practical needs. We're sensitive to time lines and experienced with meeting our clients' time constraints. And we're exceptionally skilled at and passionate about making complex scientific information accessible for the nonscientists who need to act on our findings.

## RWDI is a valuable partner to clients seeking to...

### Explore Innovations

- Find creative solutions to achieve economically thriving and healthy communities
- Understand the interplay among clean air, urban growth, emerging technologies and social change
- Understand the interplay among climate change, greenhouse gas reduction strategies and air quality.
- Delineate regional airsheds and develop holistic strategies for managing the emissions sources within them.

### Create Opportunities

- Improve stakeholder confidence and buy in by demonstrating the scientific basis for regulatory changes
- Develop proactive urban growth strategies that are sensitive to clean air and its impact on the health of the population

### Meet Challenges

- Choose the right sources to regulate, given the characteristics of the region
- Anticipate the effects of changes in urban development patterns and commercial activityAnticipate how future climate changes may affect regional air quality



## How we work

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The key tool for regional air quality assessments is computer simulation. Regional air quality simulations have three main components:

- Emissions modeling
- Meteorological modelling
- Air pollutant transport and atmospheric chemistry.

Emissions modeling consists of two steps. First we estimate what the hour-by-hour emissions are from all of the various emission sources within a region. Then we determine where these emission sources are located throughout the region. We use land use data from geographic information systems (GIS), estimates of unit emission rates for different types of sources, and statistics on the activity level of the various emission sources. These sources might include industrial production, traffic on roadways and highways, aircraft activity at airports and so on. Software systems are used to integrate all of this information. Finally, we produce gridded, hourly emissions information over the region of interest and the time period of interest (one

or more years). We generally use an emissions modeling system known as SMOKE, which was developed by the United States Environmental Protection Agency.

Meteorological modeling consists of developing a high-resolution, 3-D picture in space and time of the weather conditions into which the air pollutants are being emitted. Often, one or more years of hourly weather patterns are predicted over the entire region of interest. We generally use a software system known as WRF (the Weather Research and Forecasting Model), which was developed by the United States government through a collaboration among various branches of the government.

Atmospheric transport and chemistry modeling predicts how air pollutants will be transported downwind of the emission sources, as a result of the weather patterns predicted by the meteorological model. It also predicts the chemical transformations that the air pollutants undergo while in the atmosphere. It provides a 3-D picture in space and time of air pollutant levels over the region of interest, for each of the air pollutants of interest.



# ENVIRONMENTAL NOISE



Managing noise sources and balancing competing needs to create acceptable acoustic environments

When sound is at odds with its context, it can be harmful. In a word, sound becomes noise.



Managing noise means understanding three things: the sound source, the receptor—which is a space used by humans, animals or machines—and the path between them.



Sound sources can become a problem in the environment for several reasons. Excess sound can spark complaints from neighbors or employees, which can escalate into legal battles. Changes in land use can prompt a regulatory reassessment, especially if the new arrangements change the relationship of source and receiver. Sound (or sometimes vibration) can cause sensitive machines to work poorly or need extra maintenance. Wildlife populations can be disrupted as noise or vibration affects behavior.

## Our service

We help you understand and manage sound and vibration sources within your regulatory and community context. We're experts at modeling, measuring and interpreting sound in

the environment, and we're deeply familiar with the complex regulations that govern it. We have the in-depth expertise, judgment and insight to find the most elegant and efficient solution—or to find a solution where it looks like there wasn't one.

We've worked with noise and vibration sources large and small, from many sectors, in many community contexts. We understand how needs differ depending on the receptor space (e.g., workplace, residence, daycare, school, place of worship or culturally important space) or wildlife population (e.g., caribou, birds or whales). And we have an exceptionally strong understanding of how to navigate the regulatory landscape.

