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The views expressed in this report are not necessarily those of Industry Canada or the Government of Canada.

Report On:
the National Antenna Tower Policy Review

This study was performed pursuant
to Contract for Services No. 5007559
between Industry Canada and the
University of New Brunswick (UNB)

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Table of Contents

Section F - Appendices

Foreword

This project was undertaken at the request of Industry Canada. Mr. Rob Cepella was the departmental project officer for the study. The report addresses six policy questions - five of which were developed by Industry Canada and one by the author, David A. Townsend. These questions were developed as the framework to conduct a thorough study and public consultation on the current environment related to Canada's authorization processes for radiocommunication antennas and their supporting structures.

During the data collection phase of this project a number of sources were utilized: A bilingual e-town hall Web site was developed and mounted for public access, interaction and input. In-person and teleconference meetings were held with citizens and citizen groups wishing to have input into this consultation, with the major radiocommunication stakeholders in Canada, with companies peripherally related to antenna tower structures, with government officials at every level and with environmental advocates. Formal Written Submissions were made by numerous interested parties and hundreds of informal e-mail and telephone comments were received from across the country. Many of these were mounted on the Web site to allow comment and discussion amongst the relevant parties. Finally, extensive independent research was conducted over the contract period.

Monthly teleconference meetings were held with the National Antenna Tower Review Advisory Committee - a panel of experts appointed by Industry Canada from across the country whose mandate was "to support and assist the consultation and research activities undertaken by the contractor." This group met in Ottawa in late June in order to offer feedback and input for the writing of the final report.

The conclusions and recommendations of this report reflect the judgment of the researcher and are solely his responsibility. The gracious cooperation of all the individuals and organizations who provided input is gratefully acknowledged.

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Acknowledgments

Members of the University of New Brunswick Project Team, including Keith Culver, Paul Howe, Stephen Grant, and Mark Gallagher of xwave Solutions Inc., an Aliant Company, were essential to the successful completion of the project. Another essential team member, Veronica McGinn of the Centre for Property Studies at UNB, handled many of the administrative and organizational details of this contract. The Centre for Property Studies was particularly instrumental during the organizational stages for this project. [For more information on the members of the UNB team and their role see Section B.]

The members of the National Antenna Tower Review Advisory Committee have been generous with their time and expertise in providing advice and feedback during the course of this research. Committee members are: Rod Dobell, Mary McBride, Frank Leonard, Nick Makale, Roger Poirier, Christine Racine and Bill Rowat. [For more information on the members of this committee and their role see Section B.]

Over the course of this contract, I have had numerous communications with Rob Cepella of Industry Canada. He has always been helpful and supportive. As well, Michelle Beaupré provided administrative and support services to the National Advisory Committee and helped on many occasions with other project details.

I am deeply indebted to Kirsten Drake-McKnight, UNB law student, for her invaluable assistance in the research and writing of this report. As well, a number of other UNB students have contributed their expertise and assistance to this project. They are: Greg Crowell, Hillary Flaherty, Jackie Gallant, Emily Head, Toby Stoddart, Anita Connolly, and Shirley Von Sychowski.

Section A - Executive Summary

Background

On March 28, 2003, the Honourable Allan Rock, (then) Minister of Industry, announced the establishment of a National Antenna Tower Policy Review. After careful review of project proposals, a Policy Review Team - a group from the University of New Brunswick - was selected. This review team was mandated to consult with citizens, with communities and with relevant companies regarding improvements to the policy and siting procedures for antenna tower placement. In addition to the review team, a committee of Canadian experts was assembled, to be known as the National Antenna Tower Advisory Committee. This committee advised the policy review team throughout the course of its consultation and research activities.

Professor David A. Townsend of the Faculty of Law at the University of New Brunswick was selected to head both the policy review team and the national advisory panel of experts. The UNB Policy Review Team provided research and support services for the policy review. Members of this team include: From UNB - Keith Culver, Paul Howe, Stephen Grant, Veronica McGinn, Mark Doucette; and Mark Gallagher of xwave Solutions Inc, an Aliant company. The National Antenna Tower Advisory Committee met by teleconference on a monthly basis, and provided expert advice for the on-going policy review. The committee consisted of eight municipal, industry, health and academic representatives: Rod Dobell, Mary McBride, Frank Leonard, Nick Makale, Roger Poirier, Christine Racine, William (Bill) Rowat, and David A. Townsend.

Six Policy Questions

This report contains research information and general policy recommendations for improvement to Canada's antenna authorization processes, and in particular, provides answers and recommendations related to the following six policy questions:

1.(a) How can the local consultation process regarding the siting of a specific tower be improved?

1.(b) What are the most appropriate time frames for the processes of approving and resolving debates surrounding specific tower placements?

2. What information would most benefit concerned members of the public and how should it be provided?

3. What means are available to readily identify whether proposed installations may create radiofrequency fields in excess of established exposure limits in areas where people live and work?

4. Can protocols be arranged between local land-use authorities and antenna proponents regarding the planning and siting of antenna structures, visual guidelines and dispute resolution mechanisms?

5. How and to what extent can tower sharing be utilized in order to reduce the total number of towers?

6. What evidence exists that property values are impacted by the placement of antenna towers?

Data Collection

Over the course of this contract period numerous methods of data collection were utilized in order to optimize opportunities for consultation with, and input from, all relevant and interested constituencies. The methods of data collection included an interactive ‘e-town hall’ Web site, survey questionnaire, in-person and telephone interviews, electronic communications, Formal Written Submissions, informal submissions, telephone discussions, and in-person and teleconference meetings. The views and recommendations of individual citizens, citizen groups, government departments at all levels, commercial and public safety radio users, radio amateurs, radiocommunication associations, peripheral businesses and organizations, and environmental groups were received and incorporated in the analysis of data. Every opportunity was taken in order to make this an independent national public consultation.

Principal Recommendations

The recommendations of this policy review are:

Question 1(a): How can the local consultation process regarding the siting of a specific tower be improved?

Recommendation 1: That the legislative authority to regulate the siting of radiocommunication antennas and their supporting structures should remain exclusively with the Government of Canada.

Recommendation 2: That Industry Canada should ensure that the proponents of significant antenna structures be required to consult directly with the citizens who may be the most directly impacted by the establishment or modification of the structures.

Recommendation 3: That the policy framework involving Client Procedure Circular 2-0-03, *Environmental Process, Radiofrequency Fields and Land-Use Consultation* (CPC 2-0-03) and the other licensing and policy documents that describe differing land-use consultation requirements for particular types of radio stations should be examined. The consultation requirements for various categories of radio stations may be too different to be described within a single policy circular.

Recommendation 4: That Industry Canada should examine the practical implications of using the requirement for a site-specific radio authorization ("Type 1" and "Type 2" radio stations) as a means of streaming radio station approvals into the structured or the flexible land-use consultation model.

Recommendation 5: That more policy guidance must be provided by Industry Canada to radio users, land-use authorities and the public as to the policy criteria that will make a land-use consultation mandatory for antenna proponents.

Recommendation 6: That radiocommunication policy addressing local consultations should specify the issues that may and may not be discussed. Also, land-use authorities should be informed about the nature and extent to which they may legitimately request siting-related accommodations from antenna proponents.

Recommendation 7: That policy documents addressing land-use consultation issues should offer a protocol for the expression of concurrence/approval by land-use authorities. Such a protocol will provide more certainty for land-use authorities, antenna proponents and Industry Canada. The protocol should make clear that the issuance of a local building permit is not evidence of land-use approval.

Recommendation 8: That all land-use consultation policies should provide a framework for a dispute resolution process. In particular, the land-use authority should be given the opportunity to reply to the submission tendered to Industry Canada by the antenna proponent. Any new consultation policies should give Industry Canada a more formal and active role in circumstances where local consultations reach an impasse.

Recommendation 9: That Industry Canada should create a counterpart document to CPC-2-0-03 for use by land-use authorities and citizens. This document should explain antenna-siting issues and Industry Canada's consultation processes from a local perspective.

Recommendation 10: That Industry Canada personnel should take a more active role in the local consultations that occur between antenna proponents, land-use authorities and the public.

Recommendation 11: That land-use authorities and members of the public should be fully informed about the site and tower sharing obligations or policy expectations set by Industry Canada for antenna proponents. The department should regard local consultations as activities strategic to the implementation of its policy objectives for antenna co-location.

Recommendation 12: That land-use authorities, members of the public and antenna proponents should be fully informed about the compliance and enforcement activities available to Industry Canada, should antenna proponents fail to meet policy requirements for local consultations.

Recommendation 13: That land-use consultation materials prepared by Industry Canada should contain very basic information about electromagnetic interference (EMI), about obligations to resolve EMI problems and about Industry Canada's respective role.

Recommendation 14: That Industry Canada should implement maximum field strength criteria for the resolution of immunity complaints involving the fundamental emissions from broadcasting undertakings. While it may not be appropriate to extend the application of the field strength criteria of EMCAB-2 to broadcasters, a similar approach is warranted.

Recommendation 15: That Industry Canada should ensure that the proponents of all significant antennas and antenna supporting structures be required to perform a preliminary environmental assessment of their respective antenna installation. This assessment should be required even if the radio system is licence-exempt.

Recommendation 16: That when CPC-2-0-03 is next revised those required to fill out the attestation should be asked to consider the detrimental impact that an antenna structure or associated guy wires may have upon the flight of migratory birds. Industry Canada and Environment Canada should collaborate to perform an up-to-date literature review on the issue of bird collisions with antenna facilities so that the extent of this problem and possible remedial options may be better understood.

Question 1(b): What are the most appropriate time frames for the processes of approving and resolving debates surrounding specific tower placements?

Recommendation 17: That the current time frames of two consecutive 60 day periods for land-use consultations applicable to the antenna installations of Type 1 radio stations should be maintained. The discretion accorded to Industry Canada to extend the time frames when such might lead to a negotiated resolution of an antenna dispute also should be maintained.

Recommendation 18: That the land-use consultation processes applicable to Type 1 antenna installations require a more structured policy framework. The process should be divided into distinct stages such as: pre-application, initiation, consultation and impasse.

Recommendation 19: That Industry Canada should ensure that a flexible and expeditious land-use consultation model is available for the establishment and operation of radio stations (such as amateur stations) likely to have only a modest and localized impact upon their surroundings. This model should set out both the rights and obligations of antenna proponents seeking antenna approvals from land-use authorities.

Question 2: What information would most benefit concerned members of the public and how should it be provided?

Recommendation 20: That Industry Canada should create a national risk communication strategy to respond to public questions and concerns about the health effects to humans from exposure to radiofrequency fields.

Recommendation 21: That Canada's broadcasters and cellular/PCS carriers should adopt their own risk communication strategies. Those strategies should include risk communication training for staff members who engage in antenna site acquisition or local consultation activities.

Recommendation 22: That Industry Canada and Health Canada should jointly fund a biennial review of the state-of-the-science for *Safety Code 6* to be conducted by an independent panel of experts such as those associated with the R. Samuel McLaughlin Centre for Population Health Risk Assessment or the Royal Society of Canada.

Recommendation 23: That Health Canada should implement a policy mechanism that will feed the results of an independent review of the state-of-the-science on guidelines for human exposure to RF fields back into Health Canada's guidance creation process for *Safety Code 6*. If, as a consequence of an independent review, the existing standard is endorsed unchanged, a notation should be added to the preamble of the *Code* that informs of the review, the expert panel, its findings and the date of the review.

Recommendation 24: That when Industry Canada imposes notice obligations upon antenna proponents, as a first step to land-use or public consultations, that the antenna proponent be required to provide basic details within the notice about the plans for the marking and lighting of the antenna tower or other supporting structure.

Question 3: What means are available to readily identify whether proposed installations may create radiofrequency fields in excess of established exposure limits in areas where people live and work?

The answer offered to policy Question 3 discusses various means to identify excessive radiofrequency fields but no policy recommendations were warranted.

Question 4: Can protocols be arranged between local land-use authorities and antenna proponents regarding the planning and siting of antenna structures, visual guidelines and dispute resolution mechanisms?

Recommendation 25: That in all cases where consultations between antenna proponents and land-use authorities are required, a structured dispute resolution mechanism should be made available to the parties.

Recommendation 26: That the negotiation of antenna siting protocols between wireless carriers and local land-use authorities should be endorsed by Industry Canada because they supplement current radio regulatory policy in important ways.

Recommendation 27: That federal policies related to the siting of antennas and their supporting structures for wireless phones be supplemented with general antenna siting principles or an industry code of conduct to be negotiated by a committee with suitable representation from local land-use authorities, the wireless industry and Industry Canada.

Question 5: How and to what extent can tower sharing be utilized in order to reduce the total number of towers?

Recommendation 28: That Industry Canada implement new and more explicit policies designed to stimulate the sharing of antenna towers and other supporting structures for the mounting of radio antennas.

Recommendation 29: That Industry Canada explore policy options to stimulate the co-location of the antennas at common terrestrial or rooftop sites and to increase the incidence of the co-location of antennas with other (urban) infrastructure which society might regard as unsightly, or otherwise objectionable.

Recommendation 30: That land-use planners work with wireless network service providers to establish local planning policies that identify and designate local areas suitable for the siting of multiple antenna facilities and adopt planning policies (such as fast-track approvals) that provide incentives for service providers to locate there.

Recommendation 31: That policy options be considered by Industry Canada to stimulate the co-location of cellular and PCS antenna facilities in non-urban areas of the country.

Recommendation 32: That Industry Canada examine the site banking and site acquisition arrangements being used within the cellular/PCS service sector to determine their impact upon co-location activities within the sector and as between this sector and other commercial radio service categories. If these arrangements are found to inhibit antenna site co-location activities, Industry Canada should explore policy options to reduce those activities and work with the wireless industry to find alternative means to protect the legitimate competitive interests of the cellular/PCS carriers.

Recommendation 33: That Industry Canada consider the ways in which roaming and resale regulations and conditions may lead to a reduction in the total number of cell sites in small urban and rural areas whenever the department has such policies under examination.

Question 6: What evidence exists that property values are impacted by the placement of antenna towers?

Recommendation 34: That the impact (positive or negative) that an proposed antenna installation may have upon the property values of particular parcels of land should not be the subject of an antenna consultation.

Section B - The National Antenna Tower Policy Review

Introduction

Since the late 1970s, there has been increasing growth in technology, particularly in the wireless sector. This growth is a result of accelerating demand for better communications and enhanced access across Canada and the world. Initially, the majority of wireless subscribers were businesses, but this has changed, and now approximately half of Canadians subscribe to a wireless service, while even more benefit indirectly from such services. Individual citizens are increasingly using wireless services for personal safety, entertainment, education, work, and to communicate with family and friends. Consumers are thus demanding a wide range of services and access to new technology for both essential and non-essential services, and this evolution of new wireless technology has necessitated the physical development of land. Accordingly, telecommunications policy must evolve in order to provide choices for consumers, while at the same time respecting the environment, public health, community goals and development plans.

Over the past twenty-five years or so within Canada, the vast majority of radiocommunication antennas and antenna support structures have been established, and the radiating and/or receiving elements set into operation, without objection from any quarter. Indeed, some antennas have been established at the behest of public and local government representatives who wanted to improve access to radiocommunication-based commercial, public, safety or entertainment services. However, land-use authorities, community groups and private citizens have not been supportive in all cases.

During the 1980s we witnessed a steady increase in the types and number of wireless devices and services deployed in this country. In particular, we saw the first mass markets in TVRO (television receive only) satellite services and the roll-out of the analogue generation of cellular communications. The external infrastructure (antenna-related and supporting) necessary for these new services appeared with increasing regularity – and they were regarded as quite visually intrusive by some citizens and by some of the planning staff and elected representatives of municipal governments. Additionally, municipal officials and members of the public raised other concerns such as those related to the possible health and safety effects associated with these installations and the economic impact on land valuation. In response, municipal representatives began asking the communications regulator to outline the extent to which municipal governments could lawfully manage/regulate the potential health, safety, economic, environmental and aesthetic impact from these antenna installations.

The Townsend Report

In December of 1987, the (then) federal Department of Communications (DOC) released a study entitled, *Canadian Municipalities and the Regulation of Radio Antennae and Their Support Structures* (hereinafter referred to as the Antenna Study). David A. Townsend, with Mary E. Hatherly, of the Faculty of Law of the University of New Brunswick, researched and wrote the report. That Antenna Study examined many of the technical, practical, regulatory and constitutional issues that surrounded radio antenna siting in Canada in the late 1980s. In particular, the study concentrated upon the antenna siting issues that were being raised by municipal governments and local citizens.

First, following an extensive review of Canadian constitutional law, the report concluded that provincial governments did not have any direct constitutional jurisdiction over radiocommunication that could be delegated to Canadian municipalities. Despite this, the study also expressed the opinion that:

> ... a properly framed by-law relating only incidentally to radiocommunications, may co-exist with federal legislation provided such by-laws do not prohibit nor unduly restrict the conduct of radio services or the operation of federally-licensed radio stations.

This constitutionally-based conclusion was fully consistent with the legal advice that the federal Department of Justice had offered to the DOC within legal opinion letters and to municipalities as far back as the mid-1970s.

Second, the Antenna Study attempted to offer specific guidance about the nature and extent of (by-law) regulation that an ‘incidental’ power to regulate might permit. This guidance was premised upon an examination of the constitutional law and jurisprudence, the then-existing radiocommunication legislation (the former *Radio Act*) and upon numerous historical, practical and technical considerations. The guidance offered was divided into a "may not regulate" and "may regulate" advice section for municipal officials and this guidance appeared as Section V of that report.

While the municipal guidance contained within the Antenna Study was helpful, a number of provincial and municipal officials concluded that an ‘incidental’ jurisdiction did not adequately permit them to address the perceived local land-use concerns raised when significant antenna installations were established. Consequently, they contacted the Department of Communications and requested a greater role in the radio antenna authorization process.

In June of 1990, after a consideration of various options and in partial reliance upon the (clarified) legislative authority contained within the (new) *Radiocommunication Act* which had been proclaimed in October of 1989, the DOC changed its antenna authorization process for significant antenna installations. The department instituted a notification and consultation process that required certain applicants for antenna installations to consult directly with the appropriate land-use authority so that it might attempt to influence the ultimate placement and some other features of the antenna and/or its support structure. This consultation policy, with two revisions (the most recent revision was issued in 1995) and with supplementary regulation by other federal government departments, such as Environment Canada, has been in place ever since.

Antenna Siting Revisited, 1997

In January of 1997, Industry Canada engaged David Townsend of the Faculty of Law of the University of New Brunswick to revisit the antenna siting issue. Clearly, a number of circumstances had changed during the 1990s and the appropriateness of the municipal consultation policy that had been instituted in 1990 was being questioned in light of those evolving circumstances. In particular, the roll-out of new generations of wireless services, such as mobile telephony in the form of digital cellular and Personal Communication Services (PCS), had dramatically increased the number of requests for antenna sitings within the municipalities of major urban centres in Canada. Municipalities had a number of concerns related to the consultation process as it applied to the siting of cellular and PCS antennas and support structures in particular and, to a lesser extent, for certain other radio services.

Under the terms of this antenna investigation, data were collected from a number of print and human sources and a series of briefings and verbal reports were provided to Industry Canada related to the appropriateness of and potential for increased local involvement in the antenna authorization processes.

The Dobell Report

In 2002, Professor Emeritus A.R. (Rod) Dobell of the University of Victoria was asked to review and comment upon the circumstances surrounding the authorization of certain FM and TV broadcasting antennas and supporting structures located at Triangle Mountain, British Columbia. In particular, this review was asked to address two issues:

1. to determine whether the authorizations for the towers on Triangle Mountain in Colwood, B.C. were made in accordance with established Industry Canada regulations and procedures; and

2. to suggest recommendations for changes to the established Industry Canada procedures for consideration in the National Antenna Consultation process [then] announced.

Professor Dobell concluded that the towers on Triangle Mountain had been authorized in accordance with established Industry Canada regulations and procedures, but he raised a number of concerns about the policies and made a series of policy recommendations. The conclusions made and concerns raised included the following issues:

1. Industry Canada's regulatory responsibilities are unclear in reference to the procedures employed prior to installation of an antenna tower for a broadcasting undertaking.

2. Industry Canada is playing no direct role in the assessment of community concerns regarding antenna siting. This is being left to local land-use authorities and to the antenna applicant.

2. the regulations and policies used by Industry Canada to make determinations of "harmful interference" for situations involving broadcasting undertakings are underdeveloped.

3. the current antenna authorization policies are inadequate in relation to the notification and consultation of local land-use authorities and local residents.

4. Industry Canada's current policies and protocols for the authorization of broadcasting antennas place an apparent overemphasis on technical aspects resulting in an inadequate consideration of other complex matters such as those relating to the local impact of the installation.

National Antenna Tower Policy Review

On October 31, 2002, then Minister of Industry, the Honourable Allan Rock, announced that an independent party would be engaged to conduct a thorough study and public consultation on the current environment related to this nation's regulatory authorization processes for radiocommunication antennas and their supporting structures. In March 2003, Minister Rock announced that a team of researchers from the University of New Brunswick (UNB), led by Professor David Townsend of the UNB Faculty of Law, had been selected to undertake the National Antenna Tower Policy Review. Members of this team include: Keith Culver, Director of the UNB Centre for Social Innovation Research; Paul Howe, Assistant Professor in the Department of Political Science; Stephen Grant, Professor in the Faculty of Administration;

Veronica McGinn and Mark Doucette representing the UNB Centre for Property Studies; and Mark Gallagher of xwave Solutions Inc., an Aliant company.

Minister Rock announced also that he had created a committee of experts, to be known as the National Antenna Tower Advisory Committee, whose mandate was to advise the policy review throughout the course of the consultation and research activities. The appointees to the National Antenna Tower Advisory Committee were: Rod Dobell, Professor Emeritus of Public Policy at the University of Victoria; Mary McBride, an epidemiologist at the British Columbia Cancer Agency; Frank Leonard, Mayor of Saanich, British Columbia; Nick Makale, Chair of the City of Calgary's Telecommunication Ad Hoc Committee; Roger Poirier, Executive Director of the Wireless Information Resource Centre and President of RBP Associates; Christine Racine, urban planning consultant in Montréal; William (Bill) Rowat, President of the Railway Association of Canada; and David A. Townsend, Professor of Law of the University of New Brunswick, who chaired the Advisory Committee. The advisory committee met on a monthly basis and provided advice on a broad range of matters related to the public consultation and the radiocommunication industry.

Under the terms of the research agreement, Professor Townsend tenders this report to Industry Canada with policy recommendations for improvement to Canada's antenna authorization processes. More particularly, this Policy Review provides recommendations related to the following six questions:

Six questions for policy review

1a. How can the local consultation process regarding the siting of a specific tower be improved?

1b. What are the most appropriate time frames for the processes of approving and resolving debates surrounding specific tower placements?

2. What information would most benefit concerned members of the public and how should it be provided?

3. What means are available to readily identify whether proposed installations may create radiofrequency fields in excess of established exposure limits in areas where people live and work?

4. Can protocols be arranged between local land-use authorities and antenna proponents regarding the planning and siting of antenna structures, visual guidelines and dispute resolution mechanisms?

5. How and to what extent can tower sharing be utilized in order to reduce the total number of towers?

6. What evidence exists that property values are impacted by the placement of antenna towers?

Data Collection

Professor Townsend and the UNB Policy Review Team gathered research data from five principal sources:

(i) an online public consultation through an e-town hall Web site,
(ii) personal and focus group interviews with some local community leaders who have participated in an antenna siting controversy,
(iii) in-person and telephone interviews with selected representatives of community associations, governmental departments, and the communications industry,
(iv) formal written submissions solicited from stakeholders (many of which have been mounted on the e-town hall Web site), and
(v) independent public policy research conducted to contrast how antenna supporting structures are being regulated in other countries.

Data from Electronic Sources

An innovative e-town hall antenna Web site was launched publicly on 3 September 2003.[1] It operated actively from the 3rd of September to the 24th of October to distribute and collect data. The Web site was re-opened in November of 2003 to post all formal written submissions received as of that date, and to provide a brief update on the various data collection and other activities related to the National Antenna Tower Policy Review. Most registrants[2] were sent an e-mail notice when the site re-opened, to inform them that an update on the status of the policy review was available online.

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[1] xwave hosted the Web site pursuant to an agreement with Industry Canada, who secured the e-town hall URLs <www.antenna.ca> and <www.antenne.ca> for two years.

[2] Some registrants did not provide an e-mail address.

When in active operation, the E-Town Hall Antenna Web site permitted members of the public, and other interested parties, to learn more about antenna placement issues and to submit their views about possible improvements to Industry Canada's antenna tower approval policies. The site was designed to produce the look and feel of a real town hall meeting. Those wishing to learn more about antenna tower issues in Canada could read both the background information on antenna issues and the opinions submitted by others. Those wishing to submit their views electronically about antenna authorization issues could do so in four ways. Participants could fill-out and submit an online survey,[3] take part in an online discussion forum,[4] tender a formal written submission for posting, or express their views within an e-mail sent to the e-mail IDs <antenna@unb.ca> or <antenne@unb.ca>.[5]

Approximately 1000 communications were obtained from electronic sources; 5% of the participants communicated in French. Three hundred and twenty (320) users registered on the e-town hall Web site to participate in the discussion fora and/or completion of the questionnaire. Of these, 235 users completed and submitted questionnaires, and 165 comments were posted in the online discussion fora, with the comments being viewed approximately 6,800 times. The questionnaire and the online discussion forums were the main methods of participation by the public and amateur radio users; industry participation was low, and government participation was only slightly higher. In addition to the e-town hall Web site, there was an abundance of e-mail sent to the antenna review e-mail addresses. Between 600 and 700 messages were received, with half of those being a submission of some kind, usually expressing thoughts on what the policy review should consider and conclude.

Written Submissions

Seventy-five (75) formal written submissions to the policy review were received. Most were posted on the e-town hall Web site. Almost all of the participants who filled out the questionnaire did so online, however six people asked to have the questionnaire mailed to them and one requester mailed it back.

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[3] Quantitative and qualitative analyses of the data obtained from the online survey can be obtained at the URL <www.antennareview.ca>.

[4] Qualitative depictions of the data obtained from the six online discussion fora are attached to this report as Appendix A.

[5] Approximately 1000 e-mails were forwarded to the national policy review and almost 25 percent of those communications contained opinions about one or more of the issues under consideration. These opinions have been read and taken into consideration.

Data from In-person and Telephone Interviews

During the course of the policy review, many interviews were conducted to augment the information received through the e-town hall Web site. While the majority of meetings were held with federal government and industry members, meetings were also held with various municipalities, provincial governments, citizens or citizen groups, radio amateurs and other associations from across the country. Of particular importance to the policy review was a field investigation performed in the Spring of 2003 in the Village of New Maryland, New Brunswick. As part of this investigation, face to face interviews with villagers were conducted to obtain their views surrounding the establishment of a 100 metre cellular tower within their community one year earlier. The report, called the New Maryland Tower Site Investigation, performed content analysis of the opinions expressed during the interviews and within newspaper stories and editorial comments written by local media outlets during the controversy.[6]

[6] The New Maryland Tower Site Investigation is located at Appendix D.

Section C - Overview of Antenna Siting

Section C of this report offers an overview of the antenna siting policies of Canada, Australia, New Zealand, the United Kingdom and the United States of America. The material on Canada's antenna authorization policies is provided as one part of the policy background to the six policy questions addressed within Section D of this report.

The antenna siting policies of the four other developed nations have been included for comparative purposes. This report was written with the premise that the radiocommunication industry and other radio users in Canada should not be subjected to regulatory requirements and transactional costs (related to the establishment of their antenna towers and other visible infrastructure) that are out of line with the regulatory obligations and costs borne by their counterparts located in similar nations. At the same time, if the radio regulators located within nations similar to our own are asking the members of their radio industry and other radio users to meet certain social objectives regarded by Canadian citizens as important or worthwhile, our radio regulator should use its' authority to achieve similar objectives unless compelling reasons exist not to do so.

Antenna Siting Policy in Canada

This subsection of the National Antenna Tower Policy Review provides an overview of four of the antenna-siting/authorization policies of principal interest to those citizens and land-use authorities concerned about antenna towers. These policies relate to assessments of adverse environmental impact, human exposure to radiofrequency fields, land-use consultations at the local or regional level and the aeronautical marking and lighting of antennas and their supporting structures. Each will be examined in turn.

The source of legal authority for these policies and their policy content comes from a variety of sources. These range from primary legislation (such as the *Canadian Environmental Assessment Act* (CEAA), *Radiocommunication Act*, *Broadcasting Act* and *Aeronautics Act*), to radio licensing conditions (such as those imposed by Spectrum Licence), to Industry Canada's particular licensing policies (such as the *Broadcasting Procedure Rules* (BPRs)), to individual technical standards (such as [aeronautical] *Standard 621.19 - Obstruction Markings and Lighting*) and to departmental procedural circulars (such as Industry Canada's Client Procedures Circulars (CPCs)).

Land-use officials and members of the public interested in antenna siting issues cannot be expected to piece together all of these regulatory and policy instruments in order to understand antenna authorization in Canada. There exists a policy instrument that attempts to do this. The document is entitled Client Procedures Circular 2-0-03, *Environmental Process, Radiofrequency Fields and Land-use Consultation*, (CPC-2-0-03).[7] Its purpose is more than explanatory in that it also establishes procedural policy for the consultation processes that are to occur between those who seek to install (or modify antenna) structures and land-use authorities.

Since the summer of 1990, Canada's principal policy documents used to describe the process for the siting/authorization for most radio antennas and their supporting structures have been CPC-2-0-03, and the client attestation form[8] annexed to it. The policy circular was first issued in June 1990 and it has since been revised on two occasions. The current edition was published on June 24, 1995. While CPC-2-0-03 has never had the status of law, its contents have been applied consistently by Industry Canada and by its predecessor, the Department of Communications. In tone and content, it is clear that this document was written by the radio regulator for use by the radiocommunication industry and other radio users. By default, it is the only policy document available to inform land-use authorities, public interest groups, and citizens as to the criteria for their respective roles within the antenna authorization process in Canada.[9]

CPC-2-0-03 addresses three main policy issues[10] related to the siting and authorization of radio antennas and their supporting structures. These policy issues are (1) the potential for adverse environmental effects, (2) the regulation of human exposure to certain radiofrequency fields and (3) the requirement for consultations between individual antenna proponents and the appropriate land-use authority in the circumstances. These environmental assessment, RF exposure and land-use consultation requirements can be supplemented by other radio regulatory policies. For example, the *Broadcasting Procedure Rules* (BPRs) and *Broadcasting Procedures*

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7 CPC-2-0-03, Issue 3, June 24, 1995.

8 The form is called "Annex 1: Preliminary Environmental Information and Municipal/Land-Use Consultation Attestation." The attestation form for broadcasters has a slightly different title but the content is the same as such relates to attestations about the performance of environmental assessments and land-use consultations.

9 The need for a policy document or policy clarifications written especially for use by local land-use authorities, community groups and citizens is discussed within Section D of this report in reply to Questions 1 and 2 of the National Antenna Tower Policy Review.

10 CPC-2-0-03 also addresses the policy requirements for certain antenna proponents to share their antenna structures (e.g. sharing towers) with other radio service providers. Tower sharing, as an antenna siting objective, is discussed within Section D of this report in reply to Question 5 of the National Antenna Tower Policy Review.

(BPs) applicable to the various categories of broadcasting undertakings (e.g. AM, FM and Television undertakings) have further specified the notice requirements that must be met when the applicant for approval of a broadcasting antenna installation consults with a land-use authority.

Due to the particular policy treatment of land-use consultations necessary for the approval of the antenna systems for broadcasting undertakings and cellular/PCS base stations, these are examined separately in this subsection of this report.

Adverse Environmental Effects

As early as 1990, the applicants for most land, coast, earth and broadcasting station licences in Canada were required to perform environmental assessments upon their antenna structure proposals. The legislative provision that imposed those review obligations was located within section 3 of the (former) *Environmental Assessment and Review Process Guidelines Order.* This subordinate legislation created an environmental review scheme that was administered by the Federal Environmental Assessment Review Office (FEARO). The (then) Department of Communications created the first version of CPC-2-0-03 in 1990, as the guidance document for the performance of these environmental assessments. At the time, the environmental impact caused by the construction or placement of an antenna system, the exposure of humans to radiofrequency fields and the local land-use implications of the proposal were all regarded as environmental matters. The CPC document was actually called, "Environmental Assessment Process Associated with Spectrum Management Activities."

Applicants for these broad categories of radio licence had to complete and submit an attestation form, called "Annex D: Radio Licence Application Supplement - Preliminary Environmental Information"[11] along with their radio licence application ((general) Form 16-16). Annex D contained three short questions related the potential environmental impact of the proposed radio station itself or about its construction. These questions concerned matters such as the impact upon wildlife areas, national or provincial parks, ecologically sensitive areas, culturally sensitive areas and the migratory patterns of animals such as birds and caribou. The licence applicant responded to these questions by answering 'yes' or 'no.' A positive answer would cause the department to follow up to see if the impact could be mitigated by adjusting the proposal. The first stage of this process was called a 'preliminary environmental assessment.'

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[11] This was, of course, 'Appendix D' of the CPC circular itself. See: "Environmental Assessment Process Associated with Spectrum Management Activities," CPC-2-0-03 (Provisional), Issue 2, February 1, 1992 at p. 15.

In January of 1995 the *Canadian Environmental Assessment Act* (CEAA)[12] was proclaimed into force and it has established a new legislative approach for determining when an environmental assessment will be required. According to section 5(1)(d) of CEAA:

> An environmental assessment of a project is required before a federal authority ....issues a permit, or licence, grants an approval or takes any other action for the purpose of enabling the project to be carried out in whole or in part.

Not every federal issuance of authority to undertake a project is covered by the *Act*. The *Law List Regulations*[13] were used to list the federal legislative "powers, duties or functions" that are subject to an environmental review. Of relevance here is that section 13 of these regulations specifically enumerates section 5(1)(f) of the *Radiocommunication Act* as a federal decision-making power that approves projects that will require an environmental assessment under CEAA. Section 5(1)(f) of the *Radiocommunication Act* contains the power given to the Minister of Industry by Parliament to:

> approve each site on which radio apparatus, including antenna systems, may be located, and approve the erection of all masts, towers and other antenna-supporting structures;

Therefore, the requirement to conduct environmental assessments for radio antenna systems, under the *Canadian Environmental Assessment Act,* is now tied directly to Industry Canada's regulatory authority to grant approvals for specific sites for radio stations or for specific antennas, towers or other supporting structures.

When CEAA was proclaimed in 1995, Industry Canada had already begun to move away from granting specific antenna site or antenna system approvals for GRS [Citizen Band], most receive-only satellite dishes, and radio amateur installations. When the department updated the content of CPC-2-0-03 that year, it created the designation "Type 1" for all radio stations that required a site-specific or antenna-specific authorization and "Type 2" for those that did not. Thus, Type 2 radio stations were, and continue to be, exempt from the requirements of CEAA.

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[12] S.C. 1992, c. 37. A number of amendments recently were made to this act. See: *Bill C-9, An Act to Amend the Canadian Environmental Assessment Act,* proclaimed October 30, 2003. These changes are not relevant to the initial screening process for radio antennas.

[13] *Law List Regulations: Schedule 1,Part 1,* S.O.R./94-636, 7 October 1994.

The 1995 version of CPC-2-0-03 established a two stage environmental review for all Type 1 radio stations, and that process continues today. The applicant for the desired radio station licence must file with Industry Canada answers to seven questions related to the potential for negative environmental effects. These questions are set out in subpart 'B' of "Annex 1" to the CPC called, "Part B- Preliminary Environmental Information Attestation." This (self-administered) attestation form asks the antenna proponent to check for the close proximity of bodies of water or wetlands (within 30 metres), and whether the proposal antenna will be located within a national park, a protected area or lands to which the *Territorial Land Use Regulations* apply.[14] Providing a positive answer to one of the questions may lead to a requirement to perform a more complete environmental assessment under the *Canadian Environmental Assessment Act*. This would be the second stage.

