

**Witness Statement  
of  
Frank Babic, P.Eng.**

**Ontario Municipal Board Case No. PL141318  
Bronte Green Corporation**

**Prepared by:  
Frank Babic, P.Eng  
Amec Foster Wheeler  
160 Traders Blvd E, Suite 110  
Mississauga, Ontario L4Z 3K7**

**August 27, 2015**

**Purpose of Statement**

The purpose of this witness statement is to provide expert opinion related to noise impact on the proposed Bronte Green residential development on behalf of the Town of Oakville.

**Qualifications**

I am a Licenced Professional Engineer in the Province of Ontario.

I am an acoustic engineer and Acoustic Practice Lead with the firm Amec Foster Wheeler, which is engaged in a wide range of engineering and consulting projects.

My experience has included noise impact assessment projects for residential developments.

I have almost 20 years of professional experience related to acoustics, noise and vibration engineering.

I have previously been qualified by the Ontario Municipal Board to provide expert opinion regarding noise impact related to land use planning.

My curriculum vitae is attached as Attachment 1 to this witness statement.

**A signed Acknowledgment of Expert's Duty is attached as Attachment 2.**

**Retainer**

I was retained while employed at Amec Foster Wheeler in June 2013 by the Town of Oakville to provide peer review services related to noise for the Merton Tertiary Planning Study Area. I was subsequently retained while employed at Amec Foster Wheeler to review the Noise Control Feasibility Study Proposed Residential

Development Bronte Green Joint Venture Area Oakville, Ontario, dated April 24, 2015 and subsequently retained as expert witness related to this OMB case.

### **Summary of Opinions**

I expect to be in agreement on Issues 10, 11, 12, and 14. I expect there to be issues of disagreement on the following:

#### *Issue 9*

I expect to be in disagreement on whether the development meets NPC-300 for stationary noise sources. This is with respect to the calculations and Cadna modelling, both on the specific details of the calculations and modeling, as well as the specific points of reception and receptor-based mitigations used to assess compliance with NPC-300.

#### *Issue 13*

I expect to be disagreement on including the expanded headquarters/central reporting station at the Woodlands site, currently under consideration with the Region of Halton as per the Paramedic 10-Year Master Plan recommendations.

### **Evidence Provided, Reviewed, and Considered**

As part of the assignment, I undertook a review of the following relevant documentation related to the case:

- Noise Control Feasibility Study Proposed Residential Development Bronte Green Joint Venture Area, Oakville Ontario; Report No. WA12-032-B Revision 1, SS Wilson and Associates Consulting Engineers, April 24, 2015 (the SS Wilson April 2015 Study).
- Cadna Modelling of Stationary Sound Sources Meeting of Acoustical Experts, Bronte Green, OMB File PL141318; HGC Engineering, August 6, 2015 (the HGC Modelling, August 2015)
- Halton Noise Abatement Guidelines Version 1.0, IMLC01-14, June 18, 2014
- Oakville Bylaw 2009-98 (amended 2009-081, 2011-100, 2013-028)
- Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning, Publication NPC-300, Ontario Ministry of the Environment, August 2013
- MO-14-15 - Paramedic Services 10-Year Master Plan Report to Chair and Members of the Health and Social Services Committee, May 19, 2015

Additional supporting material (SS Wilson supporting calculations, HGC Cadna model) were also reviewed.

I completed a site visit with SS Wilson, HGC Engineering and Novus Engineering, on June 29, 2015.

## **Summary of Issues**

I have set out in my witness statement the issues I will be opining on, and my opinion on the issues. I will provide evidence and opinion on Issues 9, 10, 11, 12, 13, 14 of the considered issues list. I will focus exclusively on the noise aspects of these issues.

