APPENDIX C Correspondence Regarding Scoped Issues

Section 1: Letter from Nova Scotia Woodlot Owners AssociationSection 2: Letter from Dan Busby, CWS

- Section 3: Watercourse Alteration Certification, L. Fulton

- Section 4: Letter from County of Pictou, Setback By-law and James River Regulations

- Section 5: Letter from Allan Bond

- Section 6: Letter from Clairie MacKinnon, MLA

- Section 7: Short List – Species of Concern



APPENDIX C

Section 1: Letter from Nova Scotia Woodlot Owners Association



Federation of Nova Scotia Woodland Owners

WIND POWER

Generation of electrical energy by means of the wind is viewed in Atlantic Canada as a relatively new idea. It is not. Wind power on a large scale has been on line in California and Arizona for more than thirty years (This is a bit like the situation with nuclear power: people think it's a novel way of generating electricity. But, for example, France has derived eighty percent of its electrical energy from fission reactors for four decades.) I will reveal my hand at the outset: I think wind power is simply a poor idea with present technology.

Since the Federation has been asked for comment in the context of landowner interests, I will split my remarks into two parts: first, general observations on the suitability of wind turbines for making electricity, and then some comments about how the presence of these machines on our lands can be expected to affect forest operations.

Here is a list, in no particular order, of what I view as the drawbacks of wind turbines.

1) They are hideous

To be practical, wind installations must be on a large scale – say, several dozen towers, at a minimum, at a given location. When viewed in large numbers like this, they are distressingly ugly, but even in ones and twos they are not pretty. The huge assemblies of them in the area of the Mojave Desert between Yuma, Arizona, and Barstow, California, are a blight upon the landscape. (That area is favored because the winds are vigorous and nearly continuous there.) They are, unfortunately, visible from major highways, so travelers cannot avoid seeing them. Typically, the blades of one-third to one-half of them are motionless; this is because these units have broken down and the props have been immobilized to prevent damage.

2) They are notoriously expensive to purchase, maintain, and repair. Investors in the early wind generation companies lost all or nearly all of their money. Most of these firms have changed hands repeatedly and, as far as I can tell, few if any of them have made money over the lifetime of the generators. The technology is better now, but it is doubtful that wind turbines today are making anyone any real money in the

absence of heavy subsidies. (What is being made is good PR – more on this point below.)

3) They are noisy.

The family of Daniel d'Entrement were forced from their Lower West Pubnico home in May of this year because the whoosh of the blades of the nearby 17-turbine installation caused anxiety in the children and prevented them from sleeping properly. (Halifax Chronicle-Herald, May 20, 2006, p. F3) There are two components to the sound made by

the whirling blades: audible and sub-audible. The audible part goes unnoticed to some people but drives others to distraction (and of course children are more sensitive to stimuli than adults). The portion which is at too low a frequency to be heard by humans just consists of pressure waves pushed out by each pass of the half-blade. The effects of this on humans exposed to it over long periods of time (days, months) are not known but are unlikely to prove desirable.

4) The energy they generate may not be there when it is most needed.

When an electrical engineer designs a power grid he or she assigns to each generator something called a *load factor*. This is, roughly speaking, a measure of how much power can be expected to be produced by the unit over a given period of time, as a percentage of what it would produce if it operated at full output during that time. For hydro it will typically be 0.80 (80%), and for a Candu nuclear plant it is probably about 0.98 (98%). In other words, it is a measure of "uptime" as opposed to downtime. For a wind turbine he/she assigns ZERO, since, at any given moment, the wind may be calm, in which case the generator's contribution to the grid is nil. The engineer says, I simply can't include this unit in my calculations. This is not quite as bad as it sounds because the energy produced by a windmill can be stored, but doing so raises costs by a huge factor, and adds complexity.

5) They kill birds and bats.

This one is pretty obvious: a bird or bat flying into fast-moving blades has a poor prognosis for survival. What is not so obvious is, just how serious a problem is this? A look at the literature on the subject reveals the expected: environmentalists are up in arms, to the point of bringing lawsuits, while the backers of wind power have the damage-control machinery running at full throttle. What can reasonably be said at this stage is that most installations don't represent much of a threat when compared to other hazards such as pesticides, moving vehicles, utility lines, and tall buildings. But some, like the Altamont Pass facility near San Francisco, kill significant numbers of raptors, including golden eagles. Conclusion: don't put wind generation equipment on bird migratory routes, or in areas where endangered species are an issue.

One could go on to list other negatives, but this covers the main ones, at least for most observers.

Meanwhile, is there anything positive to be said about wind power? Of course: it does not pollute, uses no non-renewable resources (apart from those needed to make the equipment), and the source of energy is free. Unfortunately, this is where the public perception of it begins and ends and, as a consequence, it is widely seen to be a "good thing". For this reason, power utilities in our part of the world are plunging ahead with it, in order to be seen as good guys in the eye of the public. Politicians are only too happy to pile on and tell how keen they are on it, and to spend public money for subsidies to promote it. (However, it may be recalled that Nova Scotia's Minister of Energy was unwise enough, a few months ago, to point out to amazed members of the media that wind towers may not produce electric current twenty-four hours a day every day; the resulting outpouring of anger from the wind industry was entirely predictable.)

Let's move now to a consideration of how landowners might be affected by having wind turbines on their property.

- 1) Because large sums of money are involved in a venture of this sort, the developer may insist on assurance that the landowner has clear title to the land. Title searches should be the responsibility of the company, not the owner.
- 2) The landowner should consult with his insurance company concerning matters of liability where the towers and electrical equipment (including transmission lines) are concerned. If premiums are to increase, the owner should take this into account when crafting a lease.
- 3) Construction will be disruptive. Spur roads will have to be built from existing service roads to the towers. This will entail clearing of the right-of-way, resulting in the loss of this corridor to production. Specifications of any roads (including width of the right-of-way) to be built by the developers must be agreed upon by both parties. In particular it must be made clear that roadways cannot be created simply by bulldozing the trees to one side a practice still followed by some companies.
- 4) Considerable space must be given over to the towers. The allotted land will have to be clear-cut and leveled. It will be fenced to keep out animals and people, and it will not be available to produce timber.

Once the installation is in place, there are other factors to consider.

- 5) One of the great merits of a woodlot is the peace, serenity, and privacy it provides. When an industrial installation is located on the land, to some extent those qualities are lost. The price to be placed on this is a matter for each landowner to decide. And, as mentioned, the apparatus is not pretty.
- 6) The developer will require 24-hour access to the generation site, and so will have keys to gated roads. Repairs and maintenance to turbines may be required at any time, including spring breakup. Heavy equipment and four-wheel-drive trucks may cause severe damage to logging roads under these conditions, so contracts must make clear that repairs are to be made in timely fashion and at the developer's expense.
- 7) The area beneath the powerlines must be kept clear of vegetation. This must be done using methods acceptable to the landowner.
- 8) At some point, perhaps not within the current property owner's lifetime, the towers and powerlines will be removed. The contract should provide that the site be fully rehabilitated: all equipment to be removed from the site, pads and foundations taken up and properly disposed of, topsoil replaced where it has been removed, and the entire affected area replanted in trees of suitable species.

The Federation is prepared to assist in any way it can any woodland owner considering entering into an agreement to have wind turbines placed on his or her land.

Adopted by the Board of Directors January 25, 2007

Comments on this position paper are welcomed.

APPENDIX C

Section 2: Letter from Dan Busby, CWS



Suggested approach, for each site, to Brown's/Dalhousie Mountain pre-construction bird studies
Dan Busby, 26 Jan. 2007

- 1. Desk work to give a good idea of what to "expect":
- a.Atlantic Canada Conservation Data Centre (Sackville, Mt. Allison campus http://www.accdc.com contact Sean Blaney at sblaney@mta.ca or 506-364-2658)
 - do search of all rare, special species in their database b.Breeding Bird Atlas
 - prepare list of species known/expected to breed in area
 - consult both first and second Atlas http://www.mba-aom.ca c.COSEWIC/SARA
- be sure you know if it is possible that any listed species are likely to be in area http://www.cosewic.gc.ca
 - d. Nova Scotia Museum flora and mammalian
- e. General Status consult this 5-year roll-up for NS http://www.wildspecies.ca
 - f. Birds of Nova Scotia, Robie W. Tufts 1986
- gives indication of potential species to watch for and their rough abundance
- g. Local knowledge consult with recognized local birders/naturalists (Ken McKenna, Randy Lauff, Nova Scotia Bird Society members)
- h. Consult with provincial representatives for raptors (eagle, osprey, peregrine, other raptors) and bats; Mark Elderkin, NSDNR elderkmf@gov.ns.ca, 902-679-6219
- 2. <u>Breeding season</u> objective to determine all species that breed in the area, broken down by major habitat types, and make an estimate of their breeding abundance:
- Area searches for breeding bird evidence May (early breeders), June, July, August - follow Maritimes Breeding Bird Atlas protocols
- Point counts for breeding bird densities and species richness June done in specific way; contact Dan Busby, CWS for more info
 - bat hibernacula and breeding sites (consult with province/museum)
- **3. <u>Migration seasons</u>** to determine if there are significant movements of birds through the area during spring and fall migration periods
- $\,$ Point counts same locations as breeding counts, mainly for passerines
 - Mid April to end of May for Spring counts
 - Mid-August to Mid October for Fall counts
 - watch counts mainly for raptors
 - important to note height of flights (relative to turbine sweep)
 - are there bats using the ridgelines on migration?
- **4. Winter season** to determine importance of wintering habitat for resident bird species (especially non-nomadic species such as Boreal Chickadee, Gray Jay, woodpeckers)
 - area search methodology
- focus on important mature habitats (if there are any) that may be important for residents such as Boreal Chickadee, Gray Jay, crossbills, etc.
 - try to get relative abundance for each species (common, rare, etc.)
- 5. <u>Habitat evaluation</u> to determine the resident general habitat types and how the turbine placement can be done in a way that minimizes the loss of important habitat types (wetlands, mature forest)