While the following examples of adverse environmental effects do not appear on the attestation form that the proponents of Type 1 radio stations must file with Industry Canada, they are listed in the policy circular itself:[15]

- detrimental effects on water bodies, ground water or soil;
- adverse effects on legislated protected areas such as national parks, historic canals or other protected areas;
- alteration, disruption or destruction of terrestrial and aquatic habitat for wildlife and fisheries;
- changes to current use of lands and/or quality of lands and natural resources for traditional purposes by aboriginal persons;
- [and] alteration of historical, archaeological, paleontological or heritage resources resulting from a change to the environment.

To date, Industry Canada has had almost no experience with the performance of more extensive (stage 2) environmental assessments upon antenna installation proposals. This is because so few proposals have met the environmental impact criteria described in Industry Canada's client attestation form and because, to their credit, antenna proponents have altered their antenna construction plans should those plans trigger a secondary environmental assessment analysis.

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[14] This environmental review is quite rudimentary in nature. For example, no questions are asked about the potential for environmental impacts upon scenic vistas (or view scapes), heritage areas, endangered species (or their habitat) or the flightways of migratory birds.

[15] CPC-2-0-03 at p. 3.

As noted above, the antennas and supporting structures of Type 2 radio stations are not subject to any environmental review requirements because no particular ministerial authorization is required under section 5(1)(f) of the *Radiocommunication Act* in advance of their construction or modification. Recently, there has been a dramatic increase in the number and variety of Type 2 stations. There are two main reasons for this increase.

First, Industry Canada has been experimenting with licensing policy options that reduce the regulatory burden for its clients and for itself by moving away from individualized licensing transactions. These deregulatory licensing options have included 'System Licensing' and 'Spectrum Licensing'[16] which may include many base stations under one or a few licences. Currently, all Cellular/PCS service providers are authorized by Spectrum Licence and, in consequence, their antenna facilities are exempt from environmental review.[17]

Second, over the past five years or so, the electronics industries have developed many types of consumer and commercial digital wireless apparatus that operates within licence-exempt frequency bands, such as those at 2.4 GHz, 5.8 GHz and 24 GHz. Being licence-exempt does not mean that this apparatus is unregulated. Radio regulators have set rules, standards and specifications for the apparatus to control for interference from and between these wireless devices.[18] It does mean, however, that their antenna facilities are not subject to environmental assessment because no permission is granted by Industry Canada before they can be established or modified.

The transmission towers and other facilities of broadcasters continue to be subject to environmental assessment so long as the establishment of the undertaking is regulated under the *Broadcasting Act*.

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[16] Spectrum licensing (as an alternative to station licensing) was first introduced by Industry Canada in 1997 to license Local Multipoint Communications Systems (LMCS). Under section 5(1)(i.1) of the *Radiocommunication Act*, a "spectrum licence" may be issued by the Minister "in respect of the utilization of specified radio frequencies within a defined geographical area,"

[17] The evolution of all Cellular/PCS licensees to spectrum licensing is discussed in Section D of this report. See the text written to accompany Recommendation 15 on how to improve the local consultation process.

[18] The 802.11 series of standards contain those types of technical specifications.

Human Exposure to Radiofrequency Fields

Safety Code 6[19] (*SC 6* or the *Code*) is Canada's national standard on human exposure to radiofrequency (RF) electromagnetic fields.[20] It is a comprehensive document that sets out safety requirements for the installation and use of radiofrequency and microwave devices that operate in the frequency range from 3 kHz to 300 GHz.[21] The *Code* provides two sets of RF exposure limits that are based upon the status of the individual who may be exposed: (1) radiofrequency and microwave workers who may be exposed in the course of their daily work, and other persons including the (2) general public who may be exposed at any time or place. Obviously, the exposure limits for the general public are the specifications most relevant to the location and other siting features of radio antennas and their towers.

The Consumer and Clinical Radiation Protection Branch of Health Canada produces *Safety Code 6* as a guidance document. It is Industry Canada that has required compliance with it by incorporating *SC 6* into radio regulatory provisions dealing with handheld radio apparatus (like cell phones) and antenna installations. Essentially all radio apparatus and stations must be compliant with the *Code*. It is the nature and extent of the analysis that must be performed to establish compliance that differs by radio authorization or radio apparatus category. These particular specifications are published within the various rules, procedures, standards, specifications and plans used by Industry Canada. For example, Type 1 - Broadcasting undertakings must provide radiofrequency exposure analysis with each application for a broadcasting certificate. The various types of analyses that must be performed are specified by broadcasting service category and set out in Industry Canada's *Broadcasting Procedures and Rules* (the BPRs).

According to the contents of CPC-2-0-03, both Type 1 and Type 2 radio stations must be "installed and operated in a manner that complies with *Safety Code 6*."[22] Since compliance with *Safety Code 6* exposure limits is typically imposed by particular licensing condition, and the acceptable means to test for compliance with *SC 6* are specified within the policy documents

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[19] *Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, Safety Code 6*, 1999. A copy of the Code can be found on the Internet at the URL: <http://www.hc-sc.gc.ca/hecs-sesc/ccrpb/pdf/99ehd237.pdf>.

[20] The history, contents and application of *Safety Code 6* are discussed more fully within Section D of this report in reply to Question 3 of the National Antenna Tower Policy Review.

[21] From *Safety Code 6*, 1999 at p. 3 para. 2.

[22] CPC-2-0-03 at p. 4.

applicable to particular licence categories, the references to the *Code* within CPC-2-0-03 serve more as policy reminders than as a source for policy content.

Consultation with Land-Use Authorities

Within its introductory paragraph on land-use consultations, CPC-2-0-03 makes the following statements about the importance of community concerns when radio antennas and their supporting structures are established:

> Industry Canada believes that local concerns related to land-use are important to the community, and that municipal and other land-use authorities should have the opportunity to make their views known with regard to radiocommunication antenna towers within their boundaries. Therefore, we have instituted procedures to ensure that municipalities and other land-use authorities are consulted prior to the building of significant antenna structures."[23]

Circular CPC-2-0-03 provides a general policy framework for the land-use consultations that are to occur between certain antenna proponents and Canadian land-use authorities when significant antennas and/or supporting structures (including towers) are to be installed or modified.

The CPC document itself does not create the consultation obligations for the various categories of radio station in Canada.

For the most part, the local consultation requirements applicable to the various categories of radio station are imposed by Industry Canada as conditions of licence. When describing these conditions different approaches and text have been used. Land-use authorities and spectrum users cannot rely upon the text of the CPC alone. Usually, compliance with all or part of the content of CPC-2-0-03 is required, but the particular licensing conditions and policy documents written for the various categories of radio station (that involve fixed antenna systems) may modify certain elements or stages of the consultation processes set down within this general policy circular. This is especially true for radio stations authorized by particular broadcasting certificates and particular spectrum licences.

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[23] CPC at p. 4.

Document CPC-2-0-03 contains two land-use consultation models - one is much more structured than the other and the structured model has definite stages and calls for more oversight and involvement by Industry Canada. The structured consultation model is applied to "Type 1 radio stations." These are radio stations that require a site-specific approval before the antenna can be constructed or put into operation. As explained within the previous subsection of this report on 'adverse environmental effects,' this typology was created in 1995 as a consequence of the way in which the obligations to conduct environmental assessments under the *Canadian Environmental Assessment Act* were imposed. Almost all broadcasting undertakings and certain non-broadcasting land and coast stations require a site-specific certificate or licence.

Under the terms of CPC-2-0-03 the flexible land-use consultation model is reserved for Type 2 radio stations. These are stations or radio apparatus that either: (1) require a radio authorization (typically a licence) that is not site-specific or (2) are licence-exempt but must comply with specified power, frequency and other technical limits. Almost no details are provided within the circular as to how the land-use consultations for Type 2 radio stations are to be conducted.

It is logical to create both structured and flexible land-use consultation requirements for antenna proposals, and to mandate the use of one or the other (structured or flexible) based on assumptions about whether the siting of a particular type of radio station has the potential to produce a high or low impact upon a surrounding community. Other developed nations, such as the United Kingdom, have used similar policy distinctions.

(i) Consultations for Type 1 radio stations

As a starting point, all applicants for broadcasting certificates related to antenna systems are required to consult with the relevant land-use authority as a precondition to the issuance of a certificate by Industry Canada. The land-use authority must be given notice of the intention to install new or modify existing antenna installations and the notice must contain the basic detail of the proposed system or change. The notice is to be served on the land-use authority prior to or at the same time that the application for a certificate is forwarded to Industry Canada.[24] Also, all applicants for broadcasting certificates must complete and submit to Industry Canada the environmental review and land-use attestation form that is attached to the document,

[24] The requirement to commence land-use consultations before or when submitting an application to Industry Canada for a broadcasting certificate is contained within the *Broadcasting Procedure Rules* applicable to most of the various types of broadcasting undertakings.

Broadcasting Procedures Rules, Part 1.[25] As will be discussed within the next subsection of this report, with some procedural modifications, land-use consultations for the antenna installations of broadcasters tend to follow the requirements and steps set out within CPC-2-0-03 for Type 1 radio stations.

When the antennas and supporting structures of Type 1 radio stations other than broadcasting are to be established or modified, a land-use consultation may not be required under the terms of the CPC. It is for the antenna proponent to determine whether the structure or modification will be "significant" in nature.

If the proponent determines that the antenna structure, when constructed or modified, will be insignificant in nature, the proponent may check off this particular option on Part C of the "Preliminary Environmental Information and Municipal/Land-Use Consultation Attestation" form[26] and submit it to Industry Canada. The CPC warns that an antenna proponent makes this election "with the acceptance of any consequences of this decision."[27] The proponent may then proceed to the construction stage and the department will continue to process the application.

Should the proponent of a Type 1 - non-broadcasting radio station determine that the structure or modification is "significant" in nature, land-use consultation is, according to the CPC, required. Such applicants must now disclose their plans to land-use authorities in a timely manner because "[e]arly contact ensures an opportunity for full consultation." It is the responsibility of the proponent and the land-use authority to work out a "mutually acceptable agreement" and to "consider each other's requirements and work towards solutions that minimize the impact on the surroundings, including considering existing sites, while not unduly prohibiting the development of the radio facility."[28]

For Type 1 consultations, CPC-2-0-03 states that: "Industry Canada does not play a direct role in the consultation." Rather, the department will ensure that proponents disclose their plans

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[25] The attestation form for broadcasters is attached to the document, *Broadcasting Procedures Rules, Part 1* (BPR-1), Issue 3, July 2004, as *Appendix* 3.

[26] The attestation form affixed to CPC-2-0-03 ("Annex 1") is very similar to the form that must be completed by broadcasters. Part B (preliminary environmental review) and Part C (land-use consultations) are identical to the corresponding parts of the attestation annexed to BPR-1.

[27] CPC at p. 7. The CPC does not elaborate upon what those consequences might be.

[28] Most of the quotes within this paragraph of text can be found on page 4 of the CPC.

to land-use authorities, ensure that the consultation process occurs in a "timely fashion," provide information to proponents and to land-use authorities, and possibly provide "observations on the validity of land-use by-laws as they relate to radio installations." Industry Canada also will delay the issuance of antenna authorization if it becomes aware that a land-use authority has raised an objection to a proposed antenna or modification. Departmental staff will then ensure that the proponent and the land-use authority have a sufficient opportunity to negotiate a satisfactory resolution. Industry Canada will entertain a petition by the proponent to issue the antenna authorization if the parties have failed to reach a satisfactory resolution.

For Type 1 radio stations, Industry Canada considers that the land-use authority should make its view known to the proponent within 60 days of first contact, accepting that "individual circumstances will vary." There are three possible response scenarios: (i) concurrence, (ii) no response and (iii) non-concurrence. If there is concurrence, Industry Canada will continue to process the application. If no response is given, departmental staff may extend the time for consultations. If there is non-concurrence, Industry Canada may extend the time for consultation activities up to 120 days. In a situation of non-concurrence, it is the responsibility of the applicant to submit a written document to Industry Canada "detailing all actions taken to address the concerns of the land-use authority." The proponent should submit, as a minimum "a chronological summary of all events (letters, meetings, consultations, etc.); the requirement for the establishment of the specific site in question; reasons for the proposed location; and a review of alternative locations considered and reasons for their rejection, including costs and technical analysis."[29] This analysis may include "pattern coverage maps, *Safety Code 6* analysis, or any other engineering study that may be deemed appropriate."

(ii) Consultations for Type 2 radio stations

For Type 2 radio stations, no prior approval is required from Industry Canada before the establishment or modification of the antenna system is undertaken and there are no attestation forms to submit to the department. CPC-2-0-03 puts the onus on the antenna proponent/owner to consider the reaction that may be anticipated from the community before erecting or altering the antenna system. Consultation with the land-use authority is required if it is "felt that community concerns could be raised..." about the proposal. Should the proponent determine that the antenna installation or modification "is insignificant" the proponent may proceed with the proposal but it must be "with the acceptance of any consequences of this decision."[30] As discussed below,

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[29] CPC-2-0-03 at p. 7.

[30] All of the words set off in quotations within the next three paragraphs of the report can be found on pages 8 and 9 of CPC-2-0-03.

Industry Canada may review the appropriateness of Type 2 antenna installations or modifications after they are completed.

Should consultations be initiated by the (Type 2) antenna proponent, it is for the proponent and the land-use authority to determine the nature of the consultations conducted, the extent of accommodations offered in response to potential or actual community concerns, and the sufficiency and duration of the consultations. CPC-2-0-03 states that there is "no specific procedure for this consultation." While the policy circular offers little procedural guidance, Industry Canada has set out its expectations of Type 2 station proponents and land-use authorities. The CPC provides that "Where required, it is expected that the parties will propose and examine alternatives and in so doing, will give consideration to each other's needs."[31] In addition, the CPC stipulates that: "Industry Canada expects Type 2 radio station owners to address the concerns of the community in a responsible manner, and to consider seriously all requests put forward by the land-use authority."

Since the owners/proponents of Type 2 radio stations do not require prior authorization from Industry Canada for the installation or modification of their antenna systems, there is nothing to stop proponents from proceeding with their respective antenna installation or alteration at any time. As a compliance mechanism, Industry Canada has reserved the right to review Type 2 antenna structures after their establishment and if the department believes that a particular installation "is not appropriate within its surroundings, it may request submissions explaining why the structure should not be altered or removed." The Minister of Industry has the legislative authority under the *Radiocommunication Act* to order that an antenna installation be altered or dismantled.

(iii) Consultations for Cellular/PCS service providers

On April 1, 2004 the analogue cellular licences from the 1980s and the PCS (digital cellular) licences from the 1990s were converted into the same type of Spectrum Licence that was awarded to the successful bidders in the PCS spectrum auctions held in 2001.[32] The result of this regulatory action by Industry Canada is that all forms of cellular operator in Canada now hold a 'Cellular/PCS Spectrum Licence.'

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[31] CPC at p. 5.

[32] *Spectrum Management and Telecommunications Policy*, "Spectrum Licensing Policy for Cellular and Incumbent Personal Communications Services (PCS)," December 2003.

According to the conditions of licence that were affixed to this new category of radio authorization the licensees must engage in "meaningful consultation" with "all local municipalities or land-use authorities" regarding the installation of each radio station "with the aim of developing consensus solutions." Should consultations with the relevant municipal or land-use authority reach an impasse, the conditions of licence provide:

> "Installation of any antenna structure must be delayed for a period of time sufficient for Departmental review where, after considering reasonable alternatives and consultation options, land-use consultation negotiations remain at an impasse."

Thus, while these radio stations would be regarded as Type 2 stations under the terms of CPC-2-0-03, these licensing conditions have created a new land-use consultation model to which the CPC appears to have no application. The requirement to consult for every radio station appears to apply to the installation of the antenna structures and not to subsequent modifications.

(iv) Consultations for Broadcasting Undertakings

Broadcasters must submit an application to Industry Canada for a broadcasting certificate and an application to the Canadian Radio-television and Telecommunications Commission (CRTC) for a broadcasting licence. The technical issues of the certificate (antenna frequency, power, location, height etc.) must be approved by Industry Canada before a broadcasting licence will be considered.[33] There is no mandatory obligation to consult with the public, however, some broadcasters do consult the public in the area where the transmitters will be located. Industry Canada generally does not become involved in land-use consultations unless the parties reach an impasse.

According to the consultation requirements contained within CPC-2-0-03, land-use consultation is mandatory for Type 1- broadcasting undertakings. Antenna proponents must "disclose their plans to land-use authorities," complete and submit a Municipal/Land-Use Consultation Attestation form with their application to Industry Canada, and consult "regarding the location" of all proposed antenna towers.

Consultation obligations for different types of undertakings are contained within Canadian *Broadcasting Procedures Rules* (BPRs). Local municipalities must be notified of applications for a new AM/FM/TV broadcasting undertaking or changes to existing undertakings "to provide the municipality authority with an opportunity to consider the implication of the proposed antenna

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[33] Telephone communication with the CRTC (14 May 2004).

and structure site."[34] The notice shall include a sketch of the building, antenna(s) and tower(s), and be detailed enough to give a visual representation of the total structure. Notice must be filed with enough time for the municipal authority to consider the impact of the proposal. The municipal authority and the applicant are to resolve any problems. “Failing this, the Department will consider all factors pertaining to the application, as well as the municipal comments, and render a final decision.” BPR-III s. C-5.5.2. provides for notification of and consultation with municipal land-use authorities regarding proposed FM stations.[35] The consultation procedures are also the same for low power FM stations[36] and very low power FM stations in small remote communities.[37] BPR-IV s. C-5.5.2 stipulates the notification and consultation procedures for TV broadcasting stations. They are virtually identical to those of AM stations.[38] The procedures for low power TV,[39] low power TV stations in small remote communities[40] and MDS-TV[41] are virtually the same as those of FM stations.

For the antennas and supporting structures of cable TV operators, BP 23 s. 6.11[42] requires that the applicants for the appropriate broadcasting certificate provide the local municipality, or other affected authority, with early notice that an antenna structure is planned for that area. The notice must describe the location and physical characteristics of the proposed structure and associated buildings. The notice must also indicate whether the tower or supporting structure will be equipped with high intensity strobe lights.

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[34] Broadcasting Procedures and Rules, Part II: “Application Procedures and Rules for AM Broadcasting Undertakings,” BPR, Part II, December 1991, BPR-II s. C-10.4.2.

[35] The time for notice, the included sketch and the dispute resolution methods are the same as BPR-II s. C-10.4.2.

[36] Broadcasting Procedures and Rules, Part III: “Application Procedures and Rules for FM Broadcasting Undertakings,” BPR, Part 3 Issue 3, Provisional, August 2002, BPR-III s. D-1.3

[37] BPR-III s. F-1.3.

[38] Broadcasting Procedures and Rules, Part IV: “Application Procedures and Rules for Television Broadcasting Undertakings,” BPR, Part IV, April 1997, BPR-IV s. C-5.5.2.

[39] BPR-IV s. D-1.3.

[40] BPR-IV s. F-1.3.

[41] BPR-IV s. H-2.2. MDS means Multipoint Distribution Television.

[42] Broadcasting Procedure, BP-23, Issue 4, Rev. 1, May 1995.

It is a significant policy feature of Industry Canada's broadcasting rules that broadcasters are expected to comply with any municipal by-laws that may require accommodations for the siting, painting or screening of antennas or antenna structures."[43] Municipal restrictions are acceptable to Industry Canada as long as the cost involved is reasonable and the restrictions do not impair the operating capacity of the antenna.

Marking and Lighting of Towers for Aeronautical Purposes

Under the authority of the federal Aeronautics Act and the Canadian Aviation Regulations (CARs) it is the responsibility of the Minister of Transport to assess buildings and structures to determine if they constitute a hazard to air navigation. As a consequence of such an assessment, the Minister may require marking or lighting, or both, of the building or structure in accordance with published standards. Currently, the principal standard is designated as *Standard 621.19 - Obstruction Markings and Lighting*. Simply stated, the purpose of this standard is to ensure that, in all cases and for 24 hours a day, an obstruction to air navigation remains visible to air traffic at a range sufficient to permit a pilot to take appropriate evasive action. The current visibility requirement is that the obstruction be visible at a distance sufficient for a pilot to see and avoid the obstruction by not less than 300 metres vertically within a horizontal radius of 600 metres from the obstruction.

According to *Standard 621.19* the principal means of achieving this basic visibility requirement is through the lighting and/or painting of the obstruction, and decisions about each, or both, must consider the characteristics of the obstruction and all of the surrounding circumstances at its actual or proposed location.[44] Lights, or beacons, are characterized under the standard by colour (red and/or white), intensity (low, medium and high), signal type (flashing or steady burning), flash rate (from 20 to 60 flashes per minute (fpm)) and sequence of flash (to achieve the visibility necessary for the particular structure). The number and placement (top, mid and lower sections of the structure) of beacons must be determined for each obstruction. For those lights required to produce a beam of light, the width of the beam and the vertical aim of the beam (to shine it toward anticipated air traffic) are described within the standard.

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[43] BP-23, s. 6.11.5. The policy goes one to provide that "Such restrictions are acceptable to the Department as long as the operative capacity of the antenna(s) is not restricted or impaired and the cost of compliance is not unreasonable."

[44] As one can imagine, the relevant circumstances would go well beyond consideration related to the height and dimensions of the structure itself to consider things such as the its proximity to an airport, whether the structure is in a flight path, the surrounding topography, the anticipated local atmospheric conditions, etc.

Standard 621.19 lists painting specifications by the intensity and hue of the two colours, (aviation) orange and white, and by the pattern of the application of those colours (in alternating bands of colour or in a checkerboard pattern). When painted, antenna towers are coated in alternating bands of orange and white.

The federal Department of Transport operates six Regional Offices and those seeking to have a potential obstruction processed must fill out and submit an "Aeronautical Obstruction Clearance Form." This form requires basic information about the structure including its height, dimensions, type of structure, and location by longitude and latitude.

At one time, Industry Canada would not issue most types of antenna authorization until the airspace safety branch of the Department of Transport had 'cleared' the proposed the structure. Today, the issuance of radio authorizations is no longer conditional upon prior air navigation clearance. Instead, the onus is placed upon individual antenna proponents to determine and comply with all Department of Transport aeronautical obstruction requirements. The one exception to this rule is for those seeking broadcasting certificates. These proposals must be pre-approved by Transport Canada prior to technical evaluation by Industry Canada.[45]

COMPARATIVE REGULATORY MATERIAL: ANTENNA SITING IN AUSTRALIA, NEW ZEALAND, THE UNITED KINGDOM AND THE UNITED STATES OF AMERICA.

[please refer to Appendix F].

[45] The exception for broadcasting certificates was explained within Industry Canada's, Client Procedures Circular, "Antenna Structure Clearance", CPC-2-0-02, Issue 2, September 1, 1990 at p. 2.

Section D - The Six Policy Questions

Section D is the heart of the Report of the National Antenna Tower Policy Review. This section addresses each of the policy questions submitted for review by Industry Canada and provides policy recommendations. Almost all of the information provided within this section was obtained during the data collection phase of the policy review. All of the opinions and recommendations submitted to the review process were considered during the writing of this section of the report. Quotations from or references to many of the submissions are included within in the body of the text or in the footnotes. The recommendations represent the best judgement of the writer of the report, David Townsend.

Question 1(a). How can the local consultation process regarding the siting of a specific tower be improved?

If Question 1(a) were interpreted broadly the entire antenna report could fit within the answer provided. So as to intrude as little as possible upon the discussions and recommendations relevant to the other five policy questions, the answers to Question 1(a) will concentrate upon suggestions for improvements to the two land-use consultation processes that are described in Industry Canada's policy document, CPC-2-0-03: *Environmental Process, Radiofrequency Fields and Land-Use Consultation*, Issue 3, June 24, 1995. As explained in Section C of this report, the consultation processes described in this policy circular are tied to the particular conditions of licence for various categories of radio stations and to other policy documents, such as the *Broadcasting Procedures and Rules*. To the extent that the contents of CPC-2-0-03 conflict with a condition of licence or a policy described within a policy document written for a particular category of radio station, the contents of the CPC is adjusted accordingly.

a. Legislative Authority over Consultations

The first recommendation related to improving local consultation should make clear that it is not a conclusion of this policy review that the legislative authority to regulate the siting of radiocommunication antennas and their supporting structures be delegated to provincial, territorial or municipal levels of government in Canada. To state the recommendation in positive terms:

> **Recommendation 1: That the legislative authority to regulate the siting of radiocommunication antennas and their supporting structures should remain exclusively with the Government of Canada.**

b. Role for Community Groups and Concerned Citizens

As matters stand, no radio regulatory policies require that community groups or local citizens be consulted directly when antenna towers and other substantial antenna supporting structures are established in their communities. Canada does have experience with local consultations on antenna siting matters and, for the most part, these consultations have been fruitful from the perspective of all of the participants. To their credit, both broadcasters and Cellular/PCS service providers in Canada often have held public meetings about their antenna proposals without a regulatory requirement to do so.[46] It is time to build upon those positive experiences.

CPC-2-0-03 makes references to community and local concerns yet provides no role for the citizens or groups impacted by the placement of significant antenna installations.[47] There would appear to be an implicit assumption that a "municipal/land-use authority" will adequately represent its citizen constituencies or that the land-use authority will directly consult the citizens if it deems such to be advisable. Both assumptions may be unreliable. First, as will be explained below, there are significant problems with the current consultation process. Second, a municipal government, as a collective deciding body, must represent a broad range of interests and it is often difficult to adequately represent the interests of a small segment of the population. For example, a large cross section of a municipality may support the installation of a broadcasting tower, cellular antenna installation or fixed wireless broadband transmission facility because they want the service. These views may differ greatly from those held by the citizens who will live in close proximity to the antenna installation. Also, direct participation by the citizens or groups most directly impacted by antenna facilities is important because it may lead to the identification of particular siting changes or accommodations that can mitigate the negative impacts.[48]

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[46] Some broadcasters and cellular service providers have held 'town hall' or 'open-house' public meetings as one element of their land-use consultations at the municipal level. Also, the answer provided to policy Question 4 of the National Antenna Tower Policy Review discusses Canada's experience with consultation protocols recently negotiated between individual cellular service providers and some municipalities. Many of these protocols call for direct consultations with members of the community affected by the antenna proposal.

[47] According to The City of Leduc, "The consultation process can be improved by having the comments of the municipality and the local residents taken into account." The City supports making the comments of the local authorities influential to the siting process, rather than merely informative. From: The City of Leduc Formal Written Submission dated 20 October 2003. The Municipality of East Hants submits "The site location and development process must be more than a superficial approach to public participation that is frustrating to residents." From: Municipality of East Hants Formal Written Submission dated 26 June 2003.

[48] Hardy Stevenson and Associates submit that the public should be provided with options regarding siting whenever it is possible. According to the consulting firm, "The outcome of the public consultation process should be the selection of a preferred site by the public, the municipality and the carrier. The public consultation process should be designed to allow the public to learn, deliberate and choose. Although the final decision

Recommendation 2: That Industry Canada should ensure that the proponents of significant antenna structures be required to consult directly with the citizens who may be the most directly impacted by the establishment or modification of the structures.

c. Policy Framework for Consultation Requirements

It is a conclusion of this policy review that meaningful consultations involving antenna proponents, land-use authorities and local citizens should occur when significant radio antennas and supporting structures are established or modified within Canadian communities. This report also concludes that such consultations can and should occur within a (comprehensive) radio regulatory policy framework.

Currently, a general policy framework for land-use consultations is described within CPC-2-0-03. This document was last revised in1995 and is now out of date. Radio users, land-use authorities and citizens who attempt to rely upon its contents may be misinformed about the consultations required for a particular antenna siting.

For most categories of radio stations in Canada the relevant consultation requirements for each are imposed as conditions of licence. While it has been quite common to require as a licensing condition compliance with all or part of CPC-2-0-3, it has also been common to reference the CPC and yet impose substantive and/or procedural elements that differ from the consultation elements described in the circular. This has been especially true for radio stations authorized through "Spectrum Licensing." For example, for the Spectrum Licensing scheme recently imposed upon all categories of cellular service provider,[49] a number of consultation requirements were imposed as licence conditions that do not fit within the two consultation models (Type 1 and Type 2 station) described within the CPC document.[50] Clearly, Industry

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regarding location would still be the responsibility of the carrier, it would be in its best interest to carefully consider the public's comments." From: Hardy Stevenson and Associates Formal Written Submission dated 25 September 2003.

[49] The phrase all categories of cellular service provider is being used here as a casual description for the original cellular providers from the 1980s, the PCS digital cellular providers who were first authorized in the mid-1990s and the PCS providers who received radio spectrum through PCS spectrum auctions held in 2001.The new licensing scheme applicable to all cellular service providers is described within *Spectrum Licensing Policy for Cellular and Incumbent Personal Communications Services (PCS),* Spectrum Management and Telecommunications Policy, December 2003. The consultation requirements can be found at pp. 7 and 8.

[50] The consultation requirements described within the new spectrum licence conditions applicable to all types of cellular service provider defy the Type 1/Type 2 classification set out within CPC-2-0-03. For example, the radio stations are recognized as not requiring site-specific licensing (Type 2), yet (prior) land-use consultation is

Canada must revisit the policy framework it created in 1990 to see if it should be abandoned or adjusted in light of the differing consultation requirements imposed upon various categories of radio stations.

> **Recommendation 3: That the policy framework involving document CPC-2-0-03 and the other licensing and policy documents that describe differing land-use consultation requirements for particular types of radio stations should be examined. The consultation requirements for various categories of radio stations may be too different to be described within a single policy circular.**

d. Classification of Radio Stations as Type 1 or Type 2

It is logical to create both structured and flexible land-use consultation requirements for antenna proposals, and to mandate the use of one or the other (structured or flexible) based on assumptions about whether the siting of a particular type of radio station has the potential to produce a high or low impact upon a surrounding community. Other developed nations have used such policy distinctions.

As discussed within Section C of this report, policy document CPC-2-0-03 contains two land-use consultation models: one is much more structured than the other, and the structured model calls for more oversight and involvement by Industry Canada.[51] The structured consultation model is applied to "Type 1 radio stations". These are radio stations that require a site-specific approval before the antenna can be constructed or put into operation. All broadcasting undertakings and certain non-broadcasting land and coast stations require a site-specific certificate or licence.

Under this CPC, the flexible land-use consultation model is reserved for Type 2 radio stations. These are stations or radio apparatus that either: (1) require a radio authorization (typically a licence) that is not site-specific or (2) are licence-exempt but must comply with specified power, frequency and other technical limits. While most of the more recently created policy documents rarely use the terms Type 1 and Type 2 stations, they explicitly do note whether the licence being described is a site-specific form of radio authorization.

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mandatory for all stations, the attestation form annexed to the CPC must be submitted and the antenna system or modification cannot proceed unless local concurrence is obtained or Industry Canada permits it otherwise.

[51] There are a number of other differences between the two consultation models.

When the Type 1/ Type 2 designations were created within the CPC in the mid 1990s, the overall radio licensing scheme in Canada tended to support the assumption that the potential land-use impact of the antenna systems of Type 2 radio stations was much lower and more localized (than Type 1 stations) and, consequently, a flexible consultation model was appropriate.[52] Amateur Radio and Citizen Band (GRS) radio stations are good representative examples of Type 2 stations that have benefited in the past from the flexible land-use consultation model.

The radio station authorization scheme in Canada has changed considerably over the past 10 years and original assumptions about the relative land-use impact of Type 1 and Type 2 stations are no longer reliable. The department has dramatically reduced the number of individualized licensing transactions through the use of radio "System Licensing" and "Spectrum Licensing." Also, new digital radio apparatus that is licence-exempt can be deployed within fixed wireless transmission facilities that may require substantial antenna towers or other supporting structures. As no authorization is necessary to deploy this radio apparatus, the radio station would be regarded as fitting the Type 2 category.

Recommendation 4: That Industry Canada should examine the practical implications of using the requirement for a site-specific radio authorization ("Type 1" and "Type 2" radio stations) as a means of streaming radio station approvals into the structured or the flexible land-use consultation model.

e. Policy Trigger for Mandatory Consultations

At present, land-use consultations are required for all categories of broadcasting stations and for all categories of cellular service provider in Canada. These obligations are imposed as conditions of the relevant licence or described within particular policy documents written for the station and apparatus type. For all other categories of radio station, and for certain licence-exempt radio apparatus,[53] the proponent of the antenna installation under consideration must interpret and

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[52] The earlier versions of CPC-2-0-03 did not use the designations Type 1 and 2. They spoke of radio stations that required a radio licence and those that were licence-exempt, such as most TVRO (satellite) dishes, GRS [Citizen Band] stations and private receiving stations. Licence-exempt stations were encouraged, but not required, to engage in local consultations. This changed in 1995 when stations without a site-specific authorization were required to consult if it was "felt that community concerns could be raised..."

[53] For example, in 2003 Industry Canada designated radio spectrum in the band 24.05-24.25 GHz for licence-exempt fixed point-to-point transmission links. The land-use consultation requirements applicable for Type 2 radio stations were incorporated by reference into the Radio Standards Specification (RSS) 210, *Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands).* See, Notice No. DGTP-005-03: Spectrum Designation to Accommodate Licence-exempt Fixed Point-to-point Transmission Links in the Band

apply one of the two criteria described in CPC-2-0-03 to determine whether land-use consultations are required in the particular circumstances. Before establishing or modifying a Type 1 (site-specific authorization) radio station, the proponent must determine whether the resulting facility will be a 'significant antenna structure.' If so, (prior) land-use consultations are required. According to this CPC, those wishing to install or modify the antenna systems of Type 2 radio stations (no site-specific authorization) must consult with the relevant land-use authority if the station proponent feels that "community concerns could be raised..." Other categories of Type 2 radio stations, such as those authorized by Spectrum Licence, have an obligation to consult with the relevant land-use authorities if their proposal involves the approval of a "significant" antenna structure.

Neither CPC-2-0-03 nor any of the new Spectrum Licences that have used this term within their licence conditions have offered any guidance on how the licence applicant is to determine the 'significance' of the planned structure. Does it mean significance in size in relation to other antenna structures? Significance in relation to the surrounding land-use patterns? The significance of the proposal to the land-use authority or to the people living in the community? Policy guidance must be provided by Industry Canada for this term in order to bring more certainty to the consultation process for all concerned parties. Many of those who participated in the national public consultation for this project held this view.[54]

24.05-24.25 GHz., *Canada Gazette*, April 15, 2003.

[54] This point was made by The City of Leduc, which said, "To establish a national consistency with regard to the consultation process Industry Canada should indicate clearly what is considered a 'significant' modification or installation of an antenna tower. It should not be left with the proponent of the tower to determine if the proposal is 'significant'." From: The City of Leduc Formal Written Submission dated 20 October 2003. The Federation of Canadian Municipalities (FCM) questions, "Should an applicant for a scarce commodity like radiofrequency be free to determine on their own when the Government of Canada policies apply?" The FCM recommends "a clear, workable definition of a 'significant structure or change,' that includes visual aspects of proposed structures. From: FCM Formal Written Submission dated August 2003. Rogers Communications also supports a definition of "significant," to eliminate contradictory interpretations of the types of structures considered significant. Rogers also supports a definition of structures that are to be deemed 'insignificant'. Rogers submits that most replacement structures, and antennas located on existing buildings or structures are not significant. From: Rogers Communications Formal Written Submission. The Canadian Wireless Telecommunications Association (CWTA) also supports "a clearer definition of insignificance with reference to land use impact. ... The definition of insignificance is important to avoid unnecessary and unwarranted delays in situations where little or no land use impact will occur." From: CWTA Formal Written Submission dated 9 October 2003. The Radio Amateurs of Canada (RAC) recommend that Industry Canada "provide expanded guidance on what is considered to be a 'significant' change to an existing tower installation and have minor electrical and mechanical changes exempt from reapplication." From: RAC Formal Written Submission dated 10 October 2003.