## **Opinions**

### **ISSUE 9 Are the stationary noise levels and proposed mitigation measures appropriate and meet NPC-300?**

In my opinion, the stationary noise levels and proposed mitigation measures outlined in the SS Wilson April 2015 Study are not appropriate to meet NPC-300. I identify the following issues with the stationary noise impact in the Study:

1. SS Wilson did not provide sample calculations in the original Study (the SS Wilson April 2015 Study) to support its findings. SS Wilson did supply supporting stationary noise calculations to Amec Foster Wheeler following the Meeting of Acoustic Experts (received by email July 27, 2015). A review of the one sample calculation spreadsheet was completed, where it was assumed all other spreadsheets to be similar with respect to their calculation methodology. On the basis of reviewing this sample calculation spreadsheet, it appears that the calculations follow the ISO 9613-2 method of general calculation, though some specifics (including temperature and relative humidity) are not provided. Further, some broad assumptions regarding noise reflections around buildings are included in their calculations. The supporting noise calculations are based on the sources provided in the SS Wilson April 2015 Study, and I was not in a position to verify any of the sources through independent review. A fully detailed review of all calculations and sources would have to be completed to accept the analysis provided by SS Wilson, or independent noise modelling would have to be undertaken.
2. HGC prepared a Cadna model after the sample calculations had been provided. The Cadna model and SS Wilson calculations have discrepancies in their predicted levels, where the Cadna model shows higher values. A review of the modelling parameters in the HGC Cadna model indicates that the configuration looks compliant with ISO 9613-2, however further definition on sound power adjustments and description of sources (including number of trucks and loaders) is required. The sources used in the HGC Cadna model are based on the sources provided in the SS Wilson April 2015 Study, and I was not in a position to verify any of the sources through independent review. A fully detailed review of the model and sources would have to be completed to accept the analysis provided by HGC, or independent noise modelling would have to be completed.

3. Irrespective of the predicted noise levels noted by either the SS Wilson calculations or HGC Cadna model, the noise modeling does not address noise levels at upper floors of the townhomes. If the modelling included receptors located at the upper floors of the first row townhomes (4.5m above ground) non-compliance with NPC-300 would be shown. The Study indicates that this is not a point of reception since *“No windows that open into second floor or higher floors habitable rooms be permitted, where the windows could have direct exposure to the Region of Halton Public Works Facilities”* (SS Wilson April 2015 Study, pg 8, Section 2.3.2.(i)). I take issue with this “architectural design feature” as a receptor-based “on building” noise mitigation to eliminate a point of reception for the following reasons:
  - a. Building code restriction may require windows on upper floor habitable rooms, which may have to face the Public Works Facilities
  - b. Building designs have not been provided, so considerations for architectural design conditions as a noise control measure to remove a potential point of reception cannot be assured
  - c. Even if at the time of construction the upper floors are not provided with windows, it is reasonable to anticipate that future home owners may create a window opening facing the Public Works area, which would then force the Region of Halton out of compliance with NPC-300
  - d. In accordance with NPC-300 and direction by the MOE, inoperable (fixed or sealed) windows cannot be used as a noise control measure for residential buildings.
  - e. Class 1 areas under NPC-300 does not permit receptor-based “on-building” noise mitigation
4. SS Wilson and HGC predicted results are to a height of 2.0m for first floor windows. The first floor windows were not modeled at a higher height, even though the Study notes that there may windows at high cathedral ceilings, since they propose *“sealed, non-operable windows opening into high cathedral ceilings”* (SS Wilson April 2015 Study, pg 8, Section 2.3.2.(i)). Receptors located at the heights higher than 2.0m the HGC Cadna model will show non-compliance with NPC-300. I take issue with this as a receptor-based “on building” noise mitigation to eliminate a point of reception for the following reasons
  - a. As noted above, in accordance with NPC-300 and direction by the MOE, inoperable (fixed or sealed) windows cannot be used as a noise control measure for residential buildings.
  - b. NPC-300 notes that the expectation is that *“inoperable windows will be permanent for as long as the stationary source continues to operate”* (NPC-300, pg 11) and that *“The ability of the stationary source to maintain compliance with MOE requirements and obtain MOE approvals is not to be compromised by the use of inoperable windows”* (NPC-300, pg 11). It is reasonable to anticipate that a future home owner could replace the windows to cathedral ceilings with operable windows, which violates this expectation of inoperable windows as a mitigation measure.