APPENDIX C

Section 3: Watercourse Alteration Certification, L. Fulton





CERTIFICATION NO. 0711222

"THE LEADER IN FORESTRY EDUCATION SINCE 1946"

DEPARTMENT OF CONTINUING EDUCATION

This is to Certify that	LISA FULTON
has completed a Special Course of Instru	uction in:
WATERCOURSE ALTERATIO	N CERTIFICATION FOR NOVA SCOTIA
0 M (O co oft 6T)	
at the Maritime College of Forest Techn	nology.
Dated at Fredericton N. B.	Instructed Company
This 23RD day of NOVEMBER 20 07	Executive Director, Maritime College of Norest Technology



NOVA SCOTIA ENVIRONMENT & LABOUR

THIS IS TO CERTIFY THAT

LISA FULTON

BY SUCCESSFUL COMPLETION OF THE WATERCOURSE ALTERATION CERTIFICATION TRAINING COURSE HAS QULAIFIED AS A

Recognized Individual

In accordance with the NSEL Operational Bulletin for the Issuance of Blanket Approvals in Nova Scotia

DATED AT Truro THIS 23rd DAY OF November ,200°

CERTIFICATE NUMBER 0711222
DATE ISSUED November

November 23, 2007

Administrator

APPENDIX C

Section 4: Letter from County of Pictou, Setback By-law and James River Regulations



Administration/C.A.O. Administration Building 28 Willow St., Pictou Phone: (902) 485-4311 Fax: (902) 485-6475



Building Inspection: (902) 485-4568
By-Law Enforcement: (902) 485-8640
Public Works: (902) 485-4628
Racreation: (902) 485-8528
Fax: (902) 485-8839

Municipality of Pictou County

P.O. Box 910, PICTOU, NS BOK 1140 All Offices: (902) 752-1530

November 28, 2006

To Whom It May Concern:

Dear Sir:

This letter is to advise that at this time the Municipality of the County of Pictou does not have any tand use planning or zoning by-laws that would restrict the development of wind turbines.

Trusting this is the information you require.

Yours truly,

Brian Cullen, Chief Administrative Officer

/vjj

Appendix B

James River Watershed Protected Water Area Regulations

James River Watershed Protected Water Area Regulations

made under Section 106 of the

Environment Act

S.N.S. 1994-95, c. 1

N.S. Reg. 169/2006 (August 25, 2006)

Citation

These regulations may be cited as the James River Watershed Protected Water Area Regulations.

Interpretation

- 2 In these regulations,
 - (a) "Act" means the Environment Act;
 - (b) "biocide" means a substance capable of killing living organisms that is not registered as a pest control product and includes a toxic chemical;
 - (c) "Board" means the James River Watershed Stewardship Board or its successor;
 - (d) "Department" means the Department of Environment and Labour;
 - (e) "developer" means a person who develops or proposes to develop land and includes any agent or contractor who works for the developer;
 - (f) "development" means any disturbance of land for purposes of constructing roadways, residential dwellings, commercial establishments, recreation areas and parkland;
 - (g) "forestry operation" means any activity related to the use of a forest for producing timber, wood fiber or Christmas trees, including but not limited to the following activities:
 - (i) forest management planning,
 - (ii) silviculture,
 - (iii) harvesting,
 - (iv) watershed protection,
 - (v) road construction,
 - (vi) operation, storage and use of equipment and supplies used in any aspect of the activity;
 - (h) "grab sample" means a sample collected at a time and a place which represents only the composition of the source at that particular time and place;
 - (i) "Minister" means the Minister of Environment and Labour;
 - (j) "pesticide" or "pest control product" has the same meaning as set out in clause 2(q) of the Pesticide Regulations made under the Act;
 - (k) "Protected Water Area" means the land and water designated by the Minister pursuant to subsection 106(1) of the Act as the James River Watershed Protected Water Area, as described in Schedule "A" to the designation;
 - (I) "release" means to spill, discharge, dispose of, spray, inject, inoculate, abandon, deposit, leak, seep, pour, emit, empty, throw, dump, place, drain, pump or exhaust;

- (m) "residential dwelling" means a permanent structure, used for human habitation;
- (n) "vegetation" means any living plant or tree growth;
- (0) "Water Works Operator" means the Town of Antigonish, any designate, or successor or operator of the James River Water Utility;
- (p) "wetland" has the same meaning as set out in clause 2(y) of the Environmental Assessment Regulations made under the Act;
- (q) "Zone 1" means the area of the James River Watershed as outlined approximately as Zone 1 on Map "A" attached to the designation;
- (r) "Zone 2" means the area of the James River Watershed between Zone 1 and the southern edge of the Power Line as outlined approximately as Zone 2 on Map "A" attached to the designation;
- (s) "Zone 3" means the area of the James River Watershed north of Zone 2 as outlined approximately as Zone 3 on Map "A" attached to the designation.

Restricted activities

- 3 (1) No person is permitted to swim, bathe, wash, or cut ice at any time in James River or any other watercourse within the Protected Water Area.
 - (2) No person is permitted to fish from the shoreline of, or in James River between the dam in Zone 1 and the falls in Zone 2.
 - (3) No person is permitted to wash a vehicle in any watercourse or within 60 m of the shoreline or bank of any watercourse within the Protected Water Area.
 - (4) No person is permitted to operate a motorized vehicle of any kind in Zone 1 or 2, unless
 - (a) the motorized vehicle is being operated
 - (i) on a public road,
 - (ii) on a road built under an accepted forest management plan, or
 - (iii) on an access road to private land holdings; and
 - (b) unless the operation of the motorized vehicle is authorized by the Water Works Operator.
 - (5) No person is permitted to operate a vessel of any kind, on, through or over James River or any watercourse in Zones 1 and 2 of the Protected Water Area, unless authorized by the Water Works Operator.
 - (6) No person is permitted to fill a gasoline tank or transfer any liquid fuel from tank to tank on or within 100 m of the shoreline or bank of James River or any watercourse within the Protected Water Area.

Posting of signs

- 4 (1) The Water Works Operator must post signs at road access points around the perimeter of the Protected Water Area to provide notice to the general public of the designation of the Protected Water Area.
 - (2) The Water Works Operator must replace any signs posted under subsection (1) that have

been damaged or removed.

- (3) The Water Works Operator must take reasonable measures to advertise and provide notice to the general public of these regulations.
- (4) No person is permitted to remove or alter any sign, notice or advertisement posted pursuant to this Section without approval of the Water Works Operator.

Fire restrictions

No person is permitted to set, start, maintain or be responsible for an open fire in the Protected Water Area except for an open fire in a barbecue or fireplace designed for cooking purposes at a residential dwelling.

Forestry operations

- 6 (1) No person is permitted to undertake a forestry operation
 - (a) in Zone 1;
 - (b) within 60 m of any watercourse in Zone 2; or
 - (c) within 30 m of any watercourse in Zone 3.
 - (2) A forestry operation conducted within the Protected Water Area must be conducted pursuant to a forest management plan that
 - (a) is prepared by a professional forester in accordance with the Watershed Management Plan for the James River Watershed, approved by the Board dated October 2003, or its successor document, as amended from time to time;
 - (b) complies with all requirements of the Department of Natural Resources; and
 - (c) is approved by the Water Works Operator.

Road construction and maintenance restrictions

- 7 (1) No person is permitted to undertake any road construction or maintenance within the Protected Water Area unless
 - (a) written approval has been obtained in advance from the Water Works Operator; and
 - (b) the road construction and maintenance is undertaken between June 1 and September 30, inclusive, in any year.
 - (2) A person who is responsible for a road constructed under subsection (1) must maintain and repair the road.
 - (3) No person is permitted to expose at any one time more than 1900 square metres of roadway subbase in the Protected Water Area.
 - (4) No person is permitted to apply road salt on any roads or driveways within the Protected Water Area.

Water course or wetland alteration

8 (1) No person is permitted to construct a bridge or culvert or otherwise after a watercourse or

wetland within the Protected Water Area without first obtaining

- (a) written approval from the Water Works Operator; and
- (b) an approval from the Department.
- (2) An owner, operator or person responsible for a bridge or culvert approved under subsection (1)
 - (a) must maintain and repair the bridge or culvert; and
 - (b) is not permitted to remove the bridge or culvert without first obtaining an approval from the Department.

Roads and stream crossings

The construction of a forest access or wood lot road, stream crossing, culvert or other watercourse alteration within the Protected Water Area must be approved by the Water Works Operator.

Pest control products

No person is permitted to use a pest control product or biocide within the Protected Water Area unless the use is related to the operation of the James River Water Treatment Plant and carried out under the supervision of the Town Engineer.

On-site sewage disposal systems

(1) No person is permitted to install an on-site sewage disposal system within the Protected Water Area without the approval of the Water Works Operator and the Department.

Prohibition on release of substance

- 12 (1) No person is permitted to release or cause or permit the release of oil, petroleum products, soap, detergent, toxic chemicals, pest control product waste, garbage, litter, solid or liquid waste, sulphide bearing or acidic slate materials, or any other material that causes or may cause an adverse effect within the Protected Water Area.
- (2) A person who is using mechanical equipment or transporting gasoline or oil within the Protected Water Area is not permitted to release, and must take precautions to prevent the release of, a petroleum product onto the ground or into a watercourse or the runoff from the Protected Water Area.