As noted above, the policy trigger in document CPC-2-0-03 for mandatory land-use consultations for Type 2 radio stations is whether the antenna proponent feels that community concerns could be raised. While this phrase does provide a definite context for this determination it does not offer the degree of certainty necessary. The antenna proponent makes this determination alone. Industry Canada does not have a role until the antenna is erected or modified.[55] The final determination for the department is whether the antenna structure, when completed or modified, 'is appropriate within its surroundings.' More certainty must be brought to this phrase also. Obviously, it is much more difficult for a land-use authority to argue that it should have been consulted and accommodated once the structure is erected or modified.[56]

Recommendation 5: That more policy guidance must be provided by Industry Canada to radio users, land-use authorities and the public as to the policy criteria that will make a land-use consultation mandatory for antenna proponents.

f. Consultation Issues and Accommodations

CPC-2-0-03 states that the consultations between the land-use authority and the antenna proponent are to provide an "opportunity to have land-use concerns addressed" and that the two parties will "propose and examine alternatives and in so doing, will give consideration to each other's needs." The document also provides that "...the parties should consider each other's requirements and work towards solutions that minimize the impact on the surroundings...." Similar phrases appear within the licensing conditions issued for particular categories of radio stations.[57] Even with such phrases, there is very little information within these various documents

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[55] In the Press Release issued by Industry Canada when the National Antenna Tower Policy Review was first announced to the public, one of the stated objectives of the review was to reduce the surprise experienced by municipalities and citizens when antenna facilities were established in their communities. The lack of certainty surrounding the interpretation and application of the criteria that render land-use consultations mandatory for Type 1 and Type 2 radio stations may be to blame for much of this surprise.

[56] Hardy Stevenson and Associates were of the view that the public should be informed prior to an application if a wireless carrier intends to establish a significant facility. From: Hardy Stevenson and Associates Formal Written Submission dated 25 September 2003.

[57] The new licensing scheme applicable to all Cellular/PCS service providers requires that land-use consultations be "meaningful" and that the aim of the consultations is to produce "consensus solutions." These licence conditions are described in *Spectrum Licensing Policy for Cellular and Incumbent Personal Communications Services (PCS)*, Spectrum Management and Telecommunications Policy, December 2003 at p. 7.

about the types of issues up for discussion and the nature of the accommodations that a land-use authority might legitimately request of the proponent.[58]

CPC-2-0-03 also states that the consultations will provide an opportunity to have "land-use concerns addressed while respecting federal jurisdiction for the installation and operation of radiocommunication systems." Does this mean that the only legitimate requests for accommodations must relate to those matters within provincial constitutional jurisdiction (and that have been delegated to the local government level)? If that is so, the only accommodations which land-use authorities can negotiate are things such as the type of security fencing surrounding the antenna site and the planting of vegetation near the site to provide visual screening for the radio equipment shed. High on the list of matters to be discussed at local consultations with municipalities and members of the public are the visual impact of the structure, the potential for health effects to humans from exposure to radio energy and the potential for interference problems. Often, local governments and citizens have been told that interference management and human exposure to radiofrequency energy issues cannot even be put on the agenda for consultations.

Recommendation 6: That radiocommunication policy addressing local consultations should specify the issues that may and may not be discussed. Also, land-use authorities should be informed about the nature and extent to which they may legitimately request siting-related accommodations from antenna proponents.

g. Criteria for Determining Local "Concurrence"

According to current radiocommunication policies addressing local consultations, the proponents of the antenna systems for both Type 1 and Type 2 radio stations may proceed to install or modify their structures if "concurrence" is obtained from the relevant land-use authority. A number of policy issues have arisen in regard to securing local concurrence. For example, when antenna proponents file their plans with municipal land-use authorities, they often do so at the development officer's desk. Frequently, the proponent will be issued a building permit by the by-law officer upon a quick check of the local by-laws. Certain antenna proponents in Canada

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[58] The lack of a clear policy direction on local consultation results in: a lack of consistency among approaches, minimal accountability for communities, a minimal role for the public, and concerns about health risks dominating the consultation process. From: Hardy Stevenson and Associates Formal Written Submission dated 25 September 2003. Telus Mobility proposes that Industry Canada should make more of an effort to explain the scope of consultation. From: Telus Mobility Formal Written Submission dated 10 October 2003. See also the formal submission made on behalf of the CWTA dated 9 October 2003 at p. 8.

have regarded the issuance of a building permit as evidence of local concurrence. The underlying problem here is that local by-laws are often out of date on the issue of radio antenna matters. Historically they have been treated like utility poles and have been designated as structures "permitted in all zones." Even if a land-use authority were to attempt to create a by-law that dealt explicitly with antenna siting issues, it is likely that many elements of it would infringe upon federal constitutional authority and be *ultra vires*. Also, Canadian land-use planning law states that a development proposal must be assessed using the municipal laws in existence at the time of filing for approval. Therefore, by-law officers and other municipal officials may examine their by-laws and determine that they have no choice but to issue the building permit to construct or modify the antenna and supporting structure.

Under Canadian constitutional law radio regulatory matters fall exclusively within the jurisdiction of the federal government. Therefore local by-laws may touch upon radio antenna issues only in an incidental way, unrelated to their operative aspects. One policy consequence of this is that a local building permit should not be regarded by antenna proponents as authority to construct.[59] Henceforth, if an antenna proponent is issued a building permit for an antenna, the proponent should regard the document as no more than an acknowledgment of receipt of the documents provided to initiate land-use consultations.

As another example of local concurrence problems, there is no protocol on who may speak to an antenna proponent on behalf of a municipality. In a recent case, a mayor, who had decided not to run in the up-coming municipal election, told an antenna proponent that it could commence construction of a broadcasting undertaking but the mayor had not consulted the municipal council.

The lack of a policy protocol on concurrence has frustrated antenna proponents also. During consultations for this report some members of the radiocommunication industry complained of negotiating siting accommodations (and approval) with one municipal official, politician or body, only to have another claim that the decision reached was not valid or was being overruled.

Recommendation 7: That policy documents addressing land-use consultation issues should offer a protocol for the expression of concurrence/approval by

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[59] Interestingly, the Housing Development and Buildings Branch of the Ontario Ministry of Municipal Affairs and Housing has issued a branch opinion to the effect that the *Ontario Building Code* has no application to federally regulated broadcasting and telecommunication undertakings. The URL for this opinion is: <http://www.obc.mah.gov.on.ca/userfiles/HTML/nts_4_9079_1.html> A number of the submissions made on behalf of representatives from the radiocommunication industry cited this opinion.

land-use authorities. Such a protocol will provide more certainty for land-use authorities, antenna proponents and Industry Canada. The protocol should make clear that the issuance of a local building permit is not evidence of land-use approval.

h. Policy Framework for Dispute Resolution

In many cases consultations between antenna proponents and land-use authorities reach an impasse situation. The proponent may be focussed upon a site that the planning authority regards as unacceptable or the parties may disagree as to the nature, extent, cost or cost sharing of siting accommodations deemed necessary by the land-use authority. Currently, Industry Canada's policies for dispute resolution when land-use consultations reach an impasse are very undeveloped. For most Type 2 radio stations departmental policies do not provide a dispute resolution process.

For Type 1 radio stations (requiring a site-specific authorization), the dispute resolution process set out within CPC-2-0-03 does not appear to have been supplemented through the use of licensing conditions or other radio policies. This is unfortunate because there are a number of problems with it. First, upon impasse, the dispute resolution activities involve only the antenna proponent and representatives from Industry Canada. From the text of the policy document, it would appear that the local perspective is provided by the proponent from documents and opinions it submits to Industry Canada. Clearly, the antenna proponent's submission to Industry Canada should be shared with the land-use authority. The department should consider the submission and any local reply to it when deciding whether the licence will be issued.

Second, much more detail must be provided on how the impasse process will work (e.g. the respective roles of all parties, how various decisional criteria will be applied, the use of time limits for various stages, etc.)[60] Third, many of those who participated during the public consultation stage for this policy review insisted that Industry Canada play a more active role generally during the consultation stages. In particular, they thought that the department's role should become more active if the consultations reach an impasse situation.

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[60] The Corporation of the Township of Muskoka Lakes and the Municipality of East Hants both support the creation of a more formal dispute resolution mechanism for the consultation process. See: Formal Written Submission the Township of Muskoka Lakes dated 17 June 2003 and the Submission made on behalf of East Hants dated 26 June 2003. The Federation of Canadian Municipalities (FCM) endorses a voluntary and scalable dispute resolution mechanism. The FCM states that "any authoritative dispute resolution forum should require that informal avenues be exhausted first. FCM believes that, when possible, it is best to resolve differences at an early stage, thus avoiding legal expenses and other problems in the future." From: FCM Formal Written Submission dated August 2003.

No impasse process is supplied within document CPC-2-0-03 for Type 2 radio stations. Industry Canada generally is not involved in 'Type 2 consultations' between antenna proponents and land-use authorities. If local opposition has been expressed, the department will review the appropriateness of the antenna system once it has been established. Considering that antenna facilities that may now be authorized under the approval policies for Type 2 stations can range from sizable commercial structures to amateur radio antennas to unlicenced satellite dishes, this lack of process and oversight by Industry Canada may lead to inconsistent results.[61] Not all Type 2 radio stations suffer from a total lack of policy structure surrounding consultation and impasse processes. It should be noted that a few of the categories of radio stations that are authorized by Spectrum Licence are required to comply with particular consultation and dispute resolution policies.[62] These, also, are very undeveloped.

Recommendation 8: That all land-use consultation policies should provide a framework for a dispute resolution process. In particular, the land-use authority should be given the opportunity to reply to the submission tendered to Industry Canada by the antenna proponent. Any new consultation policies should give Industry Canada a more formal and active role in circumstances where local consultations reach an impasse.

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[61] The Radio Amateurs of Canada (RAC) support defining and streamlining the consultation process for Type 2 installations, without placing an undue burden on Type 2 tower proponents. RAC considers the consultation process for Type 2 installations developed by the City of Calgary to be a successful consultation model; however, RAC feels that the maximum tower height specified by the city to be too low. In addition, RAC considers that all Type 2 installations should be treated equally and undergo the same approval process, which would include any required consultation with land-use authorities. As it stands, Industry Canada has admitted that the consultation requirements for Type 2 GRS and personal use TV and FM towers generally are not enforced. From: RAC Formal Written Submission dated 10 October 2003. Also see City of Calgary, *Planning and Building Department Report to the SPC on Operations and Environment: Policy Guidelines for the Development of Amateur Radio Antenna Structures in Residential Areas* (OE98-61: Attachment 1) dated 9 September 1998. The Radio Advisory Board of Canada (RABC) is also "concerned that LAUs [land-use authorities] treat all applicants in a consistent manner within their Type 1 or Type 2 category. ... The RABC considers that all radiocommunication antenna support structures should be subject to the notification process in keeping with Industry Canada's mandate "to ensure that all Canadians are treated equally, consistently and fairly under the *Radiocommunication Act*." From: RABC Formal Written Submission dated 17 October 2003.

[62] The new Spectrum Licence applicable to all cellular service providers contains conditions that require the licensee to consult with "all local municipalities or land-use authorities with the aim of developing consensus solutions." The impasse process is described in very brief terms in the following condition of licence. "Installation of any antenna structure must be delayed for a period of time sufficient for Departmental review where, after considering reasonable alternatives and consultation options, land-use consultation negotiations are at an impasse;" From: *Spectrum Licensing Policy for Cellular and Incumbent Personal Communications Services (PCS)*, Spectrum Management and Telecommunications Policy, December 2003 at p. 7.

i. Consultation Document for Land-use Authorities and the Public

Generally, the content of CPC-2-0-03 and the licensing documents that address local consultations reveal a preoccupation with the relationship between antenna proponents and Industry Canada.[63] This casting to the documents sends a negative message to land-use authorities and citizens regarding the utility of their involvement in local consultations.[64] It would not escape the notice of local government officials or members of the public that CPC-2-0-03 refers to the antenna proponent as Industry Canada's "client." While the document itself is a 'client procedure circular' this is the key document which is available to local municipalities and to citizens to explain how consultations will be conducted. What faith can a land-use authorities or citizens have in the fair resolution of an antenna dispute if the document setting out the process describes the proponent of the matter as the client of the final decision maker?

The best way to offer land-use authorities and members of the public a balanced document on antenna consultation issues is for Industry Canada to create a counterpart document to CPC-2-0-03 that focuses upon antenna-siting issues and the consultative processes from a local perspective.[65]

> **Recommendation 9: That Industry Canada should create a counterpart document to CPC-2-0-03 for use by land-use authorities and citizens. This document should explain antenna-siting issues and Industry Canada's consultation processes from a local perspective.**

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[63] Dr. Rod Dobell spoke of this industry-focus to the department's documents and institutional culture in his report in 2002 on the establishment of broadcasting towers on Triangle Mountain in British Columbia.

[64] The City of Colwood believes that industry preeminence should be removed and Industry Canada culture should be changed to favour the interests of citizens. From: City of Colwood Formal Written Submission dated 21 August 2003.

[65] Many municipalities and community groups support the creation of a minimum set of requirements or guidelines to be followed for tower applications, as does the Federation of Canadian Municipalities (FCM). The FCM recommends that an industry code of conduct be established, as in the United Kingdom. From: FCM Formal Written Submission dated August 2003. See also the Canadian Wildlife Services Formal Written Submission which advocates a nation-wide base protocol, and Hardy Stevenson and Associates Formal Written Submission dated 25 September 2003, which advocates an Industry Canada public consultation guideline. The Regional District of East Kootenay advocates a clear definition of the roles and responsibilities of each party. From: Regional District of East Kootenay Formal Written Submission dated 3 October 2003. Timothy S. Ellam, a partner with McCarthy Tetrault LLP and a member of the Radio Amateurs of Canada attributes the confusion about amateur antenna support structures to the lack of a national policy by Industry Canada. From: Timothy S. Ellam Formal Written Submission dated 16 October 2003.

j. Industry Canada's Role in Local Consultations

According to CPC-2-0-03, "Industry Canada does not play a direct role in the consultation." Generally, for Type 2 radio stations, the department plays no role. These policies must be re-thought. Data collected for this policy review clearly demonstrated that the radio industry, land-use authorities and private citizens think that Industry Canada is too far removed from the consultation process.[66] Within his examination of the consultations that took place at Triangle Mountain, British Columbia, Professor Rod Dobell criticized Industry Canada for not having a direct role in the consultation process. It is submitted that direct involvement by Industry Canada officials is a pre-condition to 'meaningful' consultations at the local level.[67]

Recommendation 10: That Industry Canada personnel should take a more active role in the local consultations that occur between antenna proponents, land-use authorities and the public.

k. Local Consultations and Antenna Site/Tower Sharing

Question 5 of the National Antenna Tower Policy Review asked how tower-sharing and antenna siting-sharing can be utilized in order to reduce the total number of towers. The reply to

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[66] The Municipality of the County of Kings commented on the vagueness and inadequacy of Industry Canada's communication with the county during the consultation stage. The Formal Written Submission dated 24 October 2003 states: "No federal representative attended this meeting despite invitations from both the Municipality and the proponent. The overall sense from Industry Canada seemed to be that this was an issue for the Municipality and the proponent to work out even though the final approval ultimately rests with Industry Canada." The City of Red Deer Formal Written Submission recommends that municipalities be assigned a contact person from Industry Canada, for access to independent expertise. In addition, Rogers Communication "considers that it would be a significant improvement if Industry Canada took a more proactive approach both inside and outside of these discussions as a trusted and credible expert third party." In particular, Rogers hopes to see Industry Canada assume an educative role. From: Rogers Communications Formal Written Submission. Telus Mobility also hopes to see Industry Canada more effectively communicate the applicable processes and standards to municipalities and the public. From: Telus Mobility Formal Written Submission dated 10 October 2003.

[67] The Municipality of the County of Kings also expressed the view that "federal regulators should not remain separate from the public process as they can best handle many of the concerns expressed and questions raised," for example, concerns about safety provisions. From: The Municipality of the County of Kings Formal Written Submission dated 24 October 2003. Industry Canada is also in the best position to inform citizens about the distinctions between commercial and amateur towers. Amateur radio users recommend that Industry Canada, in conjunction with amateur radio organizations and land-use authorities, create and circulate an information package pertaining to the Amateur Radio Service. From: Lloyd W. Hofmann Formal Written Submission dated 3 July 2003. The City of Oshawa, in its Formal Submission dated 6 August 2003 recommended that an Industry Canada information package be made available to the public "that summarises its regulatory powers for radiocommunications, its policies and procedures for establishing new towers, Health Canada information concerning public health, and why towers are necessary to the economy." The City of Colwood believes that Industry Canada should be available to assist municipalities and land-use authorities in understanding their responsibilities, rights and the process. From: The City of Colwood Formal Written Submission dated 21 August 2003.

Question 5 fully explores those policy objectives. That material should not be repeated here, but the successful implementation of antenna sharing policies does have a direct tie to local land-use consultations. If land-use authorities and citizens are sufficiently aware of Industry Canada's policy requirements and expectations for site or tower sharing they can play a challenge function during consultations with the proponent to encourage more co-location.[68] Also, well informed municipalities will be better prepared to work with antenna proponents to identify lands or areas where multiple antenna sitings can be accommodated.

CPC-2-0-03 contains only two references to site-sharing. One is set out within a part of the document that is directed to the attention of "clients." The other reference is contained within a discussion of the objectives of the land-use consultation. Here, the document states, "...the parties should consider each other's requirements and work towards solutions that minimize the impact on the surroundings, including considering existing sites, while not unduly prohibiting the development of the radio facility." As an expression, the consideration of "existing sites" may mean very little to a land-use authority. Both treatments represent lost opportunities to lay a foundation for an increase in the site and tower sharing activities in Canada. The main policy document for broadcasters, *Broadcasting Procedures and Rules*, Part I: General Rules,[69] also contains a general policy expectation that broadcasters work cooperatively to share antenna structures.

Recommendation 11: That land-use authorities and members of the public should be fully informed about the site and tower sharing obligations, or policy expectations, set by Industry Canada for antenna proponents. The department should regard local consultations as activities strategic to the implementation of its policy objectives for antenna co-location.

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[68] Many of the municipalities and community groups that tendered formal submissions suggested that antenna proponents be subject to explicit siting requirements, including co-location objectives, and that those policies be made public. The following recommendations are good examples of the suggestions received. Gary Lunn, Member of Parliament for Saanich - Gulf Islands, urged the creation of "an enforceable commitment to shared usage." From: Gary Lunn Formal Written Submission dated 18 August 2003. The Federation of Canadian Municipalities (FCM) suggested that, at a minimum, the government should require "that the applicant demonstrate that co-location on an existing structure is unworkable. This justification should be based on technical requirements and analysis of alternatives, not the reluctance to pay reasonable costs or avoid cooperation with competitors." From: FCM Formal Written Submission dated August 2003.

[69] BPR Part I, Issue 3, July 2004. The tower-sharing provision is located at page 3.

l. Information about Compliance and Sanctions

Within CPC-2-0-03 and its attestation form (Annex 1) there are at least five references to the proponents of Type 1 and Type 2 radio stations having to 'accept the consequences' of proceeding without consulting local authorities, proceeding without waiting for a reply from the land-use authority or for wrongfully attesting/asserting that an installation, or its modification, will be insignificant. These references to regulatory compliance and enforcement activity are too vague to be credible.[70] In order to lay a foundation for their negotiations and requests for siting accommodations, land-use authorities must be aware of the policy consequences for antenna proponents if they refuse to consult or they negotiate without making a genuine commitment to the process.[71]

During the public consultation phase for this policy review the Federation of Canadian Municipalities (FCM) and some citizens complained that significant antenna installations had been established without any notice to consult being served upon the relevant land-use authority. Also, regional staff of Industry Canada expressed concern that the content of CPC-2-0-03 and other policy documents did not provide a sound legal foundation for actual enforcement of the consultation requirement. This, even though prior consultation is a condition of radio authorization in some cases. The recent *Thompson*[72] case from Vancouver Island, involving an amateur radio operator who refused to accommodate requests made by the local land-use authority and would not comply with instructions issued by Industry Canada, suggests that there are compliance issues to address regarding local consultations.

Recommendation 12: That land-use authorities, members of the public and antenna proponents should be fully informed about the compliance and

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[70] The City of Colwood advocates scrutinizing activities for compliance. The City is in favour of severe consequences for non-compliance, because "without severe consequences there is no incentive or motivation to follow the rules." It is recognized that situations may sometimes call for a departure from the rules, and the City submits that any departure from guidelines must be justified and approved at senior levels. From: City of Colwood Formal Written Submission dated 21 August 2003. The Federation of Canadian Municipalities (FCM) takes issue with several points in the CPC compliance obligations. The FCM questions whether the consequences are significant enough that they would be a deterrent, and it questions the language - "may" and "should" instead of "must." The Federation recommends enforceable, mandatory sanctions. From: FCM Formal Written Submission dated August 2003.

[71] Interestingly, the 1992 edition of CPC-2-0-03 contained much stronger compliance language than the does the current (1995) version.

[72] *Minister of Industry v. James W. Thompson*, (2004) Docket: T-569-3; 2004 FC 265 (FCTD). Eventually the Federal Court of Canada issued an order for Mr. Thompson to comply with the instructions issued by the District Office of Industry Canada.

enforcement activities available to Industry Canada, should antenna proponents fail to meet policy requirements for local consultations.

m. Information on Obligations to Abate Electromagnetic Interference (EMI)

CPC-2-0-03 contains no reference to the electromagnetic interference (EMI) issues that may be raised in relation to the establishment of many categories of radio stations or to the obligations to resolve interference problems. These issues and obligations are of great interest to land-use authorities and citizens during local consultations.

The technical parameters and limits applicable to all categories of radio stations and licence-exempt radio apparatus are specified by Industry Canada. These are to ensure that each radio station or device is neither subjected to, nor causes, a level of interference that is regarded as unacceptable. No radio station, radio apparatus or non-radio equipment (that may be sensitive to radio energy) enjoys interference-free operation. All radio apparatus and non-radio equipment that emits radio energy[73] must operate strictly within the technical parameters and limits applicable to each category. "Radio-sensitve equipment"[74] is expected to have certain radiofrequency-rejection or immunity characteristics so that it can function as intended, despite the presence of radiocommunication emissions.

As one means of controlling interference, some operators of radio stations/apparatus are expected to make on-site adjustments to the parameters (such as the frequency, power or location) of their transmitting and/or receiving equipment. Broadcasters,[75] amateur radio operators[76] and the

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[73] In the *Radiocommunication Act* such equipment is designated as "interference-causing equipment."

[74] "Radio-sensitive equipment" is defined within section 2 of the *Radiocommunication Act* as "...as any device machinery or equipment, other than radio apparatus, the use or functioning of which is or can be adversely affected by radiocommunication emissions;"

[75] See, for example, the obligations of applicants of AM broadcasting certificates to "remedy *valid* complaints of interference caused by the station to radiofrequency devices within the 250 m/Vm contour.." and to "provide technical advice to complainants, located between the 250 m/Vm contour and the service contours of the station, concerning appropriate action to resolve interference problems..." From: *Broadcasting Procedures and Rules, Part II:* "Application Procedures and Rules for AM Broadcasting Undertakings" (BPR, Part II), December 1991 at Rule C-10.4 "Broadcaster's Responsibilities"

[76] The technical and operational rules applicable to amateurs permit them to use a great range of frequencies, power options and antenna systems with conditions requiring them to make adjustments if interference is caused to other licenced radio apparatus or systems and to non-radio apparatus in circumstances where Industry Canada determines that an interference complaint is valid.

users of licence-exempt wireless devices[77] are good examples of spectrum users who have obligations to make on-site adjustments to their apparatus in certain circumstances.

When new or modified radio transmitters are proposed for communities where people work and live concerns are often expressed about the potential for and resolution of interference problems. Electromagnetic interference (EMI) issues are (almost) inevitably raised by land-use authorities and citizens when they present multiple objections to an antenna proposal. It is important that very basic information about EMI, and about the various obligations to resolve EMI problems, be referenced within local consultation materials prepared by Industry Canada.

It is not being suggested that land-use authorities or citizens be accorded the opportunity to challenge the interference protection criteria and obligations set by Industry Canada. The effect of this recommendation is that those who are concerned about the possibility of EMI be made aware that spectrum users may have obligations to abate EMI problems and that Industry Canada will oversee such determinations. In some cases involving interference, Industry Canada expects that local citizens will join with spectrum users in activities intended to resolve the EMI problem(s).

Recommendation 13: That land-use consultation materials prepared by Industry Canada should contain very basic information about electromagnetic interference (EMI), about obligations to resolve EMI problems and about Industry Canada's respective role.

n. Swamping and Immunity Determinations Involving Broadcasters

Radio engineers recognize a basic difference between "swamping" and "immunity" problems when electromagnetic interference (EMI) is experienced. In situations where the problem is classified as one of "swamping," the emitter of the radio energy is deemed responsible for the interference because it is creating a power density at a particular location that (1) exceeds established emission criteria measured by distance from the transmitter or (2) is in excess of a reasonable power density level determined in consideration of the characteristics of the radio apparatus or non-radio equipment that might usually be found operating at a particular location.

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[77] Under the terms of *Radio Standards Specification*: "Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands),"(RSS-210 Issue 5), November 2001, licence-exempt radio apparatus and systems cannot claim interference protection from other radio systems and cannot cause interference to licensed radio services. Depending upon the cause of the interference, the users of such unlicensed apparatus may be expected to make appropriate adjustments to their equipment if interference is experienced to of from licensed, licence-exempt or non-radio equipment.

For “immunity” problems the recipient radio-sensitive equipment or radio apparatus is deemed responsible because it is unreasonably susceptible to the RF energy that might reasonably be expected at a particular location.

Generally, when radiofrequency power density is measured at a particular location, its electric field strength is registered in volts per metre (V/m). So too, the immunity (or electromagnetic rejection) characteristics of certain devices are measured in volts per metre. For example, when procuring electronic equipment for use by the Canadian military such equipment is specified to withstand the presence of certain electric field strength levels (specified in V/m) and yet continue to perform their various functions.[78] Currently most medical devices purchased for deployment within Canadian hospitals are required to have immunity specifications of up to 3 V/m for devices deployed on the ward and 10 V/m for medical devices used for emergency and home care contexts.[79] The electronic devices (e.g electric organs) and radio apparatus (televisions, radios, baby monitors, etc.) found within most homes can reasonably expect to have certain immunity characteristics also. In the late 1980s, the U.S. government considered requiring all home entertainment equipment (HEE) to be manufactured to operate, without significant degradation in performance, despite the presence of an electric field strength density of 1 V/m. That regulation was never enacted in the U.S.A. or in Canada.

Historically and presently most of the interference complaints received by Industry Canada and the Federal Communications Commission (FCC) relate to disruptions to the functioning of the electronic equipment that one would find within the average home. When interference is experienced the challenge is to make determinations of fault when no immunity standards exist for such equipment. As a ‘work-around solution’ Industry Canada has created a policy for distinguishing between swamping and immunity problems involving home electronic equipment by using field strength values that roughly correspond to notional immunity levels for three categories of home electronic equipment.

Section 5(1) (*l*) of the *Radiocommunication Act* permits the Minister of Industry to make determinations of the existence and cause of “harmful interference,” and to issue orders to the appropriate person(s) in control of the “radio apparatus, interference-causing equipment or radio-sensitive equipment” deemed to be at fault, to cease or modify the operation of the

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[78] For example, the U.S. Military has been producing a series of immunity specifications for many types of equipment under the MIL-STD-462 series of standards.

[79] The international standard that addresses the immunity characteristics of most medical devices is IEC 601-1-2, 2nd Edition Part 2 Electromagnetic Compatibility - Requirements and Tests.

blameworthy equipment or apparatus "until such time as it can be operated without causing or being affected by harmful interference."

In order to assist departmental inspectors in making determinations of harmful interference, Industry Canada has produced two policy documents. The first is entitled *Electromagnetic Compatibility Advisory Bulletin*: "Criteria for Resolution of Immunity Complaints Involving Fundamental Emission of Radiocommunications Transmitters," EMCAB-2, Issue 1, June 1994. EMCAB-2 provides a table of field strength values (specified in V/m as measured at the premises of the affected equipment) that are used by the department to distinguish between swamping and immunity problems in relation to determinations of harmful interference under section 5(1)*(l*) of the *Radiocommunication Act*. The second policy is called *Spectrum Management, Client Procedures Circular*: "Determinations of Harmful Interference With Respect to Radio-Sensitive Equipment" CPC-3-14-01, Issue 1, April 1, 1997. CPC-3-14-01 provides an overview of the procedures, processes and fees associated with making interference determinations using the table of field strength values set out in EMCAB-2.

Table 1 in document EMCAB-2 provides field strength values for "broadcasting receivers"[80] and its "associated equipment,"[81] which are both set at 1.83 V/m; and "radio sensitive equipment"[82] which is accorded the field strength value of 3.16 volts per metre. EMCAB-2 explains how these three equipment categories and values will be used:[83]

> "If the level of transmitted signal exceeds the applicable field strength value on the premises of the affected equipment, it will be deemed that the transmission is the cause of the problem. If the field strength is less than the applicable value, the affected equipment's lack of immunity will be judged the cause."

It is well known that both broadcasting undertakings and amateur radio installations can, in certain situations, create electric field strength densities in the range of 9 V/m, and above,

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[80] "Broadcasting Receivers" are defined as "equipment for the reception of broadcast sound and television signals, e.g. stereo receivers/ tuners, clock radios, televisions, etc.;" This and the other two definitions specified immediately below apply only to the three categories of home electronic equipment set out in Table 1 of EMCAB-2.

[81] "Associated Equipment" are "devices associated with broadcasting receivers, e.g. audio/ video recorders and playback devices;"

[82] "Radio-Sensitive Equipment" means "all other non-radio electronic equipment, e.g. baby monitors, telephones, electric organs, home security systems, computers, guitar amplifiers, etc."

[83] EMCAB-2 at p. 4.

within the homes located nearest to the relevant antenna systems.[84] Such readings are well in excess of the immunity characteristics that one might reasonably expect to find in mass-market consumer goods, like home electronic equipment; and serious interference problems may be anticipated.

It is submitted that the complaints resolution policy contained within EMCAB-2 is an effective policy approach for handling immunity and swamping problems, like those noted above, in an expeditious and inexpensive manner. If co-operative efforts between the radio user and the citizen cannot resolve an interference problem, Industry Canada is available to perform tests within the citizen's residence. If field strength values are above those specified in Table 1, the department can require the radio user to effect appropriate modifications or cease transmitting.

One problem with the complaints resolution policy and process contained in documents EMCAB-2 and CPC-3-14-01, is that AM, FM and televison broadcasting transmitters are exempted[85] from them. This is problematic because the interference protection criteria contained within Industry Canada's *Broadcasting Procedures and Rules* are not nearly so protective of private residences.[86] It is important that the swamping and immunity criteria set for broadcasting undertakings strike an appropriate balance between the service objectives of the broadcaster and the interests of those who will live nearest to the transmitters. Following his case study of the transmission facilities located on Triangle Mountain, BC, Professor Dobell reached the same conclusion.[87] It is submitted that if land-use authorities and citizens were assured of a base level

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[84] Electric field strength measurements taken during in the summer of 2002 in residences located at Triangle Mountain in Colwood, BC produced a number of measurements in this upper range. See: Indoor Safety Code 6 Measurements in Colwood Triangle Mountain, FM Broadcast Site Victoria (Colwood) BC, by Angela Choi, Industry Canada: Pacific Region, 21 June 2002. Also, readings of this nature were obtained in and near the residence of Timothy Houghtby of Kanata, Ontario by radio inspectors working for the (then) Department of Communications during the Fall of 1984. It was determined that the principal source of these emissions was the amateur radio station of one of his immediate neighbours, John (Jack) Ravenscroft. In the Spring of 1985, Mr. Houghtby commenced litigation in the Supreme Court of Ontario that went eventually to the Ontario Court of Appeal.

[85] EMCAB-2 at p. 4.

[86] According to the Canadian Association of Broadcasters (CAB), although not required to do so by Industry Canada, most "broadcasters will go the extra distance to assist local residents experiencing problems with consumer electronic (non-radio apparatus) equipment, even to the extent of modifying or replacing equipment that falls outside the scope of a 'valid' complaint under IC's rules." From: CAB's Formal Written Submission dated 17 October 2003.

[87] Dr. Dobell's conclusions were strongly supported within the formal submissions tendered on behalf of the City of Colwood, BC and verbally by the Triangle Mountain Transmission Towers Citizens Committee at an in-person meeting held in Colwood on August 21, 2003. The City of Colwood suggested that Industry Canada

of interference protection when broadcasting transmitters are sited near private residences this knowledge would greatly facilitate local consultations during the licensing process.

Recommendation 14: That Industry Canada should implement maximum field strength criteria for the resolution of immunity complaints involving the fundamental emissions from broadcasting undertakings. While it may not be appropriate to extend the application of the field strength criteria of EMCAB-2 to broadcasters, a similar approach is warranted.

o. Preliminary Environmental Assessments

As explained in Section C of this report, under the terms of the *Canadian Environmental Assessment Act* (CEAA),[88] and the *Law List Regulations*[89] enacted pursuant to CEAA, an environmental assessment will be required for the establishment or modification of a radio antenna or supporting structure only if a site-specific or antenna-specific licence is required by Industry Canada under section 5(1)(f) of the *Radiocommunication Act*.

In point of fact, since the mid 1990s Industry Canada has been moving away from the use of site-specific licences as a form of radio authorization. In order to dramatically reduce the number of individual licensing transactions, Industry Canada has been experimenting with system licensing and spectrum licensing. For spectrum licensing, an applicant is awarded spectrum user rights to specific frequencies within a defined geographical area. The approval of individual base stations is not involved.

Spectrum licensing has recently become Industry Canada's licensing policy of choice. Examples of radio systems authorized recently through spectrum licensing would include Fixed Wireless Access (FWA) systems for rural areas that operate in the frequency range

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create a system "to record complaints of harmful interference, communicate them to the broadcaster for remedy, track their status and ensure correction." If necessary to solve the interference problem, the transmitter should be shut down. From: The City of Colwood Formal Written Submission dated 21 August 2003.

[88] S.C. 1992, c. 37. A number of amendments recently were made to this act. See: *Bill C-9, An Act to Amend the Canadian Environmental Assessment Act*, proclaimed October 30, 2003. These changes are not relevant to the initial screening process for radio antennas.

[89] *Law List Regulations: Schedule 1,Part 1*, S.O.R./94-636, 7 October 1994.

3400-3550 MHz.;[90] Point-to-Point and Point-to-Multipoint Wireless Systems that operate in the 38 GHz and 39 GHz bands;[91] and Fixed Wireless Access (FWA) stations operating in the 2300 MHz bands and Wireless Communications Services (WCS) stations operating in the 3500 MHz bands the licences for which were auctioned off by Industry Canada in February of 2004.[92]

Also, and perhaps most importantly, on April 1, 2004 the analogue cellular licences from the 1980s and the PCS (digital cellular) licences from the 1990s were converted into the same type of spectrum licence that was awarded to the successful bidders in the PCS spectrum auctions held in 2001.[93] The result of this regulatory action by Industry Canada is that all forms of cellular operator in Canada now hold a (converged) 'Cellular/PCS Spectrum Licence.' Therefore, any new antenna installations or modifications to existing cellular/PCS antenna systems will not be subject to any environmental review unless they are co-sited or co-modified with another type of radio apparatus that requires a site-specific licence, such as terrestrial microwave facilities.[94] If Industry Canada is relying upon the co-siting of radio apparatus that does require a site-specific licence for its oversight of the environmental impact of Cellular/PCS antenna installations, that would be a rather haphazard exercise of its environmental responsibilities.