5. SS Wilson in the Study provides a condition that “All roof designs for the first row dwellings to provide uniform height of 8 meters above ground levels ... This is essential for noise control purposes to provide adequate shielding for the second and subsequent rows of dwellings from the Region of Halton Public Works Facilities” (SS Wilson April 2015 Study, pg 9, Section 2.3.2.(iii)). I take issue with the use of minimum first row building height conditions as part of zoning approval as these are essentially receptor-based noise mitigations whereas, for Class 1 of NPC 300, “the preferred and normally most economical and practical noise control options is the use of source based noise control measures” (NPC-300, pg 32). Receptor based site configuration noise control measures, as the first row building height may be considered, are subject to an agreement as per NPC-300 Part A. Without this agreement, the noise mitigation strategy should be for source-based noise control so that the first row buildings are compliance with NPC-300, such that second row buildings would also be compliant.
6. The noise impact predictions provided by SS Wilson and HGC only consider the current operational scenario of the Region of Halton Public Works Facilities. The Paramedic 10-Year Master Plan calls for consideration of an expanded headquarters/central reporting station at the Woodlands site, which would create future noise impacts to the residential development. It is my opinion that this future condition be incorporated in the stationary noise impact, and associated noise mitigation considered for this potential noise source.

**ISSUE 10 Are the transportation noise levels and proposed mitigation measures appropriate and meet NPC-300?**

The Noise Control Feasibility Study addresses transportation noise from Bronte Road and Upper Middle Road. Road traffic noise was predicted using STAMSON and mitigation proposed with respect to acoustical barriers, central air conditioning systems, ducted forced air heating systems, building acoustic insulation and warning clauses. These were prepared in accordance with NPC-300. It is my opinion that the transportation noise levels and proposed mitigation measures are appropriate from an acoustic point of view and meet NPC-300.

**ISSUE 11 Does the proposed development comply with the minimum distance separation with respect to noise?**

The Noise Control Feasibility Study does not include separation distance discussion with respect to the Mid-Halton Wastewater Treatment Plant (MHWWT). Based on the site visit conducted on June 29, 2015 the MHWWT as a Class II facility meets the required separation distance for noise. It is my opinion that the proposed development complies with the minimum separation distance with respect to noise.

**ISSUE 12 Should an updated Noise Study be provided by the applicant?**

It is my opinion that an updated Noise Study should be provided by the applicant.

**ISSUE 13 Have all surrounding industries been appropriately recognized for their noise impact on the development, including but not limited to the Region of Halton Centre, Police Station, Yard, and Woodlands Operation Center?**

The Noise Study recognizes the Region of Halton Centre, Police Station, Yard and Woodlands Operation Centre. The Study does not recognize the Mid-Halton Wastewater Treatment Plant for its noise impact on the development.

The Noise Study does not recognize future developments at the noise sources that may have future stationary noise impacts to the development. Specifically, the Paramedic 10-Year Master Plan calls for consideration of an expanded headquarters/central reporting station at the Woodlands site, which would create future noise impacts to the residential development.

**ISSUE 14 What is the appropriate classification for the area under NPC-300? Should Class 4 be considered for this development?**

The classification for the area is Class 1 as the area is “an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as urban hum” (NPC-300, pg 7).



amec  
foster  
wheeler

# Frank Babic, P.Eng., INCE

## Acoustic Practice Lead

### Professional summary

An Associate Engineer within Amec Foster Wheeler Environment & Infrastructure, Mr. Babic has more than 17 years of experience in acoustics, noise and vibration. Mr. Babic heads the Eastern Canada Acoustics Practice for Amec Foster Wheeler and his expertise includes environmental noise, transportation noise, building acoustics and vibration. He is familiar with the use of the noise and vibration standards and regulations, as well as detailed engineering design for noise and vibration controls.

Mr. Babic has worked to complete environmental assessments and operating permits for numerous facilities. Most recently he has been project director for noise and vibration components of a number of projects relating to environmental noise permitting, building acoustics design, transportation noise impact assessment and environmental assessment in the mining sector.