Prohibition on landfills

No person is permitted to establish a dump, landfill, waste disposal site or disposal site for sulphide bearing or acidic slate materials within the Protected Water Area.

Easement restriction

No person is permitted to construct a road, pipeline, railway, telephone line, power line or other similar development or grant an easement on, over or across the Protected Water Area,

without first obtaining the written approval of the Water Works Operator.

Storm water management

- No developer is permitted to commence any development unless the development is conducted according to a Stormwater Control Plan that is
 - (a) prepared by a professional engineer; and
 - (b) approved in advance by the Water Works Operator in consultation with the Department.

Erosion and sediment control

- (1) No person is permitted to authorize or commence an operation to extract peat, gravel, rock or minerals within the Protected Water Area without the approval of the Water Works Operator.
 - (2) No person is permitted to undertake an activity that causes or might cause soil erosion resulting in sedimentation of a watercourse located within the Protected Water Area.
 - (3) No owner, occupier, contractor or person responsible for a construction operation or an activity within the Protected Water Area requiring grubbing or earth moving that would expose more than 200 m2 of subbase at any time is permitted to proceed without the approval of the Water Works Operator.
 - (4) No person is permitted to release water that has a suspended solid concentration greater than 25 mg/L in a grab sample from any area within the Protected Water Area.
 - 17 If sedimentation occurs in a watercourse within the Protected Water Area, an operator or person responsible for the sedimentation must undertake immediate action to install erosion and sediment control measures, and immediately notify the Water Works Operator.

Watercourse setbacks and buffers

- No person is permitted to erect a structure, excavate, fill or alter the grade of land within 100 m of James River or within 30 m of any watercourse or wetland located in the protected Water Area, unless such activity is
 - (a) related to the operation of the James River Water Treatment System; and
 - (b) approved in advance by the Water Works Operator.

Consultation with the Board

19 The Water Works Operator may consult with the Board before granting any authorization or approval required by these regulations.

Watershed management

The Water Works Operator may conduct activities that are required to maintain, enhance, or protect the source water quality or quantity of the James River Watershed.

MUNICIPALITY OF THE COUNTY OF PICTOU

Land Use Bylaw



Wind Energy Developments

August 2007

Table of Contents

TITLE AND PURPOSE	Page	3
ADMINISTRATION	Page	4
INTERPRETATION	Page	9
GENERAL DEVELOPMENT ZONE	Page	11
DEFINITIONS	Page	13
SCHEDULE "A"	Page	15

Land Use By-law

1. TITLE AND PURPOSE

TITLE

1.1. This By-law shall be known and may be cited as the Land Use By-law for the Municipality of the County of Pictou.

PURPOSE

- 1.2. The purpose of this By-law is to carry out the purpose and intent of the Municipal Planning Strategy in accordance with the provisions of the Nova Scotia Municipal Government Act (Chapter 18, Acts of 1998) as amended, by regulating the development of wind turbines. This By-law shall apply to the Municipality of the County of Pictou shown on Schedule "A", Zoning Map.
- 1.3. This By-law does not exempt any person from complying with other bylaws or regulations in force within the Municipality of the County of Pictou or from obtaining any license, permission, permit, authority or approval required there under. Where any provisions of this By-law conflicts with those of any other Municipal, Provincial or Federal regulation, by-law or code, the more stringent requirement shall prevail.

2. ADMINISTRATION

DEVELOPMENT OFFICER

2.1. This By-law shall be administered by the Development Officer appointed by the Council of the Municipality of the County of Pictou, and the Development Officer shall issue Development Permits under this By-law.

ACTING DEVELOPMENT OFFICER

2.2. In the absence or incapacity of the Development Officer, the Acting Development Officer appointed by Council shall act in the Development Officer's stead.

REQUIREMENT FOR DEVELOPMENT PERMIT

2.3. No person shall undertake, or cause or permit to be undertaken, any wind turbine development in the area to which this Land-Use By-law applies unless a Development Permit has been obtained in relation to such development from the Development Officer or Acting Development Officer, as appointed by Council.

NO PERMIT REQUIRED

2.4. A Development Permit is not required for any development except for wind turbine development.

REQUIREMENT FOR APPLICATION

2.5. Every person wishing to obtain a Development Permit must submit an application for such Development Permit to the Development Officer in the form prescribed from time to time by Council.

CONTENTS OF APPLICATION

- 2.6. Every application for a Development Permit shall be accompanied by a plan drawn to an appropriate scale and showing:
 - 2.6.1. the true shape and dimension of the lot to be used or upon which the development is proposed;
 - 2.6.2. the proposed location, height and dimensions of any building or structure for which the permit is applied and the location information shall include measurements of the lot frontage and front, side and rear yards;
 - 2.6.3. the location of every building or structure already constructed, or partly constructed, on such lot and the location of every building or structure existing upon abutting lots;
 - 2.6.4. the location of any watercourse and location of any existing or proposed building or structure in relation to the watercourse; and
 - 2.6.5. other such information as may be necessary to determine whether or not the proposed development conforms with the requirements of this By-law.

SURVEY OF LANDS

2.7. Where the Development Officer is unable to determine whether the proposed development conforms to this By-law, the Development Officer may require that the plans submitted under Section 2.6 be based upon an actual survey by a Nova Scotia Land Surveyor.

SIGNATURES

2.8. The application for a Development Permit shall be signed by the owner of the lot, or by his or her authorized agent, and shall set forth in detail the current and proposed use of the lot and each building or structure, or part thereof, together with all information necessary to determine whether or not the proposed development conforms to the requirements of this Bylaw.

ISSUANCE OF A DEVELOPMENT PERMIT

- 2.9. The Development Officer shall not issue a Development Permit unless:
 - 2.9.1. the proposed development is in conformance with this By-law; or
 - 2.9.2. the Development Officer has granted a variance from the terms of this By-law, pursuant to the Municipal Government Act and the time for appeal has elapsed or the appeal has been disposed of and the development is otherwise consistent with the requirements of this Land Use By-law.

DEVIATIONS

2.10. No person shall deviate, or allow deviations to be made, from the description of the proposed development that is contained in the Development Permit, unless the developer has obtained a new Development Permit from the Development Officer.

RIGHT OF ENTRY

2.11. Pursuant to the Municipal Government Act, the Development Officer, at all reasonable times, may enter into or upon any property within the area to which this Land Use By-law applies for the purposes of any inspection necessary in connection with the administration of this Bylaw.

LAPSE OF PERMITS

2.12. Every Development Permit issued under this By-law shall automatically lapse, and become null and void, if the development to which it relates has not commenced and three years has passed since its issuance.

REVOCATION OF DEVELOPMENT PERMIT

2.13. The Development Officer may revoke a Development Permit where the development permit was issued based upon false or mistaken information.

DECISION IN WRITING

2.14. Any decision of the Development Officer to refuse the issuance of a Development Permit shall be given by written notice served by ordinary

mail, whereas any decision to revoke a Development Permit shall be given by written notice served by registered mail, and such revocation shall become effective on the third business day after it was sent.

VIOLATIONS

2.15. In the event of any alleged contravention of the provisions of this By-law, the Municipality of the County of Pictou may take action as outlined in the Municipal Government Act, as amended from time to time.

EFFECTIVE DATE

2.16. Pursuant to the Municipal Government Act, this By-law shall take effect on the date a notice is published in a newspaper, circulating in the Municipality, informing the public that the Planning Strategy and its implementing Land Use By-law are in effect.

COST OF NOTICE FOR A VARIANCE

2.17. Pursuant to the Municipal Government Act, where a variance from the requirements of this By-law has been granted or refused, the Development Officer shall give notice to the persons required and in the manner prescribed by the Municipal Government Act, such notice to be served by ordinary mail, and the Municipality shall recover from the applicant the cost of giving such notice.

3. INTERPRETATION

ZONES

3.1. For the purpose of this By-law, the whole of the Municipality of the County of Pictou shall be placed in the General Development Zone, the boundaries of which are shown on the attached Schedule "A". This zone is also referred to by the symbol "GD".

ZONING MAP

3.2. The attached Schedule "A" is titled "Zoning Map" and forms a part of this By-law.

INTERPRETATION OF CERTAIN WORDS

3.3. In this by-law, words used in the present tense include the future; words in the singular number include the plural; words in the plural include the singular number; the word "used" includes "arranged", "designed" or "intended to be used"; the word "shall" is mandatory and not permissive. All other words and phrases carry their customary meaning except for those defined in Part 5 of this By-law, entitled "Definitions".

STANDARDS OF MEASUREMENT

3.4. The Metric System of Measurement is used throughout this By-law and in all cases represents the required standard. Imperial measurements are approximate only, for convenience only, and are not to be regarded as precise.

VARIANCE FROM MINIMUM REQUIREMENTS

- 3.5. In accordance with the requirements of the Municipal Government Act, the Development Officer may not grant a variance for the size of yards (setback requirements) provided the
 - o variance violates the intent of this Land-Use By-law;
 - o difficulty experienced is general to properties in the area; or
 - o difficulty experienced results from an intentional disregard for the requirements of this Land-Use By-law.

4. GENERAL DEVELOPMENT (GD) ZONE

PERMITTED DEVELOPMENTS

4.1. All developments are permitted in the General Development (GD) Zone.

REQUIREMENTS

4.2. No requirements apply to any development except wind turbine development which is subject to the following:

Utility Scale Wind Turbines

- o Minimum setback from residences, except residences located on the same lot as the wind turbine, shall be 600 metres (1968.5 feet). There is no setback requirement from residences located on the same lot.
- Minimum setback from all property lines shall be one times the height of the turbine.
- o Minimum setback from the boundary of a public road shall be 300 metres (984.3 feet);

Domestic Wind Turbines

 Minimum setback from all adjacent lot boundaries shall be one times the height of the turbine.