Other forces are afoot that are increasing the number of fixed antenna systems that escape environmental review. For example, over the past five years or so, the electronics industries have

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[90] *Spectrum Management and Telecommunications Policy*, Client Procedures Circular, "Licensing Procedure for Fixed Wireless Access Systems in Rural Areas in the Frequency Range 3400-3550 MHz," CPC-2-1-19, Issue 1, December 1, 1999.

[91] *Spectrum Management and Telecommunications Policy*: "38 GHz Licensing Process and Application Procedure," CPC-2-1-17, Issue 3, February 1, 2001.

[92] *Spectrum Management and Telecommunications Policy*: "Policy and Licensing Procedures for the Auction of Spectrum Licences in the 2300 MHz and 3500 MHz Bands," published September 2003 and revised July 2004, at p. 25.

[93] *Spectrum Management and Telecommunications Policy*, "Spectrum Licensing Policy for Cellular and Incumbent Personal Communications Services (PCS)," December 2003.

[94] It is likely the case that in many remote areas, Cellular/PCS service providers would deploy terrestrial microwave facilities to 'back-haul' the traffic from the cell site to a point of interconnection with the Public Switched Telephone Network PSTN). This microwave technology continues to be subject to a traditional site-specific licence from Industry Canada. One might assume also that rural areas may need the greatest environmental protection.

developed many types of consumer and commercial digital wireless apparatus that operate within licence-exempt frequency bands, such as those at 2.4 GHz, 5.8 GHz and 24 GHz.[95]

Being licence-exempt does not mean that this apparatus is unregulated. Radio regulators have set rules, standards and specifications for the apparatus to control for interference from and between these wireless devices.[96] Technical and operational rules have been adjusted to accommodate such equipment in order to stimulate the development of new wireless networks and services. The Canadian government has created a 'connectedness' agenda that relies, in part, upon the deployment of such apparatus as a relatively inexpensive and expeditious means of making access to the Internet available to more of our citizens. These policies have further stimulated the deployment of licence-exempt networks.

Some of the wireless networks and fixed transmission links being created using licence-exempt radio apparatus involve antenna towers and other supporting structures that are quite sizeable. In those situations it is possible for the surrounding environment to be negatively impacted. Under current radio regulatory and environmental policies no preliminary environmental review would be required. Another policy approach must be found.

Under the terms of the *Radiocommunication Act,* the Minister of Industry has broad powers to "fix the terms and conditions" of any licence, including a Spectrum Licence. Section 5(1) of the *Act* states that the minister may issue licences "taking into account all matters that the minister considers relevant for ensuring the orderly establishment or modification of radio stations..." These powers may permit the minister to require that applicants for spectrum licences perform preliminary and secondary environmental assessments as conditions of their respective licences. Consequently, the department would not need to rely solely upon the legislative scheme provided by the *Canadian Environmental Assessment Act*.

Likewise, the Governor-in-Council has broad authority under section 6(1)(m) of the *Radiocommunication Act* to exempt radio apparatus from licensing requirements and to prescribe qualifications for such exemptions. This power may support regulations that require

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[95] These wireless systems are operating in ISM spectrum. The ISM Bands represent portions of radio spectrum allocated for the operation of Industrial, Scientific and Medical (ISM) equipment that emits RF energy as the equipment performs its intended function(s). ISM spectrum was originally set aside as 'pollution bands' so that non-radio equipment could emit radio energy in a manner that would not interfere with radiocommunication activities.

[96] The 802.11 series of standards contain those types of technical specifications.

environmental assessments for the operation of licence-exempt equipment in circumstances where the environment may be at risk.

Recommendation 15: That Industry Canada should ensure that the proponents of all significant antennas and antenna supporting structures be required to perform a preliminary environmental assessment of their respective antenna installation. This assessment should be required even if the radio system is licence-exempt.

p. Towers and Bird Collisions

Birds are a critical link in the ecosystem.[97] More than 50 million birds around the world make migratory movements, and there is growing concern that broadcasting and telecommunications towers pose a threat to birds making migratory[98] or daily movements.[99] The amount of bird "towerkills" seems to be unknown, but the subject of much speculation.[100] Although the data is not concrete, large scale deaths and cumulative effects from regularly occurring fatalities are significant concerns.[101] Of the approximately 80 formal written submissions to the National Antenna Tower Policy Review, four concerned the effects of towers on birds.[102]

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97 Wendy K. Weisensel, "Battered by Airwaves?" Wisconsin Natural Resources Magazine (February 2000) online: <http://www.wnrmag.com/stories/2000/feb00/birdtower.htm>.

98 Paul K. Anderson, "Wireless Telecommunications and Night Flying Birds: We May be Sacrificing Millions of Migrants for Convenience, Entertainment and Profit" *Biodiversity* 4:1 (2003) 10 at p. 10.

99 Canadian Wildlife Services Formal Written Submission.

100 For example, the Canadian Nature Federation Formal Written Submission dated 24 October 2003 estimates "between 4 and 50 million birds killed per year in the United States." According to the United States Federal Communications Commission, "To the Commission's knowledge, to date there have been no studies sufficient to support a reliable estimate of the number of migratory birds that may have died as a result of collisions..." From: Federal Communications Commission (FCC) "FCC Opens Inquiry to Study the Impact Communications Towers May Have on Migratory Birds" (20 August 2003), online: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-238058A1.doc>.

101 Bird Studies Canada Formal Written Submission dated 24 October 2004.

102 See Canadian Wildlife Services Formal Written Submission; Canadian Nature Federation Formal Written Submission dated 24 October 2003; Bird Studies Canada Formal Written Submission dated 24 October 2004; Niagara Peninsula Hawkwatch Formal Written Submission dated 16 January 2004.

Canada has an international obligation under the *Migratory Birds Convention*[103] to protect migratory birds and their nests. While the Convention does not specifically address broadcasting and telecommunications towers, in Article Two of the protocol between Canada and the United States, the countries agree to manage migratory birds, to protect the habitat necessary for the conservation of migratory birds, and to develop, share and use scientific information. This article may create an obligation on the Government of Canada to initiate studies regarding the effects of communications towers located in Canada on migratory bird populations, and implement measures to reduce the number of bird deaths.

Knowledge about successful measures to avoid avian collisions with towers is rather undeveloped. There is some speculation that adjustments to the colour or type of tower lighting, or to their design or structure will help to avoid collisions.[104] More research on the relationship between bird collisions and lighting, tower height, terrain, and environmental distractions such as city and highway lighting is needed.[105]

Until more conclusive research is conducted, groups concerned with migratory bird populations suggest several things that tower proponents could implement to protect migratory bird populations. They recommend that during tower siting consultations advice from wildlife and nature groups be sought about local migratory flyways.[106] They suggest that antenna sites and towers be shared by many users as a way of reducing the total number of towers. These groups urge that towers not be located in or near wetlands, in areas that have a high incidence of fog and low cloud ceilings or in the habitats of threatened or endangered species. They recommend that guy wires be kept to a minimum and that there be markers affixed to increase their visibility[107] Independent inspection of towers is also recommended, to monitor towerkills and to identify and

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[103] *Migratory Birds Convention Act*, 1994 c. 22 online: Canada Department of Justice: <http://laws.justice.gc.ca/en/M-7.01/>.

[104] Weisensel, “Battered by Airwaves?”.

[105] Anderson at p. 16.

[106] Canadian Wildlife Services Formal Written Submission.

[107] Minutes of the Bird Collision Group teleconference for the National Antenna Tower Policy Review (23 March 2004).

resolve any remaining problems.[108] Finally, a national antenna siting protocol is advocated, which aims to decrease the threats that towers pose to birds.[109]

Groups concerned about the migratory bird population also express concern that the *Canadian Environmental Assessment Act* excludes many towers from the requirement of undertaking an environmental assessment. Perhaps the Act may be used to support an obligation to consider bird kills when an assessment is undertaken.

According to section 2 of the *Canadian Environmental Assessment Act*:

> "environmental assessment" means, in respect of a project, an assessment of the environmental effects of the project that is conducted in accordance with this Act and the regulations;
>
> "environmental effect" means, in respect of a project,
> (a) any change that the project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) the *Species at Risk Act*,
>
> "environment" means the components of the Earth and includes...living organisms...

It is important to note that the definition of "environmental effect" means ... <u>"any change that the project may cause in the environment</u>..." (emphasis added).

It is reasonable to conclude from these definitions that the 'environmental effects' to be addressed within the *Canadian Environmental Assessment Act* would include avian mortality due to collisions with radio antenna towers or their guy wires that are erected in the migratory flight paths of the birds. If that is true, preliminary environmental assessments performed by applicants for Type 1 radio stations should address this concern when completing Part B of the attestation form that is annexed to CPC-2-0-03. In this regard, it is of particular interest to note that the 1992 version of this attestation form specifically referenced migratory birds. Question 4 of this attestation asked the antenna proponent whether "The station will interfere with migratory patterns, e.g. birds, caribou, etc."[110]

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[108] Niagara Peninsula Hawkwatch Formal Written Submission dated 16 January 2004 at p. 2-3.

[109] Canadian Wildlife Services Formal Written Submission; Canadian Nature Federation Formal Written Submission dated 24 October 2003.

[110] From: "Environmental Assessment Process Associated with Spectrum Management Activities," CPC-2-0-03 (Provisional), Issue 2, February 1, 1992 at p. 15.

Should Industry Canada accept and implement Recommendations 15, then any antenna proponent (Type 1 or Type 2) seeking approval for a significant antenna structure should be required to consider the impact upon migratory birds.

> **Recommendation 16: That when CPC-2-0-03 is next revised those required to fill out the attestation should be asked to consider the detrimental impact that an antenna structure or associated guy wires may have upon the flight of migratory birds. Industry Canada and Environment Canada should collaborate to perform an up-to-date literature review on the issue of bird collisions with antenna facilities so that the extent of this problem and possible remedial options may be better understood.**

Question 1(b). What are the most appropriate time frames for the processes of approving and resolving debates surrounding specific tower placements?

From the perspective of all of the parties involved in the processes of approving and resolving debates surrounding specific tower placements, the setting and enforcement of time frames are very important matters. The policy framework for the consultations and negotiations that need to take place must strike the right blend of structure, certainty and flexibility. An unstructured or uncertain process can result in protracted debates about proposed antenna installations that will be frustrating and resource intensive for antenna proponents, land-use authorities, concerned members of the public and Industry Canada. Additionally, many commercial antenna proponents face significant competitive and financial pressures to establish, expand and enhance their networks just a quickly as possible.[111] Obviously, an overly-structured consultation process with rigidly applied time frames will not be able to adjust to the sensitivities, high or low, presented by a particular antenna placement.

a. Current Time Frames

As described in Section C of this report, the policy elements that frame the land-use consultation process applicable to any particular category of radio station may be found in

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[111] For example, within its submission to this policy review the Canadian Wireless Telecommunications Association (CWTA) pointed out that Industry Canada's policy changes to the licence regime for cellular and PCS carriers will mean that carriers will pay radio licence fees by geographical service area regardless of whether they have network infrastructure operating throughout the area. See: CWTA Formal Written Submission, 9 October 2003 at p. 10. Also, the Bell Wireless Alliance emphasized the competitive forces upon new PCS service providers operating in the 2 GHz frequency range by noting that they must demonstrate to Industry Canada that they have put the spectrum to use within five years of the award of licence. From Bell Wireless Alliance Formal Written Submission, 10 March 2004 at p. 5.

different sources. These sources include the conditions of licence for that category of radio station, the specific policy documents applicable to the station and the general policy and procedure document entitled *Environmental Process, Radiofrequency Fields and Land-Use Consultation* (CPC-2-0-03).[112] It should also be noted that certain licence-exempt radio equipment is subject to conditions and specifications that include an obligation to follow one of the land-use consultation processes described in CPC-2-0-03 (for Type 2 stations).

Policy document CPC-2-0-03 describes two basic land-use consultation models. Each is subject to modification through licence conditions and other policies. The first model is a structured consultation process that involves stages, time frames, an attestation form that must be filed with Industry Canada and a dispute resolution protocol. This structured model applies to all radio stations that require a site-specific approval by Industry Canada before construction on an antenna system can proceed. As explained previously, radio stations requiring a site-specific licence are called "Type 1" stations in the policy circular. These include all broadcasting undertakings that require a licence under the *Broadcasting Act* and all other categories of stations that require a traditional radio licence (historically these have been site-specific). All broadcasting undertakings must consult with the relevant land-use authority in every case. The remaining Type 1 stations must consult only if their antenna proposal is assessed to be a 'significant structure.' The consultation process for each of the various categories of broadcasting undertakings have been supplemented by adding more particular notice and disclosure requirements (regarding the particulars of the licence application). These modifications have been affixed as licence conditions to the respective broadcasting certificates.

The second land-use consultation model described in CPC-2-0-03 is very flexible. The circular does not describe any stages, time frames or dispute resolution protocol for this model, and no form is filed with the department.[113] These are "Type 2" radio stations and either they are licence-exempt or they require a type of licence that is not site-specific. The flexible model can be, and often is, modified by licence conditions and other policies. For example, all of the

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[112] CPC-2-0-03, Issue 3, June 24, 1995.

[113] One exception to this statement applies to Fixed Wireless Access (FWA) systems in rural areas that operate in the frequency range 3400-3550 MHz. These are Type 2 stations that are authorized by spectrum licence. One of the conditions of this spectrum licence is that all applicants file an attestation with Industry Canada that they have complied with the authorization procedures for non site-specific radio stations as outlined in the document CPC-2-0-03. Presumably, this means that the applicant must fill out and submit Part C of the attestation form that is attached to the policy circular as "Annex 1." Part C offers a very brief report on status of the land-use consultations. See: *Spectrum Management and Telecommunications Policy*, Client Procedures Circular, "Licensing Procedure for Fixed Wireless Access Systems in Rural Areas in the Frequency Range 3400-3550 MHz," CPC-2-1-19, Issue 1, December 1, 1999.

categories of radio station now covered by "Spectrum Licences" fit into the Type 2 designation, but Industry Canada has supplemented the basic land-use consultation process applicable to particular categories of spectrum licence. These modifications have been implemented by affixing them as licensing terms and conditions. More detail about some of the actual modifications for certain Type 2 radio stations covered by spectrum licensing will be provided below.

This subsection of the antenna report asks for policy recommendations about appropriate time frames for antenna approval and dispute resolution surrounding a particular antenna (tower) placement. Interestingly, within Industry Canada's licensing and policy documents that address land-use consultation issues, only CPC-2-0-03 provides consultation and dispute resolution time frames and those are only applicable to consultations for Type 1 stations. For Type 1 radio stations Industry Canada has provided two consecutive 60-day periods for completion of the necessary consultations, negotiations and dispute resolution activities. CPC-2-0-03 states:

> While individual circumstances will vary, Industry Canada generally considers that once a participating land-use authority is contacted, it should make its views known to the applicant within 60 days. Further, the consultation process should be completed within 120 days.[114]

It would appear that the first 60 day time frame is intended to permit the land-use authority to review, consult and seek clarifications about the antenna proposal, and the second 60 day period (up to 120 days in all) is accorded for a negotiation and resolution stage. In the event that the land-use authority and the Type 1 antenna proponent need more time to negotiate a satisfactory resolution, or in circumstances where negotiations have broken down but Industry Canada is hopeful that more time may lead to a resolution, the CPC provides for *ad hoc* extensions of time as follows:

> When Industry Canada becomes aware of a land-use authority objection to a site-specific station, issuance of the licence will be delayed for a period of time sufficient for negotiations between the parties.

Within the CPC itself Industry Canada has recognized that it has no authority over provincial or local land-use regulators.[115] These consultation processes are merely made available to them to provide an opportunity to influence the placement and visual impact of antenna facilities. If the antenna proponent is a broadcaster, or if the proponent wishes to establish or

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[114] CPC-2-0-03 at p. 4.

[115] *Ibid.* at p. 5.

modify a significant antenna structure of another Type 1 station, a final approval from Industry Canada is a necessity through the issuance of the particular station licence.

Should the antenna proponent of a non-broadcasting Type 1 station inform Industry Canada that it has decided that land-use consultations are not required because the proposed structure is insignificant, the department will continue to process the application unless it receives objections from the relevant land-use authority. Should the land-use authority decline the consultation opportunity, neglect to make its views known to the antenna proponent or make unreasonable (or unconstitutional) demands for accommodations with respect to the proposed installation, Industry Canada may, of course, issue the certificate or licence.

If Industry Canada concludes that the land-use authority and the antenna proponent have reached an impasse in their consultations, and a mutually acceptable resolution is not possible, the antenna proponent is permitted to file a written submission (petition) to the department requesting that the licence be issued. The submission must describe all of the efforts made by the proponent to accommodate the concerns raised by the land-use authority and include: "a chronological summary of all events (letters, meetings, consultations, etc.); the requirement for the establishment of the specific site in question; reasons for the proposed location; and a review of alternative locations considered and reasons for their rejection, including costs and technical analysis." [116]At this point, Industry Canada can attempt to resolve the matter(s) in dispute, deny the licence, issue the licence on the terms and conditions set out in the original application or grant the licence with modifications intended to provide a balanced resolution for the parties. No time frames are provided in CPC-2-0-03 for this impasse (dispute resolution) stage.

As described within the policy circular, the proponents of 'significant' Type 2 antenna installations are expected to consult with the appropriate land-use authority and address community concerns in a responsible manner.[117] As noted above, there are no particular process or time frames specified for these consultations but, in the end, if Industry Canada should conclude that a completed antenna installation or modification is not appropriate for its surroundings the owner may be required to provide submissions explaining why the structure should not be altered or removed.[118]

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[116] *Ibid.* at p. 7.

[117] *Ibid.* CPC at pp. 8-9.

[118] In a very recent case heard before the Federal Court of Canada an injunction was issued by the court which ensured compliance with an order by Industry Canada to an amateur radio operator to reduce the height of his antenna tower to 40 feet above ground level. The amateur had not complied with the consultation process for

For the past eight years Industry Canada has been experimenting with a licensing option called "Spectrum Licensing." By its very definition, pursuant to section 2 of the *Radiocommunication Act*, a spectrum licence does not involve a site-specific radio authorization. Thus, to the extent that fixed radio stations (with antenna systems) are deployed under a particular category of spectrum licence, they are Type 2 radio stations and subject to the flexible land-use consultation model.

For some of the categories of spectrum licence this basic consultation model has been modified in ways that are relevant to Question 1(b) of the National Antenna Tower Policy Review. For example, as of April 1, 2004 a (converged) spectrum licensing regime has been applied to all Cellular/PCS service providers in Canada. According to the conditions of licence for this category of radio authorization the licensees must engage in "meaningful consultation" with " all local municipalities or land-use authorities" regarding the installation of each radio station "with the aim of developing consensus solutions." These phrases do not appear in CPC-2-0-03 in relation to the basic land-use consultation models for Type 2 or Type 1 radio stations. More particularly to the issue of the need for an appropriate time frame for antenna approvals and resolving disputes about particular antenna placements is the following licence condition:

> "Installation of any antenna structure must be delayed for a period of time sufficient for Departmental review where, after considering reasonable alternatives and consultation options, land-use consultation negotiations remain at an impasse."

This licence condition appears to provide a very flexible dispute resolution process that involves a role for Industry Canada as the final decision-maker. While this modification to the basic consultation model for Type 2 radio stations is a welcome addition, its lack of a time frame for resolving impasse situations has already proved to be a problem in few antenna-siting situations. The condition states that, in an impasse situation, the installation of an antenna system must be delayed for "a period of time sufficient for Departmental review..." In a few cases, antenna proponents have insisted that a "sufficient" period of time has already passed for the department to have completed its review (and have made a decision). Consequently the proponent has claimed that it should be able to commence construction immediately. Their view is that the word *sufficient* should be judged on an objective standard that takes into account the significant pressures that Cellular/PCS service providers are under to build-out their networks. One must

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Type 2 antenna installations. See: *Minister of Industry v. James W. Thompson,* (2004) Docket: T-569-3; 2004 FC 265 (FCTD).

remember that there is no site-specific authorization to withhold in this type of situation and that the little bit of policy detailing land-use consultations for Type 2 radio stations contained in CPC-2-0-03 would not assist the department at all.

The licence condition discussed immediately above has also been added to the spectrum licences that apply to the Fixed Wireless Access (FWA) stations operating in the 2300 MHz bands and Wireless Communications Services (WCS) stations operating in the 3500 MHz bands that were auctioned off by Industry Canada in February of 2004.[119] The only policy change to this licence condition for these two new spectrum licences is that it applies only to "significant" antenna structures. (That term was not defined either.)

b. Opinions About the Appropriateness of Current Time Frames

Prior to offering recommendations related to the appropriateness of the current time frames within CPC-2-0-03 it is important to pay particular attention to the opinions offered by those closest to the process. This subsection of the final report will discuss many of the views submitted to the National Antenna Tower Policy Review about the existing time frames.[120]

Most of the larger commercial spectrum users (e.g. broadcasters and cellular/PCS service providers) offered support for the 60 + 60 day time frames listed in the CPC on condition that these time frames are more strictly enforced in the future.[121] In its submission, the Canadian

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[119] See: *Spectrum Management and Telecommunications Policy*: "Policy and Licensing Procedures for the Auction of Spectrum Licences in the 2300 MHz and 3500 MHz Bands," published September 2003 and revised July 2004, at p. 25.

[120] The online Questionnaire results from the survey operated through the National Antenna Tower Policy Review Web site reveal that over 40% of respondents felt that the current time frames are "about right", although members of the public were less likely to feel this way than amateur radio users, members of industry or local government representatives.

[121] See, for example, Radio Advisory Board of Canada Formal Written Submission dated 17 October 2003; Canadian Broadcasting Corporation Formal Written Submission dated 23 October 2003; Canadian Wireless Telecommunications Association Formal Written Submission dated 9 October 2003; Telus Communications Inc. Formal Written Submission dated 10 October 2003; Rogers Communications Inc. Formal Written Submission of October of 2003. Bell Wireless Alliance Submission dated 10 March 2004. The Radio Advisory Board of Canada stated that "While federal regulatory authorities cannot compel LUAs to participate or to meet filing deadlines, they can refuse to accept objections that have not been filed in a timely manner." (p. 5) While not an industry organization, the Canadian Department of National Defence, in its Formal Written Submission dated 26 September 2003 offered the following suggestion: "...the CPC could be reinforced for occasions when time limits - for the consultation process - are not respected by the LUA [land-use authority]. Industry Canada should be in a position to evaluate if a LUA has made every effort to respect these timeframes."

Wireless Telecommunications Association (CWTA)[122] pointed out that, in the United Kingdom, the provisions of the *Town and Country Planning (General Permitted Development) (Amendment) (England) Order 2001*[123] permit the antenna proposal to proceed automatically if the local planning authority has not responded to the application within 56 days of its receipt.[124] Other Canadian radiocommunication industry members reinforced the view the local consultation process should be terminated at the end of the first 60 day period if the land-use authority has not responded. Telus Communications suggested that, in the future, objections raised during a local consultation that do not fit within the terms of the CPC process not be used to determine whether concurrence had been achieved.[125]

Most of the submissions made on behalf of the cellular and PCS carriers accepted that Industry Canada should be permitted to issue *ad hoc* extensions of time for compelling reasons,[126] but they cautioned that "...delays impose unfair costs and business risks on broadcasters and carriers and ultimately deprive residence and business customers and users of a choice in services and providers that they request and deserve."[127] During a meeting held in Ottawa, one Cellular/PCS carrier complained that it had waited for over 500 days for Industry Canada to finally call an end to a local consultation stage that was not progressing.

Within its formal submission to this policy review the Canadian Association of Broadcasters (CAB) expressed frustration with the fact that the *Broadcasting Procedures and Rules* (BPRs) require broadcasters to complete all local consultations before Industry Canada will undertake the technical evaluation of their antenna proposals.[128] The significance of this sequence is made all the more important by the fact that the Canadian Radio-television and Telecommunications Commission (CRTC) will not consider an application for a broadcasting

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122 CWTA Formal Written Submission, 9 October 2003 at p. 9.

123 *Town and Country Planning (General Permitted Development) (Amendment) (England) Order 2001*, No. 2781 online: Her Majesty's Stationary Office <http://www.hmso.gov.uk/si/si2001/20012718.htm>.

124 *Ibid*. at A.3(7).

125 Telus Communications Inc. Formal Written Submission dated 10 October 2003.

126 Canadian Wireless Telecommunications Association Formal Written Submission dated 9 October 2003 at pp. 8-9.

127 Rogers Communications Inc. Formal Written Submission at p. 13.

128 Broadcasters are directed to disclose the basic details of their antenna proposals to the relevant land-use authority no later than the day the broadcaster submits its application to Industry Canada.

licence under the *Broadcasting Act*, until the Minister of Industry has issued a broadcasting certificate under the *Radiocommunication Act*. The CAB urged that the sequence of requirements be reversed for broadcasters, with local consultation being the final requirement to satisfy. This, in the CAB's opinion, would reduce the regulatory burden for broadcasters, land-use authorities and Industry Canada; eliminate confidentiality concerns (applicants not wanting the details of their business proposals to reach their competitors), and reduce some of the pressures related to strict adherence to the time frames for local consultation. Alternatively, should the sequence of approvals for broadcasters remain unchanged, the CAB requested that the deadlines for land-use consultations be more strictly enforced.[129] The CAB drove home this point with the statement that:

> It is illogical to require all other participants in the broadcast licensing process to meet submission deadlines and not to require this of the LUAs [land-use authorities] as well.[130]

According to many of the Amateur radio operators who made submissions to this policy review, the current CPC time frames (for Type 1 stations) may be suitable for the approval of commercial radio antenna installations, but they are not appropriate for the antenna systems of amateur radio operators. The alternative policy suggestions offered by amateurs ranged from exempting them from all local consultation requirements[131] to maintaining the flexible (Type 2) consultation model so long as time frames are added that adjust with the type of antenna system under consideration.[132] Within its formal written submission the Radio Amateurs of Canada (RAC) made a clear distinction between the appropriate policy treatment for commercial and amateur towers, and made several suggestions:

> RAC considers that these time-lines [in the CPC] have worked fairly well for consultations on amateur radio towers, but are really most appropriate for consultation on Type 1 installations. Type 2 installations are not site-specific and Industry Canada does not approve the siting of the installation within the

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[129] Many of the formal written submissions made on behalf of the radiocommunication industry complained that Industry Canada has been much to hesitant to call an end to land-use consultations that have exceeded the time frame specified within CPC-2-0-03 and have little hope of reaching a negotiated resolution.

[130] The Canadian Association of Broadcasters' suggestions are found at pp. 11-12 of its Formal Written Submission dated 17 October 2003.

[131] Nora Hague Formal Written Submission dated 17 October 2003.

[132] For example, Lloyd W. Hofmann, in his Formal Written Submission dated 3 July 2003, suggests a 14 day consultation process for installations under 25m, with 30 to 90 days for special/enhanced installations.

> existing radio environment, and therefore it is considered that it should be possible to shorten the time frame for consultation on Type 2 installations.
> ...
> RAC recommends that general procedures be established for consultations on Type 2 station antenna support structures and that guidelines and time lines be established for actions to be taken if the tower consultation process fails. RAC recommends that the timeline for Type 2 installations be amended to 45 days. RAC agrees with the Radio Advisory Board of Canada that any timelines published in CPC-2-0-03 must be adhered to by LUAs [land-use authorities] and tower proponents in all cases. If the parties cannot make a decision within the established timelines then the final decision regarding tower location and characteristics **must** remain with Industry Canada and the Department, in its turn, must make timely decisions."[133] (emphasis in original)

Another amateur suggested that a more structured consultation framework would make the approval process easier for all, and that amateur radio users would not be opposed to more structure provided the process would still allow them to erect a suitable antenna supporting structure.[134]

Municipalities and community groups across the country were divided in opinion on the time frames currently listed in CPC-2-0-03. Some expressed the belief that the existing time frames are appropriate and sufficient,[135] while others urged their amendment. Suggestions included commencing the 60 day time period only after the land-use authority has received from the proponent all of the information necessary for a public meeting (if a meeting is required);[136] having flexible time frames that vary based on the comments and level of opposition at the public meeting;[137] commencing the consultation at least 6 months prior to the date for the erection of the antenna installation;[138] and requiring proponents to complete and submit a detailed impact

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[133] Radio Amateurs of Canada Formal Written Submission dated 10 October 2003 at pp. 13-14.

[134] Timothy S. Ellam Formal Written Submission dated 16 October 2003 at p. 2.

[135] City of Leduc Formal Written Submission dated 20 October 2003; City of Ottawa Formal Written Submission dated 29 October 2003.

[136] City of Oshawa Formal Written Submission dated 6 August 2003 at p. 2.

[137] Town of East Gwillimbury Formal Written Submission dated 8 August 2003.

[138] Hidden Valley Community Association Formal Written Submission dated 22 October 2003.

analysis which would be considered by all of the parties in stages.[139] The Federation of Canadian Municipalities (FCM) urged that any reforms to the process must respect the jurisdiction of municipal governments.[140]

On the issue of selecting appropriate time frames for consultations with land-use authorities one final point may be one of the most useful. During the data collection phase of this project municipalities and cellular/PCS carriers were encouraged to send in copies of the local consultation protocols they have negotiated with each other. Approximately 18 samples were forwarded. It is instructive to note that most of the protocols have used the same time frames as specified within CPC-2-0-03 for Type 1 radio stations (60 days + 60 days) for the consultation and dispute resolution stages.[141]

c. Recommendations about Appropriate Time Frames

The pubic consultation conducted for the National Antenna Tower Policy Review collected facts, opinions and policy suggestions from many sources and in a variety of ways. In relation to the time frames most appropriate for approving and resolving debates surrounding Type 1 antenna structures, the vast majority of participants supported the current time frames in CPC-2-0-03.[142]

Two additional points are relevant to the time frame question. Employing two consecutive 60 day periods appears to be in keeping with the time frames used in other developed countries and, when given the opportunity to negotiate a consultation model, most Canadian municipalities and cellular/PCS carriers chose this overall framework.

Recommendation 17: That the current time frames of two consecutive 60 day periods for land-use consultations applicable to the antenna installations of

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139 Ciel noir et environment visuel Laurentides (CNEL) Formal Written Submission dated 14 September 2003.

140 The FCM elaborated, requesting the protection of municipal governments' jurisdiction to require consultations, enforce zoning by-laws, issue building permits, and require compliance with site plans for antenna towers. For more information, see the Federation of Canadian Municipalities Formal Written Submission dated August 2003 at pp. 9-12.

141 See, for example: Town of Caledon Formal Written Submission dated 26 June 2003 at protocol p. 9; Township of King Formal Written Submission dated 11 July 2003 at protocol p. 5; Regional Municipality of York Formal Written Submission dated 3 September 2003 at protocol p. 5.

142 This is true for the data received from the formal written submissions, the e-town hall discussion forum, the online survey, the New Maryland case study and the opinions obtained during in-person and telephone consultations conducted for this project.

Type 1 radio stations should be maintained. The discretion accorded to Industry Canada to extend the time frames when such might lead to a negotiated resolution of an antenna dispute also should be maintained.

It is submitted that the appropriateness of these time frames for Type 1 radio stations can be assessed only after a number of other clarifications and modifications have been made to the contents of CPC-2-0-03 and after sufficient experience has been gained with an improved local consultation policy.

Policy Question 1(a) of the National Antenna Tower Policy Review asked about how the local consultation process can be improved. Sixteen recommendations for policy reform were offered in this report. Almost every one of those recommendations may influence the answer to Question 1(b) about appropriate time frames for approving particular antenna installations and resolving disputes. Likely, Recommendation 2, about including concerned members of the public into the consultation process, will have the greatest impact on time frame issues. Some of the other recommendations may have a time-saving influence. For example, Recommendation 9 urges Industry Canada to play a more active role in the local consultation process. Should that occur, departmental representatives would be well positioned to remove impediments to progress and otherwise expedite the consultation. Also, a departmental presence at public consultations could help to identify and clarify the issues about which the public is being consulted and officials from Industry Canada could provide objective answers to some of the questions posed by concerned members of the public.

One problem with making recommendations about implementing appropriate time frames into the current land-use consultation process for Type 1 and Type 2 radio stations is that few decision-making or dispute resolution stages are (currently) set out for Type 1 radio stations and no stages are provided for Type 2 stations. In the future the consultation process applicable to Type 1 and 2 radio stations should be divided into four stages: pre-application, initiation, consultation and impasse. The policies for the pre-application stage should clarify Industry Canada's expectations that commercial antenna proponents initiate a cooperative working relationship with the planning staff of local governments by identifying their short and longer term antenna siting requirements within the local jurisdiction. Long in advance of a particular antenna application, proponents and land-use authorities should work cooperatively to plan for the integration of commercial radiocommunication antenna installations into local communities. It is accepted that Industry Canada has no direct control on whether land-use authorities take advantage of this opportunity.

A clearly defined and declared initiation point is important if the time frames for local consultations are to be respected. Currently, when antenna proponents contact land-use authorities with antenna proposals, no policy action or event brings home to the land-use authority that this is 'day one' of a 120 day consultation process. It is significant that the press release announcing the appointment of the National Antenna Tower Policy Review Committee stated that the review would look into "improving the local consultation process regarding the siting of a specific tower to reduce the incidence of surprise, which can accompany the construction of new antenna towers."[143] Both citizens and local governments have been surprised in the past.[144]

Recommendation 18: That the land-use consultation processes applicable to Type 1 antenna installations require a more structured policy framework. The process should be divided into distinct stages such as: pre-application, initiation, consultation and impasse.

Recommendation 3 of this report urges Industry Canada to re-examine the Type 1 and Type 2 radio station designations that were created in the mid-1990s. While it is sensible to have both a structured and a flexible land-use consultation model, the streaming criteria that direct any particular category of radio station into the structured or the flexible model must be based upon sound public policy objectives. If one reads the 1990 and 1992 versions of CPC-2-0-03, it is clear that the genesis of the Type 2 category of station that was enshrined in the 1995 edition of the Circular consisted mainly of small, private radio stations such as GRS [citizen band], TVRO satellite (dishes), and amateur radio stations. It was logical to assume that their potential land-use impact was modest and quite localized and, consequently, that a flexible approval process was appropriate.

As described elsewhere within this report, it was Industry Canada's experimentation with (deregulatory) licensing options, such as system licensing and spectrum licensing, that moved certain radio stations with substantial antenna facilities into the Type 2 classification. Clearly, radio stations with the potential to establish substantial antennas and supporting structures should

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143 Industry Canada, News Release, "Allan Rock Announces National Antenna Tower Policy Review Committee" (28 March 2003) online: <http://www.ic.gc.ca/cmb/welcomeic.nsf/261ce500dfcd7259852564820068dc6d/85256a220056c2a485256cf700561c10!OpenDocument>.

144 Since the late 1990s the Federation of Canadian Municipalities (FCM) has complained to Industry Canada that some commercial antenna towers have been constructed without proper notification to the appropriate local government. The FCM has requested that amendments be made to CPC-2-0-03 that specify clear sanctions for antenna proponents who do not comply with the local consultation requirements. See: FCM Formal Written Submission August 2003 at p. 2.

not be processed under such an unstructured decision-making model. At the same time, there is still a policy requirement for a more flexible and expeditious land-use consultation model for antenna facilities that are likely to have modest and localized impact upon their surroundings, such as those of amateur radio operators.