### Employment history

Amec Foster Wheeler Environment & Infrastructure, Acoustics Practice Lead, (March 2013 – Present)  
AECOM, Senior Engineering Manager (July 2007 – March 2013)  
Swallow Acoustic Consultants, Acoustic Engineer, (February 2001 – July 2007)  
Vibro-Acoustics, Sales Engineer, (July 1999 – February 2001)  
Environmental Acoustics, Acoustic Consultant, (May 1996 – July 1999)

### Certifications and training

Ontario Ministry of Labour Worker Awareness Training, 2014  
Short Course on Aircraft Noise, NoiseCon 2010  
CADNA Noise Modeling Basic Training, 2008  
Undergraduate Vibration Course, McMaster University 2003  
ASHRAE Noise & Vibration Control Seminar, 1999  
Technical Writing, Ryerson University 1998  
Undergraduate Noise Course, University of Waterloo 1996

### Honors and awards

#### 2012 AECOM SMART Award

Winner of the AECOM SMART Award for innovative implementation of remote monitoring for the Southeast Collector Sewer Project. This involved the installation of over a dozen noise and vibration monitors for tunnel shaft constructions which provide 24/7 monitoring with web-based interface. Further, tunnel vibration monitoring was implemented along the Tunnel Boring Machine route through this service.

### Representative projects

#### Sample projects

Seward OMB Hearing and Noise Study, Courtright, Ontario Prepared a Noise and Emissions study for Seward Enterprises to address emissions issues related to zoning approval. Acted as technical noise expert at the OMB hearing related to the case [2015].

1215 Appleby Development, Burlington, Ontario Technical noise expert for the City of Burlington to review the noise study for the proposed hotel development. Included serving as technical noise expert in anticipation of an OMB hearing related to the development [2015]

Merton Study Peer Review – Bronte Green, Oakville, Ontario Technical peer review of the Merton planning study related to noise impact. Engaged as technical noise expert on behalf of the Town of Oakville related to the Bronte Green Development related to the OMB hearing related to the Bronte Green development [2015]

University of Toronto Innis College Cinema, Toronto, ON Senior lead on construction review

Years with Amec Foster Wheeler: 2

Years Experience: 17+

### Education

Bachelor of Applied Science, Civil Engineering, University of Waterloo, Waterloo, ON Canada, 1996

Option, Management Science, University of Waterloo, Waterloo, ON Canada, 1996

### Professional qualifications

Professional Engineer, Ontario, #90475229, 2000

Institute of Noise Control Engineering, 2012

### Memberships/affiliations

Canadian Acoustical Association

Acoustical Society of America

Institute of Noise Control Engineering

Ministry of Transportation RAQS

### Languages

English and Croatian (Spoken)

Frank Babic, P.Eng., INCE

and commissioning of cinema retrofit construction. Included site inspections and shop drawing reviews of the construction. Commissioning of the space, including interior reverberation time and sound isolation measurements were completed [2014-2015].

Canadian Power Line Implosion, Fort York, ON Senior lead on peak noise level measurements of demonstration blasting for multiple hydro cable lines between the US/CAN border. Prepared noise contours of the blast radius for assessment of impacts on the US side [2014].

All Aboard Florida Rail Noise and Vibration, FL Senior lead on noise measurement of train passby and railyard. Measured vibration levels from train passby using multi-channel vibration monitoring system. Measurements used in the support of an environmental assessment for the railyard. Involved in the peer review and technical review of the noise and vibration assessment that was completed for the All Aboard Florida rail project from Miami to Orland. Completed a detailed supplemental assessment of the West Palm Beach rail yard, including yard and train pass by noise and vibration [2014].

UHN Rooftop Noise Monitoring, Toronto, ON Senior lead on spring and summer noise monitoring of rooftop equipment impact to the community. Included detailed noise measurements supported by audio recordings. Developed a custom reference monitoring method for the project to extrapolate and isolate rooftop equipment noise to the community [2014].