EXPANSION OF WIND TURBINE DEVELOPMENT

4.3. Notwithstanding the setback requirement from a residence contained in Section 4.2, where a residence is constructed within the setback distance of utility scale wind turbine development erected after the effective date of this Strategy, the wind turbine development may expand. The setback requirement for any expansion shall be the distance from the wind turbine development established after the effective date of this By-law to any residence constructed subsequent to the wind turbine development.

SETBACK ON LAND LEASED FOR WIND TURBINE DEVELOPMENT

4.4. The setback requirement from a property line contained in Section 4.2 is waived where wind turbine development occurs on land where the adjacent property is subject to a lease for that purpose for a term of 19 years or greater. The setback requirement shall apply to any property which is not leased for wind turbine development.

5. DEFINITIONS

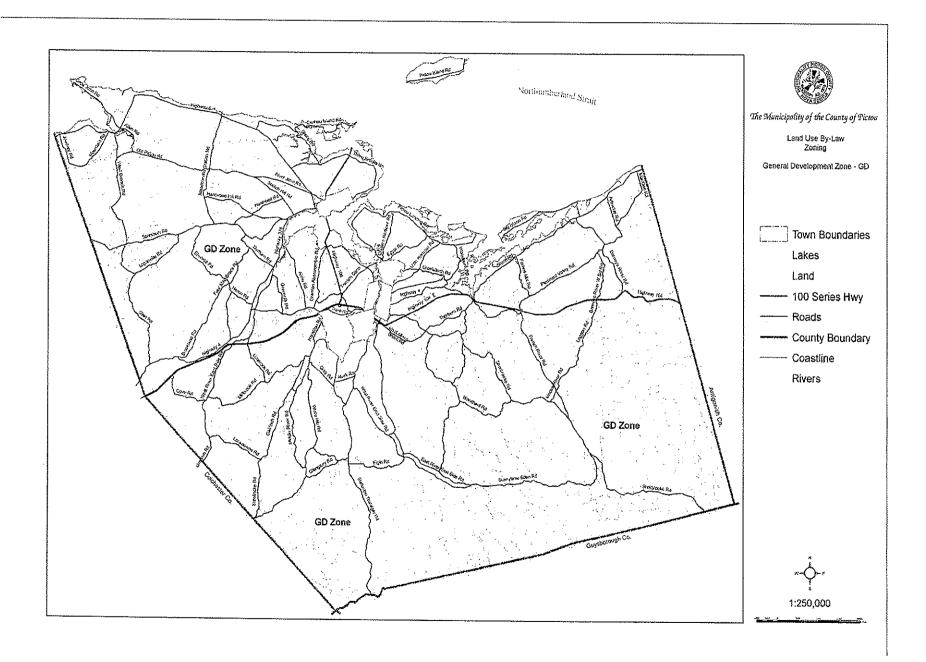
For the purposes of this By-law all words shall carry their customary meaning except for those words and phrases defined in this Part.

- 5.1. **Domestic Wind Turbine** means a wind turbine which has a rated capacity of not more than 200 Kilowatts (kW) and which is intended primarily to reduce on-site consumption of utility power;
- 5.2. **Height of Wind Turbine** means the distance from ground level to the height of a rotor blade in a vertical position;

5.3. Public Road means:

- 5.3.1. any road or highway owned and maintained by the Department of Transportation and Public Works excluding designated controlled access highways pursuant to Section 21 of the Public Highways Act, or
- 5.3.2. any road owned and maintained by the Municipality of the County of Pictou;
- 5.4. **Utility Scale Wind Turbine** means a device for converting wind power to produce electricity of at least 200 Kilowatts (Kw);
- 5.5. **Residence** means a structure used for human habitation, whether for seasonal or permanent occupancy, and is assessed for taxation purposes on the Municipality of the County of Pictou's annual assessment roll.

5.6. **Watercourse** means the bed and shore of every river, stream, lake, creek, pond, spring, lagoon or other natural body of water, and the water therein, whether it contains water or not.



APPENDIX C

Section 5: Letter from Allan Bond



----- Original Message Follows -----

From: Alan J. Bond

To: lisa fulton@canada.com

Subject: Re: municipal planning (drafts)

Date: Wed, 23 May 2007 15:54:21 -0300

Hi Lisa:

Further to our conversation of today's date I wish to confirm that at the present time the Municipality of the County of Antigonish does not have regulations governing the siting of wind turbines in the Municipality. Building permits would obviously be required however there are no planning strategies or land use by-laws specific to wind energy development.

I also wish to acknowledge the information you have provided on the Shear Wind Inc. project and your response to the "draft" by-law being proposed for Pictou County.

Regards, Alan Bond Municipal Clerk/ Treasurer Municipality of the County of Antigonish 863-1117 p

APPENDIX C

Section 6: Letter from Clairie MacKinnon, MLA



Clarrie MacKinnon, MLA Pictou East Westville, NS B0K 2A0

1905 Main Street PO Box 914 phone 396-1853 fax 396-1803

June 20, 2007

Lisa Fulton Fulton Energy Research

Dear Lisa

It is with great interest that I listened to your presentation in my office regarding a proposed wind farm in Barney's River, Pictou County, Nova Scotia.

This is a very exciting project! It is my hope that a partnership with Nova Scotia Power will be established in the very near future. This wind farm will enable residents of a wide area to reduce their ecological footprint, it will provide a substantial tax base for a cash strapped municipality, and lease fees paid to land owners will find their way into our local economy.

I note that you have contacted close to 20 stakeholders, including those with agricultural and environmental interests, recreation clubs, all levels of government and First Nations Bands. The wide scope of research seems to include every aspect of wind farm development.

Once again, thank you for taking the time to enlighten me about this project. I hope you will keep me informed of progress and look forward to hearing from you any time.

Sincerely

Clarrie MacKinnon, MLA Pictou East

APPENDIX C

Section 7: Short List – Species of Concern



Fauna MCODE ELCODE	EON E	ONUISCINAME	COMNAME	GRANK	NPROT
CHARmelc ABNNB03(66	66 Charadrius	Piping Plover	G3	Е
ALCEamer AMALC030		25 Alces amei		G5	
CAPRvoci ABNTA070		7 Caprimulgu	Whip-Poor-Will	G5	
VIREgilv ABPBW01.			Warbling Vireo	G5	
VIREphil ABPBW01.		3 Vireo philad	Philadelphia Vireo	G5	
NYCTnyct ABNGA11(4 Nycticorax	Black-crowned Night-heron	G5	
ASIOotus ABNSB130	7	7 Asio otus	Long-eared Owl	G5	
BUCEisla ABNJB180	1	1 Bucephala	Barrow's Goldeneye - Eastern pop	G5	SC
GLYPinsc ARAAD020	18	18 Glyptemys 1	Wood Turtle	G4	SC
OPHImain IIODO1211	1		Maine Snaketail	G4	
AESHsuba IIODO1417	1	1 Aeshna sul	Subarctic Darner	G5	
LESTeuri IIODO6706	1	1 Lestes euri	Amber-Winged Spreadwing	G4	
SATYacad IILEPD403	1	•	Acadian Hairstreak	G5	
DOROlepi IIODO2801	1	1 Dorocordul	Petite Emerald	G5	
ENALaspe IIODO7111		2 Enallagma		G5	
ALASvari IMBIV0210		1 Alasmidont		G3	
POLYgrac IILEPK508	2	2 Polygonia (Hoary Comma	G5	
Flora				~~~	
		ONUISCINAME		GRANK	NPROT
ATRIacad PDCHE040		•	Maritime Saltbush	G2G4	
HUDStome PDCIS030:			Sand-Heather	G5	
PILEpumi PDURT070		·	Canada Clearweed	G5	
BIDEhype PDAST180			Estuary Beggar-Ticks	G4	
ZIZIaure PDAPI2F0:			Common Alexanders	G5	
AGERalti PDASTBX		_	White Snakeroot	G5 G5	
CUSCcept PDCUS010			Button-Bush Dodder	G5 G5	
CHENrubr PDCHE091			Coast-Blite Goosefoot Rich's Sea-blite	G5T3	
SUAEmari PDCHE0Po CRATrobi PDROS0H				G2G4Q	
		3 Crataegus	Bebb's Sedge	G204Q G5	
CAREbebt PMCYP037 CAREalop PMCYP030			Foxtail Sedge	G5	
JUNCgree PMJUN011		•	Greene's Rush	G5	
DICHacli PMPOA24		4 Dichantheli		G5T5	
CAREvaci PMCYP03I			Estuarine Sedge	GNR	
CAREtine PMCYP03I			Tinged Sedge	G4G5	
CHENrubr PDCHE09			Coast-Blite Goosefoot	G5	
CAREpell PMCYP03:		· ·	Woolly Sedge	G5	
ANEMvirg PDRAN04(•	Virginia Anemone	G5	
ELYMhybi PMPOA2H			Bottlebrush Grass	G5T5?	
DESMcana PDFAB1D(Showy Tick-Trefoil	G5	
ELYMwieg PMPOA2H			Wiegand's Wild Rye	G4G5	
PLANruge PDPLN021		-	Black-Seed Plantain	G5	
SANIodor PDAPI1Z0		~	Black Snake-Root	G5	
IRISpris PMIRI090S			Siender Blue Flag	G4G5	
AMELstol PDROS050		•	Running Serviceberry	G5	
CAREtene PMCYP03I			Slender Sedge	G5	
	-		~		