In their formal written submissions, within their postings to the e-town hall discussion forum and when consulted in person or by telephone, amateur radio operators expressed concerns about suffering inordinate delays and/or expenses in securing approvals from land-use authorities for their antenna installations. On the other side, some municipalities complained that, during the local consultation process, certain amateurs behaved as if their immediate neighbours should not be permitted to offer any input in relation to the height, nature or number of the antenna facilities they install. A policy response is needed.

> **Recommendation 19: That Industry Canada should ensure that a flexible and expeditious land-use consultation model is available for the establishment and operation of radio stations (such as amateur stations) likely to have only a modest and localized impact upon their surroundings. This model should set out both the rights and obligations of antenna proponents seeking antenna approvals from land-use authorities.**

Finally, it is beyond the scope of this policy review to offer recommendations in response to the request by the CBC that the sequence of approvals for broadcasting authorizations be reordered so that local consultation be one of the final stages. Local governments, in particular, should be consulted about this proposal before such a change is contemplated. One unfortunate result of this policy change may be that broadcasters would be approaching land-use authorities after all technical issues related their proposed antenna facilities have been approved by two federal regulators. Many of the antenna siting-related accommodations that local governments might seek from broadcasters have the potential to impact the technical specifications of the, now approved, antenna application.

Question 2. What information would most benefit concerned members of the public and how should it be provided?

Policy Question 2 is difficult to answer because it offers no context. Recommendations about information that would most benefit concerned members of the public, and advice on how best to provide it, can only be offered if one knows the context for the use of the information. Knowledge about its use provides the framework for drawing conclusions about what information will be the most beneficial, and how, when and by whom it should be provided.

As a starting point, it should be appreciated that Canada's current antenna authorization policies, as set out within Industry Canada's CPC-2-0-03 and other policy documents, do not call for any form of participation in the decision-making processes by concerned members of the public. Nor do these policies require that any information be provided to the public as a means of informing them about antenna authorization in general or about particular antenna installations under consideration.[145] In order to provide a framework for recommendations for Policy Question 2, two contexts will be used.

The first context examined will be a public hearing, or other form of public consultation, held in conjunction with the possible approval of a particular antenna installation. It should be noted that "Recommendation 2" of this report urges Industry Canada to require that the proponents of significant antenna installations consult directly with the members of the public who will be the most impacted by the installation. The information-based requirements for creating a consultation that is meaningful for the public and for the decision-making process will be discussed below.

The second context offered will relate to the information needs of concerned members of the public when that information is not being used to determine a particular antenna siting proposal. The public's need for such information may arise at any time but it will probably mostly arise in conjunction with a local consultation about an antenna installation, whether or not members of the public are participants. This second context is about the explanation of particular government policies and decision-making to members of the public who have concerns about them. As to who should provide this information, it is submitted that the federal government has an obligation to explain its policies and decision-making to its citizens. According to a recent draft report prepared by the Treasury Board of Canada, the federal government has an obligation

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[145] Industry Canada has created and made available general information about radio antennas and about antenna towers. Pamphlets, videos and the Industry Canada Web site are used to disseminate this material. Much of it is in a FAQ (frequently asked questions) format.

and has made a commitment to explain itself to concerned citizens - - and to listen to their replies:

> The Government of Canada recognizes that its central role is to serve Canadians and that a citizen focus must therefore be built into its policies, programs, services and initiatives. [And at p.2] Greater emphasis on consultation and citizen engagement corresponds to growing expectations from Canadians for more accessible, responsive and accountable governance. Canadians generally want to be consulted by their government. Increasingly, they would like to discuss the values that underlie program and policy options and trade-offs and choices facing decision-makers.[146]

Thus, combining both contexts, policy recommendations will be offered under the assumptions that (i) concerned members of the public must be accorded a meaningful opportunity to participate in antenna siting decisions which directly affect them and (ii) they have a right to express their concerns and to receive thoughtful replies related to antenna siting matters for which public input is not being sought and, if submitted, will not be used to decide the matter at hand.

Despite the fact that CPC-2-0-03 does not call for public participation within the local consultation requirements set out for Type 1 and Type 2 radio stations, many public hearings regarding antenna installations have been held in Canada. As explained elsewhere in this report, over the previous eight year period, a number of the municipal governments in Ontario, Alberta and British Columbia have negotiated antenna siting protocols with Canada's major wireless carriers. These protocols supplement the contents of CPC-2-0-03 and other licensing policies. The vast majority of the protocols provide for public hearings, or another type of public consultation,[147] to be held when cellular or PCS antenna towers are to be sited within or near residential areas. Essentially, the public hearing is treated as one component of the fuller consultation process that transpires under the protocol between the municipality and the wireless carrier seeking the municipality's concurrence in relation to its antenna proposal. The degree of influence accorded to the public's reactions and concerns expressed about a particular antenna proposal is left to each municipality to determine in the context of their protocol.

Some of these consultation protocols offer good answers to the questions about the information needs of concerned citizens who are to participate directly in decisions made

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[146] *Government of Canada Policy on Consulting and Engaging Canadians*, Draft for Discussion, Treasury Board Secretariat, 24 September 2001 at pp. 1-2.

[147] Some of the protocols describe their public consultation as a "community information session" rather than a public hearing. See, for example: Policy for Establishing Telecommunication Tower/Antenna Facilities, Town of Markham, Ontario, June 25, 2002 at pp. 3-4. Often, the phrase "community information session" means that an 'open house' format will be used rather than a town hall style of meeting.

regarding a particular antenna proposal and as to how those needs should be met. Should Industry Canada accept “Recommendation 2" of this report, an examination of a sampling of those protocols will help to inform the elements of a new public consultation policy.

a. Information Related to the Consultation

The notice circulated to concerned members of the public should provide sufficient information to citizens about the public consultation to help them to determine:

- whether to attend and participate;
- where, when and how to participate;
- how to make submissions if someone cannot attend the public consultation;
- the format of the public consultation (e.g. town hall or open house);
- the particulars about the antenna proposal and the purpose of and objectives for the public consultation.

The notice also should inform citizens about the steps and time frame for the process, and about who has the authority to make the final decision.

A protocol recently created by the City of Colwood, British Columbia provides a good example of the notice requirements for a public consultation. This protocol states:

> 7. D. The carrier shall undertake the following community consultation process by holding at least one public meeting as follows:
>
> (i) The carrier shall notify the following of the meeting:
> • all residents and property owners within 500 metres of the base of the proposed structure,
>
> ...
>
> (ii) Notification of the meeting shall be sent by regular mail or hand delivered not less than 10 days prior to the meeting dates. The meeting notification shall include:
> (1) the date, time and place of the meeting and an agenda,
> (2) information on the location, type and size of the antenna structure proposed
> (3) the facility’s output in relationship to *Safety Code 6*,
> (4) the name and telephone number of a contact person for the carrier
> (5) the name and telephone number of a contact person for Industry Canada, Victoria Spectrum Management Office, and
> (6) notice that all information required by Industry Canada is available at Colwood City Hall.[148]

[148] City of Colwood, Antenna Consultation Policy, approved by City Council 28 January, 2002 and updated 27 May 2002 at pp. 2-3.

b. Information Relevant to Potential Local Impact

For the public to have faith in a decision-making process, they must be given an overview of all of the decisional criteria that will be applied. Next, they must be informed about how their participation relates to those criteria. Clarifying the public's role improves the efficiency and relevance of their participation and will lead to a greater acceptance of the final outcome.[149]

The current edition of CPC-2-0-03 uses phrases like, "have land-use concerns addressed," "minimize the impact on the surroundings," "[Type 2] address the concerns of the community in a responsible manner" and "[Type 2] an antenna structure... appropriate within its surroundings" to describe the objectives for local consultation. Yet, CPC-2-0-03 does not call for local consultations to include the public. Most of the antenna siting protocols being used within the wireless sector in Canada speak of the need to assess the "visual impact" of the proposed antenna installation, but some protocols go farther and contain references to "area sensitivity," "environmental impact" and "land-use compatibility."[150] They often provide for public hearings if antenna towers are proposed for residential areas, but it is rare for the public's role within the decision making to be well explained.

In those circumstances where concerned members of the public are brought into the local consultation process it is submitted that their primary role is to bring a better understanding of the potential impact of the proposed antenna installation on the immediate area. Because they live in the area, they are well qualified to explain the particular amenities, sensitivities, vulnerabilities and other relevant characteristics of the area. Their contributions can provide both useful information and a strong inducement for the antenna proponent and the local land-use authority to work together to find accommodations that may minimize negative impacts or, if not able to do so, to consider alternative siting arrangements.

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[149] In a meeting held with executives and members of the Canadian Wireless Telecommunications Association (CWTA), some carriers expressed the view that often the public meetings they convene at the request of municipalities are poorly attended by members from the community. From: CWTA consultation held 18 December 2003 in Ottawa. See also, Formal Written Submission by Telus Mobility of 10 October 2003 in which the carrier states that attendance at 'open houses' rarely exceeds 10 percent of those invited and that often their staff members outnumber the attendees. These comments can be found at pp. 7-8. It is submitted that there may be a number of reasons why many public consultations have not been well attended. For example, one municipality in the Prairies complained that the notice of meeting that was being used by one major carrier was contained within an envelope which was addressed to "occupant" and otherwise had the appearance of an advertising handbill when it arrived in the mailbox.

[150] Within some of the formal written submissions filed by the major wireless carriers and in meeting with the carriers, objections were raised about protocols that attempt to expand the range or considerations beyond the minimization/mitigation of visual impact.

In order to comment usefully about how a proposed antenna installation might impact the particular amenities, sensitivities or vulnerabilities of their area, concerned members of the public require advanced access to much of the siting-related information of the installation under consideration. Again, some of the existing protocols offer a good response to this need for siting particulars. They call for the antenna proponent to file with the land-use authority diagrams, plans and/or photos that detail such things as the:

- residential uses in the area;
- location of existing vegetation and other screening features;
- long and short range viewscapes;
- institutional and recreational uses within view of the site;
- proximity of public roadways;
- nearby environmental areas of significance; and the design and colouration of any lighting on the support structure.

A few protocols require that the proponent circulate a true-to-scale image of the proposed antenna and supporting structure that is superimposed upon a photograph of the site area so that its visual impact can be better appreciated.[151]

Generally, within Canada, detailed siting information is rarely presented to the public by the wireless carriers or by municipalities. It is interesting to note that Telus, Bell, and Rogers recently collaborated to produce a standardized package of information to be provided to concerned citizens who reside near locations proposed for wireless antenna towers. This information, which is a short précis of the contents of CPC-2-0-03, does not invite citizen input. Rather, it states that the consultation process is intended to allow the municipality, "as a representative of the public good,"[152] to comment upon significant antenna proposals

To summarize, concerned members of the public who are going to participate effectively in a local consultation related to a proposed antenna installation need specific information about the consultation itself (e.g. time, place, format, purpose, public's role, identification of the decision-maker, etc.) and the siting related information about the installation under consideration (e.g. location, type and height of supporting structure, colouration, etc. and particulars about the

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[151] For the most part, this listing of filing requirements was taken from a draft protocol that is under development and discussion for the Town of Halton Hills, Ontario. Request from the municipality: Draft Protocol for Establishing Telecommunication Towers and Related Facilities, Planning Department of Halton Hills. See the filing requirements at pp. 2-3.

[152] A copy of the standardized package of material for the public is attached to the Formal Written Submission filed by Telus Mobility dated 10 October 2003, as Appendix "B." The quotation can be found at p. 15 of the submission.

surrounding environment such as the zoning, viewscapes, heritage and ecological features, etc.).

c. Other Information Requirements

From a legal perspective, the issues that a land-use authority can require the proponent[153] of a radio antenna installation to consult about are restricted to (a) those matters noted in CPC-2-0-03, (b) the contents of any consultation protocols that have been negotiated between the land-use authority and antenna proponents and (c) those (incidental) siting matters that may fall within provincial (and territorial) powers under the Constitution Act of Canada[154]. In contrast, the list of antenna siting issues about which the public may have concerns is not so limited. Looking back at the public consultations held in Canada on antenna sitings, questions going beyond the bounds of the consultation requirements contained within current laws, policies and protocols would include:

- whether the radiocommunication service was truly needed;
- whether electromagnetic interference may be experienced and how it would be resolved;
- the adequacy of (or the selection of) the parameters within *Safety Code 6* on human exposure to radiofrequency fields;
- the requirements to mark and light the supporting structure for air navigation safety;
- the possibility of negative impact on the property values of the properties closest to the proposed site.

All of the concerns listed immediately above fall within the second context set out in the introduction of this subsection of the report. Generally, these are not matters about which the antenna proponent or the land-use authority consult with the public. During the data collection phase of this policy review, many antenna proponents expressed the view that they were prepared to provide only the most rudimentary information about such issues. The representatives from a few wireless carriers stated that they felt strongly that it was not their role to respond to public concerns raised about RF exposure, potential interference, and aeronautical marking and lighting safety. They claimed that when they have attempted to provide fuller information about such issues it became clear to them that many people felt that their explanations and information could

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[153] One of the conclusions offered within this policy review is that many of the consultation requirements contained within the protocols that have been negotiated between wireless carriers and Canadian municipalities extend (some) consultation obligations beyond those required within CPC-2-0-03 and they are beyond the authority that may be exercised through the constitutional powers accorded to provincial and territorial governments. This issue is discussed within the section on local protocols (Policy Question 4).

[154] Any provincial powers would have to be lawfully delegated to the local government level. Local governments obtain their powers from municipal statutes passed by provincial governments.

not be trusted because of their obvious interest in the outcome of the consultation.[155]

At present, Industry Canada replies to telephone, e-mail and letter inquiries about antenna siting issues at the District Office or Regional Office level. If a letter is addressed to the Minister of Industry it is designated as a "ministerial letter" and the reply is prepared at the national office in Ottawa. Due to the high number of checks on the content and tone of ministerial replies it may take months before the writer receives an official response. While representatives from the respective District Office will, on occasion,[156] attend public meetings held by antenna proponents, it is very rare for them to assume a role beyond 'observer status.' When attending public hearings, representatives from District Offices do not offer to make statements to the media about antenna issues. If a public meeting is up-coming, the District Offices will often keep telephone and e-mail replies very brief so as not to distract the public's focus away from the issues to be examined at the public hearing (principally, the visual impact of the antenna proposal).

i. Necessity for particular antenna infrastructure

It is submitted that the public should not be consulted on the necessity for a particular antenna installation or a modification, but the public does deserve a brief answer about how such determinations are/were made. Generally, decisions about the need for particular broadcasting installations are made by the Canadian Radio-television and Telecommunications Commission (CRTC) in conjunction with the applicant. If a public hearing is held by the CRTC in conjunction with a particular broadcasting application, there are few restrictions on the questions that concerned members of the public may ask. On occasion citizens have attended CRTC hearings involving the establishment or alteration of broadcasting facilities hoping to debate the need for the particular site , antenna system or change of facilities being proposed.

For wireless networks involving cellular and PCS (digital cellular) services it is the service provider who decides whether to establish or modify a cellular or PCS antenna installation. This is especially so now that Industry Canada has moved to 'Spectrum Licensing'[157] for these wireless services. Canada has created a regulatory model that uses licensing

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[155] Some wireless carriers have attempted to respond to public concerns about RF exposure and the contents of *Safety Code 6* by securing the services of a national expert who will attend to make a presentation and answer questions. The independence of such experts has been challenged at these meetings on the grounds that the expert's transportation costs, and possibly a consultancy fee, are being paid by the wireless carrier.

[156] If a District Office anticipates that a public meeting held about a broadcasting, cellular or PCS installation will be contentious, it will send a staff person to observe.

[157] As explained in Section C of this report, spectrum licensing does not involve the issuance of individual siting or radio station approvals by Industry Canada.

conditions[158] and competitive market forces to drive decisions about the range and quality of the network service offerings of individual wireless carriers. Wireless carriers should not have to consult the public or land-use authorities about whether antenna installations are truly necessary.[159] When asked, wireless carriers will explain why a particular antenna installation is needed.[160] Likewise, amateur radio operators should not be required to engage in a debate with municipal officials or to consult with their immediate neighbours on the question as to whether a particular antenna installation or modification is needed.

ii. Electromagnetic interference (EMI) questions

Members of the public may experience electromagnetic interference (EMI) problems when new radio transmitters are established in their vicinity. Once these transmitters are in operation, it is possible that the performance of some of the electronic equipment in their homes will be degraded. When degraded performance begins coincident with new antenna operations, concerned members of the public tend to blame the antenna proponent who established the new transmitter and/or Industry Canada for permitting it to happen.

"Recommendation 12" of this report, and the explanatory text associated with it, addressed the need for Industry Canada to create land-use consultation materials that provide very basic information about EMI, about obligations to resolve such problems and about Industry Canada's role in the problem identification and resolution process. "Recommendation 13" urged Industry Canada to implement maximum field strength criteria appropriate for the resolution of immunity complaints involving the fundamental emissions from broadcasting undertakings. Through this approach, the department was encouraged to provide an increased level of interference protection from broadcasting emissions to the types of electronic equipment found

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158 For example, licensing conditions for certain PCS service offerings determined by spectrum auction state "Within five years of the auction's close the licensee must demonstrate to the department [Industry Canada] that the spectrum has been put to use. The establishment of coverage of 50% of the population within the licensing service area, or some other indicator of usage that is acceptable to the department will be required." From: Licence Conditions for the Auction of Additional PCS spectrum in the 2 GHz Frequency Range, Licence Condition 14: Implementation of Spectrum Usage.

159 Often, wireless carriers are asked by land-use authorities and/or concerned citizens to establish particular services or improve the quality of current service offerings by making additional investments in the antenna infrastructure within a particular community. For example, in February of this year the Town of Oakville, Ontario convened a meeting with the PCS service providers serving its community to ask that additional antenna sites be established to improve the coverage for digital cellular services. From: Report of Administrative Services Committee, Town of Oakville, March 2, 2004 at p. 1.

160 For example, for an 'open house' style of public consultation held by Bell Mobility in Cambrian Heights (Calgary) on 30 January 2003, Bell created and circulated an impressive package of background material for the public that included an explanation as to why the 25 metre monopole antenna being proposed was needed to improve local service coverage.

within the average Canadian household.

It is a conclusion of this policy review that, due to the technical and regulatory complexity of the electromagnetic interference (EMI) issues that may arise when antenna significant broadcasting installations are established or modified, Industry Canada must be prepared to participate actively in public consultations where there is a strong possibility of EMI problems involving home electronic equipment.[161] The department's role should be to answer the EMI-related questions that concerned members of the public may pose. In particular, Industry Canada should be prepared to explain, in plain language, the obligations of the antenna proponent should interference occur.[162]

iii. Questions related to *Safety Code 6* (RF exposure)

During the online Discussion Forum that operated under the National Antenna Tower Policy Review project from September 3rd to October 24th 2003 the most emotional comments submitted related to health concerns about human exposure to the radiofrequency energy from cellular technology. Often, the participants did not specify whether they were concerned about the emission from hand-held units or from (fixed) radio antenna installations. Also, about 50 unsolicited e-mails were sent from across Canada and around the world to the two e-mail IDs for the project: antenne@unb.ca and antenna@unb.ca. Most of those e-mails contained expressions of concern about health effects from RF exposure. Relatedly, about five phone calls were received from citizens who feared that their health had been negatively impacted by exposures they had experienced from radio antenna installations in Canada. One woman forwarded a copy of her medical file which, she said, proved that she had suffered facial burns and other injuries from her cellular telephone. She held those views firmly, despite the fact that her doctor had not reached the same conclusion. RF safety issues were also featured prominently in the formal written submissions received and posted on the project Web site (www.antennareview.ca and www.antenneexamine.ca).

When consulted under this policy review, representatives from wireless carriers, broadcasting undertakings and local governments expressed the view that the public's questions

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[161] There is very little possibility of EMI issues arising in relation to the establishment of cellular or PCS installations.

[162] For example, applicants seeking a Broadcasting Certificate to establish a new AM broadcasting undertaking (AM radio antenna installation) must sign a commitment, printed on the application form, to correct or to offer advice in relation to certain EMI issues that may arise. See: Application for a Broadcasting Certificate AM (Amplitude Modulation) New Undertaking, Industry Canada Form: IC 2357BB, dated December 2001. The "Commitment" is set out at p. 2.

and concerns about human exposure to radiofrequency fields are the most challenging of all antenna-related issues to handle. One executive from a national wireless carrier called this the "tar baby issue" of public meetings: The more you handle it, the more entangled and emotional it becomes.[163] Speaking generally about the submissions received from members of the public regarding RF exposure, their emotional state on this issue ranged from a modest sense of apprehension to a full state of angst. It is clear that for some members of the public there is at least one health effect from possible exposure to radiofrequency fields: anxiety.[164]

When making determinations about hazardous activities and technologies most scientists and government policy makers employ a sophisticated analysis called 'risk assessment." In contrast, most citizens tend to rely upon there own intuitive judgements about hazards, called 'risk perception.'[165] Their perceptions usually are based upon media reports, information and opinions found on the Internet, and the opinions of family members and friends. Risk perception theory suggests that, based upon current media and Internet stored information, many members of the public would perceive RF exposure from fixed antenna installations as being a high risk activity. Almost all of the factors related to the perception of high risk are present: The extent of personal control over the risky activity is perceived as being low, the worst possible consequences are perceived as being dreadful in nature (possibly cancer or DNA damage), the risk is not assumed voluntarily, the degree of familiarity with the risky activity is low and the risk for children in particular may be perceived as being more elevated.[166]

In relation to human health concerns about RF safety, the management of risks and risk perception involves three elements: (1) risk assessment, (2) risk analysis and policy-making, and

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[163] At public meetings related to the establishment of PCS tower installations held within the Atlantic Provinces during the previous five-year period, concerns expressed about the RF exposure issue have increased substantially in number and force.

[164] It is difficult to know what percentage of the population has a high level of concern about the RF exposures that may be associated with fixed cellular or PCS antenna installations. In June of 2002 a professor at the University of Saskatchewan conducted a telephone survey of 200 adults residing in Saskatoon, Saskatchewan on their perceptions of the risks and benefits of cellular technology. According to the results of the survey these respondents had a low level of concern about exposures from the base station antenna installations. See: *On the Visibility and Effectiveness of www.wirc.org and Public Perceptions of Wireless Technology*, Dr. M.D. Mehta, Associate Professor and Director, Sociology of Biotechnology Program, University of Saskatchewan, 28 January 2003 at p. 6.

[165] See: Paul Slovic, *Perceptions of Risk*, Science, Volume 236, 17 April 1987, 280-285, at p. 280.

[166] Often, factors such as these are called qualitative characteristics of risk perception. See generally, *Risk Management: Guidelines for Decision-Makers*, CAN/CSA-Q850-97, July 1997 and IEC/TC 56 (Sec.) 410 Guidelines for the Risk Analysis of Technological Systems, 1995)

(3) risk communication. In order to determine the information the public may need on this issue, and who should provide it, these three elements must be examined.

As noted above, risk assessment is a sophisticated analysis of potentially hazardous activities or technologies. Usually, the assessment of the risk is based upon an independent examination of the most current peer-reviewed scientific studies available. For the past twenty years or so, risk assessments in Canada in relation to RF exposure have been done principally by a group of scientists working in the radiation branch of the federal Department of Health. There have been exceptions to this. One exception to this trend occurred in 1998 when Health Canada requested that the Royal Society of Canada convene an Expert Panel to perform a population health risk assessment on human exposures to RF energy. The Royal Society published its assessment one year later and concluded that public exposures to telecommunication base stations were of a sufficiently low intensity that biological or adverse health effects were not anticipated.[167] In 2004 the Royal Society updated the research from its previous study and concluded that there is no clear evidence of adverse health effects associated with RF fields, but that additional research should be done.[168]

The second element of risk management, risk analysis and policy making, also has been undertaken by the radiation branch at Health Canada for many years. Based upon analysis of the risk assessments completed, Health Canada has selected and then modified a particular RF exposure standard as matters of policy choice. Since 1979, the Bureau of Radiation Measurement division of Health Canada has published a document entitled, "*Safety Code 6."*[169] This code, which sets ranges of radiofrequency exposure limits for RF workers and for members of the general public, was updated in 1991 and 1999. Over time, *Safety Code 6* has extended to a broader range of frequencies and its limits have become more stringent. As a code or standard,

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[167] *A Review of the Potential Health Risks of Radiofrequency Fields from Wireless Telecommunication Devices*, Expert Panel Report, The Royal Society of Canada, March 1999 online: <http://www.rsc.ca//files/publications/expert_panels/RF//RFreport-en.pdf> at p. 3.

[168] *Recent Advances in Research On Radiofrequency Fields and Health: 2001-2003,* Expert Panel Report, The Royal Society of Canada, 2004 online: <http://www.rsc.ca//files/publications/expert_panels/RF//expert_panel_radiofrequency_update2.pdf>. The Royal Society also published an update report in 2001, published in the Journal of Toxicology & Environmental Health, part B, Vol. 4-4, 2001.

[169] The full title of *Safety Code 6* has changed over the years. In 1979, the report title was: *Safety Code 6 Recommended Safety Procedures for the Installation and Use of Radiofrequency and Microwave Devices in the Frequency Range of 10MHz - 300 GHz.* The 1991 title was: *Limits of Exposure to Radiofrequency Fields at Frequencies from 10 kHz - 300 GHz Safety Code 6*, and the most recent version, published in 1999, is entitled: *Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz Safety Code 6.*

Safety Code 6 has no independent legal authority. Its enforcement is achieved by its incorporation (by reference) into federal, provincial or municipal laws. Industry Canada has referenced *Safety Code 6* as a required element within the technical and regulatory rules applicable to all handheld communicators and fixed antenna installations. As part of the authorization processes for certain fixed antenna installations, Industry Canada staff require that RF predictive models be used to undertake a computational analysis of RF energy levels. The development and use of RF predictive models is discussed in reply to Question 3 of the National Antenna Tower Policy Review.

The third element, risk communication, involves an interactive exchange of information and opinions among various individuals, groups, and institutions about particular risks. For communications involving the public, successful risk communication occurs when the public is adequately informed about a particular risk within the limits of the credible knowledge available. According to risk communication theory, the public's perceptions about the party who is conducting the risk dialogue and providing the information is an important factor in how the information is received. Again, according to risk communication theory, three perceptions are very important for communications that may be regarded as credible and trustworthy. These are perceptions about the communicator's knowledge and expertise, openness and honesty, and concern and caring sentiment.[170]

In relation to risk communication activities about RF exposure directed to concerned members of the public in Canada, many institutions and parties are involved. A short list would include Health Canada, Industry Canada, the Canadian Wireless Telecommunications Association (CWTA), the Wireless Information Resource Centre (WIRC),[171] R. Samuel McLaughlin Centre for Population Health Risk Assessment (McLaughlin Centre),[172] the major wireless carriers, the Bell University Labs program and the British Columbia Cancer Agency. Of course, should the public raise concerns about the health effects to humans from exposure to radiofrequency fields in

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[170] See, for example, R.G. Peters, V.T. Covello, and D.B. McCallum, *The Determinants of Trust and Credibility in Environmental Risk Communication: An Empirical Study*, Risk Analysis, Vol 17, 1997 at pp. 43-54.

[171] WIRC is an independent, non-profit organization which provides independent and impartial information about research related to the health effects of wireless technology. Recently WIRC became affiliated with the McLaughlin Centre for Population Health Risk Assessment.

[172] The McLaughlin Centre is located at the Institute of Population Health at the University of Ottawa. Dr. Daniel Krewski is the Director of the Centre.

relation to a particular land-use consultation, the antenna proponent may engage in a self-styled risk communication strategy.[173]

Before making recommendations about the information that should be available to the public about RF exposure and about how such information should be provided, it is important to examine in more detail the risk management activities related to this issue by Industry Canada and Health Canada.

In 1988, the (then) Department of Communications (DOC) and the (then) Department of National Health and Welfare signed a memorandum of understanding (MOU) that attempted to set out their respective responsibilities concerning public exposure to electromagnetic fields from radiocommunication devices and fixed antennas. The document made it clear that the health ministry was to perform the research necessary to publish *Safety Code 6* and keep it under review as a guidance document. It agreed also to provide advice and information to the DOC and to the public on RF exposure issues. For its part, the Department of Communications agreed to implement the exposure standard within national radiocommunication policy and to defer to the Department of Health on RF exposure matters.

A matter not well settled between the two departments was their respective responsibilities for handling RF exposure controversies surrounding proposed or existing radio antenna installations. As the number and intensity of these controversies increased in the 1990s, and as both suffered significant budget cut-backs, each looked to the other to take the lead on the handling of these public concerns. Consequently, it was common throughout the decade for neither department to attend public hearings, nor provide information and assurances to concerned members of the public.

In August of 2003 Industry Canada and Health Canada signed a new MOU that resolves the controversy described above.[174] Paragraphs within section 2 of the MOU clarify that, as between the two departments, it is the responsibility of Industry Canada to:

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[173] It is interesting to note that some of the officials working for wireless carriers who were interviewed for this project expressed the view that discussions about RF exposure were beyond the scope of legitimate topics for land-use consultations.

[174] "Memorandum of Understanding on Respective Responsibilities For Public Exposure to Electromagnetic Energy Produced by Radiocommunication Devices," between the Spectrum, Information Technologies and Telecommunications Sector of Industry Canada and the Healthy Environments and Consumer Safety Branch of the Department of Health, effective 3 August 2003. Currently, Industry Canada and Health Canada officials meet 2-3 times per year to discuss their respective and joint activities related to the establishment and implementation of *Safety Code 6* as a national standard.

> (1) be the principal respondent to public and industry inquiries pertaining to....the application of radiofrequency human exposure limits;
>
> ...
>
> (5) respond to concerns raised by the public, via meetings, publications and /or other appropriate means, addressing compliance with radiofrequency human exposure limits adopted by the Department.[175]

Many opinions were expressed during the data collection phase of this project about Industry Canada's responsibility(ies) to respond to public concerns about RF exposure.[176] Opinions received from radiocommunication interests, local and regional governments, public interest groups and the public were almost unanimous in their view that Industry Canada must play a more active role in the local consultation process and, in particular, in responding to concerned citizens about the potential for negative health effects to humans from exposure to radiofrequency fields.[177] It is a conclusion of the National Antenna Tower Policy Review that this is an appropriate role for Industry Canada and that a national communication strategy is necessary.

> **Recommendation 20: That Industry Canada should create a national risk communication strategy to respond to public questions and concerns about the health effects to humans from exposure to radiofrequency fields.**

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[175] Within the responsibilities to be undertaken by the Department of Health is the obligation to assist Industry Canada, when invited, with the activities quoted above from section 5 of the MOU.

[176] It should be noted that some of the participants to the public consultation for the National Antenna Tower Policy Review also expressed frustration about the absence of representatives from Health Canada at local consultations held about particular antenna installations. The respective roles of the two ministries in relation to local land-use consultation activities should be negotiated between them as an element of Industry Canada's national risk communication strategy on human exposure to radiofrequency fields. On this health and safety issue, representatives from Health Canada should, of course, have higher levels of credibility with land-use authorities and members of the public.

[177] The City of Red Deer, in its Formal Written Submission, recommended that *Safety Code 6* be explained to the public during consultations, and that basic printed material and Power Point presentations be available for use during consultations. Hardy Stevenson and Associates submit that Industry Canada and Health Canada should adopt a stronger role in educating the public about health and safety issues. As it stands, the carriers are forced to defend *Safety Code 6* during public consultations, and the public does not view carriers as a neutral source for health information. From: Hardy Stevenson and Associates Formal Written Submission dated 25 September 2003. Telus Mobility proposes that *Safety Code 6* and Transport Canada requirements should be a prominent part of the information package given by Industry Canada to the public. From: Telus Mobility Formal Written Submission dated 10 October 2003. The Radio Advisory Board of Canada (RABC) states that "questions raised from time to time domestically regarding the adequacy or interpretation of *Safety Code 6* in the course of local consultations are, properly, matters for consideration by the appropriate national agencies. It is appropriate for proponents to direct interested persons to Health Canada, but individual site approvals should not be delayed due to issues raised regarding the adequacy of the standard itself." From: RABC Formal Written Submission dated 17 October 2003.

This strategy should include the designation of staff in headquarters and in the regions to reply to public concerns about RF exposure, to address the training needs for such staff in media relations and in risk communication techniques and to examine the need for additional resource materials on RF exposure (that communicate at an appropriate comprehension level). In those circumstances when the department anticipates that RF exposure concerns will play a prominent part in a land-use consultation it should ensure that a properly trained and supported staff person is present to speak to concerned citizens and to the media, if such is deemed useful or necessary.

In 2002, the World Health Organization (WHO) published a report entitled *Establishing a Dialogue on Risks from Electromagnetic Fields*.[178] This publication, issued in handbook format, was created to help stakeholders and decision-makers engage the public in a dialogue about the potential of health effects from exposure to electromagnetic fields (EMF). It offers excellent answers to the questions about when, what, how, and with whom to communicate information about the potential risks from EMF exposures. According to the handbook a fundamental aspect of any risk communication strategy is that it be implemented as soon as possible when EMF related facilities are to be sited:

> There is often significant public anxiety over particular sources of EMF, such as transmission lines and mobile phone base stations. This anxiety can lead to strong objections to the siting of such facilities. When community opposition builds, it is often because the communication process was not started early enough to ensure public trust and understanding.[179]

The broadcasting and wireless industries in Canada cannot rely solely upon the communication efforts of the ministries of Industry and Health. Their own communications about RF safety should commence as soon as they commence site investigation activities and continue even after the site chosen is operational.

> **Recommendation 21: That Canada's broadcasters and cellular/PCS carriers should adopt their own risk communication strategies. Those strategies should include risk communication training for staff members who engage in antenna site acquisition or local consultation activities.**

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[178] World Health Organization, *Establishing a Dialogue on Risks from Electromagnetic Fields* (Switzerland: World Health Organization, 2002) online: <http://www.who.int/peh-emf/publications/risk_hand/en/>.

[179] WHO, *Establishing a Dialogue*, p. 24.

The preamble text to the *Safety Code 6* standard states that "This code will be reviewed and revised periodically and a particular requirement may be considered at any time if it is found necessary." It is significant that many of those who provided comments addressing *Safety Code 6* for this project expressed the view that the current version (1999) of the standard is out of date.[180] To have credibility, an RF exposure guideline must be, and must be seen to be, based upon very current and objective scientific evidence. While Health Canada has neither re-issued nor otherwise validated the content of *Safety Code 6* over the previous five year period, an independent review of the standard, and of the state-of-the-science upon which it is based, was recently undertaken. Scientists affiliated with the R. Samuel McLaughlin Centre for Population Health Risk Assessment located at the University of Ottawa performed the review and published their findings.[181] Unfortunately, concerned members of the public are unlikely to know about this research or about this recent endorsement of *Safety Code 6* as a suitable guideline for certain types of RF exposure.

At a meeting held in Ottawa on June 18, 2004 members of the National Antenna Tower Advisory Committee (NATAC) expressed concern about the fact that no political or regulatory mechanism exists in Canada to trigger an independent review of the state-of-the-science for *Safety Code 6*, nor to feed the results of such a review back into the risk analysis and policy making activities of Health Canada. Moreover, NATAC members were of the opinion that Health Canada no longer has sufficient resources to continue to play both the risk assessment and risk analysis and policy making roles for this guideline. As a government department, Health Canada's research (and funding) priorities tend to be rather short term and they migrate with changing perceptions about the most pressing public health issues. It should not be a surprise to learn that much of the department's attention and resources are now being applied to issues related to infectious diseases and bio-terrorism. Independent panels of experts, such as those affiliated with the Royal Society of Canada and the McLaughlin Centre, are in a much better position to review the most current research and to perform the necessary risk assessment functions. Health Canada should continue to perform its risk analysis and policy-making function in relation to this standard.