Our work starts with defining the character and key properties of your sound source. In particular, we specialize in separating the contributions of multiple sources whose effects may be cumulative. This step determines whether compliance is an issue and, if so, where effort should be focused. If your sound sources need control, our next step is to look at the equipment itself. The best way to control noise is to limit the generation of sound. Often, we also need to control sound at some intermediary point, so we examine the path traveled by the sound or vibration. This is where we draw on our world-leading

expertise in weather and climate: Atmospheric conditions are key to the transmission of sound. We look for ways to modify the transmission path; here we also draw on our understanding of your industry and our resources in building engineering.

At this point, we may use the computer models and measurement strategies established during initial investigations to fine-tune a solution. These models are sophisticated, but the phenomena are complex and sometimes can't be modeled fully. That's why our professional judgment is key to interpreting your modeling results correctly.

Real-time measurement can also be critical to successful noise mitigation and community relations, so we've developed our own real-time monitoring system that we can customize to your needs.

## Typical scenarios

### Environmental standards

- Sound-level limits for an industrial development
- Environmental impact of a large infrastructure project, such as wind farms
- Protection of wildlife or traditional use lands

### Land use changes

- Development of residences in an industrial area, or vice versa, impinging on a regulatory buffer zone
- Development of major transportation routes
- Development of new activities, e.g., tractor-trailer deliveries to a new supermarket in a residential area

### Neighborliness

- Concern for sound mitigation as part of good design and community responsiveness

## Disputes

- Complaints by neighbors, e.g., about a pumping station or concert venue

## Typical noise sources

- Alert devices (horns/back-up alarms)
- Amusement parks
- Concert venues
- Cruise ship horns
- Dog kennels
- Industrial operations
  - *Manufacturing*
  - *Resource extraction*
  - *Upstream and midstream oil & gas*
- Power generation (conventional & renewable)
- Pollution control devices
- Ventilation fans
- Transportation
  - *Aircraft*
  - *Highways*
  - *Trains*
  - *Shipping (ports)*
- Motocross tracks
- Occupational noise
- Power tools
- Shooting ranges



RWDI is a  
valuable  
partner  
to clients  
seeking to...

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## Explore Innovations

- Use novel solutions to minimize noise impact, creating high value, well regarded projects

## Create Opportunities

- Increase community buy in by demonstrating and communicating effectiveness of noise mitigation

## Meet Challenges

- Balance noise sources against community needs to
- Achieve a successful regulatory approval

- Address community concerns for planned projects
- Address complaints
- Protect wildlife and traditional use lands while proceeding with responsible development
- Evaluate noise concerns in the context of litigation

## Fulfill Expectations

- Comply with regulatory environmental standards (sound level limits)
- Meet commitments to the community
- Provide mandated environmental assessments or permit applications





# AIRPORTS

Advanced engineering  
for outstanding facilities

RWDI is a valuable partner  
to clients seeking to...

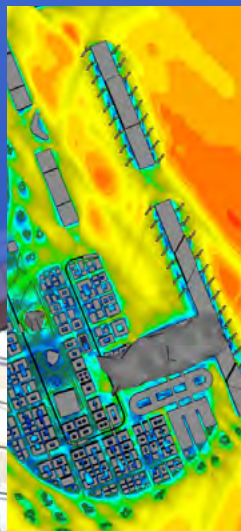
### Explore Innovations

- Achieve world class sustainability by leveraging the local climate
- Realize ambitious architectural forms
- Earn trust from communities and regulators by showing a deep understanding of relevant environmental concerns, and using advanced tools to measure and mitigate impacts



### Meet Challenges

- Achieve an efficient and economical design underpinned by rigorous engineering analysis
- Gain deep insight into local microclimate to pinpoint and address potential issues, from glare to turbulence
- Manage wind and snow loading on long-span roofs
- Minimize operational delays with detailed, hyper-local weather forecasting