MTO Rumble Strip Noise Testing, Welland, ON Senior lead on noise measurements of multiple car passbys on various rumble strip configurations. Rumble strip types were review for both interior and exterior noise to determine the most appropriate type to use in centre lane installation [2014].

MTO Highway 404 Extension, Toronto, ON Senior lead on a detailed noise assessment of the Highway 404 extension. This included an update to the original environmental assessment to account for concrete pavement. Noise modelling was completed using TNM. Assessment of noise barrier mitigation was completed in accordance with MTO Noise Policy [2014].

Windsor-Essex Parkway (WEP) Noise Barrier Modelling, Windsor ON Senior lead for the revisions to noise barrier modelling for the WEP project. Included re-evaluation of sound isolation with revised barrier configurations and landscape contouring. All traffic noise analysis completed with TNM noise modelling software [2013].

Town of Milton Traffic Study Steeles Ave and Ontario Street, Milton ON Team lead for the traffic noise study to address noise complaints from the townhome community. The objective of the study is to predict current sound levels from road traffic noise sources in the area (e.g., Steeles Ave, Ontario St. N), to use these predictions to assess potential impacts according to the applicable guidelines, and to specify mitigation measures if necessary [2013].

Wheelabrator Traffic Noise Modelling, USA Team lead for the traffic noise study to address potential increase in traffic noise due to additional delivery traffic to the Wheelabrator facility. All traffic noise analysis completed with TNM noise modelling software [2013].

TTC Leslie Street LRV Rail Vibration Mitigation, Toronto ON Team lead of the rail vibration group, preparing a conceptual and detailed design of a floating slab system for the new LRV line on Leslie Street to meet EA vibration limits. Included FTA screening and assessment, transfer mobility, force density, floating slab vibration analysis and detailed design [2012].

Edmonton LRT Winspear/Citadel Vibration, Edmonton AB Senior noise and vibration lead, responsible for co-ordination of vibration subconsultant work with AECOM design team. Oversight of vibration measurement work, coordination/liason with Winspear/Citadel theatres and City of Edmonton, technical review of conceptual vibration design [2012].

Metrolinx/GO Transit Georgetown South Corridor Noise and Vibration Mitigation Strategy, Toronto, ON Preparation of the Noise and Vibration Strategy for the construction and operation of the GO Transit Georgetown South Corridor. This included development of an overall strategy, individual impact assessment of each construction element (over 9 separate construction projects), and development of a noise and vibration mitigation strategy for each individual construction element. Further, the operational noise and vibration impact was assessed for the corridor (including floating track/ballast mat requirements and noise barrier constructions) [2010-2012].

Region of Durham, Westney Road Noise Measurements, Ajax, ON Conducted long-term noise monitoring of road traffic at residences along Westney Road. Included an evaluation of noise exposure from road traffic, as compared to road traffic noise predictions using STAMSON [2010].

City of Calgary, Calgary Airport Runway Noise Assessment, Calgary, AB Provided technical review and input into the GAP analysis and scoping document for the Calgary Airport Runway [2010].

Menkes, Aircraft Noise Impact Study, Mississauga, ON Provided a noise impact study for a warehouse/office complex to address aircraft noise from Pearson International Airport [2004].

IAMGOLD Cote Gold Mine Environmental Assessment Prepared the Noise and Vibration Technical Study for the Cote Gold Mine project. Included assessment of construction and operational noise to Ministry of Environment noise guidelines (NPC-300) and blasting noise and vibration to NPC-117. Assessment included impact from tailings and open pit operations [2013].



Labrador Iron Mines, Noise and Vibration Baseline and Impact Assessment, Shefferville, QC Prepared baseline and impact assessment for the noise and vibration associated with mining activities at the James, Redmond and Houston properties. Baseline included remote noise and vibration monitoring at all receptors, including an assessment of baseline measurements for use in the impact assessment. A noise impact assessment was completed with CADNA/A noise model of all exterior noise sources associated with the operations at the mines. A vibration impact assessment was provided based on predicted vibration levels from mining operations [2009-2010].