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[180] See, for example, the Formal Written Submission of Colwood Transmission Towers Citizens' Committee, dated August 7, 2003 at p. 1. These views about the inadequacy of *Safety Code 6* were made in person at a meeting held in Colwood, British Columbia on 21 August 2003. At its National Board of Directors Meeting in March of 2003 the Federation of Canadian Municipalities (FCM) endorsed a policy on telecommunications towers and antennas that called for *Safety Code 6* to be updated.

[181] Citations for this research are listed on the Web site maintained by the McLaughlin Centre. These can be found at the URL: <http://mclaughlincentre.ca/publications/index.shtml>.

Concerned members of the public must have faith that *Safety Code 6* is based upon an objective, expert and current risk assessment.[182]

> **Recommendation 22: That Industry Canada and Health Canada should jointly fund a biennial review of the state-of-the-science for *Safety Code 6* to be conducted by an independent panel of experts such as those associated with the R. Samuel McLaughlin Centre for Population Health Risk Assessment or the Royal Society of Canada.**

At present, there is no institutional or policy mechanism to feed the results of an independent review about the state-of-the-science on guidelines for human exposure to radiofrequency fields back into Health Canada's risk analysis and policy-making activities related to *Safety Code 6*. This problem should be addressed.

> **Recommendation 23: That Health Canada should implement a policy mechanism that will feed the results of an independent review of the state-of-the-science on guidelines for human exposure to RF fields back into Health Canada's guidance creation process for *Safety Code 6*. If, as a consequence of an independent review, the existing standard is endorsed unchanged, a notation should be added to the preamble of the *Code* that informs of the review, the expert panel, its findings and the date of the review.**

iv. Questions about aeronautical marking and lighting

On occasion, members of the public and representatives from land-use authorities have had questions about the aeronautical marking and lighting requirements administered by Transport Canada. Usually the questioner has wanted to know about how the application of these requirements may affect the visual impact of a particular antenna proposal.[183] A small number of the formal submissions to the National Antenna Tower Policy Review claimed that the public's lack of knowledge about these lighting and marking requirements was problematic for antenna

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[182] A public meeting held as part of a local consultation about a particular antenna proposal is not an appropriate forum to debate with the public the adequacy of *Safety Code 6* as a national guideline for RF exposure. The information related to the adequacy of the *Code* should be provided as one element of a national risk communication strategy to be developed by Industry Canada.

[183] For example, in August of 2003 a representative from the environmental public interest group, Ciel noir et environnement visuel Laurentides (CNEL) forwarded an e-mail asking for basic information about the lighting of antenna towers.

proponents and suggested that Industry Canada play a future role in explaining them to concerned citizens.

Upon review of Canada's aeronautical marking and lighting rules applicable to radio antennas and supporting structures, it is a conclusion of the policy review that certain information about these rules and their application would be useful to members of the public concerned about the visual impact of the antenna installations located within their vicinity.

A brief overview of the marking and lighting requirements for radio antennas and their supporting structures is provided in Section C of this report. The material immediately below is provided as an attempt to provide the type of information that may be helpful to land-use authorities and concerned members of the public.

Aeronautical marking and lighting requirements and local consultations

As a starting point, when land-use authorities and members of the public are consulted about particular antenna proposals, it is a conclusion of this policy review that the antenna proponent should provide details about the aeronautical painting and lighting plans for the antenna or supporting structure. Prior notice of the lighting to be deployed is particularly important if high intensity strobe lighting is to be used. Interestingly, one of Industry Canada's current broadcasting policies contains a precedent for such a notice requirement. Cable television receiving undertakings are required to consult with land-use authorities about their antenna proposals (e.g. for a cable TV head-end). Within the notice served upon the land-use authority, as the first step in the consultation process, the applicant must indicate whether the "proposed antenna tower or structure will be equipped with high intensity strobe lights."[184]

> **Recommendation 24: That when Industry Canada imposes notice obligations upon antenna proponents, as a first step to land-use or public consultations, that the antenna proponent be required to provide basic details within the notice about the plans for the marking and lighting of the antenna tower or other supporting structure.**

While citizens do not wish to make antenna towers and other supporting structures less visible when viewed from navigational airspace, many would appreciate information relevant to the reduction of the visual impact of such structures when viewed from the ground. First, it is important to realize that *Standard 621.19* sets strict visibility requirements for aeronautical

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[184] *Technical Standards and Procedures for Broadcasting Receiving Undertakings (Cable Television)* BP-23, Issue 4, Rev.1, May 1995, Procedure 6.11.2 at p. 32.

obstructions but that alternative marking and lighting options may be acceptable to Transport Canada to achieve the visibility required in the circumstances. For example, for many of the antenna towers used for cellular and PCS services the proponent may request that it be approved for flashing white lighting (and no paint) or flashing red lighting and orange and white paint. Often, citizens living near antenna towers perceive that a flashing white light is more intrusive to their community than a red one, especially at night. The antenna proponent may request white lighting, where such is an option, so as to be freed from the expense of maintaining the bands or colour on the tower.[185]

It should also be known that dual (colour) mode lighting may be approved for some cellular and PCS antenna towers. Thus, once it is dark, a tower approved for white lights (and no paint) may switch to red lights because the presence of paint is no longer relevant. Thus, at night, the unpainted tower with dual mode beacons will be just as visible to air traffic as a painted one (that has red lights for 24 hours a day). An antenna proponent may not ask to be approved for dual mode lighting because it is more expensive to purchase and maintain.

Members of the public who are concerned about the visual obtrusiveness of antenna towers because of their lighting requirements should know that a company in Québec has developed and patented a deflector that fits around the standard beacon units used for the lighting of aeronautical obstructions. These deflectors shield the path of the light to the ground while maintaining the visibility of the beacon when viewed from navigational air space.[186] The units consist of a series of conically shaped elements that shield the downward path of light, yet they resist nesting by birds and the build up of snow and ice. According to representatives for the company, if fitted with their product a light beacon ceases to be visible when viewed from ground level from a distance extending from the base of an antenna tower to 2.5 km outward. And, when viewed at a distance of 3 km from the base of the tower only 10 percent of the beacon is revealed.[187] As of the Spring of 2004 about 30 of these deflectors had been installed on cellular and PCS antenna towers located in Ontario[188] with good results. According to the developers of

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185 Generally, the orange and white bands on antenna towers must be repainted on a five year cycle.

186 The company is called Cegeny, Inc. and it is based in Longueuil, Québec. The company plans to market these unit across North America.

187 These performance characteristics relate to typical cellular and PCS towers and were obtained from a consultation by teleconference call to Cegeny representatives on 5 April 2004. Apparently, Cegeny has commissioned engineering tests that have confirmed that beacons fitted with these deflectors continue to comply with *Standard 621.19* requirements.

188 Many of the units were installed in ‘cottage county’ areas of Ontario where frequent complaints were made that the light from antenna beacons polluted the natural viewscapes.

this deflector, each unit installed adds about $5,000.00 to the cost of the antenna tower. While it is not suggested that this product become a standard fixture of antenna installations in Canada, it may be an important option in circumstances where aeronautical obstruction lighting has a particularly intrusive impact upon concerned members of the public.

v. Questions about impact upon property values

The issue of public concerns about the impact of antenna towers upon the property values of lands located near to the installation will be addressed more fully elsewhere in this report but a few comments will be offered here. It is a conclusion of this policy review that the impact (positive or negative) an antenna installation may have upon the property values of particular parcels of land should not be the subject of an antenna consultation. Generally, land-use planning authorities are not required to take such impacts into account when siting urban and rural infrastructure that concerned members of the public may find objectionable. Almost every planning decision will produce positive and negative impacts upon the value of land located in the immediate vicinity.

It is readily accepted that those who will live in close proximity to an antenna installation under consideration may raise concerns about the possible impact upon the value of their lands. These individuals should be permitted to voice their concerns, but it should be explained that the principle purpose of consultations with the public and/or land-use authorities is to consider the visual impact of the proposal upon the immediate environment. Negative impacts should be explored through discussions about the potential for loss of the particular amenities or important visual characteristics of the area.

Question 3. What means are available to readily identify whether proposed installations may create radiofrequency fields in excess of established exposure limits in areas where people live and work?

Over the past 25 years, a number of means have been devised to predict when a proposed antenna installation may create radiofrequency fields in excess of the established exposure limits for humans. Essentially, for all of these tools, the user provides the technical operating parameters of the proposed radio apparatus and antenna installation, and the tool supplies the estimated distances necessary (from the radiating antenna to the exposed human) to remain compliant with the established (RF) exposure limits. These predictive tools have evolved from rather simplistic (look-up) tables, to a series of mathematical field-strength equations, to sophisticated computer software that will produce 3D graphic images that outline the estimated compliance distances. As the tools have become more sophisticated, more (and more varied) technical parameters related to the radio equipment and its surroundings can be entered for processing. Today, calibrated field-strength measurements, taken from actual radio installations, are used to refine and confirm the accuracy of the computer programs available.

Clearly, the answer to Policy Question 3 is that there are many means available to readily identify whether proposed installations may create radiofrequency fields in excess of established exposure limits in areas where people live and work. To provide a more refined answer to this question one would have to know to whom the means would be readily available and for what purpose. Predictive tools and processes used by Industry Canada within its antenna authorization processes would be too complex and expensive for some of Canada's antenna proponents seeking to confirm that their proposed installation or modification will be compliant with the established exposure limits. Finally, one should ask whether there are means readily available to land-use authorities and to concerned members of the public to confirm that an antenna proposed for their vicinity will be compliant to the established exposure limits. This section of the National Antenna Tower Policy Review will examine Canada's established exposure limits within *Safety Code 6,* discuss the use of current RF exposure predictive tools by Industry Canada and some radio users, and offer some views on the use of those (or other) tools, by local governments and concerned citizens.

a. An Overview of Safety Code 6

Safety Code 6[189] (*SC 6* or the *Code*) is Canada's national standard on human exposure to radiofrequency electromagnetic fields. The *Code* is a comprehensive document that sets out safety requirements for the installation and use of radiofrequency (RF) and microwave devices that operate in the frequency range from 3 kHz to 300 GHz.[190] It was first published in 1979 by the Radiation Protection Bureau of the Department of National Health and Welfare. In 1991 and 1999 *SC 6* was revised to reflect advances in technology, the proliferation of wireless communications and new biological studies on the hazards of exposure to radiofrequency energy. The 1991 revisions extended the range of frequencies covered by the *Code* to 300GHz, reduced the recommended exposures for members of the public for particular frequency bands, and adjusted most exposures to make them more frequency dependent (to account for differing body size and resonance).

The *Code* provides two sets of RF exposure limits that are based upon the status of the individual who may be exposed: radiofrequency and microwave exposed workers who may be exposed in the course of their daily work and other persons including the general public who may be exposed at any time or place.[191] The exposure limits are specified by Electric Field - as measured in volts per metre (V/m), Magnetic Field - as measured in amperes per metre (A/m) and Power Density - as measured in watts per metre squared (W/m^2) or milliwatts per centimetre squared (mW/cm^2).[192] In terms of power density, the maximum permissible exposures for both groups (occupational and public) may be averaged over specified periods of time (measured in minutes) and the average is not to exceed the limit for continuous exposure. Of course, this policy review is concerned about the application of *SC 6* limits as specified for the general public.

b. Industry Canada and the Implementation of SC 6

The Consumer and Clinical Radiation Protection Branch of Health Canada produces *Safety Code 6* as a guidance document. The Code has no independent legal status, but compliance can be made mandatory by its incorporation into validly enacted laws, regulations or standards.

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189 Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, *Safety Code 6*, 1999. A copy of the *Code* can be found on the Internet at the URL: <http://www.hc-sc.gc.ca/hecs-sesc/ccrpb/pdf/99ehd237.pdf>.

190 From *Safety Code 6*, 1999 at p. 3 para. 2.

191 The exposure limits for members of the general public have a greater factor of safety on the presumption that RF workers are more knowledgeable about the possible health risks and can protect themselves.

192 Power density is not applicable at frequencies below 100 MHz. A power density of 10 W/m^2 is equivalent to 1 W/cm^2 .

Industry Canada has required compliance with *SC 6* by incorporating it into radio regulatory provisions dealing with handheld radio apparatus (like cell phones) and antenna installations. CPC-2-0-03 warns all Type 1 and Type 2 antenna proponents that "Industry Canada requires that radio stations be installed and operated in a manner that complies with *Safety Code 6*."[193] For Type 1 antenna installations the CPC provides:

> The authorization process for Type 1 stations includes an initial analysis that considers the potential effect of the proposed station within the existing radio environment. Where the analysis indicates that the maximum RF field level permitted by *Safety Code 6* may be exceeded, the applicant may be required to undertake mitigation measures. These measures may include reducing the transmitter power or duration of transmission, changing the type, direction or height of the antenna, or restricting access to areas near to the antenna. Where the calculation indicates that the proposed station will meet *Safety Code 6*, Industry Canada will continue the normal authorization process.[194]

Type 2 antenna installations are not subject to any form of prior authorization by Industry Canada. The onus is placed upon the owner/operator to ensure that the radio equipment is compliant with *SC 6* requirements and the department may conduct audits of operational radio stations. For Type 2 antenna installations, such as those of amateur radio operators, CPC-2-0-03 states:

> Type 2 stations must comply with *Safety Code 6*. Where it is expected that the operation of the proposed station will result in non-compliance with *Safety Code 6*, mitigation measures as described for Type 1 must be pursued by the owner of the station.[195]

As noted above, the authorization processes for Type 1 radio installations, which would include broadcasters and site-specific wireless carriers, provide for an 'initial analysis' to ensure that the proposed station or modification is compliant with *Safety Code 6*.

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[193] CPC-2-0-03 at p. 4.

[194] *Ibid*. CPC at p. 6.

[195] *Ibid*. CPC at p. 8.

The Department of Industry has a three step screening and evaluation process for ensuring that Type 1 antenna installations will operate within *SC 6* exposure limits. If a flag is raised at one level, the evaluation is intensified at the next. The three stages are as follows:[196]

Step 1: The first stage involves looking at a listing of service categories to see if the antenna system under consideration is listed. The radio service categories listed are known to produce very low radiofrequency fields within the area surrounding the antenna where people may be present.[197] Listed services are exempt from further RF exposure evaluation as long as the antenna height (as measured in metres above the ground or rooftop) and power (as measured in EIRP or equivalent isotopically radiated power) are within the limits specified on the exclusion list. For example, if the lowest point of the proposed antenna is 10 metres in height or greater and the total EIRP is 1649 watts or less, the proposal is screened out of further evaluation. This exclusion list was first published and used in 1998 by the US Federal Communication Commission (FCC). If a proposed antenna installation is not exempted under this stage it proceeds to Step 2.

Step 2: This step uses a template contained within Technical Note TN-261[198] to obtain a conservative estimate of the area, as measured out from the radiating antenna,[199] that would exceed the exposure limits specified for the general public within *Safety Code 6*. If the public might reasonably have physical access to the area that exceeds *SC 6* levels, the proposal must be evaluated under Step 3. The template contained within TN-261 provides predicted radiofrequency fields that are based on a technical document that was created and used by the FCC. When possible, Industry Canada has attempted to harmonize its processing and evaluation policies for exposure to RF fields with those in the U.S.A.

Step 3: The third step involves using more sophisticated RF field assessment tools, such as the calculating module contained with the department's Automated Licensing

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196 Information on the three step process was obtained from Industry Canada representatives and from a recent engineering study entitled "Radio Field Intensity of Multi-Site-Multi-Bands Antenna Towers" by Roshdy Hafez of Carleton University, 31 March 2003.

197 The exclusion list is based upon conservative estimates of the (typical) power density and field strength levels from certain categories of antenna installations.

198 Technical Note TN-261. Rev. 1 "Antenna Tower Evaluation Template for Radiofrequency Fields with Respect to Health Canada's Safety Code 6," 6 September 2002.

199 Typically, the area of non-compliance is drawn as a box. This graphic depiction shows the minimum horizontal and vertical distance from the antenna where the public should not have access. If public access is blocked by a proper fence or a securely locked door (like to a rooftop) then compliance is not a problem.

System (ALS), or performing actual on-site measurements as soon as the antenna is operational.

In addition to the lists and templates discussed above, Industry Canada has three tools for predicting and measuring radiofrequency fields:[200]

1. Automated Licensing System (ALS). The ALS database contains information pertaining to existing antenna installations. In particular, the ALS contains a *Safety Code 6* calculating module that determines whether a new installation will meet current RF exposure limits.

2. Hi-Field Prediction Tool for Broadcast Tower Installations. This tool is used to predict whether a new installation will meet current RF exposure guidelines. The tool provides a simple graphical interface and outlines the RF field. Section 8.2 of BPR-1 discusses the Hi-field module and provides detailed information with respect to RF evaluations.

3. Guidelines for the Measurement of Radiofrequency Fields at Frequencies from 3 kHz to 300 GHz (August 2000).[201] This document outlines some principles and background information for the measurement of radiofrequency electromagnetic fields. It also provides a number of recommended measurement procedures for the different types of telecommunication services. The techniques for both the near field and far field measurements are based on instrumentation currently available. The recommended procedures are not considered appropriate for the measurement of electromagnetic fields in the reactive near field region.

Industry Canada is in the process of improving upon the accuracy of the values obtained from the template set out within Technical Note TN-261 (for Step 2). Currently, the template does not apply to all service categories and it is based upon the simplest of scenarios - a single antenna, operating in a single frequency band and doing so in isolation from other antennas. The new technical document will consider scenarios involving multiple antenna sites operating at multiple frequencies.

c. Means Available to Radio Users to Ensure Compliance with SC 6

There are numerous means available to radio users in Canada to readily identify whether the antenna installations or modifications they are proposing may create radiofrequency fields in excess of those permitted under *Safety Code 6*. These tools range from computer programs that

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[200] Information gathered from e-mails received from Industry Canada.

[201] Located at http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/en/sf01451e.html

are commercially available for use by certified radio engineers to simple look-up tables suitable for amateur radio operators seeking to predict the fields from a typical amateur antenna installation.[202] Industry Canada publishes a look-up table for predicting the various RF exposure contours for compliance with *Safety Code 6* limits for AM broadcasting undertakings and for 'low power' FM and TV stations.[203]

Many of the formal written submissions filed by broadcasters and wireless carriers for this national policy review addressed *SC 6* and the means available to them to assess their antenna proposals for compliance with it. The Canadian Association of Broadcasters (CAB) informed that the methods used to predict RF fields were well known to broadcasters because they were developed by joint government/industry committees with representation from equipment manufacturers and radiofrequency engineering consultants.[204] The CBC explained that:

> ... applications for new or modified broadcasting certificates must include a technical analysis [done by or on behalf of the broadcaster] demonstrating that operation of the proposed facilities will not produce electromagnetic fields higher than the *Safety Code 6* limits at any location where public access is possible.[205]

Within its submission, the Radio Advisory Board of Canada (RABC) confirmed that there are various means available to its members to predict RF fields to ensure compliance with *SC 6*.[206] The Canadian Wireless Telecommunications Association (CWTA) informed that all of the major wireless carriers have their own computer software for *SC 6* compliance.[207]

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[202] The vast majority of amateur radio stations produce radiofrequency fields that are well within those specified under *Safety Code 6*. Problems may arise if it is possible for humans to get very close to the antenna, such as when it is mounted on the balcony of an apartment complex. Also, some amateurs actively experiment with the technical features of their stations (antenna types and heights, multiple frequencies and ERP (power)) such that compliance to *SC 6* may require technical or operational adjustments.

[203] These tables are published in Appendix 2 to the *Broadcasting Procedure Rules, Part 1*: General Rules (BPR Part 1), Issue 3, July 2004 at pp. 27-28.

[204] Canadian Broadcasting Corporation Formal Written Submission dated 23 October 2003 at p. 5.

[205] Canadian Association of Broadcasters Formal Written Submission dated 17 October 2003 at p. 7.

[206] RABC Formal Written Submission dated 17 October 2003 at pp. 8-10.

[207] In 1997, the CWTA, some its members, and representatives from Industry Canada worked on the development of a computer program called *RaPD Calc* that predicts RF fields for compliance with *Safety Code 6.* While *RaPD Calc* is not longer widely used, the carriers are now employing the techniques and models developed for this software. See: CWTA Formal Written Submission dated 9 October 2003 at p. 10.

Representatives from the amateur radio community offered the opinion that the fields generated by amateur antenna installations are unlikely to encounter compliance problems in relation to *Safety Code 6*.[208] They confirmed that numerous means are available to amateurs for reliable RF field prediction through the use of mathematical tables and models that are similar to those available to commercial radio users.[209] If theoretical signal-level calculations are close to permitted levels, actual measurements are usually taken by the amateur to ensure compliance once the facility is operational.[210] Any disputes about RF predictions are resolved by Industry Canada.[211]

d. Means Available to Land-Use Authorities and Citizens

Generally speaking, in circumstances when concerned citizens in Canada have objected to proposed antenna installations on the grounds that the radiofrequency fields generated may be hazardous to the health of the people living in the vicinity, they have tended to challenge the adequacy of *Safety Code 6* itself as opposed to the evaluations done to ensure compliance with it.[212] Nevertheless, there are citizens and land-use authority staff who would like to be able to confirm the reliability of the *SC 6* compliance data being provided by the antenna proponent to Industry Canada.

The very first challenge to those who may wish to confirm that a proposed antenna installation will generate RF fields that are in compliance with *Safety Code 6*, would be getting access to the compliance data which the proponent supplied to Industry Canada. CPC-2-0-03 does not require that Type 1 or Type 2 antenna proponents make this data available to land-use authorities or to the public. It is interesting to note that within a few of the formal submissions to this policy review provided by radio users, the view was expressed that such data should not be made generally available because citizens and land-use authorities would not have the knowledge or the resources to perform or confirm *SC 6* evaluations.[213] Station data, including PCS/Cellular

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[208] Lloyd W. Hoffman Formal Written Submission dated 3 July 2003.

[209] Ralph Cameron Formal Written Submission dated 23 September 2003.

[210] *Ibid.*

[211] Radio Advisory Board of Canada Formal Written Submission dated 17 October 2003 at pp. 8-10.

[212] Recommendations made in response to Policy Question 2 (What information would most benefit concerned members of the public...?) were intended to improve the public's perceptions about the timeliness and adequacy of the contents of *Safety Code 6.*

[213] Canadian Wireless Telecommunications Association Formal Written Submission dated 9 October 2003 at pp. 10-11; Telus Communications Inc. Formal Written Submission dated 10 October 2003 at pp. 5-6.

stations, has been made available to the general public through Industry Canada's Assignment and Licensing System (ALS) database and Spectrum Direct Web site.[214]

If citizens or land-use authorities wanted to perform their own *SC 6* evaluation of an antenna proposal they would require access to the technical parameters of the radio installation or modification under consideration and, likely, technical information about other existing or planned radio facilities in the area or at the same site. While some of the existing antenna siting protocols negotiated between Canada's wireless carriers and certain land-use authorities require the proponent to provide the basic technical parameters of the antenna under consideration, no protocol appears to provide access to the parameters of other radio installations in the immediate vicinity. Without such data, a *SC 6* analysis would be incomplete.

Should a proposed antenna installation involve only a single antenna operating in one frequency band it may be possible for a concerned citizen or land-use authority representative to perform a rudimentary *SC 6* evaluation if the basic technical parameters were made available. Likely, the best approach for the public would be to read over *Safety Code 6* and to try to understand how to estimate the limits. In Appendix III of *Safety Code 6* there is a sample calculation that can used as a model. Depending upon the radio facility under consideration, this type of calculation can become complex, but it will give a useful estimate of the radiofrequency fields within the areas where people may have access. While *Safety Code 6* does try to provide guidance for the public to estimate limits, it can still be confusing. Industry Canada's document, Guidelines for the Measurement of Radiofrequency Fields at Frequencies from 3 kHz to 300 GHz (August 2000) is good supplementary reading for *Safety Code 6.*

As an alternative to using the methodologies provided within the Appendix III to *SC 6*, it should be noted that a member of the Amateur Radio Relay League (ARRL), who is located in Texas, maintains an Internet site[215] that will calculate the power densities of proposed antenna facilities. While compliance is based on the FCC's regulations, they are similar to Canada's and can be used to obtain good estimates.

Once an antenna installation is established and operating, land-use authorities, community groups or citizens who are concerned about compliance to *Safety Code 6* can perform actual field measurements from public areas around the facility. Inexpensive devices can be used, along with the formulas discussed above, to provide approximate compliance data. Companies such as Narda

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[214] Spectrum Direct, Industry Canada online: <http://spectrumdirect.ic.gc.ca>.

[215] The calculator can be found at <http://n5xu.ae.utexas.edu/rfsafety/>.

Safety Solutions,[216] Orgone Biophysical Research Laboratory Inc,[217] ETS Lindgrenthat[218] sell RF field testing equipment. Use of such devices must be in accordance with *Safety Code 6.*[219]

During consultations held with departmental staff at Health Canada,[220] it was learned that members of the Consumer and Clinical Radiation Protection Branch had created an RF field mapping system for cellular base stations.[221] The equipment can be mounted on the roof of an automobile and operated with minimal technical expertise. The automobile is driven in various patterns in proximity to the subject antenna site and RF field readings are recorded by location on the ground. The various locations of the device are determined using a geo-positioning unit (GPS) that is built in. Once the readings have been taken, a graphic print out of the contours of the RF fields in the vicinity is provided and can be used to determine compliance with *Safety Code 6*. At the time of the consultation, officials at Health Canada had not decided as to the terms and conditions applicable to making this monitoring device available outside of the department.

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216 <http://www.narda-sts.com/>.

217 <http://www.orgonelab.org/cgi-bin/shop.pl/SID=1086289660.21055/page=ycellphonemeter.htm>.

218 <http://www.ets-lindgren.com/>.

219 See *Safety Code 6* at Page 52.

220 An in-person consultation was held with staff of the Consumer and Clinical Radiation Protection Branch of Health Canada on 19 December 2003 in Ottawa.

221 Information about this RF field mapping device was presented at the International Union of Radio Science (URSI), North American Radio Science Meeting, held June 22-27, 2003 in Columbus, Ohio. The title of the article is “Report on: Measurement of Cellular Base-Station Emissions Using a Newly Developed RF Field Mapping System.” The article is available on the Health Canada Web site at the URL: <http://www.hc-sc.gc.ca/hecs-sesc/ccrpb/electro.htm>

Question 4. Can protocols be arranged between local land-use authorities and antenna proponents regarding the planning and siting of antenna structures, visual guidelines and dispute resolution mechanisms?

Clearly, the answer to Policy Question 4 is "Yes." For some time now in Canada individual land-use authorities and antenna proponents have been negotiating agreements that contain antenna-siting protocols. As will be explained below, many of these negotiated protocols address the planning and siting of antenna structures and they contain visual (impact) guidelines. While no existing protocols contain dispute resolution mechanisms, these can be included in the future, if appropriate. Within this section of the report, Canada's history with negotiated protocols will be examined. As well, the implications of the three issue areas noted above - the planning and siting of antenna structures, visual guidelines and dispute resolution mechanisms - will be discussed, and policy recommendations will be offered.

a. Canada's History with Negotiated Protocols

Almost all of our experiences to date with antenna protocols have related to agreements that have been negotiated over the previous eight year period between certain local land-use authorities and the major wireless carriers (the cellular and PCS providers).[222] These agreements have contained procedural and policy details regarding how antenna-siting issues will be handled within the particular local jurisdiction, and they have evolved over the previous eight years. While no two protocol agreements have been identical, typically they have provided a process for public hearings and permitted the local administration to influence certain antenna siting issues regarding the placement and visual impact of individual cellular and PCS antenna installations. Once negotiated, these protocols are endorsed by the local government council and then implemented as a signed agreement between the local government and the carrier(s) involved. Once a protocol has been established within one municipality, the other wireless carriers have tended to sign on to it.

Likely, Canada's first local protocol was a rooftop siting policy adopted in 1990 by the City Council of North York (within Metro Toronto).[223] In recognition of the fact that the City had no legal (constitutional) authority to create local by-laws that could impact directly upon antenna

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[222] As will be discussed subsequently within this section, at least one protocol exists that does not involve cellular and PCS antennas. In 1998, representatives from the amateur radio community and the City of Calgary negotiated a protocol for the siting of amateur antennas and supporting structures within residential areas of the city.

[223] This information about North York was provided within the Formal Written Submission from the Bell Wireless Alliance, 12 March 2004 at p. 14.

siting and placement, it adopted a guidance document as an alternative. With the support of the radio industry and the district office of the (then) Department of Communications, the city council was able to rely upon this protocol to influence certain rooftop siting decisions.

With the roll-out of digital cellular services in 1996, some of the urban municipalities where PCS antennas were first deployed began looking for a means to clarify and expand upon their role, and the role of concerned citizens, within Industry Canada's CPC-2-0-03. These municipalities focused upon the new towers which PCS systems required.[224] The municipalities of Edmonton,[225] Calgary, Oakville and Surrey were some of the first to negotiate public participation features within their protocols.[226] These protocols addressed issues such as when and how public participation (consultation) would be conducted, and how the results of the public consultation would be used in the decision-making process. Usually, the trigger for a public hearing was tied to the proximity of the location of the proposed tower to residential developments. A discretion to waive a public hearing was accorded to the local land-use authority if the visual impact of the proposed tower could be minimized to a satisfactory extent.[227] Generally, these protocols can be regarded as the first generation of such agreements, and they were used as models by a number of other municipalities.

The protocol negotiated in 1998 between the City of Calgary and the wireless carriers that were then operating in Alberta was the most comprehensive of its time. This protocol, written as statements of siting principles, included provisions that required the carriers to "take all

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[224] PCS, the second generation of cellular system, was implemented first within major urban centres in Canada as an overlay to the existing analogue cellular infrastructure. Due the anticipated capacities of these digital PCS systems and because they operated at higher frequencies than analogue cellular networks, smaller cell sites and, in consequence, comparatively more antenna sites were required for each urban centre served.

[225] In frustration over its role within the tower approval process, the City of Edmonton passed a bylaw in 1997 that attempted to institute a moratorium on the siting of antenna towers within its jurisdiction. Throughout June of 1997, representatives from Rogers (then Cantel), Telus, Microcell, Clearnet (later purchased by Telus) and Industry Canada worked with the City to find a satisfactory solution. The public consultation protocol which the City and the carriers negotiated and signed was one of Canada's first protocols to plan a role for public participation within the local land-use consultation process. The City of Edmonton repealed the moratorium and approved the new consultation protocol at a council meeting held on July 15, 1997.

[226] Telus Mobility claims to have pioneered the negotiation of protocols with municipal governments, starting in 1996.

[227] The avoidance of a public hearing has been a strong inducement for antenna tower proponents to work with the local land-use authorities in an attempt to site and screen antenna towers in such a manner as to minimize their visual impact. Local land-use authorities have inserted waiver provisions because they have realized that they were being permitted to exert direct influence upon tower placement and structural issues (e.g. type of supporting tower). Neither CPC-2-0-03 nor the Canadian constitution have clearly accorded influence over such matters.

reasonable measures" to optimize the use of tower co-location (where such improved the visual impact on the community affected) and to "maximize the use of installations other than towers in all residential communities as much as possible."[228] It also contained a number of visual impact guidelines.

In the fall of 1998, representatives from the Federation of Canadian Municipalities (FCM), the Canadian Wireless Telecommunications Association (CWTA), the major wireless carriers and a few Canadian municipalities attempted to negotiate a general protocol for national application. After a series of meetings these efforts broke down. Perhaps it was premature to attempt to create a national protocol at that time.

At the time of writing this report, antenna protocols for cellular and PCS installations are being used principally in Ontario, Alberta and British Columbia. Most of the larger municipalities are now in their second generation of protocol. In Ontario, where the up-take has been the greatest, it has been estimated that ten percent of the local land-use authorities have adopted an antenna protocol for cellular and PCS antennas.[229]

In an effort to assist its' members who wished to establish their own antenna-siting protocols, in March 2002 the Federation of Canadian Municipalities (FCM) began mounting representative samples of existing protocols on its Web site.[230] As part of this antenna policy review, analysis was performed on the content of those, and a few other, sample protocols. Using a computer spreadsheet program, eight tables were created in order to compare and contrast the contents of 19 antenna siting protocols.[231] The municipalities represented within the tables are Airdrie, AB; Bighorn, AB; Caledon, ON; Chatham/Kent, ON; Colwood, BC; Delta, BC; Edmonton, AB, Guelph, ON; Langley, BC; London, ON; Markham, ON; North Saanich, BC;

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[228] The Calgary protocol, called "Statement of Principles Agreed to by the Carriers: Commitments to Calgary's Residential Communities," was signed by (then) Cantel, Telus, Microcell and (former) Clearnet in the late 1990s. Bell signed the protocol in 2003, a few years after it began offering PCS services in the Prairies. Both quotations can be found on the first page of the protocol.

[229] This percentage for Ontario was offered by the Bell Wireless Alliance within its Formal Written Submission of 12 March 2004 at p. 14.

[230] The FCM has maintained these postings and the samples can be found online at <http://www.fcm.ca/newfcm/Java/index.htm>.

[231] Most of the sample protocols used to create the spreadsheet were obtained from the FCM Web site. About ten local governments forwarded final or draft copies of their respective protocols as part of their submission to the National Antenna Tower Policy Review. A few of those protocols were used for the tables.

North Vancouver, BC; Oakville, ON (two protocols); Port Moody, BC; Strathcona, AB; Sudbury, ON; Surrey, BC. These eight tables can be found at Appendix E of this report.

A review of the various elements contained within the 19 antenna protocols will reveal both significant degrees of commonality and variance between them. Viewed generally and over time, one must conclude that the various elements addressed within the most recent protocols have become more comprehensive in their scope. Due to the comprehensiveness of the issues addressed, most of the more recent protocols could be regarded as second generation in their development.

While Industry Canada's CPC-2-0-03 does not currently require that community groups or members of the public be directly consulted on antenna siting issues, most of the protocols examined make provisions for public hearings. Usually the onus is put on the wireless carrier to co-ordinate and conduct these hearings. The carriers must provide notice of the date, time and location of public meetings, and the name and telephone number of a representative from the wireless carrier. The protocols differ somewhat on how the public is to be notified of the particulars of the hearing. Some require door-to-door, hand delivery of notices within a specified distance from the base for the proposed tower,[232] others call for the publication of notices within a local newspaper. Most of the protocols contain a listing of land-use staff members, federal and municipal politicians, and community groups, all of whom must be contacted in advance of the hearing. A few protocols require signs to be posted upon the parcel of land where the tower is to be erected.[233]

Eleven out of the nineteen protocols specifically list the information that is to be given to the public about a proposed tower installation. All of these protocols describe as essential information the (proposed) location of the tower, its height and its structural details (e.g. monopole, lattice style, self-supporting or guy wire supported). Several protocols also require the name and telephone number of a representative from the local land-use authority, and the inclusion of visual aids, such as photos, drawings and maps showing the proposed location of the tower and the distance from residential property and amenities. A few protocols require the circulation of a true-to-scale image of the proposed tower that is superimposed upon a drawing or photo of the area where the tower to be erected. Such images are intended to give the public a

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[232] The protocols for North Saanich, Caledon and Strathcona require the carrier to provide proof that a notice was actually served upon members of the public.

[233] The municipalities of Caledon and Markham require the posting of signs upon the parcel of land.

better appreciation of the visual and other impacts that the proposed installation may have upon the immediate and surrounding areas.

A majority of the protocols that call for public meetings require the wireless carriers to take minutes (detailed meeting notes) at the meeting and to file those notes with the local land-use authority. Typically, the minutes must highlight any public objections that were received and comment upon the adjustments made to the tower proposal in light of the objections, or explain why an accommodation was not feasible or appropriate.