SUBNAT	SRANK	SPROT	DATASEN	DISTKM	FIRSTOBS	LASTOBS	OBSERVE EODATA
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PE NS	\$1 \$1\$2				. 1999 08 03	2002 08 12 1999 08 03	Curley, R. Descrip.: 1 Pulsifer, M Count: 100
NS	S1			36Km +/-1	19XX XX XX	19XX XX XX	Hills, C.B. Count: 1. S
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NS	S1S2			24Km +/-1		1902 00 29	Smith, EC; Abundance
NS	S102			24Km +/-1			
NS	S1			24Km +/-1			
NS	S1?					19XX XX XX	
NS	S1			26Km +/-1	0		
NS	S1?			26Km +/-5	(19XX XX XX	19XX XX XX	
NS	S1S2					19XX XX XX	
NS	S1					198X XX XX	Oldham, M.J.
NS	S1S2				19XX XX XX		N
NS NS	S1? S1S3				. 2000 07 07 . 1993 06 24	1993 06 24	Newell, RE Pheno.: flo
NS	S133				1993 06 24	1993 00 24	Oldham, M Count: sinç Oldham, M Abundance
NS	S1?					19XX XX XX	Oldridin, M/tbdridaisce
NS	S1				2003 08 16	2003 08 16	Blaney, C.: Abundance
NS	S1S2				1901 00 00	1901 00 00	Robinson, C.B.
NS	S1			38Km +/-1	191X XX XX	191X XX XX	St John, H
NS	S1				2003 08 16	2003 08 16	Blaney, C.: Abundance
NS	S1				2003 08 15	2003 08 15	Blaney, C.: Count: 1. A
NS	S1SE				2003 08 21	2003 08 21	Blaney, C.S Abundance
NS NS	S1				2003 08 21	2003 08 21	Blaney, C.: Count: 5. A
NS PE	S1 S1?			43Km +/-1	0 1952 XX XX	1952 XX XX	Erskine, DS, Erskine,
NS	S1S2				1954 07 01	19XX XX XX	LISKING, DO, LISKING,
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		SHG 2003	1	0	0	0
Soil: NS12(Daury, R.W	16470	SHG 2001	1	0	0	0
•	03653	SHG 2001	3	0	0	0
larva, 1 ear Habitat: riv Brunelle, P 1	95761	SHG 2004	1	0	0	0
NBM Habitat: lak Brunelle, P 1	97672	SHG 2004	3	0	0	0
NBM Habitat: lak Brunelle, P 2	08211	SHG 2004	2	0	0	0
NSM acc# Soil: NS12(Layberry, F 2	17102	SHG 2005	1	0	0	0
NBM Habitat: lak Brunelle, P 2	00029	SHG 2004	3	0	0	0
NBM Habitat: po Brunelle, P 2	09384	SHG 2004	2	0	0	0
NSMNH Soil: NS12(Pulsifer, M 2	12932	SHG 2004	1	0	0	0
NSM acc# Soil: NS12(Layberry, F 2	18757	SHG 2005	1	0	0	0
SPECIMENGENDESCITATION IDN	UM I	EDITION	RARENS ID	A2334	A2337	
Soil: NS12(Zinck, M. 8 1	67755	SHG 2003	1	0	0	0
	20565	SHG 2004	1	0	0	0
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	12561	SHG 2004	1	0	0	0
Soil: NS12(Pronych, G 1	09533 \$	SHG 2004	1	0	0	0
Soil: NS12(Pronych, G 1	16033 \$	SHG 2004	1	0	0	0
Soil: NS12 Pronych, G 1	22657 3	SHG 2004	1	0	0	0
Soil: NS12/Zinck, M. 8 1	67758 \$	SHG 2003	1	0	0	0
Soil: NS12(Pronych, G 1	20465 9	SHG 2004	1	0	0	0
Soil: NS12/Roland, A.I 1	67939 \$	SHG 2003	1	0	0	0
Soil: NS12(Zinck, M. 8 1	67708 5	SHG 2003	1	0	0	0
Soil: NS12(Zinck, M. 8 1	67610 5	SHG 2003	1	0	0	0
Habitat: du Zinck, M. 8 1	67572 5	SHG 2003	1	0	0	0
ACAD acct Habitat: ed Newell, R.E 2	20178 \$	SHG 2005	1	0	0	0
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		SHG 2004	1	0	0	0
•		SHG 2003	1	0	0	0
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•		SHG 2004	1	0	0	0
G .		TMP 2001	3	0	0	0
Habitat: sw Roland, A.I 1	48035 5	SHG 2002	1	0	0	0

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APPENDIX C

Section 8: Preliminary Geotechnical Assessment, Jacques Whitford Ltd.





Environmental Engineering Scientific Wanagement Consultants

Unit 1 26 Paint Street Port Hawkesbury NS Canada 89A 3J8

> Bus 902 625 3655 Fax 902 625 3700

www.jacqueswhitford.com







Jacques Whitford

An Environment of Exceptional Solutions

CONFIDENTIAL

VIA FACSIMILE VIA EMAIL (902) 759 6626 lisa_fulton@canada.com

Job No. 1027791

August 2, 2007

Ms. Lisa Fulton Fulton Energy Research 796 Dan Fraser Road RR#3 Westville, NS BOK 2A0 On behalf of Shear Wind Inc.

Dear Ms. Fulton:

RE: Preliminary Geotechnical Assessment, Proposed Wind Farms Glen Dhu Wind Farm, Barney's River, NS

Jacques Whitford Limited, acting at your request, has completed a preliminary geotechnical site assessment for the project noted above. Based on our recent telephone conversation and your email of June 4, 2007, we understand the assessment will be used to gain a better understanding to the general soils and bedrock conditions at the site to assist with the design and budgeting of a site geotechnical survey in advance of design and construction of the project.

This report is intended for preliminary use and should be used in conjunction with a full geotechnical report based on subsurface information obtained at each wind tower location.

Our scope of work for this assessment included the following:

- Review of bedrock and surficial geological mapping;
- Site visit to project location, conducted on June 27, 2007;
- Preparation of this report.

Surficial Geology

The surficial geology of the proposed wind farm location generally consists of five formations. Bedrock is often encountered at the surface (outcropping) in many areas, while soil cover consists of mainly stoney glacial till (ground moraine) deposits. Other formations in this area include hummocky ground moraine, residuum (weathered bedrock) and silty till plain (ground moraine).

a.) Stoney Glacial Till (ground moraine) deposits

The stoney glacial tills are generally found to be of a compact to dense relative density. These soil conditions are generally suitable for spread footings construction for this application.

Project No.: 1027791

Ms. Lisa Fulton Page 2 of 4 August 2, 2007

b.) Hummocky Ground Moraine

Hummocky ground moraine deposits typically consist of compact gravel and sand and are generally not consistent within the soil strata. These soil conditions are generally suitable for spread footings construction for this application

c.) Residuum (weathered bedrock)

Residuum is bedrock that has become mechanically and chemically altered due to weathering to become soft and unconsolidated. These conditions are generally suitable for spread footings construction for this application.

d.) Silty Glacial Till (ground moraine)

The silty glacial tills are generally found to be of a compact to dense relative density. These soil conditions are generally suitable for spread footings construction for this application.

e.) Surface Bedrock

Bedrock at the surface is typically weathered and in some cases may be rippable with a large sized dozer. Bedrock outcrops are observed in these areas, but generally will have a thin soil cover which supports vegetation and may have thin overlying till layers. Towers at these locations may have to be anchored to the bedrock by means of grouted rock anchors.

Bedrock Geology

The bedrock geology of the proposed wind farm site generally consists of two groups of bedrock; the Georgeville Group (3GG) and the Arisaig Group (LO-EDA), with the majority of the proposed wind towers in the area of the Georgeville Group. Within these two bedrock groups are various formations. Included in the Georgeville Group is the Maple Ridge Formation (3Gr), James River Formation (3Gj), Keppoch Formation (3Gk) and the South Rights Formation (3Gs). The Arisaig Group includes the Beechhill Cove, Ross Brook, French River, McAdam, Moydart and Stonehouse Formations (SA) and the Bears Brook Formation (OSAb). A desktop review of the bedrock geology showed the following:

a.) Georgeville Group (3GG)

i. Maple Ridge Formation (3Gr)

This formation consists of deep water mudstone, siltstone and wacke.

ii. James River Formation (3Gi)

This formation consists of conglomerate, wacke, mudstone and minor basalt.

iii. Keppoch Formation (3Gk)

This formation consists of siltstone, slate and wacke.

iv. South Rights Formation (3Gs)

This formation consists of deep water laminated mudstone and siltstone.



b.) Arisaig Group (LO-EDA)

i. <u>Beechhill Cove, Ross Brook, French River, McAdam, Moydart and Stonehouse Formations (SA)</u>

This formation consists of marine siltstone, mudstone, shale, minor limestone, arkose and rhylite.

Project No.: 1027791

ii. Bears Brook Formation (OSAb)

This formation consists of sandstone, arkose, conglomerate, siltstone, basalt, and rhyolite.

Please note this information should be used for preliminary planning purposes. Geological mapping is very approximate and often interpolated from limited data. A geotechnical field program would be required to accurately assess subsurface conditions at each windmill location in order to provide engineering input and recommendation for site development and foundation design of wind turbine foundations.

The following table provides a summary of surficial and bedrock geology conditions of the areas of each proposed tower location following a desktop review based on mapping produced by the Nova Scotia Department of Natural Resources. Please note that conditions encountered in the field may vary from those indicated by the mapping.