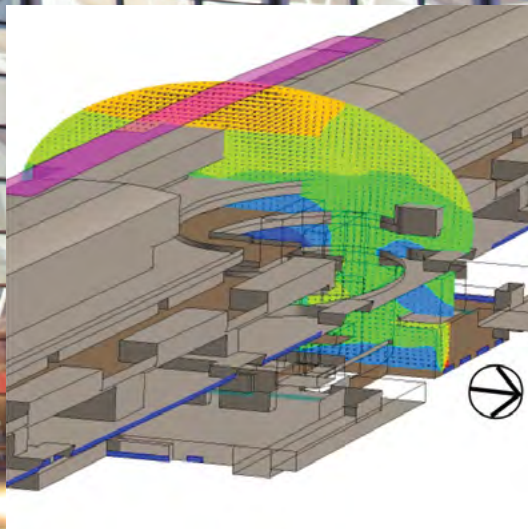
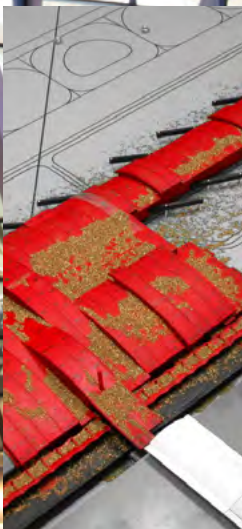


### Create Opportunities

- Make data driven design decisions to optimize building performance
- Adopt leading edge sustainability practices to save operating costs and meet corporate responsibility objectives

### Fulfill Expectations

- Create a safe and comfortable occupant experience for passengers and staff
- Meet regulatory requirements and offer detailed assessments of the expected impacts of your facility
- Inform the entire project team with easy-to-understand presentations of the environmental and technical considerations driving your design





# BETTER AIRPORTS HAVE ARRIVED

Our specialized expertise and advanced technical capabilities let us deliver valuable guidance to airport designers and operators – in areas ranging from wind loading to air quality, noise and glare. We've helped airports around the world ensure safe operations and set new standards of sustainability and performance.

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## PLANNING

Airports are working hard to meet growing demand for air travel while operating sustainably and being good neighbors. RWDI's unique combination of science, technology and engineering capabilities helps operators anticipate challenges and optimize facilities – whether they're building a new airport, or adding capacity at an existing one.

We've worked with planners, designers and fellow engineers around the world to study potential noise and air quality impacts and recommend mitigation plans; estimate greenhouse gas emissions; refine planned runway alignments; configure facilities to optimize throughput while minimizing local impact; adapt terminal buildings and airside operations for the local microclimate; and generate detailed profiles of turbulence patterns on specific approach and departure routes.

### SERVICES AT A GLANCE



Environmental Impact Assessments



Feasibility Studies



Land Use Planning



Regulatory Compliance Support



Masterplanning



Air Quality



Noise and Vibration



Turbulence Analysis



# DESIGN

Airports fulfill unique and complex operational functions. And with their sheer scale and symbolic importance to the cities and countries they represent, they also invite bold architectural visions. We deliver advanced technical insights that help airports perform beautifully in their core functions, live up to their designers' aesthetic ambitions, and fulfill their operators' regulatory responsibilities and sustainability goals.

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## Wind analysis for facades and structural systems

Our engineers and climate specialists deliver sophisticated wind studies for airports – informing choices in areas ranging from structural design to cladding to building enclosure assemblies.