Cape Breton University, University Wind Farm, Cape Breton, NS Technical oversight and QAQC of three turbine wind noise analysis. Included a comparison of modelling methods using CADNA/A and Windfarmer [2013].

NextEra Bluewater, Goshen, and Jericho Wind Farms, Grand Bend, ON Development of the noise assessment for wind farms at the Bluewater, Goshen and Jericho sites. This included a Wind Farm Noise Impact Assessment in accordance with the Canadian *Green Energy Act* [2010-2012].

Apotex Richmond Hill Acoustic Assessment, Richmond Hill, ON Lead and senior review of updated acoustic assessment to address non-compliance issues related to an acoustic audit of the facility. Works involved revised noise measurements of non-compliant noise sources, assessment of traffic noise to address noise criteria and noise mitigation recommendations including rooftop barrier [2013].

Ontario Power Generation (OPG), Acoustic Assessment and Noise Abatement Action Plan for Certificate of Approval, Nanticoke, ON Conducted a noise survey of all sources at the OPG facility. Prepared an exterior noise model using CADNA/A. Prepared an Acoustic Assessment Report outlining the required noise reductions to meet MOE noise limits. Prepared a Noise Abatement Action Plan outlining the noise control measures to be implemented to meet MOE noise limits [2009-2010].

Barbados Light and Power Environmental Assessment Addendum St. Michael, Barbados Lead and senior reviewer for the noise assessment of 240MW utility with the installation of medium-speed generators. Assessment included CADNA modelling and building construction recommendations to achieve noise limits in accordance with World Bank Group Noise Assessment Guideline for Power Plants [2013].

Metrolinx LS-3 Construction Noise Assessment, Toronto, ON Lead and senior review for the construction noise impact assessment for Launch Shaft 3 for the Eglinton East Twin Tunnel Project. Assessment involved baseline measurements and CANADA modelling of construction noise impacts to nearby residential receptors (condominiums and apartments) [2013].

Toronto Transit Commission (TTC), Spadina Extension – 407 and Sheppard West Stations, Toronto, ON Provided the noise impact assessment for construction and operation noise and vibration for both stations as part of the environmental assessment for the project. Acoustic consultant on record for the detailed design of both 407 and Sheppard West Stations including architectural acoustics, mechanical and electrical noise control, and audio paging system assessment. Acoustic modelling of the interior acoustics was prepared using EASE software. Of specific technical interest was the installation of vibration control systems for both the GO Bus (407 Station) and GO Train (Sheppard West Station) to address structure borne noise to the station box [2009-2012].

Public Works and Government Services of Canada (PWGSC), Major Crimes Courtroom Renovation, Toronto, ON Provided acoustic consulting services for renovation of the Major Crimes Courtrooms. Services included review of architectural (wall constructions and acoustic panels) and mechanical (HVAC systems) for courtrooms, holding cells, interview rooms, and judicial chambers [2007].

University of Toronto, CIUT Radio Station Relocation, Toronto, ON Acoustic consultant on record for the design and construction of the CIUT Radio Station facilities at Hart House. This involved the relocation of the existing CIUT station to the heritage Hart House building, which is a public facility for students including meetings, music performances, cafeterias, etc. Construction design included a dual studio construction on the upper floor, and a presentation studio on the ground floor with an open concept to allow for audience integration in the studio. Consulting services included design for architectural, mechanical and electrical with the University real estate design group, and oversight of construction for acoustics [2009-2010].

City of Brampton, The Rose Theatre, Brampton, ON Involved with design and construction of an 850-seat performing arts theatre. Main focus was design and implementation of noise and vibration control measures for the HVAC system to achieve low (RC-25) background levels in the theatre. Secondary involvement included interior acoustic treatment design (including suspended baffles for improved sound reflections, acoustic panels), shell constructions for walls and doors. Some involvement in the building isolation system from train noise/vibration, including transfer slab vibration isolation from the concrete garage beneath the building, and precast facade vibration isolation [2006].