Table 1 Summary of Surficial and Bedrock Geology

Proposed Wind Tower Location	Surficial Geology	Till Formation	Bedrock Formation		
11	Bedrock		SA		
2	Till	Stoney Glacial Till	3Gj		
3	Till	Stoney Glacial Till	3Gr		
44	Till	Stoney Glacial Till	3Gr		
5	Bedrock		3Gj		
6	Till	Stoney Glacial Till	3Gr		
7	Till	Silty Glacial Till	SA		
8	Till	Stoney Glacial Till	3Gr		
9	Till	Stoney Glacial Till	3Gr		
10	Residuum		3Gr		
11	Till	Stoney Glacial Till	3Gr		
12	Bedrock		SA		
13	Till	Stoney Glacial Till	3Gs		
14	Bedrock		3Gj		
15	Bedrock	***	3Gj		
16	Bedrock	***	3Gj		
17	Till	Stoney Glacial Till	3Gr		
18	Till	Stoney Glacial Till	3Gr		
19	Till	Hummocky Ground Moraine	3Gr		
20	Till	Stoney Glacial Till	3Gr		
21	Bedrock		SA		
22	Till	Stoney Glacial Till	3Gi		
23	Bedrock		3Gr		
24	Till	Stoney Glacial Till	3Gr		
25	Residuum		3Gk		
26	Till	Silty Glacial Till	SA		
27	Bedrock		SA		
28	Bedrock		3Gr		
29	Bedrock	NHA	SA		
30	Bedrock		3Gj		



Ms. Lisa Fulton Page 4 of 4 August 2, 2007

31	TIII	Siity Glacial Till	3Gs
32	Bedrock	****	3Gr
33	Residuum	***	3Gr
34	Bedrock	***	SA
35	Residuum	4-4	3Gk
36	Till	Stoney Glacial Till	3Gr
37.	Bedrock	****	3Gj
38	Bedrock	an t-mu	OSAb
39	Residuum	***	3Gj
40	Bedrock	***	OSAb
41	Till	Silty Glacial Till	3Gs
42	Residuum	4	3Gj
43	Bedrock		3GJ
44	Residuum	·	3Gs
45	Residuum		3Gs
46	Till	Stoney Glacial Till	3Gr
47	Bedrock		OSAb
48	Residuum	***	3Gj
49	Residuum		3Gj
50	Till	Stoney Glacial Till	3Gr

If you have any questions or require any further details, please contact the undersigned at your convenience.

Yours very truly,

JACQUES WHITFORD

Mark L. Macdonald, P.Eng. Port Hawkesbury, NS

/mmd



APPENDIX C

Section 9: Seismicity





Natural Resources Canada Ressources naturelles Canada



Earthquake zones in Eastern Canada

P 'kground on earthquakes in eastern Canada

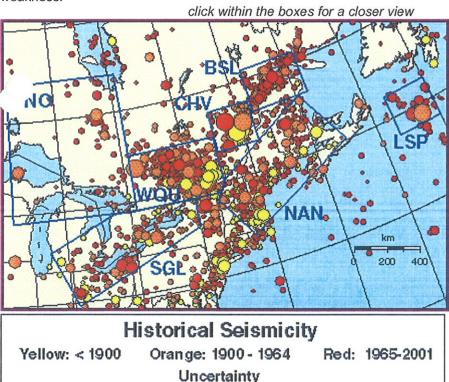
continual shifting of large segments of the earth's crust, called tectonic plates, causes more than 5. 6 of the world's earthquakes. Eastern Canada is located in a stable continental region within the North American Plate and, as a consequence, has a relatively low rate of earthquake activity. Nevertheless, large and damaging earthquakes have occurred here in the past and will inevitably occur in the future.

Rate of Activity

Each year, approximately 450 earthquakes occur in eastern Canada. Of this number, perhaps four will exceed magnitude 4, thirty will exceed magnitude 3, and about twenty-five events will be reported felt. A decade will, on average, include three events greater than magnitude 5. A magnitude 3 event is sufficiently strong to be felt in the immediate area, and a magnitude 5 event is generally the threshold of damage. The seismograph network of Earthquakes Canada can detect all events exceeding magnitude 3 in eastern Canada and all events magnitude 2.5 or greater in densely populated areas.

Causes

The causes of earthquakes in eastern Canada are not well understood. Unlike plate boundary regions where the rate and size of seismic activity is directly correlated with plate interaction, eastern Canada is part of the stable interior of the North American Plate. Seismic activity in areas like these seems to be related to the regional stress fields, with the earthquakes concentrated in regions of crustal weakness.



• 2.5 ≤ M < 3.0 • M ≥ 3.0 • M ≥ 4.0 • M ≥ 5.0 • M ≥ 6.0 Although earthquakes

+/- 25km

can and do occur throughout most of eastern Canada, years of instrumental recordings have identified certain clusters of earthquake activity. In these clusters, earthquakes occur at depths 'ng from surface to 30 km (the deepest mine in Canada is 2 km deep). More information is able on the historical seismicity of the following regions in Eastern Canada:

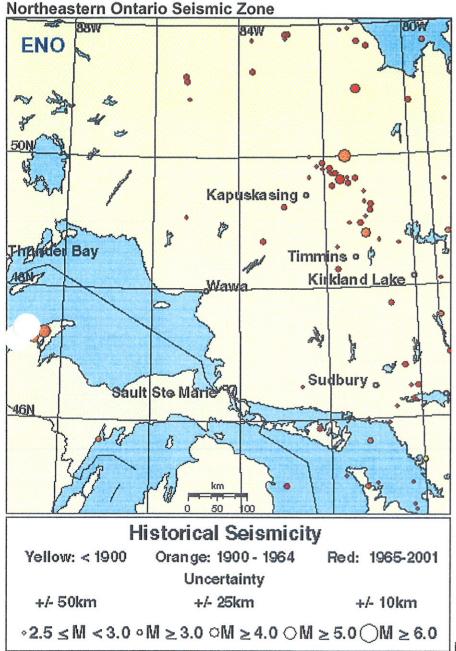
+/- 10km

- Northeastern Ontario (ENO)
- Southern Great Lakes (SGL)
- West Quebec (WQU)

+/- 50km

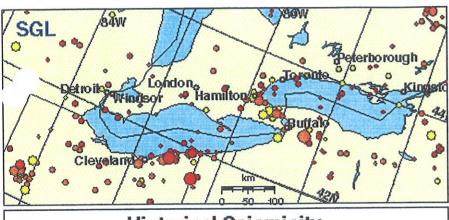
Charlevoix-Kamouraska (CHV)

- Lower St. Lawrence (BSL)
- Northern Appalachians (NAN)
- Laurentian Slope (LSP)



Very low level of seismic activity. From 1970 to 1999, on average only 1 or 2 magnitude 2.5 or greater earthquakes have been recorded in this large area. Two magnitude 5 earthquakes (1905, northern Michigan, and 1928, northwest of Kapuskasing) have occurred in this region.

Sthern Great Lakes Seismic Zone



Historical Seismicity

Yellow: < 1900 Orange: 1900 - 1964 Red: 1965-2001

Uncertainty

+/- 50km +/- 25km

+/- 10km

• 2.5 ≤ M < 3.0 • M ≥ 3.0 • M ≥ 4.0 ○ M ≥ 5.0 ○ M ≥ 6.0
</p>

This region has a low to

moderate level of seismicity when compared to the more active seismic zones to the east, along the Ottawa River and in Quebec. Over the past 30 years, on average, 2 to 3 magnitude 2.5 or larger earthquakes have been recorded in the southern Great Lakes region. By comparison, over the same time period, the smaller region of Western Quebec experienced 15 magnitude 2.5 or greater earthquakes per year.

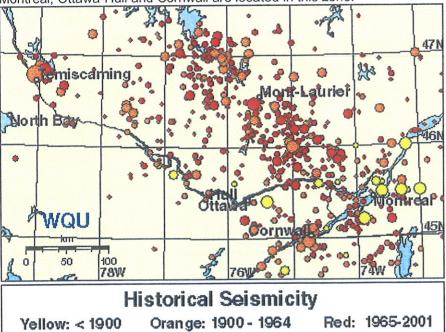
Three moderate sized (magnitude 5) events have occurred in the 250 years of European settlement of this region, all of them in the United States - 1929, Attica, New York, 1986, near Cleveland, Ohio, and 1998, near the Pennsylvania/Ohio border. All three of these earthquakes were widely felt in

southern Ontario but caused no damage in Ontario.

stern Quebec Seismic Zone

The Western Quebec Seismic Zone constitutes a vast territory that encloses the Ottawa Valley from Montreal to Temiscaming, as well as the Laurentians and the Eastern Ontario. The urban areas of

Montreal, Ottawa-Hull and Cornwall are located in this zone



Orange: 1900 - 1964 Red: 1965-2001

Uncertainty

+/- 25km +/- 50km

+/- 10km

•2.5 ≤ M < 3.0 • M ≥ 3.0 • M ≥ 4.0 ○ M ≥ 5.0 ○ M ≥ 6.0

The pattern of historical

shows the earthquakes concentrating in two sub-zones: one along the Ottawa River and the second along a more active Montreal-Maniwaki axis. <u>Between 1980 and 2000</u>, the earthquakes located by the seismograph network follow the main trends observed for the older earthquakes.

orical Seismicity

The Western Quebec Zone was the site of at least three significant earthquakes in the past.

- In 1732, an earthquake estimated at 5.8 on the Richter scale shook Montreal, causing significant damage.
- In 1935, the area of Temiscaming was shaken by an earthquake of magnitude 6.2.
- In 1944, an earthquake of magnitude 5.6, located between Cornwall, Ontario and Massena, N.Y., caused damage evaluated at two million dollars of the time.