## Design support for unique architectural elements

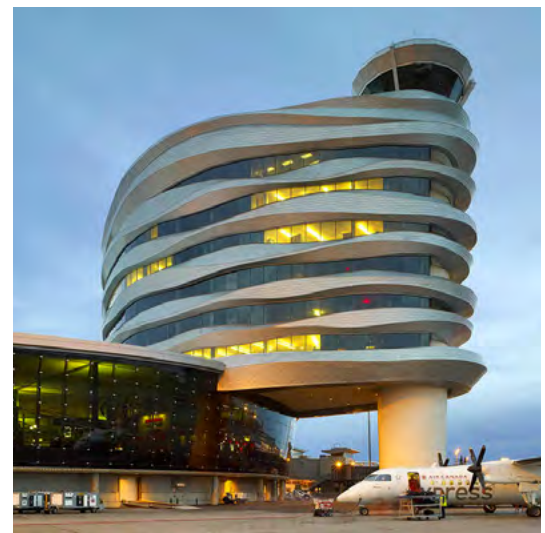
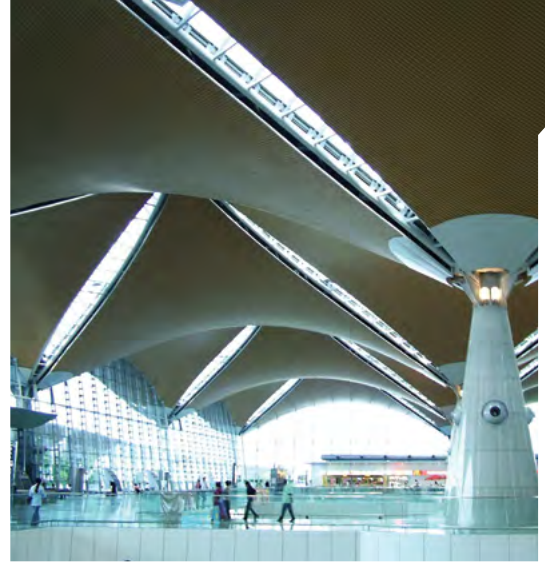
We deliver analysis to ensure that airports' special architectural features are optimized for their wind climate, preventing unwanted effects like whistling and vibration.

## Damping systems for control towers

We design, fabricate and install damping systems to limit wind-induced motion in air traffic control towers. We also support aerodynamic form optimization and other design choices to stabilize these slender structures.

## Guidance on long-span roofs

Drawing on extensive experience with large buildings – from major airports to stadia and arenas – our team offers guidance on wind loading, snow loading, falling ice and snow, and other challenges associated with expansive roofs.





### Commissioning

We're independent energy experts who serve as a vital third-party link between designers and contractors. We act as owners' advocates, ensuring that the facility's energy systems perform as designed and fulfill stated sustainability and performance objectives.

### High-performance building enclosures

RWDI's field-leading building enclosure consultants collaborate with our climate and meteorology specialists to help airports optimize their windows, facade systems and other enclosure elements, taking into account daylight, solar heat gains, glare impacts, energy performance and other factors.

### Energy and water modeling

Industry leaders in green building and innovation, we take the guesswork out of designing energy and water systems by showing you how energy and water performance targets affect your facility's bottom line.

### Air quality inside and out

We perform detailed modeling and offer guidance on ways to achieve excellent air quality – using both passive and mechanical means – throughout airport facilities. Our team is experienced in troubleshooting issues particular to airports such as the ventilation of large spaces, and vehicle exhaust in passenger pick-up/drop-off zones. We also model airside emissions from aircraft and ground vehicles, offering design guidance to help operators understand and mitigate air impacts.



Wind Effects on  
Facade Systems



Wind Effects on  
Structural Systems



Tuned Mass Dampers



Commissioning



Building Enclosure  
Consulting



Daylighting



Sustainability



Energy and Water  
Modeling



Renewable Energy



Glare



Pedestrian Comfort  
and Safety



Falling Ice and Snow



Air Quality



Ventilation

### SERVICES AT A GLANCE

# OPERATIONS

Our team helps airports deliver safety, comfort and efficiency for passengers – while enhancing their own sustainability and bottom line. Whether the goal is to optimize conditions inside a terminal building, mitigate noise and vibration for neighbors, or inform airside decisions with the best available climate analysis and weather information, we have the right mix of capabilities. Operators around the world trust our team’s deep expertise as well as our unique technical tools, renowned culture of collaboration and our relentless drive to innovate.