Only one protocol addresses the antenna installations of a radio service other than those related to cellular and PCS networks. In 1998, the City of Calgary negotiated a protocol for amateur antenna siting with representatives from of the amateur radio community.[234] This agreement contains a number of policy guidelines applicable to the siting and visual impact of amateur towers that may be located within residential areas, and it provides for a public hearing if the proposed tower will exceed the threshold height of 18 meters (as measured from grade). At present, neither the City of Calgary nor the amateur radio community are fully satisfied with this protocol. Representatives from the City of Calgary would like to renegotiate the protocol because they have concluded that the guidelines were drafted in too casual a style and that it is too easy to avoid the local objectives sought to be achieved by the agreement.[235] The national amateur association, the Radio Amateurs of Canada (RAC), commented upon this protocol in their submission to the National Antenna Tower Policy Review.[236] While they agreed with most of the principles contained within the protocol, the RAC disagreed with the tower height threshold for construction without consultation of 18 metres from grade. The RAC insisted that the height of "typical structures" for amateur antennas should be regarded as being 21 metres high in urban areas and 31 metres in rural areas.[237] They would like to see the Calgary protocol changed to

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234 City of Calgary, *Planning and Building Department Report to the SPC on Operations and Environment: Policy Guidelines for the Development of Amateur Radio Antenna Structures in Residential Areas* (OE98-61: Attachment 1) dated 9 September 1998. Industry Canada participated in those discussions.

235 For example, representatives from the City of Calgary explained they have come to realize that an amateur's antenna installation is often a work-in-progress. Thus, an installation that was exempted (under the protocol) when installed can be subject to additions to its height and in the number of antennas arrays such that it becomes more intrusive over time. The radio station owners often claim that each change, in of itself, should be regarded as insignificant under Industry Canada's policies for the modification of Type 2 antenna installations. If regarded as an insignificant modification, each change would be exempt from local consultation requirements.

236 Radio Amateurs of Canada Formal Submission dated 10 October 2003.

237 *Ibid*. at p. 9. When first drafted, the "Calgary Guidelines" set the threshold height at 13 metres (42.64 feet) but this was increased to 18 metres at the strong urging of the amateur community.

permit ham operators to build up to (at least) 21 metres without a formal review of the application or triggering a requirement for a public hearing on the proposal.[238]

b. Implications of Local Protocols for the Planning and Siting of Antenna Structures, Visual (Impact) Guidelines and Dispute Resolution Mechanisms

i. Planning and siting of antenna structures

At their essence, the very purpose of almost all of the 19 protocols examined is the planning and siting of antenna structures. These protocols list locations where antenna towers are discouraged, such as historic, heritage and school areas, and locations that are encouraged, such as within or adjacent to industrial parks. Almost all of the protocols that make provision for public hearings/meetings offer guidance on how the hearings may be screened out or waived (in the discretion of a land-use staff member). Often a public hearing can be screened out if the proponent will agree to certain siting accommodations such as co-locating with existing antenna towers, siting near other urban infrastructure or locating the proposed antenna upon a tall rooftop.

Obviously, the best planning for the siting of antenna structures will be achieved in those situations where an antenna proponent reveals its current and anticipated network coverage requirements to a local land-use authority and requests that the authority work with the proponent in planning the siting of its network infrastructure. During consultations for this policy review, municipal planners and local politicians expressed a strong desire to engage in planning exercises intended to ensure that local and radiocommunication objectives could be more fully achieved.

Interestingly, at its 2004 Annual Meeting held recently in Edmonton, the Federation of Canadian Municipalities (FCM) endorsed the following policy recommendation regarding the creation of a national protocol for the planning and siting of radio antenna towers.

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[238] The justifications for the increase in antenna height (threshold) relate to the exploitable characteristics of the radiofrequency spectrum and the frequencies assigned to radio amateurs. These matters were explained in many of the amateur radio submissions received. See, for example, the RAC submission at pp. 5, 9 and A-3, the Formal Written Submission of Timothy S. Ellam dated 16 October 2003 at p.2-3, the Formal Written Submission of Ralph Cameron dated 23 September 2003 at p. 3, the Formal Written Submission of the Radio Amateur du Québec Inc. dated 1 October 2003 at pp. 3-4, and the Formal Written Submission of Lloyd W. Hofmann dated July 3, 2003 at p. 2. An in-person meeting was held with representatives of the RAC on 18 December 2003 in Ottawa.

> Industry Canada must develop a protocol to ensure that telecommunications companies work with individual municipalities in the development of site plan arrangements for the locating and construction of antenna towers.[239]

Generally, the type of collaborative site planning being recommended by the FCM does not occur in Canada within the wireless sector. In most cases network coverage requirements are determined and the proposed cell sites are planned by individual carriers before local land-use authorities are approached for siting approvals. Typically, the radio engineering team for each carrier will plan the location of the individual cell site; the property acquisition team will examine the relevant local land-use regulations to see if zoning or other restrictions might complicate siting decisions; and then the property acquisition team will secure options for long term leasing agreements with landlords who own suitable buildings and/or land that is located as close as possible to the cell site set out on the engineering diagrams and maps. The wireless carriers regard their network infrastructure plans as very competitive information that may be revealed outside of the company only on a need-to-know basis. This corporate culture is a natural product of the competitive regulatory model that has been created for cellular services in Canada. Almost every aspect of the business, including the planning of the cell sites, has strong competitive elements. Given the pervasiveness and force of this corporate culture it is difficult to see how a negotiated protocol alone could stimulate an increase in the planning and siting of antenna structures with local land-use authority involvement.

It should be noted that CPC-2-0-03 contains two separate provisions that may be interpreted as requirements that Type 1 antenna proponents reveal their antenna siting plans to land-use authorities. The CPC states that both broadcasting and non-broadcasting Type 1 proponents must "disclose their plans to land-use authorities."[240] The document goes on to advise that: "Early contact ensures an opportunity for full consultation." It is submitted that these policy requirements are not stated with the clarity, detail and force necessary to induce the wireless carriers to reveal details of their network plans to land-use authorities with sufficient lead time for cell sites to be planned in a co-operative manner.

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[239] FCM Position Statement Regarding Telecommunications Towers and Antennas, Federation of Canadian Municipalities 2004 Annual Meeting, May 30, 2004, Edmonton Alberta.

[240] CPC-2-0-03, Issue 3, 24 June 1995 at p. 5

As an alternative policy approach Industry Canada should examine the contents of the United Kingdom's *Planning Policy Guidance on Telecommunications*,[241] which contains clearer and more forceful policy statements such as the "Government strongly encourages telecommunications operators and local planning authorities to carry out annual discussions about rollout plans for each authority's area,"[242] "Pre-application discussions should be carried out between operators and local planning authorities on a specific development proposal and should be set within the context of the operators strategy for telecommunications development for the area"[243] and "[local and regional] Development plan policies should take account of ... the results of early consultation between planning authorities and telecommunications operators to enable the requirements of the telecommunications networks and routing and phasing of the network development to be taken into account..."[244]

Of all of the Canadian protocols examined for this policy review, the protocol negotiated with all of the major wireless carriers by the City of Calgary should be highlighted as the protocol with the greatest potential to stimulate an increase in the planning and siting of antenna structures with land-use authority involvement. Included within the 13 principles that the companies have committed to when siting within residential areas is the requirement that,

> Companies will cooperate with one another to provide a comprehensive overview to residents of all current and known potential equipment sites in their neighbourhood during each consultation process.[245]

Also, prior to filing an application to the City of Calgary for a particular site approval, each carrier must engage in a "preconsultation" process during which potential cell site locations and other particulars are to be discussed at meetings with the relevant Alderman, local community organizations, and representatives from the city's Planning and Building Department. Both of these initiatives are intended to permit citizens, community groups, politicians and city staff to

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241 UK, *Planning Policy Guidance 8 (PPG 8): Telecommunications*, effective date 22 August 2001. Available online at the URL: <http://www.odpm.gov.uk/stellent/groups/odpm_planning/documents/page/odpm_plan_606918.hcsp>

242 *Ibid*. Planning Policy number 8

243 *Ibid.* Planning Policy number 9

244 *Ibid.* Appendix Supporting Guidance Statement number 37. Within its Appendix, the document warns planning authorities that they must keep in confidence the details of the network plans revealed to them by the telecommunications operators.

245 The Calgary Protocol: "*Statement of Principles Agreed to by the Carriers*" at p. 2.

influence the selection of the site itself and the siting particulars before the filing of the type of siting application that is anticipated within the terms of Industry Canada's Client Procedure Circular, CPC-2-0-03. In a working draft of a potential replacement for the current Calgary protocol, the City has expressed an intention to build upon its "pre-application" stages. For example, in the current discussion version of the draft protocol,[246] the wireless carriers are required to give notice to the local Alderman and to City staff of their plans to physically investigate an area for potential antenna sites before they commence their initial searches for appropriate sites. Additionally, under this draft, all required local and public consultations must be completed, and critical comments considered (over a two week period), prior to the actual submission of the application for local concurrence.

ii. Visual (impact) guidelines

An examination of contents of the protocols negotiated between local land-use authorities and major wireless carriers reveals that most of them contain some sort of visual impact guidelines. Seventeen out of the nineteen protocols examined require mitigation of the visual aspects of towers. They attempt to improve the visual impact through painting, decorative fencing, screening, landscaping and set-back requirements. Several of these protocols require that the carrier preserve the natural vegetation of the area. Some of the guidelines attempt to place limits upon the height, painting, lighting and the attachment of signs or advertising that may make the installation more obtrusive. Of course, these local administrations are aware that they may not require that the height of a proposed installation be reduced and they may not request accommodations to the painting and lighting of towers (or other supporting structures) that may interfere with the aeronautical obstruction painting and lighting requirements set by Transport Canada. A significant number of protocols specify that towers shall only accommodate telecommunications facilities: signs or materials not directly related to the equipment and towers are not permitted. It is a common feature for these protocols to require that the antenna tower be removed and the site restored to its previous state should the installation no longer be needed by the carrier.[247]

The Calgary protocol contains a number of siting principles that amount to visual impact guidelines. The protocol states that the Wireless Telecommunication Industry jointly commits to

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[246] Discussion Draft, City of Calgary, Telecommunications Antenna Structures Planning Criteria, Revision 7, dated 2 December 2003.

[247] The wireless carriers readily agree to this requirement because most of their cell site are utilize space on land or buildings which they lease. Invariably, these lease agreements contain covenants that require non-operational equipment to be removed and the site restored.

take all reasonable measures to minimize the impact of sites on Calgary communities and that, in particular, the carriers commit to following four principles related to visual impact:

...

1. We will be innovative and responsive in considering ways to minimize the impact of installations on the aesthetics of all communities.
2. Companies will work cooperatively in taking all reasonable measures to optimize the use of co-location in communities, when doing so would decrease the impact of that site on the community.
3. We will maximize the use of installations other than towers in all residential communities as much as possible.
4. We will consider all options in design and technology to minimize tower height and impacts, and implement these options whenever feasible.[248]

The City of Guelph, Ontario has taken a more detailed approach within its protocol on matters affecting visual impact. The Guelph General Development Guidelines state:

When considering new telecommunication towers, carriers shall give consideration to the following matters:

1. New towers shall be considered only when other options have been considered and such options are deemed to be impractical or undesirable.
2. The City will encourage the design and location of telecommunication towers to be as inconspicuous as possible upon the surrounding landscape. In particular:
   (a) Views to significant local buildings, natural heritage features including the Speed and Eramosa Rivers, city parks and the downtown should be protected from the development of new towers;
   (b) Towers and base stations should be located as far away from a public roadway as possible and away from adjoining property lines;
   (c) Carriers are encouraged to propose tower locations and heights so that Transport Canada requirements will not necessitate the painting or lighting of towers. Where possible, towers and equipment shelters should be of a colour that is neutral or that blends in with the surroundings;
   (d) The natural vegetation of a site shall be protected where possible;
   (e) Towers over 30 metres in height should be minimized to the greatest degree possible;
   (f) Stealth towers or monopole designs should be considered where possible to minimize visual impacts upon the surrounding area;
   (g) Towers should be located a distance of at least 240 metres or six times the height of the tower from residential uses.

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[248] The Calgary Protocol: "*Statement of Principles Agreed to by the Carriers*" at p. 1.

3. Carriers are encouraged to consider locations within the City's industrial and rural areas.[249]

iii. Dispute resolution mechanisms

Presumably, the third element within Policy Question 4 on Protocols is asking for policy recommendations on how a significant disagreement between an antenna proponent and land-use authority might be resolved using a negotiated dispute resolution mechanism. Disagreements could result from a resistance to siting accommodations requested by either land-use authorities or carriers, or to a complete breakdown of negotiations between both parties and the land-use authority indicating its non-concurrence to the antenna proponent (impasse).

As the antenna approval process is currently structured within CPC-2-0-03, the proponent and the land-use authority are expected to "consider each other's requirements and work toward solutions that minimize the impact [of the antenna and supporting structures] on the surroundings...."[250] and "work toward a mutually acceptable agreement."[251] For Type 1 installations, the CPC states that: "Industry Canada does not play a direct role in the consultation."[252] Instead, Industry Canada limits its role to ensuring that the consultation takes place in a timely fashion and the department will provide some information and advice to the land-use authority. Should the proponent and the land-use authority reach an impasse in their negotiations, Industry Canada will entertain a petition by the proponent to issue the antenna authorization after reviewing all of the information submitted by the proponent. No provision is made within the CPC for the land-use authority to play a direct role in the petition process for Type 1 installations. Thus, for Type 1 installations, Industry Canada will enter the disagreement only at the point of impasse and, at that point, the matter may be determined without the direct participation of the land-use authority.[253] If, during negotiations, the parties have a significant

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249 The General Development Guidelines from Guelph are available online at the FCM Web site at the URL: <http://www.fcm.ca/newfcm/Java/guelphguidelines.htm>

250 CPC-2-0-03 at p. 4.

251 *Ibid.*, CPC at p. 5.

252 *Ibid.*

253 It should be noted that the Board of Directors of the Federation of Canadian Municipalities (FCM) recently adopted a telecommunications policy principle that states that unilateral decisions by Industry Canada to resolve antenna impasse situations are "unacceptable and in certain circumstances could be unconstitutional." See: Telecommunications Towers and Antennas, Principles adopted by the National Board of Directors in March of 2003.

disagreement regarding an accommodation, the contents of policy CPC-2-0-03 suggest that Industry Canada will remain detached from the dispute.[254]

For Type 2 installations no particular process is specified for the negotiations between the parties or for the determination of the proponent's right to proceed with the installation should an impasse be reached or other significant disagreement occur. Since no particular authorization to proceed is required for Type 2 installations, at the point of impasse both the proponent and the land-use authority are left with no dispute resolution mechanism. The department's expectation is stated in these simple terms, "Industry Canada expects Type 2 radio station owners to address the concerns of the community in a responsible manner, and to consider seriously all requests put forward by the land-use authority."[255] As matters stand, should the proponent proceed with the installation and Industry Canada determine subsequently that the installation of an antenna structure is not appropriate within its surrounding "...it may request submissions [from the Type 2 operator] explaining why the structure should not be altered or removed."[256]

> **Recommendation 25: That in all cases where consultations between antenna proponents and land-use authorities are required, a structured dispute resolution mechanism should be made available to the parties.**

Such a mechanism should be provided within CPC-2-0-03 but offer the option for an alternative dispute resolution mechanism that may be negotiated between the parties.

The text of Policy Question 4 asks about the suitability of dispute resolution mechanisms that may be contained within an antenna siting protocol that has been negotiated between antenna proponents and land-use authorities. One clear limitation to negotiated protocols is that they bind only the signatories to them. Therefore, a negotiated dispute resolution mechanism will offer a useful policy option for some categories of radio service, but not others. For instance, while a small number of radiocommunication companies could undertake to bind the major broadcasting companies and wireless carriers in Canada, individual protocols would not be a policy option for Canada's 52,000 radio amateurs. Even the national amateur radio association, the Radio

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[254] It should be noted that within his report about the FM broadcast antenna towers on Triangle Mountain, Dr. Rod Dobell criticized Industry Canada for its passive role within the current antenna authorization process. See: Report on the Triangle Mountain Antenna Towers Review, Dr. A. R. Dobell, University of Victoria, December 31, 2002 at pp. 7 and 8. Many of the formal written submissions filed on behalf of the radiocommunication industry called for a more active role by Industry Canada during the negotiation stages.

[255] CPC-2-0-03 at p. 9.

[256] *Ibid.*

Amateurs of Canada, could not sign local land-use authority protocols on behalf of its 6000 members.

Accepting that dispute resolution mechanisms can be negotiated between certain antenna proponents and land-use authorities, it would be useful to offer a model protocol. Unfortunately, none of the antenna protocols used within the wireless sector appear to contain a dispute resolution mechanism. While generic alternative dispute resolution (ADR) models are readily available, it is important to find examples of negotiated protocols that are used in comparable situations.

It is submitted that Canada's railway sector may offer some useful lessons for the telecommunication sector when it comes to responding to the challenges presented by the disruptive influences that railway operations can have upon local communities. Citizens and municipalities have for many years raised concerns about disruptive rail activities such as train whistles, the blockage of roads at railway crossings, vibrations, train noises at rail yards and the use of herbicides to impede the growth of vegetation near rail facilities. Often referred to as 'proximity issues,' local municipalities have not been able to use bylaws to regulate directly in relation to these concerns because railway operations and facilities are regulated federally. As is the case within the telecommunications sector, bylaws attempting to regulate directly rail operations and facilities would be constitutionally invalid.

Significantly, even the history of attempts to resolve rail proximity issues at the local level[257] is very similar to the history of attempts to resolve local antenna controversies. During the 1980s, in response to various residential complaints, individual train operating companies began negotiating guidelines or protocols with local land-use authorities. These protocols, which existed almost exclusively within the Province of Ontario, committed both the municipality and the rail operator to work together to minimize the disruption caused by the proximity to rail operations. The guidelines structured the behaviour of the railway company and the municipality. The company's disruptive behaviours were better managed through operational guidelines, and the municipality, in return, agreed to better manage residential development activities on lands located next to tracks and other rail facilities. Both the Canadian National Railway (CNR) and the Canadian Pacific Railway (CPR) negotiated dispute resolution mechanisms to accompany many of the guideline agreements they signed with municipalities. The contents, approaches and currency of the protocols and settlement mechanisms varied considerably. And, while the

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[257] Much of the history related to railway proximity issues is available on the Web site operated on behalf of the Canadian Railway Association. See the various sub-topics listed under the title, "Railway/Municipality Proximity Issue Information Base" located at the URL: <http://www.proximityissues.ca/english/index.cfm>.

protocols offered some solutions for the municipalities and rail companies that negotiated and signed them, the vast majority of the rail routes in Canada, which brought trains into residential areas, were not covered by such agreements. A more comprehensive approach to proximity issues was needed.[258]

In order to produce more consistent, comprehensive and broadly accepted guidelines, in April of 2003 the Railway Association of Canada (RAC) and the Federation of Canadian Municipalities (FCM) signed a memorandum of understanding (MOU) that provides a framework for both of these national associations, and their respective members, to work cooperatively to understand better and to resolve both current and emerging proximity issues.[259] The MOU structures the creation of a "steering committee," with an equal number of representatives from each side, which is to develop and implement various guideline and abatement strategies. It also calls for the RAC and the FCM to create a dispute resolution mechanism to resolve protracted disputes at the local level. Presently the parties are finalizing the text of a general dispute resolution protocol and it is expected to be implemented this fall.[260] The text relies heavily upon the dispute resolution protocols previously negotiated by the CNR and CPR. It is submitted that the contents of this protocol will offer a good starting point for those who attempt to create a dispute resolution protocol for implementation by wireless carrier and local land-use authorities in Canada.

Recommendations Regarding Protocols

The answer to Policy Question 4 is clear. Yes, protocols can be arranged between local land-use authorities and some antenna proponents regarding the planning and siting of antenna structures, visual guidelines and dispute resolution mechanisms. Based upon the many verbal and written submissions made on this subject to the National Antenna Tower Policy Review, and on other research done for the review, this study can conclude that the protocols negotiated and implemented by the major wireless carriers and land-use authorities in Canada have, for the most part, been a very positive development.

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[258] It is rumoured that Transport Canada informed our rail companies that a national response to proximity issues was needed and that federal government was prepared to legislate national proximity abatement rules if alternative approaches could not be found.

[259] "Memorandum of Understanding" between The Federation of Canadian Municipalities and The Railway Association of Canada, signed into force in April of 2003.

[260] Information regarding the status of the dispute resolution protocol from e-mail communication from Michael Lowenger, RAC Vice President (Operations and Regulatory Affairs), dated 9 July 2004.

First, and perhaps most importantly, these protocols have supplemented and brought clarity to many aspects of the contents of Industry Canada's CPC-2-0-03. Most of these protocols have brought the public into the CPC's local consultation process through their requirements for public hearings. They have permitted local land-use authorities to influence the type of antenna structure used and, in many cases, its location, height, mounting, lighting, painting, landscaping and screening in ways not described within CPC-2-0-03, and in ways that go beyond the constitutional authority of provincial (and hence municipal) governments. Administrative and procedural details left unspecified within CPC-2-0-03, such as the identification of principle contact parties, the stages and requirements for approvals, and time frames for individual consultative activities, have been provided.

Second, these protocols have caused many local land-use authorities to identify and communicate (to wireless carriers) their important local amenities and planning priorities that may be impacted by the siting of significant antenna installations. These developments have expedited the planning and approvals necessary for the roll out of their networks. Some of these protocols have caused land-use authorities to identify their wireless communication priorities and, on occasion, certain lands and rooftops have been (pre)authorized for antenna installations.

Third, these protocols have been created and their contents have evolved in direct response to local concerns. The contents have been negotiated rather than imposed and, consequently, they have enjoyed a high degree of acceptance and compliance.

It is clear that Canada's wireless carriers have become increasingly supportive of negotiated protocols over the past three to four years. As one part of this national policy review an effort was made to solicit industry views about these protocols.[261] The carriers are under tremendous pressure to roll out their facilities and services and they therefore appreciate protocols that bring certainty and speed to these negotiation and approval processes. They support protocols that offer accelerated approvals if the carrier satisfies a local siting objective such as locating on existing antenna structures, siting in designated areas, constructing on rooftops or using camouflage technologies to hide antennas. When protocols provide for public consultations, the carriers prefer protocols that permit the use of open house formats as an alternative to town hall

[261] The following recommendations from the wireless industry are contained in a letter from Dave Yarmouth, Associated Director Network Operations, Bell Mobility (28 May 2004). This letter was submitted to the National Antenna Tower Policy Review upon request. It includes several enclosures and copies of municipal protocols, along with comment on the protocols. Included are letters and memos regarding protocols from the Region of York, City of London and Town of Oakville, sent by Stephen D'Agostino of Thomson Rogers, solicitors for Bell Mobility, Rogers Wireless Inc. and Telus Mobility. Protocols and policies from the Town of Markham, the Municipality of Chatham-Kent, the City of London, and the Town of Oakville are also included.

styles of public meeting.[262] They expressed the view that town hall meetings can be ineffective and unnecessarily controversial. Finally, the carriers objected to clauses within protocols that stipulate that antenna supporting structures may only accommodate telecommunications facilities. Municipalities are inserting these stipulations to prevent extraneous materials and advertising signs from being mounted on antenna facilities. The wireless carriers expressed concern that such stipulations inhibited the use of camouflaging materials that may help the installation blend into its immediate surroundings.

Not all of the protocols have made a positive contribution to the challenges of siting antenna structures. Some protocols have contained elements that are too vague, contradictory or clearly unconstitutional. Some seek to impose siting accommodations on the wireless carriers that are unreasonably expensive in the circumstances of particular siting challenges. Many of these drafting problems were caused because there is little technical support available for those municipalities wanting to create a protocol. As the number of these protocols increase, and as existing protocols are re-negotiated, the efforts necessary to respond will consume enormous resources for the wireless carriers. Those local land-use authorities that do not dedicate the resources necessary to create a protocol may be left with the vagaries and other problems existing within CPC-2-0-03. There is also the problem that only the signatories to these protocols are bound by them. This will limit their use for many radio service categories.

There is the question of the inclusion of a dispute settlement mechanism within future protocols used within the wireless (cellular and PCS) sector. Based upon the consultations conducted for this national policy review, it is difficult to imagine the major wireless carriers supporting the use of a private dispute resolution mechanism that does not give Industry Canada the final decision as to whether the antenna installation will be erected or modified.

> **Recommendation 26: That the negotiation of antenna siting protocols between wireless carriers and local land-use authorities should be endorsed by Industry Canada because they supplement current radio regulatory policy in important ways.**

Most importantly, these protocols cause the local land-use authority and the wireless carrier to identify and respond to the special concerns and unique amenities of each area subject to the agreement and, in many cases, they have brought the public into the decision making process. In the future, Industry Canada should support these protocols by permitting the carrier to opt out of

[262] Bell, Rogers and Telus prefer to use public open houses to educate the public and solicit their views.

certain general federal siting policies if the parties have negotiated the contents of an alternative specific guidance document.

While this policy review has concluded that negotiated protocols should be supported because of the policy refinements they permit, it is also a conclusion of this report that basic antenna siting principles of national application are needed in Canada. Only a small number of Canada's local land-use authorities are subject to these protocols and many do not have the technical expertise or resources to negotiate them with each major wireless carrier and keep them updated. If basic national siting principles are put into place, those local land-use authorities with the inclination, knowledge and financial resources necessary should be permitted to negotiate with the major carriers to refine them.

Recommendation 27: That federal policies related to the siting of antennas and their supporting structures for wireless phones be supplemented with general antenna siting principles or an industry code of conduct to be negotiated by a committee with suitable representation from local land-use authorities, the wireless industry and Industry Canada.

Australia, New Zealand and the United Kingdom have created guiding principles for antenna siting that supplement local, state and federal regulations. Australia has an Industry Code and a Code of Practice, New Zealand has National Guidelines, and the UK has a Planning Policy Guidance and a Code of Best Practice.[263] In each country, the guidance documents have been created through consultation with various levels of government and industry members, to ensure a balance of views. A document of Canadian guiding principles for antenna siting should be created, which will, like its international counterparts, increase public understanding, provide government guidance and advice, standardize practices for consistency, provide awareness of responsibilities and immunities, and encourage communication at all stages between proponents, local authorities and citizens.

Various options are available for enforcement of such documents. In Australia, the Federal Court can place financial penalties on the antenna proponents if they do not comply with the Code,[264] and the Telecommunications Industry Ombudsman hears disputes about breaches of

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[263] For more information on international approaches to antenna siting see the comparative policy material discussed under Policy Question 1: How can the local consultation process...be improved?

[264] Australian Communications Authority, *Frequently Asked Questions of Radiocommunications Infrastructure Industry Code*, online: <http://www.aca.gov.au>.

industry codes of practice. The carrier must comply with the ombudsman's direction.[265] In New Zealand, the Environment Court helps to resolve disputes involving the application of the National Guidelines.

As an another example of voluntarily imposed antenna siting guidelines, in 2001 the United Kingdom mobile phone network operators published ten commitments to best siting practice for new development.[266] UK network operators have committed to:

1. improved consultations with communities;
2. detailed consultations with planners;
3. site sharing;
4. educational workshops for councils;
5. a database of base station sites;[267]
6. compliance with exposure levels guidance;
7. exposure guideline certification;
8. prompt responses to enquiries;
9. support for research into health and mobile phones; and
10. the standardization of the documentation for planning submissions.

There is also the interesting question as to suitability of similar protocols for the planning and siting, visual impacts, and dispute resolution challenges experienced by other radio services in Canada, such as amateur radio and radio and television broadcasting.

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[265] *Telecommunications Code of Practice 1997* (Cth.) online: SCALEplus: Australian Attorney General's Department < http://scaleplus.law.gov.au/html/instruments/0/30/0/2003102801.htm at s. 2.37.

[266] Letter from Deloitte & Touche to Mike Dolan, Director of the Mobile Operators Association (9 July 2003), *Implementation Review of the Ten Commitments to Best Siting Practice for the UK Mobile Phone Industry* online: Mobile Operators Association. <http://www.mobilemastinfo.com/planning/Implementation_Review_of_the_Ten_Commitments.pdf> at p. 10.

[267] U.K., Office of Communication - Sitefinder online: <http://www.sitefinder.radio.gov.uk/>.

Question 5. How and to what extent can tower sharing be utilized in order to reduce the total number of towers?

While Policy Question 5 addresses issues related to the sharing of antenna towers, the reply will discuss and make recommendations related to a fuller range of facility sharing, including the sharing of (a) antenna supporting structures, (b) antenna sites, and (c) networks (through interoperability and companion arrangements). It is submitted that each of these types of facility sharing can lead to a net reduction in infrastructure costs for the radio system user and, as a public benefit, a net reduction in the number of antenna towers (or other supporting structures) that must be established. Where appropriate, facility sharing issues related to particular categories of radio service will be discussed within this section.

The three types of facility sharing noted above will each be defined and the particular implications for sharing discussed in turn.

a. Sharing of Supporting Structures

This is the practice of mounting radio transmitting and/or receiving antennas on existing structures. These existing structures may be radiocommunication-related, such as antenna towers or antenna masts or poles, or they may be entirely unrelated to radiocommunication purposes, such as electrical utility poles, (high-tension) electrical transmission line towers, water towers, church steeples, flag poles and the sides of buildings.

As a starting point, it should be noted that Industry Canada's Client Procedures Circular,[268] which addresses the policy obligations for the proponents of all significant radio installations, states that Industry Canada expects that certain antenna supporting structures will be shared:

> If all service providers were to act independently to establish separate antenna structures, the potential would exist for justifiable concern that the number of such structures within an area would be excessive. To avoid such a situation, Industry Canada expects applicants and antenna structure owners, along with industry associations, to work cooperatively in reaching agreements which allow for and encourage the sharing of antenna structures so as to minimize their number.[269]

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[268] Client Procedures Circular, *Environmental Process, Radiofrequency Fields and Land-use Consultation* CPC-2-0-03, Issue 3, 24 June 1995.

[269] *Ibid*. CPC-2-0-03 at p. 6.

It is interesting to note that Industry Canada's client circular directs this expectation (to work cooperatively in reaching sharing agreements) to the providers of "spectrum-based telecommunication services." It is difficult to determine which service providers would be subject to this policy because this is not an established telecommunication or radio service designation in Canada. Contextually, it would appear that this policy is directed at spectrum users who may require significant antennas and supporting structures to offer telecommunication services to the public.

Within its broadcasting policies, Industry Canada has directed a similarly worded expectation to all categories of broadcasting undertakings. Rule 2.1 of the General Rules for all broadcasters states:

> To avoid an excessive number of antenna structures in any given area, the Department expects applicants and antenna structure owners to work cooperatively in reaching agreements which allow for and encourage the sharing of antenna structures.[270]

The Canadian Association of Broadcasters (CAB), within its written submission to this policy review, listed the following benefits of sharing supporting structures. The CAB stated that the sharing of antenna structures would:

1. reduce the total number of towers required in the community;
2. reduce the capital cost of the new installation;
3. simplify aeronautical clearances;
4. allow supporting infrastructure, such as buildings and emergency power generators, to be shared; and,
5. allow the sharing of maintenance personnel and site operating costs.[271]

Based upon submissions such as this and independent research performed during the data-collection phase of this policy review the following recommendation is made to Industry Canada:

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[270] *Broadcasting Procedure Rules, Part 1*: General Rules (BPR Part 1), Issue 3, July 2004.

[271] CAB Formal Written Submission dated 17 October 2003 at p. 5. The Bell Wireless Alliance provided a similar list of the benefits of co-location within its Formal Written Submission dated 10 March 2004 at p. 13.

Recommendation 28: That Industry Canada implement new and more explicit policies designed to stimulate the sharing of antenna towers and other supporting structures for the mounting of radio antennas.[272]

This recommendation is made with the understanding that there are many circumstances when sharing may not be advisable from a technical (engineering) perspective and that for non-technical reasons the sharing of supporting structures may not be appropriate for particular types of radio services or for aesthetic reasons.

First, there are a number of engineering challenges related to the sharing of supporting structures. If radio antennas are to share the same towers, masts and poles, the radio engineering issues would include concerns about the suitability of the existing site for signal service requirements, potential for interference problems between systems, structural loading limitations,[273] structural height and antenna spacing limitations and (although a remote possibility) the potential for co-located radio facilities to produce a combination of emissions that would exceed *Safety Code 6*[274] limits for human exposure to radiofrequency energy.

Where radio antennas are to be mounted on non-radio structures, such as water towers, utility poles or the sides of buildings, structural and other engineering concerns related to the attachment and weight (loading) limitations may be raised. For example, the location of radio antennas on (high-tension) electrical transmission line towers produces significant electrical safety concerns for those who must install and maintain the radio antennas.[275]

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[272] Within its written submission the Canadian Association of Broadcasters (CAB) stated that there may be circumstances in which certain commercial radio services should be required to justify why co-location was not feasible. See: CAB Submission at p. 6. Also, Microcell Communications made some policy suggestions to stimulate the co-location activities of the cellular and PCS providers. See: Microcell Communications Formal Written Submission dated 24 October 2003 at pp. 6-7. In November of 2003, a private member's bill was introduced into Parliament by MP Gary Lunn to amend sections of the *Radiocommunication Act* to simulate co-location activities for commercial radio services. See: *Bill C-467, An Act to amend the Radiocommunication Act*, 2nd Session, 37th Parliament, 5 November 2003. The bill did not proceed past its introduction.

[273] The structural deficiencies may relate to the stability of the supporting structure in the wind. For example, it was learned during consultations with representatives with the Office of the Premier of Prince Edward Island that Rogers Communications has declined to locate its cellular antennas on most of the early cellular antenna towers sited on PEI because they will not be sufficiently stable. Typically, Rogers connects into the public switched telephone network (PSTN) via its own terrestrial microwave network and these microwave dishes will lose connectivity if the supporting structure twists in the wind. From: Meeting held on 13 January 2004 in Charlottetown.

[274] *Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, Safety Code 6*, 1999.

[275] During consultations with members of the Canadian Electricity Association it was learned that commercial radio antennas have been sited on high-tension electrical transmission line towers in British Columbia, Alberta, Manitoba and Ontario. CEA members stressed the safety, security and legal liability concerns related to this

Second, sharing support structures may not be possible or appropriate for reasons that are unrelated to the engineering challenges. As a starting point, if the site is leased for radiocommunication purposes, the lessor (landlord) may not allow co-siting or may permit it subject to unacceptably onerous terms and conditions.[276] Also, while the sharing of supporting structures is often done for aesthetic reasons, in some circumstances it can degrade the aesthetic appearance of an antenna site, or limit the deployment of aesthetic options such as the use of camouflaging techniques or the use of single-purpose structures (and antennas) that have a very modest visual profile.[277] Obviously, the sharing of supporting structures should not be encouraged in circumstances where it will result in a significant degradation of the aesthetic appearance of an antenna site. Aesthetic degradation may occur due to the addition of antenna elements or cabling, or because the supporting structure must be made taller[278] or be reinforced physically in order to achieve the structural integrity necessary to meet the additional loading requirements. From an aesthetic perspective, the sharing of antenna supporting structures is an important siting option and policy objective, but it is not a panacea.

For many types of radio services or service users, it may be inappropriate to ask that they share supporting structures with other radio apparatus. Amateur radio operators typically install their antennas and supporting structures upon their own residential property and it would be unworkable to expect that they would do otherwise.[279] Government departments or agencies that must protect the security of their communications should not be pressured to co-site on the antenna supporting structures of commercial radio installations. For example, for reasons of national security the radiocommunication facilities owned and operated by the Department of National Defence (DND) should not be subject to co-location obligations.[280]

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type of siting. From: CEA Formal Written Submission dated 16 October 2003 and CEA Teleconference dated 15 April 2004.