From time to time, the area is also shaken by weaker earthquakes felt by the local population. Between 1980 and 2000, 16 earthquakes reached or exceeded a magnitude of 4.0 on the Richter scale.

- In 1990, an earthquake of magnitude 5 took place near Mont-Laurier, Quebec.
- In 1996 and 1997, two earthquakes of magnitude 4.4 and 4.3 occurred near Ste-Agathe-des-Monts, Quebec.

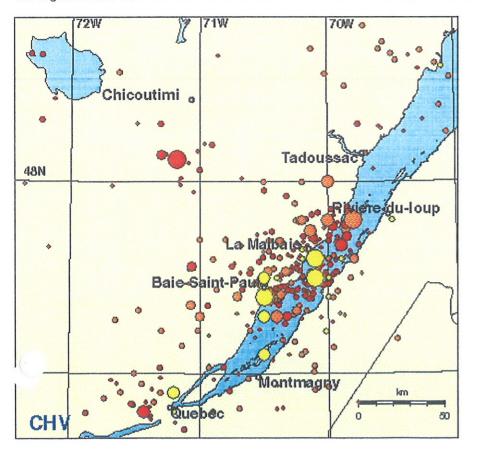
An earthquake occurs in the Western Quebec Seismic Zone every five days on average.

For more information

- View seismicity during the <u>last 30 days</u>.
- Annual reports: <u>1998</u> <u>1999</u> <u>2000</u> <u>2001</u>
- Research papers describing the geological, geophysical and seismological characteristics of the seismic zone.

Charlevoix Seismic Zone

Yed some 100 km downstream from Quebec City, the Charlevoix Seismic Zone (CSZ) is the most iically active region of eastern Canada. As most earthquakes occur under the St. Lawrence hiver, between Charlevoix County on the north shore and Kamouraska County on the south shore, this region is also often referred to as the Charlevoix-Kamouraska Seismic Zone.



Historical Seismicity

Yellow: < 1900

Orange: 1900 - 1964

Red: 1965-2001

Uncertainty

+/- 50km

+/- 25km

+/- 10km

•2.5 ≤ M < 3.0 ∘ M ≥ 3.0 ∘ M ≥ 4.0 ⊖ M ≥ 5.0 ⊕ M ≥ 6.0
</p>

Historically, the zone has been subject to five earthquakes of magnitude 6 or larger: in $\underline{1663}$ (Mag. 7); $\underline{1791}$ (Mag. 6); $\underline{1860}$ (Mag. 6); $\underline{1870}$ (Mag. 6 1/2); and $\underline{1925}$ (magnitude M_S 6.2 \pm 0.3). Since the 1925 event was the only one recorded by seismographs, the previous events have approximate magnitudes evaluated using felt areas and damage. Similarly, pre-instrumental locations of events are less precise. Overall, the distribution of historical and recent events shows an earthquake concentration between La Malbaie and Rivière-du-Loup. The earthquake potential of the CSZ led the GSC to conduct two field surveys in 1970 and 1974. These two surveys clearly delineated the CSZ to be an active zone about 30 by 85 km, elongated along the St. Lawrence River, and enclosing the towns of Baie-St-Paul, La Malbaie and La Pocatière.

Earthquake Hypocentres

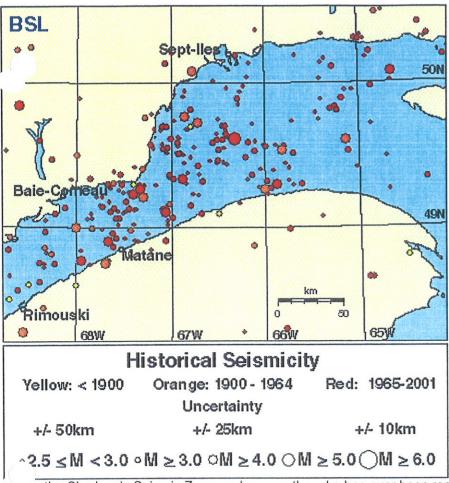
Significant Signif

For more information

- View seismicity during the <u>last 30 days</u>.
- Annual reports: <u>1998</u> <u>1999</u> <u>2000</u> <u>2001</u>
- Related publications.

Lower St. Lawrence Seismic Zone

Located some 400 km downstream from Quebec City in the estuary of the St. Lawrence River, the Lower St. Lawrence Seismic Zone (LSZ) is a seismically active region of eastern Canada. As most earthquakes occur under the St. Lawrence River, between the regions of the Quebec North Shore and the Lower St. Lawrence, this zone is sometimes referred to as the "Lower-St. Lawrence-Quebec North Shore" Seismic Zone.



ke the Charlevoix Seismic Zone, no large earthquake has ever been reported or recorded in the L5Z. Only two events are known to have exceeded magnitude 5.0. On June 23, 1944, an earthquake of magnitude 5.1 on the Richter scale occurred occurred near Godbout, east of Baie-Comeau. More recently, on March 16, 1999, an earthquake of magnitude 5.1 occurred in this region, at about 60 km south of Sept-Iles. Over the years, numerous lower magnitude events have been recorded. Between 1977 and 1997, the Lower St. Lawrence Zone has had five earthquakes of magnitude 4.0 or larger, whereas Charlevoix has had eight during the same period.

The region is closely monitored by a network of five local stations of the <u>Canadian National Seismograph Network</u>. With the current network, all earthquakes larger than about magnitude 2 on the Richter scale can be located. Hence, all earthquakes that could be felt (i.e. larger than magnitude 2.5) can be detected by the network and located by the analysts of the Geological Survey of Canada. About 60 events are recorded in the LSZ annually. Most earthquakes occur under the St. Lawrence River, within a triangular zone defined by the towns of Baie-Comeau, Sept-lles, and Matane on the south shore.

Although the network is not sufficiently dense to accurately determine earthquake focal depths, it can be assumed that the active zone lies in the mid- to upper crust, between 5 and 25 km depth, similar to the Charlevoix Seismic Zone (CSZ). From some focal mechanism determinations (see references below) and by analogy with the CSZ, most earthquakes probably cluster along or between the mapped lapetan faults (also called St. Lawrence paleo-rift faults), beneath the Logan's line and the Appalachians.

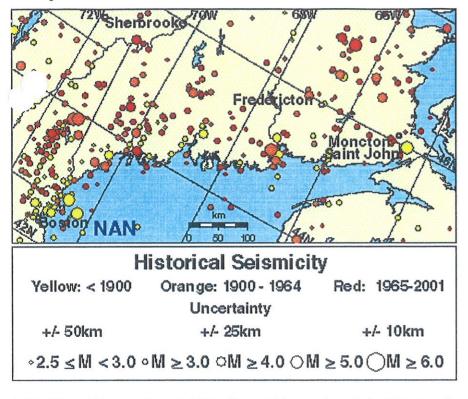
A Lower St. Lawrence earthquake occurs every five days on average.

For more information

- View seismicity during the <u>last 30 days</u>.
- Annual reports: <u>1998</u> <u>1999</u> <u>2000</u> <u>2001</u>
- Research papers describing the geological, geophysics and seismological characteristics of the seismic zone.

Northern Appalachians Seismic Zone

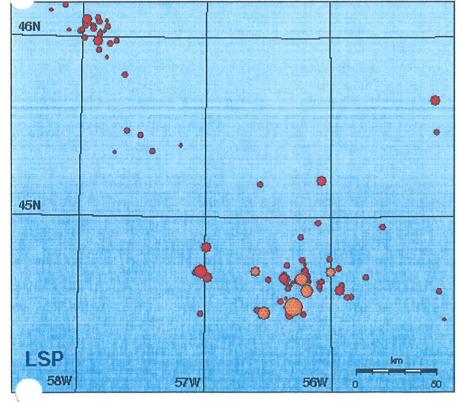
The Northern Appalachians Seismic Zone includes most of New Brunswick and extends into New England down to Boston.



In the <u>Miramichi area</u> of central New Brunswick, a series of significant earthquakes occurred in 1982 (largest M5.7) and was followed by numerous aftershocks thereafter. The zone also witnesses a continuing low level of seismic activity including many <u>larger historic earthquakes in New Brunswick</u>.

Laurentian Slope Seismic Zone

T' aurentian Slope Seismic Zone comprises an area off Canada's southeast coast, which includes are considered as a coast of the coast of



Historical Seismicity

Yellow: < 1900

Orange: 1900 - 1964

Red: 1965-2001

Uncertainty

+/- 50km

+/- 25km

+/- 10km

 \circ 2.5 \leq M <3.0 \circ M \geq 3.0 \circ M \geq 4.0 \circ M \geq 5.0 \circ M \geq 6.0

In 1929 a large M7.2 earthquake occurred near the Grand Banks and was responsible for a large tsunami (seismic sea-wave) which tragically drowned 27 people when it came ashore on the Burin Peninsula in southern Newfoundland. This was one of the few incidents involving loss of life in any recorded Canadian earthquake.

Last modified 2006-02-23 http://earthquakescanada.nrcan.gc.ca/zones/eastcan_e.php

Important notices

Appendix C

Section 10: Aeronautical Obstruction Form (Glen Dhu)



Transports Canada

STANDARDS OBSTRUCTION MARKINGS — AERONAUTICAL OBSTRUCTION CLEARANCE FORM

PURPOSE OF FORM

The purpose of this form is to specify the location of new or altered structures that may pose a hazard to aviation. It also allows Transport Canada (TC) to identify proposals that conflict with Air Regulations or, as necessary, to advise the applicant of marking and lighting requirements. This form does not constitute authority for construction.