## Air quality and greenhouse gases

Our scientists and engineers are experts in quantifying emissions and assessing air quality through measurement and modeling techniques. We conduct rigorous analysis to inform effective mitigation strategies, and we support regulatory compliance by delivering third-party GHG verifications. Our team's deep understanding of airport operations lets us offer valuable support to airport operators, helping them manage emissions and think broadly about how to manage complex environmental concerns.

## Visibility analysis and enhancement

We support safety using advanced glare analysis, which can pinpoint the exact location and intensity of glare impacts – including from the airport’s own facilities and/or solar arrays. We can also assess and offer mitigation guidance on fogging risks.

## Customized meteorological forecasting

With an abundance of high-quality data and a team of in-house meteorologists, we help airports ensure safety while minimizing delays. Our user-friendly reporting and personal guidance helps operators make informed decisions as they plan snow clearance, manage deicing operations, and protect passenger and worker safety in all weather.

## Noise and vibration

Our noise and vibration team brings deep technical insights, advanced tools, and extensive project experience with airports. We’re skilled not only in the technical and regulatory demands of noise assessments but in the communication and engagement practices that help airports earn community support.


## SERVICES AT A GLANCE


 Falling Ice and Snow

 Air Quality and Greenhouse Gases

 Visibility Analysis and Enhancement

 Meteorological Forecasting

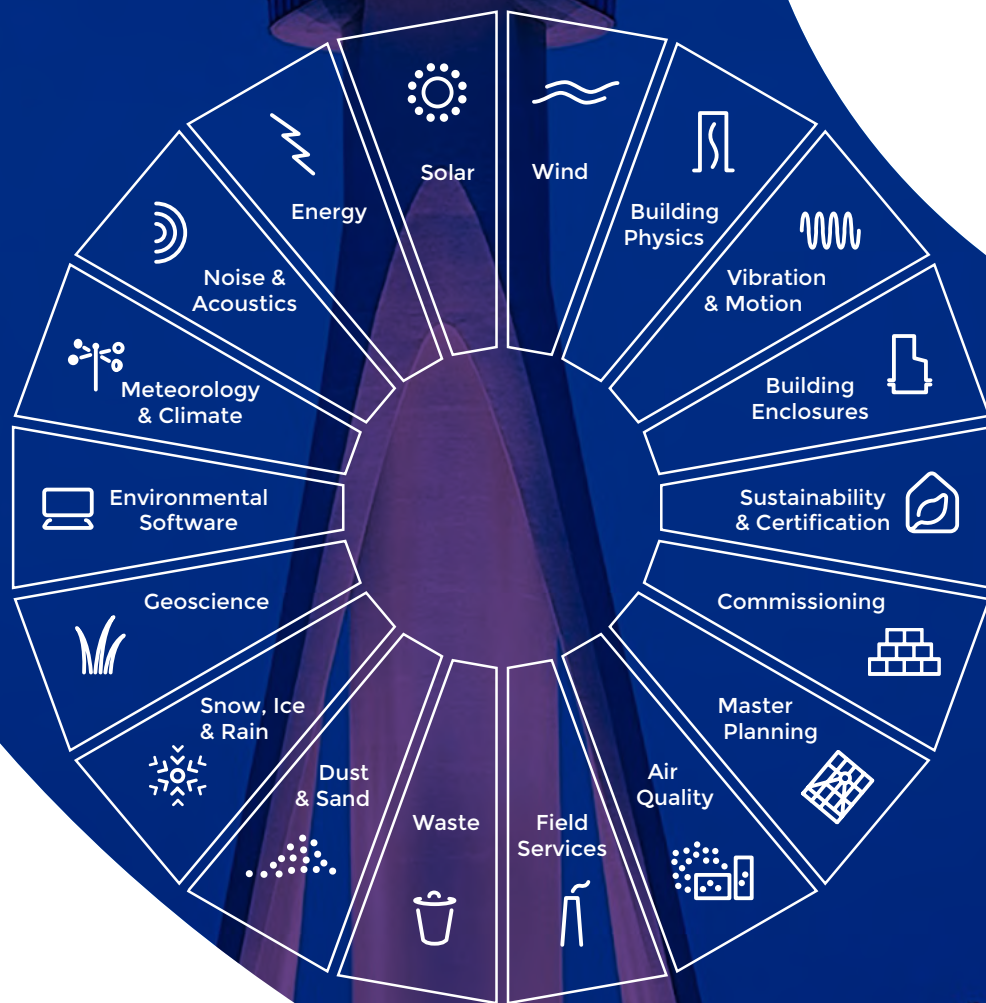
 Noise and Vibration

 Sustainability



## Services

**RWDI's core practice areas bring together a diverse array of capabilities around a common purpose: meeting the immediate aims and broader business goals of our clients.**



**RWDI Global Headquarters:**  
600 Southgate Drive, Guelph,  
Ontario, Canada N1G 4P6  
Tel: +1.519.823.1311





## **PROPOSAL**

### **Oshawa Executive Airport Environmental Air Quality & Noise Surveys**

GTA Environmental Proposal #19-06-03A

June 3, 2019.

**PREPARED FOR:**

Mr. Steve Wilcox  
Airport Manager  
Total Aviation & Airport Solutions  
Oshawa Executive Airport  
1200 Airport Blvd.  
Oshawa, Ontario  
L1J 8P5

Main Phone #: (905) 576-8146 ext. 3858  
Cell Phone #: (905) 243-7606  
Email: [SWilcox@Oshawa.ca](mailto:SWilcox@Oshawa.ca)