Cambridge Memorial Hospital, Acoustic Review New Addition, Cambridge, ON Involved in design development and contract document development of acoustic, noise, and vibration controls for the addition. Included reviews of the HVAC systems, mechanical equipment (chillers, cogeneration equipment, pumps, etc.) and architectural designs of floors, walls, and windows. This also included a custom designed demountable discharge plenum for the emergency generator. Project also included preparation of a Certificate of Approval (air and noise) for the generator [2006].

Frank Babic, P.Eng., INCE

City of Orillia, Orillia Recreation Centre, Orillia, ON Acoustic consulting services related to the architectural (constructions, acoustic treatments) and mechanical (HVAC) for the community centre. Also included swimming pool acoustic treatment [2005-2006].

University of Toronto, Hazel McCallion Academic Learning Centre, Mississauga, ON Provided acoustic services relating to noise control of the library facility. Specific areas included acoustic treatment of the open atrium and sound masking for improved speech privacy in the space [2005-2006].

MaRS Discovery Centre, Lecture Room Acoustics, Toronto, ON Provided acoustic consulting services in the design of two multi-use lecture halls and meeting rooms. Services included design consultation for construction and HVAC, as well as interior acoustic treatment for reverberation control [2005].

Intria Items Inc., OSHA Plant Assessment, Mississauga, ON Conducted noise level measurements in the plant for compliance with health and safety noise standards. Provided noise control recommendations (acoustic treatments, mechanical changes) to achieve acceptable levels in the plant [2004].

Deloro Mine Phase 3 Cleanup Monitoring, Peterborough, ON Prepared the Construction Noise Monitoring and Control Plan for the Deloro Phase 3 Cleanup project. Senior lead overseeing the installation and on-going noise monitoring of construction noise at the site. Technical challenges included low-temperature installation, power considerations and extreme winter considerations for real-time monitoring. Senior lead overseeing preparation of blast noise and vibration monitoring [2013-2014].

York Region, Southeast Collector Sewer Noise and Vibration Monitoring, Markham, ON Remote noise and vibration monitoring for the Southeast Collector Sewer Project. This involved the installation of over a dozen noise and vibration monitors for tunnel shaft constructions which provide 24/7 monitoring with web-based interface. Further, tunnel vibration monitoring was implemented along the Tunnel Boring Machine route through this service [2011 – 2012].

*Other services and projects in Environmental Noise, Building Acoustics, and Transportation Noise and Vibration are available upon request.*

#### Publications and presentations

“Transmission Loss of Ultra Lightweight Concrete Block”. Babic, Frank. Canadian Acoustics Journal, v. 34, no 4, 2006

“An Approach to Noise Impact Assessment for Long-Term Construction”. Babic, Frank NoiseCon 2010.

“AC Transmission Line Corona Noise”, Babic, Frank. AWMA Ontario Section Air Quality and Environment Acoustic Modeling Conference, 2013.

“Rooftop Noise Impact Investigation to the Community”, Babic, Frank, Rodrigues Alfredo, Salim Mohammed. Canadian Acoustics Association Conference, 2014

Technical Contributor “NFPA 130 Standard for Fixed Guideway Transit and Passenger Rail Systems & NFPA 502 Standard for Road Tunnels, Bridges, and Other Limited Access Highways”, Plotkin, David, Babic Frank, Oldfield Alan, Thalheimer, Erich, Carman Richard, Fidell Sanford, 2014



Ontario

Ontario Municipal Board  
Commission des affaires municipales de l'Ontario

**ACKNOWLEDGMENT OF EXPERT'S DUTY**

Case Number	Municipality
PL 141318	Oakville

1. My name is Frank Babic.....(name)  
 I live at the Mississauga.....(municipality)  
 in the Canada.....(county or region)  
 in the Ontario.....(province)
2. I have been engaged by or on behalf of Town of Oakville.....(name of party/parties) to provide evidence in relation to the above-noted Board proceeding.
3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:
  - a. to provide opinion evidence that is fair, objective and non-partisan;
  - b. to provide opinion evidence that is related only to matters that are within my area of expertise; and
  - c. to provide such additional assistance as the Board may reasonably require, to determine a matter in issue.
4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date Aug 27/15

Frank Babic  
Signature