WHEN TO COMPLETE THE FORM

Completed forms, or computer generated copies in the same format, shall be submitted in triplicate at least 90 days prior to all alterations which increase the structure's height; or for proposed new stuctures only if:

- the new structure is within six (6) kilometres of the centre of an aerodrome, or two (2) kilometres of a TC radar, radio navigation or radio communication antenna; or
- (ii) the new structure exceeds 20 metres in height, including catenary wire crossings; or,
- (iii) the new structure is within 15 metres and exceeds the height of a dominant structure already in place.

SUPPORTING DATA AND DOCUMENTS REQUIRED

- a 1:50,000 scale map, clear photocopy of same, or the most detailed map available to allow determination of the structure's latitude and longitude.
- (ii) sketches, plans or blueprints for structures other than radio or TV antennae.

Completed applications are to be forwarded to the applicable Transport Regonal office listed on reverse.

NORMES D'IDENTIFICATION DES OBSTACLES — FORMULAIRE D'AUTORISATION D'OBSTACLE AÉRIEN

BUT DU FORMULAIRE

Le but de ce formulaire est de spécifier l'emplacement des structures nouvelles ou modifiées qui pourraient présenter un danger à l'aviation. Cela permet également à Transports Canada d'identifier les propositions qui entrent en conflict avec les Règlements de l'Air ou, si nécessaire, d'informer le requérant des exigences d'obstacles et de balisage lumineux. Ce formulaire ne constitue pas une autorisation de construction.

QUAND REMPLIR LE FORMULAIRE

Les formulaires remplis, ou des copies produites par un ordinateur dans le même format, doivent être soumis en 3 copies au moins 90 jours avant toute altération modifiant la hauteur de la structure; ou pour nouvelles structures seulement si:

- la structure est à moins de six kilomètre du centre d'un aérodrome, ou deux kilomètres d'un radar de Transports Canada, d'une radio navigation ou d'une antenne de radiocommunication; ou
- (ii) la nouvelle structure dépasse 20 mètres dans sa hauteur, incluant les traverses de lignes caténaires; ou
- (iii) la nouvelle structure est à l'intérieur d'une distance de 15 mètres et dépasse en hauteur une structure dominante déjà en place.

RENSEIGNEMENTS ET DOCUMENTS SUPPLÉMENTAIRES REQUIS

- (i) une carte géographique à l'échelle 1:50,000 ou une photocopie très claire, déterminant la longitude et la latitude de la structure; ou si une telle carte n'est pas disponible, la carte la plus détaillée possible; et
- (ii) le croquis, et le plan de la structure à ériger sauf pour les antennes de radio ou de télévision.

Les formulaires doivent être dûment complétés et envoyés au bureau régional de Transports Canada énuméré au verso.



TRANSPORT CANADA AVIATION REGIONS **GROUPE AVIATION DE TRANSPORTS CANADA (GATC)**

Pacific Region

Regional Manager

Aerodrome Safety

Transport Canada

P.O. Box 220

800 Burrard St.

Vancouver, British Columbia

V6Z 2J8

Telephone: (604) 666-2103

(Pacific Region - British Columbia)

Prairie and Northern Region

Regional Manager

Aerodrome Safety

Transport Canada

P.O. Box 8550

Winnipeg, Manitoba

R3C 0P6

Telephone: (204) 983-1362 (Manitoba,

Saskatchewan and Nunavut)

(403) 495-5181 (for Alberta, Yukon and

N.W.T.)

Ontario Region

Regional Manager

Aerodrome Safety

Transport Canada

4900 Yonge Street

Suite 300

Willowdale, Ontario M2N 6A5

Telephone: (416) 952-0235

(Ontario Region - Ontario)

Quebec Region

Regional Manager

Aerodrome Safety

Transport Canada

700 Leigh Capréol

Dorval, Quebec

H4Y 1G7 Telephone: (514) 633-3252

(Quebec Region - Quebec)

Atlantic Region

Regional Manager

Aerodrome Safety

Transport Canada

P.O. Box 42

Moncton, New Brunswick

E1C 8K6 Telephone: (506) 851-7243

(Atlantic Region - New Brunswick, Nova Scotia,

Prince Edward Island and Newfoundland,

including Labrador)

Région du Pacifique

Gestionnaire régional

Sécurité des aérodromes

Transports Canada

Boîte postale 220

800, rue Burrard

Vancouver (Colombie-Britannique)

V6Z 2J8 Téléphone: (604) 666-2103

(Région du Pacifique - Colombie-Britannique)

Région des Prairies et du nord

Gestionnaire régional

Sécurité des aérodromes

Transports Canada

Boîte postale 8550

Winnipeg (Manitoba)

R3C 0P6

Téléphone: (204) 983-1362 (Manitoba,

Saskatchewan et Nunavut)

(403) 495-5181 (Alberta, Yukon et T.N.-O.)

Région de l'Ontario

Gestionnaire régional

Sécurité des aérodromes

Transports Canada

4900, rue Yonge

Suite 300

Willowdale (Ontario) M2N 6A5

Téléphone: (416) 952-0235

(Région de l'Ontario - Ontario)

Région du Québec

Gestionnaire régional

Sécurité des aérodromes

Transports Canada

700, rue Leigh Capréol

Dorval (Québec)

H4Y 1G7 Téléphone: (514) 633-3252

(Région du Québec - Québec)

Région de l'Atlantique

Gestionnaire régional

Sécurité des aérodromes

Transports Canada

Boîte postale 42

Moncton (Nouveau-Brunswick) E1C 8K6

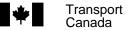
Téléphone: (506) 851-7243

(Région de l'Atlantique, qui comprend le

Nouveau-Brunswick, la Nouvelle Écosse, l'Île du

Prince-Édouard et Terre-Neuve, incluant le

Labrador).



port Transports da Canada

APPENDIX C TO CAR 621.19 - ANNEXE C RAC 621.19

TC File No./Ref No. – TC n° du dossier/N° de réf.

AERONAUTICAL OBSTRUCTION FORMUL CLEARANCE FORM D'OBSTA

FORMULAIRE D'AUTORISATION D'OBSTACLE AÉRIEN

OLLANAITOL I OINIII	D ODO I A CELE AL	· · · · · · · · · · · · · · · · · · ·			,		
TO BE C Operator's Name – Nom de l'opérateur	OMPLETED BY APPLICAN	IT – À REMPLIR PAR LE RI	EQUÉRANT				
Operator's Address – Adresse de l'opérateur							
Operator's Contact – Agent de liaison de l'opérateur							
Contact's Telephone No. – N° de téléphone de liaison	Contact's FAX No. – N° de	táláconiaur da liaison	Contact's Email Add	dress – Adresse électro	onique de ligison		
· · · · · · · · · · · · · · · · · · ·		telecopieur de liaison	Contact's Email Aud	iless – Aulesse electic	oriique de ilaisori		
Applicant's Name – Nom du requérant Address – Adresse							
City – Ville	Province/Territory - Province/Territoire			Postal – Code – post	Postal – Code – postal		
Applicant's Telephone No. – N° de téléphone du requérant	Applicant's FAX No. – N° d	le télécopieur du requérant	Applicant's Email Ad	ddress – Adresse élect	ldress – Adresse électronique du requérant		
Nearest city / town to proposed facility Ville la plus proche de la structure proposée Geographic	coordinates of structure – c		de la structure " W Longtitude Longtitude O	NAD27 N	IAD83 WGS84		
l .	THER STRUCTURE		<u> </u>	Feet - Pieds	Meters – Mètres		
TOURS/ANTENNES BATHMENT OUR		A Height above ground Hauteur au-dessus du s	ol				
		B Building height Hauteur du bâtiment					
		C Ground elevation above Hauteur du sol au-dessu					
		List any tall adjacent buildir shield the proposed structu		nich may			
	B 	Faire une liste indiquant les projeté (Inclure un diagram	s structures et bâtime	nts avoisinants plus ha	ut que le bâtiment		
New struc. – Nouv. struc. Add. to exist. struc.	incl. total hght. – Ajout à un	bâti. exis. incl. hauteur total	Proposed Constru	uction – Date – de con	struction proposée		
Oui Non							
TYPE OF STRUCTURE (narrative description and function) –	TYPE OF STRUCTURE (narrative description and function) – GENRE DE STRUCTURE (description narrative et fonction)						
Signature (of applicant) (du requérant)				Date (Y/A-M-D/J)			
TRANSPORT CANADA USE ONLY – À L'USAGE DE TRANSPORTS CANADA							
Site acceptable – Emplacement acceptable	DNAUTICAL ASSESSMENT	Γ – ÉVALUATION AÉRONA	UTIQUE				
Yes No (if no, reason) Non (si non, pourquoi)							
Lighting as per (TP382) required – Balisage lumineux tel que de la light yes No or Non ou	demandé au (TP382)						
Painting as per (TP382) required – Balisage peint tel que dem	andé au (TP382)						
Oui Non ou Temporary lighting required – Nécessité d'un balisage luminet	ux temporaire						
Yes No (if yes, type) Oui Non (si oui, de quel genre)							
Advise Transport Canada in writing 90 days before construction Avertir Transports Canada par écrit 90 jours avant la construction	when const au commer	ruction starts ncement de la construction	and on comple et à la fin des t		usqu'au		
Civil Aviation Inspector (as required) – Inspecteur Aviation Civile (si nécessaire) Comments – Commentaires							
				(Y/A-M	-D/J)		
Signatu	Signatur	е		Date (Y/A-M-D/J)			
Regional Manager Aerodrome Safety Gestionaire Régional Sécurité des aérodromes	· -		1	Date (1/A-IVI-D/J)			