**PREPARED BY:**

Mr. Mark Smith P.Eng. CIH  
Senior Consultant  
GTA Environmental



*Environmental Air Quality & Noise Survey Proposal  
Oshawa Executive Airport, Oshawa, ON.  
Proposal #19-06-03*

June 3, 2019.

Dear Mr. Wilcox:

At your request, we have prepared a scope of work to provide an outdoor environmental air quality and noise survey at the Oshawa Executive Airport over a 2-month period in July/August.

We understand that you would like to sample for total suspended particulate (TSP), lead, nitrogen oxides (i.e. nitrogen dioxide and nitrogen monoxide) and noise at four outdoor locations at the airport. Samples would be collected on a 24-hour basis, which would provide 60 days of daily monitoring during the summer.

If you have any questions or require additional information, please contact Mark Smith at **1-877-260-0987**. Thank you for your consideration.

Yours sincerely,

**GTA ENVIRONMENTAL**

Mark Smith, P.Eng. CIH  
Senior Consultant



*Environmental Air Quality & Noise Survey Proposal  
Oshawa Executive Airport, Oshawa, ON.  
Proposal #19-06-03*

## **SCOPE OF WORK**

The survey will be completed in accordance with industry guidelines and standards. The Senior Consultant, who is an **Ontario P. Eng.** and **Certified Industrial Hygienist (CIH)** will manage the project. GTA Environmental proposes the following scope of work:

### **Service A: Outdoor Environmental Air Quality & Noise Survey**

- Conduct an outdoor environmental air quality survey at the Oshawa Executive Airport over a 2-month period in the summer (ie. July/August). During this time, 60 consecutive, 24-hour samples will be collected for the following parameters: Total suspended particulate (TSP), lead, nitrogen oxides (nitrogen dioxide (NO<sub>2</sub>) and nitrogen monoxide (NO), and noise.
- Four (4) outdoor sampling locations will be selected.
- A canopy will be required to position monitoring equipment under during rainy days.

### **TSP Sampling**

- Collect four (4) TSP air samples each 24-hour period using a calibrated air sampling pump (2.5 LPM) and pre-weighed filters in cassettes.
- Battery powered pumps will be used, which will be connected to a high-capacity auxiliary battery to allow for extended pump run-times, in the absence of power outlets.
- Each week, 7-days' worth of samples, plus one (1) quality control field blank, will be sent to the laboratory for gravimetric analysis.
- Interim data will be presented in a table format each week for review.

### **Lead Sampling**

- The same four (4) air samples collected each day for TSP above, can also be analysed for Lead on the same filter using GC/MS analysis.
- Each week, the 7-days' worth of TSP samples, plus the quality control field blank, will also be analysed for Lead using GC/MS.
- Interim data will be presented in a table format each week for review.

### **Nitrogen Oxides (NO<sub>2</sub> & NO) Sampling**

- Collect four (4) nitrogen dioxide samples each 24-hour period using a calibrated, direct reading electronic instrument capable of data logging.
- Battery powered monitors will be used, which will be connected to a high-capacity auxiliary battery to allow for extended instrument run-times, in the absence of power outlets.
- Each week, prepare 7-days' worth of data printouts.
- Interim data will be presented in a table format each week for review.





*Environmental Air Quality & Noise Survey Proposal  
Oshawa Executive Airport, Oshawa, ON.  
Proposal #19-06-03*

### **Noise Monitoring**

- Collect four (4) noise samples each 24-hour period using a calibrated, direct reading electronic instrument capable of data logging.
- Instruments will be set to A-weighted, slow response, 3-dB doubling, and no threshold for minimum sound level.
- Battery powered monitors will be used, which will be connected to a high-capacity auxiliary battery to allow for extended instrument run-times, in the absence of power outlets.
- Each week prepare 7-days' worth of data printouts.
- Interim data will be presented in a table format each week for review.

### **Laboratory Detection Limits & Ministry of Environment Standards**

Parameter	Limit of Detection (LOD)	MOE Standard (1-hour)	MOE Standard (24-hour)	MOE Standard (30-day)
TSP as PM44	2.8 ug/m3		120 ug/m3	
Lead	0.14 ug/m3		0.5 ug/m3	0.2 ug/m3
Nitrogen Oxides (NO2 & NO)	0 - 189 ug/m3	400 ug/m3	200 ug/m3	
Noise	20 dBA	40-50 dBA		

### **SCHEDULE**

GTA Environmental is prepared to begin work on this project after receiving written authorization to proceed. It is anticipated that the field work will take two (2) consecutive months to complete.

Interim data will be available each week for review as the project progresses. This would include tabulated data for quick review.

A full report of our findings will be available approximately 2-weeks after the last day of sampling. An electronic pdf file will be provided. The report may also be reviewed and edited as necessary to produce the final report.



*Environmental Air Quality & Noise Survey Proposal  
Oshawa Executive Airport, Oshawa, ON.  
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## FEE STRUCTURE

We propose completing the above noted scope of work according to the following fee structure:

**Service A:** A lump sum fee of **\$73,800.00, plus 13% HST** for 60 days of individual sampling data.

As this is a large project, a deposit is required to initiate and fund this project. After 4 weeks, a second instalment will be required. The final payment will be invoiced net 30 days after the draft report is issued.

Initial deposit requirement is \$20,000.00, plus 13% HST.

Second instalment is \$16,900.00, plus 13% HST.

## PAYMENT TERMS & CONDITIONS

The project will be invoiced shortly after the survey, with the net payable in 30 days. 18% annual interest applies to late payments.

## PROJECT AUTHORIZATION

You may authorize **GTA Environmental** to proceed with the scope of work by signing one copy of this proposal and returning it to **GTA Environmental** by fax at **1-(519) 260-1303** or by email at [mark@gtaenvironmental.com](mailto:mark@gtaenvironmental.com). The client company may also issue a purchase order with their own terms and conditions.

The scope of work and associated costs related to the **Environmental Services** outlined herein has been reviewed. **GTA Environmental** is hereby directed to proceed accordingly.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Print Name and Title

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
P.O. Number