276 The author is unaware of any country that has implemented tower or site sharing in such as manner that it removes a lessor's right to set leasing terms and conditions which may control co-location approvals.

277 Generally, low profile, monopole supporting structures are not designed to support multiple antennas. Likewise, the options to use camouflaging or 'stealth' technologies (to blend antenna structures into their surroundings) often become quite limited when more than one antenna is to be accommodated on the supporting structure.

278 The height of a supporting structure may have to be increased in order to achieve the required interference separation between each of the antenna elements or so that the antennas of each service provider can be mounted above the surrounding terrain or urban infrastructure.

279 Radio amateur organizations often own a community antenna site which is shared by its members but this does not negate the need for a home-based antenna. Within his formal written submission, Lloyd W. Hoffman of Edmonton, Alberta stated that 98.7 percent of all fixed amateur radio installations were located at the residence of the operator. See Hoffman Formal Written Submission dated 3 July 2003 at p. 2.

280 This point was reinforced by DND representatives during the data-collection phase of this national policy review. From: DND Formal Written Submission, dated 26 September 2003 at p. 3 and meeting held on 29 January 2004 in Ottawa.

During the consultations for this policy review information was provided to the effect that broadcasting undertakings in Canada, such as the CBC, tend to share their antenna supporting structures for FM and TV services with other radio users whenever such sharing is technically feasible and financially worthwhile.[281] Co-locating other types of radio services with AM broadcasting antennas occurs very infrequently for a number of reasons.[282] While broadcasting undertakings in Canada have historically shared their FM and TV supporting structures with other radio services, such as cellular and PCS service providers, these other services have not usually been able to reciprocate. The dedicated towers controlled by other radio service providers tend to be too short to achieve the coverage sought by broadcasters. Additionally, the supporting structures used for traditional rooftop installations do not extend to a sufficient height above the rooftop to permit an adequate separation between the radiating elements of a broadcasting antenna and the upper floors where people are living or working. Compliance with *Safety Code 6* exposure limits requires more distance between residents and the antenna elements.

While broadcasters have not traditionally sought out the supporting structures controlled and used by other radio service providers increasingly this will change with Canada's move to digital broadcasting signals. The electromagnetic characteristics of digital radio and television signals and associated antennas are such that a number of smaller, lower powered and lower mounted antennas may be used to extend signal coverage. Consequently, broadcasters using digital signals increasingly will look to co-site upon existing supporting structures located within urban and suburban areas. Such sharing should be encouraged and facilitated.

Wireless carriers (cellular and PCS providers) are the only Industry Canada radio service category for which the sharing of antenna supporting structures has been referenced as a condition of licence.[283] Wireless carriers are expected to make their supporting structures available to other wireless service providers on a "non-discriminatory" basis and, to the extent that such is practicable, in a manner that permits a competitor to "use and pay for only those

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281 From: Consultation with CBC representatives 30 January 2004 in Ottawa. See also CBC Formal Written Submission dated 23 October 2003. The CBC operates nearly 1200 AM, FM and television transmitters in Canada from about 980 antenna sites (CBC submission at p. 1). See also, Formal Written Submission of Canadian Association of Broadcasters (CAB), dated 17 October 2003 at pp. 5-6.

282 Due to the electromagnetic characteristics of AM broadcasting antennas, the signal may suffer significant degradation if other radiofrequency emitters are located nearby. Also, the low terrain and rather isolated locations selected for AM facilities are not optimal for other radio services. Finally, AM antenna towers are single-purpose structures not designed for additional loading requirements. *Ibid*. Submission of CAB at p. 5.

283 Perhaps, the condition related to cooperative structure-sharing might be better described as a policy 'expectation' than a policy requirement.

parts of the network infrastructure which they require."[284] Within the principal policy document circulated (in 1995) for the authorization of PCS systems, Industry Canada stated,

> [A]pplicants are expected to respect Industry Canada's policy of encouraging shared use of advantageous antenna sites among telecommunications service providers, where it is practical and where appropriate commercial agreements can be reached.[285]

Canada's experiences with the sharing of supporting structures and antenna sites by wireless carriers will be discussed together within the next subsection.

b. Site Sharing

This is the practice of locating radio transmitting and/or receiving antennas in very close proximity with other antennas or proximately to other infrastructure which society might regard as unsightly, or otherwise objectionable, such as electrical power line corridors, electrical sub-stations and smoke stacks. When radio antennas are co-located with other antennas (without sharing supporting structures) usually this occurs through the sharing of roof-top sites.

As noted above, radio antennas can be co-sited with other antennas and/or with other urban structures. Issues of co-siting must be considered within the context of antenna site selection. The selection of a site for most (fixed) radio antenna facilities involves radiocommunication and non-communication factors. For example, to ensure that a mobile phone or broadband network will function properly, the service provider must consider the overall signal coverage requirements, system usage patterns, surrounding topography and radio signal quality (e.g. potential for interference).[286]

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[284] Wireless policy requirements cited from Order in Council P.C. 1994-1689, dated 8 October 1994. These particular requirements are related to the system interconnection requirements set by the federal government so that new wireless service entrants not associated with a major telephone company could obtain access to the public switched telephone network (PSTN).

[285] From: "Policy and Call for Applications: Wireless Personal Communications Services in the 2 GHz Range, Implementing PCS in Canada", Industry Canada, 15 June 1995 at p.13.

[286] Due to these engineering concerns, any efforts to co-locate antennas in one area should be done in consultation with the operators of any existing antenna sites. Within their Formal Written Submissions, the Canadian Association of Broadcasters (CAB) and radio engineer, D.E.M. Allen, called for the creation of a notification process when (other) antennas were to be sited in the vicinity of a broadcasting installation. CAB and Allen submissions both dated 17 October 2003. Representatives from DND made a similar request for a notification process in order to protect sensitive Signal Intelligence Monitoring Stations and other DND receive-only installations. Obviously, DND does not want any radio transmitters located proximately to sensitive listening stations used for national security purposes. During a meeting held in Ottawa on 29 January 2004, representatives from DND provided a map of the grounds of a DND facility that noted that a cellular/PCS antenna tower had been established just beyond the fenced perimeter of a DND listening station. No advance notice had been provided. Industry Canada has a process to identify non-broadcast stations within 2 km of broadcasting stations. See CPC 2-1-10 online:

When terrestrial and rooftops antenna sites are shared, the radiocommunication challenges are much the same as when supporting structures are shared. As discussed within the previous subsection, a number of engineering issues complicate the establishment of FM or television broadcasting antennas at sites established for most other radio services. Additionally, the signals from AM antennas will be seriously disrupted if they operate in close proximity to urban infrastructures such as smoke stacks or electrical power substations.

Examples of the non-communication factors for the antenna site selection (for most commercial radio services) would include: the cost of acquisition and preparation of the proposed site, ease of accessibility to the site, existence of contractual conditions or restrictive covenants that may inhibit development of the proposed use, availability of electrical and other services at the site, aeronautical obstruction concerns, potential environmental impact of the installation, the planning adjustments requested by the local government, and the potential for opposition from local citizens to the proposed installation.

Generally, once an antenna site has been selected and the financial and transactional costs related to these non-communication factors have been incurred (for the first installation), these costs will be considerably less for subsequent installations established at that site. Thus, real efficiencies can be achieved for the antenna proponent when existing terrestrial rooftop sites are shared and the aesthetic benefits to the community can be substantial.[287]

In consideration of the clear benefits and despite the inherent challenges of co-location activities,

> **Recommendation 29: That Industry Canada explore policy options to stimulate the co-location of the antennas at common terrestrial or rooftop sites and to increase the incidence of the co-location of antennas with other (urban) infrastructure which society might regard as unsightly, or otherwise objectionable.[288]**

<http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/en/sf01291e.html>.

[287] Of course there are limits to these benefits. For example, the accumulated (negative) visual or environmental impact from locating multiple antennas at one terrestrial site could outweigh any advantages to the surrounding community.

[288] Within the written submission filed on behalf of the Canadian Pacific Railway Company (CPR) the siting of antenna installations on railway lands (rail yards and rights-of-way) was strongly endorsed. See: CPR Formal Written Submission dated 22 October 2003 at p. 2.

This recommendation is made with the understanding that these two types of co-location will not be workable for all radio services (or radio users) and that the co-location of antennas with urban structures will not be appropriate in some circumstances.

One of the most critical determinants for increasing the extent of (antenna) site sharing is advanced (land-use) planning. Federal, provincial, regional and local officials with land-use planning functions must factor radiocommunication siting requirements into their long and short term planning decisions. When planning officials are both aware of and supportive of the radiocommunication requirements for particular radio service installations they can:

1. designate suitable areas within their planning jurisdiction where radio antennas may be readily sited;[289]
2. work with those seeking to construct tall buildings to pre-plan their rooftop areas for antenna installations (and their associated cabling);
3. inform antenna proponents of areas within their jurisdiction where citizens have a history of opposing developments of a similar nature; and
4. create detailed guidance as to the particular siting accommodations they may favour or require (such as types of supporting structures favoured and visual screening requirements).

As an incentive for antenna proponents to work with planners to create detailed guidance, planning authorities should commit to a process that will fast-track the approval of siting applications that fit within the established planning policies. As an additional incentive, planning authorities should agree to restrict, or otherwise manage, residential and industrial development near a designated antenna area.[290]

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[289] In Canada some local planning authorities have worked with antenna proponents to designate antenna farms, where multiple types of antennas may be sited on a particular parcel of land. In the U.K. antenna proponents and planning authorities are encouraged by the radio regulator to designate an area for antennas and for the planning authority to pre-authorize the addition of more antennas at that location. By means of section 106 of the UK *Town and Country Planning Act 1990*, a local planning authority can make an enforceable commitment to permit more antennas to be added to the site. See: U.K.Planning Policy Guidance 8: Telecommunications, at para. 70.

[290] Within the consultation process, representatives from a few broadcasting interests and from the Department of National Defence (DND) expressed concern about the encroachment of residential or urban development upon their established antenna sites. Broadcasters complained that the encroachment of residential housing often produced a number of negative consequences. The structures and the electromagnetic noise from various equipment disrupted their signals and, on occasion, such encroachment brought citizens within electric fields (produced by the broadcaster) of sufficient power density to disrupt the functioning of some electronic consumer goods. From: Consultation with CBC/Radio Canada, dated 30 January 2004 in Ottawa. See: DND Formal Written Submission, dated 26 September 2003 at p. 4.

Recommendation 30: That land-use planners work with wireless network service providers to establish local planning policies that identify and designate local areas suitable for the siting of multiple antenna facilities and adopt planning policies (such as fast-track approvals) that provide incentives for service providers to locate there.

During the data collection phase of this policy review, land-use authorities expressed significant frustration with the current antenna authorization policies in Canada as they did not provide them with the knowledge, opportunity, or forum necessary to factor radiocommunication antenna siting requirements into their planning decisions. Some expressed the view that the consultation model for land-use authorities, set out within Industry Canada's CPC-2-0-03, was actually a disincentive to work with antenna proponents when asked to give approval to siting proposals.[291]

Significantly, not all planning staff consulted felt excluded from the antenna authorization process. For example, it was apparent that the planning staff in Calgary and in Montréal had fairly good working relationships with Canada's cellular/PCS wireless carriers. The respective city officials were able to obtain network information from the carriers and secure siting-related accommodations from the carriers that tended to make antenna installations more compatible with the local land-use environment.[292] In both cities, staff felt that support from the District Office of Industry Canada was a key factor to securing good co-operation from the cellular/PCS carriers.

Within urban areas the rooftops of (relatively) tall buildings are obvious and sometimes critical antenna site choices for the establishment of many types of commercial radio services. Since many mobile radio services operate using radio frequencies that travel in a line-of-sight manner, only a small number of buildings located within a large city block may offer a location that will permit the antennas to be mounted above the surrounding skyscape and urban clutter. Aside from the radiocommunication advantages, there are a number of other reasons to site upon the roofs of buildings. Rooftop sitings tend to be much less expensive than those involving antenna towers or other supporting structures. Also, the tops of buildings can be made secure

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[291] It is interesting to note that the Province of Prince Edward Island refused to participate in antenna approval policies in 2002 in frustration over the planning and approval role given to provincial planning officials. Also, the mayor of a large municipality in British Columbia stated that his council merely says "no" to antenna proponents seeking approval due to the lack of a meaningful role in the authorization process. He asked, "Why should we put ourselves into the path of angry citizens who oppose the antenna installation when the current process does not give us any levers to secure siting accommodations from the companies who want these antennas? If the minister [of Industry] over-rules us, we have done nothing wrong." From: In-person interview dated 21 August 2003.

[292] From: In-person interviews, 28 October 2003 in Montréal and 18 June 2004 in Ottawa.

from intruders more easily and less expensively than is the case for most other siting situations. When requested, planning approval for rooftop siting tends to be less complicated and more quickly secured because land-use authorities and citizens often favour these sites over other choices.[293]

Canadian radio regulatory policy may offer an additional inducement to site upon building tops. As discussed previously, CPC-2-0-03 permits Type 1 (non-broadcasting proponents only) and Type 2 antenna proponents to self designate whether their proposed antenna installation or modification will be "significant" or "insignificant" in nature. Some antenna proponents adopt the view that most rooftop activities involving antennas produce so little visual impact (when viewed from the ground) that they are "insignificant" in nature and, as such, no local consultation or notice is required under federal policy.[294]

As a practical and legal matter, antenna proponents use leasing arrangements made with building owners or managers to secure rooftop space. They will lease space on roofs or, if such is available at a reasonable cost, will lease the entire rooftop. While such is rare in Canada, some building owners manage their own 'antenna farm' operation and will try to maximize revenues by leasing roof space, or mounting space upon a supporting structure to as many antenna proponents as possible.[295] As a general rule, the requesting antenna proponent must bear the costs associated with the radio-related and structural modifications necessary to ensure a compatible co-existence with the (pre)existing antenna installations.

In the U.S.A. and Mexico it is becoming increasingly common for third party antenna site providers to create multi-tenant antenna sites.[296] These independent companies take out long-term leases on particularly advantageous rooftops and purchase existing antenna tower sites in order to lease out space to as many radio antenna systems as prudent radio engineering,[297] the roof or

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293 Frequently, local land-use authorities are so supportive of rooftop antenna installations that they will fast-track their approval.

294 When consulted about this issue, many land-use authorities took the view that they wanted (at the least) to be notified about the erection of a commercial antenna installation upon a rooftop located within their jurisdiction.

295 Rooftop antenna farms operated by the owner or manager of the building are much more common in the U.S.A. than in Canada.

296 These third party antenna site operators began appearing in the late 1990s in the U.S.A. It was at this time that some of the large wireless service providers came to the conclusion that it was in their best (fiscal) interests to sell some of their antenna infrastructure to an independent third party and to lease space at their former site. Presently, there are five competitors in the U.S.A. operating multi-tenant antenna sites on a national basis.

297 Prudent radio engineering will ensure that no lessee suffers an unacceptable level of radio interference and that the emissions from all radio users cannot combine in such a manners so as to exceed the maximum permissible exposure limits for those living or working nearby.

antenna structure, and the local land-use authority will permit. Third party antenna site-providers are not common in Canada.

Tower and rooftop sharing by Cellular/PCS carriers in Canada

In an examination of the tower and rooftop sharing activities of the four principal wireless (cellular and PCS) carriers in Canada, it is important to look at the sharing activities between themselves, as competitors, and the extent to which they are sharing their antenna sites with other categories of radio services.

Generally speaking, when compared to other categories of radio services, it has been the establishment of cellular and PCS towers that has attracted the most negative attention from land-use authorities, community groups and local citizens. This phenomenon has been experienced within most developed nations. Due to the very nature of the physical configuration of a wireless network (typically honeycomb or cellular), the antennas and their supporting infrastructure must be extended out into the population of wireless phone users. Thus, antennas must be sited amongst or immediately next to users, including in residential areas. They must be established along highway (traffic) corridors and in rural recreational areas (cottage country).

Also, Canadian communities of relatively modest and small size have requested that enhanced digital cellular services be extended to them as one element of an economic and community development strategy.[298] The further that cellular and PCS network infrastructure extends out from traditional urban areas the more likely it is that the service provider will have to erect dedicated supporting structures upon which to mount the antennas. And, when the density of network users is low (and widely disbursed) the service provider will seek to establish fewer and relatively taller antennas in order to achieve the greatest coverage and the most efficient use of equipment.[299]

In Canada, differing technologies and frequencies are being used by the major wireless carriers to provide cellular and PCS services.[300] These differences can and do affect the optimal

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[298] In Atlantic Canada, for example, Aliant Mobility has spent about 300 million dollars over the past five years to implement a plan to extend its "1X" data wireless services to 90 percent of the resident population. From: "Aliant Completes Wireless 1X Data Network Expansion, Wireless Data Speed Doubles," Aliant Mobility press release dated 8 April 2004. Industry Canada has been investigating policy options that would stimulate the extension of advanced digital wireless services to un-served and under-served areas of rural Canada. See: Consultation on the Spectrum for Advanced Wireless Services and Review of Mobile Spectrum Cap Policy, Canada Gazette - Part 1, Notice DGTP-007-03, October 2003.

[299] As the population density increases in many urban areas the (antenna) service cells are split and more, but lower, antennas are established.

[300] Currently, there are two analogue and five digital networks operating in Canada.

location, height, antenna type and service coverage for their respective antenna installations. Each of these factors can place restrictions on the sharing of antenna supporting structures and sites with other wireless carriers.[301] Despite these engineering differences and restrictions, Canada's wireless carriers are offering very similar services to essentially the same configurations of urban and rural population. These two similarities will bring their network infrastructures into the same market areas and present co-siting opportunities for the carriers, especially if two or more carriers enter a new market together.

These similarities of services and markets were regarded by the federal government as key competitive drivers for the regulatory model created for cellular and PCS services. It was assumed that the carriers would enter each new market and roll out their physical infrastructure and services almost in tandem.

Before policy options that may increase tower and rooftop sharing are considered, it is important to examine the patterns and circumstances surrounding the roll out of wireless infrastructure in Canada.

In the most lucrative urban, suburban, and recreational area wireless markets in Canada the roll out of wireless services usually has occurred in tandem and with considerable flourish. For these lucrative wireless markets the carriers entered the service areas in tandem with analogue cellular in the 1980s and early 1990s and then returned together in the late 1990s to upgrade to digital cellular.[302] One might assume that having the carriers arrive together, and under considerable competitive pressure, might have empowered the local or regional governments involved to convene a common meeting with the cellular/PCS carriers in order to investigate the sharing of towers and rooftops. Unfortunately, such meetings rarely have taken place because the wireless carriers have regarded their antenna site deployment plans as strategic and confidential information. Even when filed with the local development office, land-use planning authorities have not been permitted to discuss a corporate antenna deployment plan in public or with another carrier. When the issue of sharing has been raised, the carriers have conferred with each other in private and then informed the planning authority as to whether any sites will be shared. If towers

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[301] In consultations with representatives from Bell Wireless Alliance it was explained that it was challenging for Bell's CDMA systems to be co-located with Microcell's GSM technology because the radio spectrum used by both systems is very proximate. Some of the technical solutions worked out by the two companies to facilitate co-location are now being used to co-locate similar systems in other countries. From: Teleconference call with Bell Wireless Alliance dated 21 April 2004.

[302] When data was collected from local governments in 1986 (Townsend), 1997 (Townsend) and for this policy review, large municipalities reported that the wireless carriers tended to arrive at their development offices almost in tandem and in waves, as technological up-grading was undertaken.

or roofs are not to be shared the local or regional officials merely have been told that sharing was not possible for 'technical reasons.' There has been no way to challenge such statements.

The patterns and circumstances that surround the roll out of cellular and PCS infrastructure in modest markets for wireless services should also be examined. Described geographically, these modest markets would include most of the country. Atlantic Canada, the northern regions of Quebec and Ontario (beyond the cottages), most of Prairies and the three territories offer modest to poor prospects for return on wireless investments.[303] In these areas the competitive edge is not present. The carriers do not usually arrive together to establish or upgrade services. In fact, the first-in or first to go-digital may substantially undermine the business case for investment by other providers. Most of the supporting structures used are dedicated towers that are often quite tall. As is the case in PEI, the initial cellular infrastructure and service has probably been established by the cellular branch of the (former) provincial phone company. In PEI the legacy towers from these initial cellular services are tall, single-purpose towers that likely will not support additional antennas.

In these modest wireless markets the location and height of the wireless antennas have been, for the most part, determined by radio engineering considerations. The nature and type of supporting structures have been decided using engineering and financial criteria. In other words, activities to minimize the aesthetic impact such as sensitive placement of the tower upon the site, the use of low (visual) profile supporting structures and screening some views of the tower or equipment building (with berms or vegetation) have played little or no role in siting decisions. In fact, due to the height of the typical tower in these areas they have (almost invariably) required aeronautical marking and lighting. It is accepted that making aesthetic adjustments to a wireless antenna tower installation will add to its costs.[304] If the business case for establishing wireless services was already weak, the increased costs of aesthetic accommodations may undermine the initiative altogether.

It is submitted that increasing the co-location activities of wireless carriers within non-urban areas of Canada may achieve a number of positive objectives. In addition to the general co-location benefits discussed previously, co-location of cellular and PCS antenna structures in non-urban areas may permit the pooling of ideas and resources so as to invest in sensitive siting techniques, camouflaging and screening technologies and landscaping techniques

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[303] Of course, vast expanses of the geographic areas described have no cellular or PCS services.

[304] A stealth installation, as they are called, can produce a ten-fold increase in the cost of the antenna site. One of the most expensive stealth antenna types has its antenna hidden within a large, artificial pine tree.

that might not be practical for a single-carrier installation. Also very important for non-urban areas, the number of aeronautical obstructions would be reduced.[305]

Recommendation 31: That policy options be considered by Industry Canada to stimulate the co-location of cellular and PCS antenna facilities in non-urban areas of the country.

As noted previously within this report, the wireless carriers are the only category of radio service for which tower and site sharing are conditions of their radio authorization. In a letter sent by Industry Canada to new PCS licensees in 1996, the government regulator expressed disappointment about the poor progress that the providers of analogue cellular had in establishing commercial arrangements to share their supporting structures with each other:

> You are expected to respect Industry Canada's policy of encouraging shared use of advantageous antenna sites among mobile telecommunications service providers. We note with some disappointment a lack of significant tangible progress by the cellular and PCS players in adopting measures that will result in greater sharing of antenna sites as a means to minimize any undesirable impact. Should the industry not show a greater willingness to voluntarily address the growing concerns of land-use authorities and the public we anticipate that further intervention may be required.[306]

Over the previous five or six years officials from Industry Canada have met on a number of occasions with executives of the wireless carriers and with representatives of the national industry association, the Canadian Wireless Telecommunication Association (CWTA), to express frustration about the modest amount of, and uneven participation by some carriers in, co-location activities within the wireless industry.

For the purposes of this policy review, the assistance of the CWTA was sought in order to obtain current statistics on the nature and extent of tower and rooftop sharing activities within the wireless carrier sector. The statistics obtained establish that 68 percent of all PCS/cellular antenna

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[305] Within its submission the Canadian Owners and Pilots Association (COPA) expressed strong support for policy initiatives that would result in more co-siting in non-urban areas so as to reduce the number of obstructions to aeronautical traffic. Multiple antenna towers located along highway corridors can pose a significant challenge to air traffic that uses those same corridors to mark visual flight paths. On a related matter, COPA also was concerned about the increasing number of towers being established in non-urban areas and near aerodromes not actively regulated by Transport Canada. See: COPA Formal Written Submission dated 15 October 2003 at pp. 3-4. (COPA represents the interests of pilots who use small aircraft for personal travel and recreation purposes.)

[306] Quoted from letter sent by Industry Canada to all PCS licensees, dated 15 April 1996. This letter was noted within the Formal Written Submission of Microcell Telecommunications Inc., dated 24 October 2003.

sites in Canada are used by the particular holder of the antenna site alone (not shared). Of particular note is that 79.5 percent of PCS/cellular antenna tower structures in Canada are not shared with any other wireless competitors.[307] Also of note is that 68 percent of all of the rooftop antenna installations held by wireless carriers are not shared with any other radiocommunication service. The statistics provided through the CWTA were as follows:

Sharing of Towers, Rooftops and Other Structures by Wireless Carriers in Canada
As of March 2004

Total number of cellular and PCS cell sites in Canada = 6783

60% - of all cell sites are on dedicated towers
33% - of all cell sites are on rooftops/buildings
7% - of all cell sites are on other structures (e.g. water towers)

Evidence of sharing of cell sites

68% of all cellular and PCS cell sites are not shared
20.5 % of all towers are shared with at least one wireless competitor
11 % of all towers are shared with non-competitor(s)
30 % or all rooftops/buildings are shared with at least one wireless competitor
2 % of all rooftops/buildings are shared with non-competitor(s)
11 % of other structures are shared with at least one wireless competitor
38 % of other structures are shared with non-competitor(s)

Within its formal written submission to the National Antenna Tower Policy Review, representatives from the PCS provider, Microcell Telecommunications Inc., expressed the view that contractual arrangements made within the wireless carrier sector were inhibiting tower and antenna site sharing in Canada. The Microcell submission stated:

[307] To be fair, it should be noted that just under 30 percent of antenna towers are being shared if one examines sharing activities with competitors and non-competitors. The problem with adding the co-siting activities with non-competitors into the total of shared towers is that many of the non-competitors are municipal, provincial and commercial radio users which otherwise may not have erected a dedicated tower for their services. Thus, the key question is whether this type of tower-sharing would lead to a net reduction in towers erected? In situations where a wireless carrier is hosting the antennas of a non-competitor, a net reduction in towers is not the most likely result.

> While the incumbents all profess to be open to co-location agreements, the specific terms and agreements are at times heavily tilted away from what a truly competitive site co-location market would produce. For example, one-for-one swapping clauses or "site banking" requirements, which force one wireless operator to trade access to its own antenna sites in order to gain access to another operator's sites, are obviously discriminatory against new entrants – who by definition have fewer sites than an incumbent operator. These practices greatly restrict the true extent of sharing that could otherwise take place, and reduce the benefits Canadians would receive from more extensive and intelligent deployment of network infrastructure.
>
> Another problem is the practice of operators signing exclusive leasing arrangements for certain site locations, that is to say rooftops or other locations and pre-existing structures. The historical practice of signing exclusive deals with landlords....cause[s] unnecessary proliferation of towers and other site structures...[308]

These statements stimulated further enquiries for the purposes of this national policy review to learn more about these contractual arrangements. All four wireless carriers were asked about the content of their contractual agreements for sharing with their competitors and about the leasing arrangements made with landlords with regards to their antenna sites.

First, all four carriers have co-siting/sharing agreements with each of their respective wireless competitors. While the text for each agreement is quite similar, each contract can differ to a modest extent. The vast majority of the contractual clauses of these agreements address the many technical, practical, economic and legal implications of co-siting. If the interconnection of telecommunications facilities is part of the particular arrangement, it must be done in accordance with applicable CRTC interconnection tariff. All electrical work must meet the relevant Canadian Standards Association (CSA) requirements. The requesting party must pay for all site preparation and modification charges and pay a consultation fee for the hosting carrier's time and efforts. Typically, the hosting carrier will provide site heating and cooling, electrical utility connection and back-up power. As per the terms of these agreements, the host's engineering personnel are to be integrally involved with the installation and set-up of the new equipment. The requesting party will undertake to be responsible for the resolution of all interference problems associated with the co-location. Antenna mounting and equipment space is charged out per square metre and by antenna type, usually on monthly basis. Electrical power is charged out per fuse amp/per month and a monthly standby charge is levied for back-up power. In case of legal liability, the requesting carrier must agree to indemnify the hosting carrier for any damages or injuries which might occur. In that regard, the requesting carrier must agree to take out general commercial liability insurance sufficient to satisfy potential claims in the millions of dollars. The hosting

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[308] *Ibid*. submission of Microcell at p 5.

carrier may terminate the agreement, upon (about) three months notice, should the space occupied by the requesting carrier be necessary for the hosting carrier's needs or should the ownership of the site be transferred.[309]

Of critical importance to this policy review are the one-for-one accommodations and 'banking' protocols set out within these site-sharing agreements. The agreements are written on the premise that antenna site access will be traded on a one-for-one basis. Even with all of the duties and payments that must be undertaken by a requesting carrier, the provision of access to an existing tower or rooftop is regarded as though it provides a commercial advantage to the requestor. To ensure that this economic advantage does not get out of balance, these agreements provide for a banking protocol. Each accommodation to a wireless competitor, by permitting the competitor to co-locate on your site, is a credit. When an imbalance of accommodation credits in the bank reaches a particular number that bank is full and no additional sites are shared with the requesting carrier by the competitor until the requesting carrier has remedied the imbalance by sharing some of its antenna sites. All of the wireless carriers track every co-location accommodation made to each competitor. The agreements call for these banks to operate on a national basis.

While the various agreements signed between the major wireless carriers have created a rigid contractual structure for banking credits, the system currently is operating on a more informal basis. The threshold number of accommodation credits necessary to fill the bank (the imbalance point at which you refuse co-location requests with that company) is now a flexible number as between some carriers. Also, some of the carriers are operating the bank on a regional as opposed to a national basis. An imbalance of banking credits with a particular competitor in one region of the country does not affect co-location accommodations with that competitor in another region. These moves towards a more flexible banking system are not industry wide. One of the major carriers continues to insist that the banking system be operated in the manner set within the contractual agreements. Thus, this carrier will stop accommodating a competitor when that competitor's bank is full and their refusal to co-locate is nation-wide.

Microcell's assertion that the wireless carriers are negotiating exclusivity clauses into the private leasing arrangements they make with landlords for access to their rooftops and other

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[309] In October of 2002, Telus Communications Inc. filed a "Radio Tower Access Service" Tariff with the CRTC. That tariff, which was given final approval in February of 2003 contains many of the clauses that appear within a typical site-sharing contact used by the wireless carriers. See: Telecom Order CRTC 2003-85 dated 20 February 2003 and Telus Communication's original filing with the CRTC, Carrier Access Tariff item 215, Radio Tower Access Service, 10 October 2002. The one-for-one site sharing or 'banking' provisions of a typical inter-carrier agreement were not filed.

useful siting structures requires some elaboration. From individual meetings with the carriers it was learned that all four wireless carriers will negotiate exclusivity clauses within their leasing agreements whenever the landlord will agree and so long as the exclusivity clause does not come at too high a price. The problem for the carriers is that many landlords recently have learned about the potential value of their properties for antenna site leases and they will refuse to sign exclusivity clauses, or exact a premium price for them. While the market place is now inhibiting the number of new exclusivity clauses, many of the sites secured in the 1980s and 1990s continue to be subject to exclusivity provisions. These are long-term leases with options to renew at the election of the carrier. Within major urban areas of Canada these legacy leasing arrangements apply to some of the most prime antenna siting locations. Also, exclusivity clauses continue to appear in non-urban contexts where landlords are experiencing antenna siting for the first time and may not realize the potential for leasing to many radio service providers.

When asked about these exclusivity leasing arrangements some of the carriers explained that they were necessary in order to ensure control over the sites for radiocommunication purposes. They stated that the exclusivity clause gave them control over newcomers and that these clauses are waived (for each newcomer) once suitable radio spectrum arrangements have been made to control for interference and to ensure that the exposure limits within *Safety Code 6* will not be exceeded at the site. Other wireless carriers admitted that they secure exclusivity clauses whenever possible so that they can acquire co-location credits for the site banking scheme the carriers are operating.[310]

It is a conclusion of this policy review that the site banking and site leasing arrangements being used in the cellular and PCS radiocommunication sector are inhibiting the sharing of existing tower, rooftop and other sites in Canada. These arrangements are inhibiting the sharing of sites between wireless competitors and the exclusivity clauses are also inhibiting the sharing of certain sites by wireless carriers with other categories of commercial radio service.[311] It is submitted that the statistics provided by the CWTA support these conclusions.

Exclusivity clauses are not the best means to provide for the resolution of the many technical issues that must be addressed when two or more radio services are sited on one rooftop

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[310] If there is no exclusivity clause and the site is useful to competitors they will arrive without the first carrier acquiring an accommodation credit. One carrier stated during meetings that some of their competitors charge up to $5,000.00 to waive an exclusivity clause on a one-time basis. This carrier explained that this fee, which is not applied toward the costs associated with the technical accommodations necessary for the co-location, is meant to offset the cost of securing the clause with the landlord.

[311] A broadcaster consulted under this project stated that when they encounter an exclusivity clause at a site where a wireless carrier is established they tend to look elsewhere unless the site is a critical location for them.

or supporting structure. As between themselves, the wireless carriers already have detailed contractual protocols for the resolution and costing of such matters. During a consultation one major carrier complained that it has been waiting up to four years for a competitor to waive exclusivity clauses at a few locations and they could not explain the reason(s) for these delays.

The operation of the site banking system on a national basis is particularly problematic. When a rapid build-out of wireless infrastructure has occurred by one or two carriers in one region of the country the site co-locations secured in the build-out region have filled the siting bank with the carrier who operates the bank on a national basis. Consequently co-locations in another region of the country have been denied and towers have been constructed in circumstances where co-siting was possible from a technical perspective.[312] Even where the banking system is operating on a regional basis it is concerning that one likely result of this scheme is that towers will be constructed unnecessarily in rural areas because of co-location accommodations made in urban areas of the same region.[313]

> **Recommendation 32: That Industry Canada examine the site banking and site acquisition arrangements being used within the cellular/PCS service sector to determine their impact upon co-location activities within the sector and as between this sector and other commercial radio service categories. If these arrangements are found to inhibit antenna site co-location activities, Industry Canada should explore policy options to reduce those activities and work with the wireless industry to find alternative means to protect the legitimate competitive interests of the cellular/PCS carriers**.

Industry Canada should take advantage of every opportunity to convey a clear and consistent message to the cellular/PCS service providers that they are expected to make a serious commitment to increase their antenna site co-location activities. In this regard, it should be noted that on April 1, 2004 the department amended the cellular licences awarded in the 1980s and the incumbent PCS licences from the 1990s. These licences were converted to Spectrum Licences and fixed with the same enhanced privileges as the Spectrum Licences issued to the new PCS

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312 During consultations one wireless carrier admitted that they were in the process of constructing a tower in one region of the country because a co-location has been denied due to an imbalance of banking credits in another region.

313 Generally, it is the larger cities and larger suburban municipalities in Canada that have negotiated antenna siting protocols with the national wireless carriers. These protocols frequently contain undertakings by the signatory carrier to engage in co-location with other carriers when such is feasible. In times of rapid expansion within an urban or suburban area it would be a simple matter for the expanding carrier to develop an imbalance of co-locations in the siting bank with its competitors and, consequently, have to construct towers for its roll out in rural areas in circumstances where co-locations with those competitors were possible.

licensees who acquired their spectrum in the spectrum auctions held in 2001. Thus, all cellular/PCS providers now have the same type of spectrum licence with (relatively) common conditions of licence. The problem with this licensing change is that there appears to be no reference in the licensing policy document to an obligation to work co-operatively to increase antenna sharing between the new licensees. Clearly, this was a missed opportunity to reinforce this policy requirement. In the worst case, the conditions of licence may now be amended by this action so as to remove the obligation that existed previously.

c. Sharing Networks

This is the practice of using roaming and resale agreements to permit the customers of one of the contracting service providers to operate upon the network infrastructure of another contracting provider for a fee paid to the hosting provider. Usually the contracting service providers have overlapping service areas but each may not have built out its network infrastructure throughout its authorized service area. This type of facility sharing requires common, or at least compatible, operating standards and protocols. Often, telecommunications policies will specify the requirements for and limits to the creation of network sharing agreements between service providers.

The roaming and resale service arrangements within the wireless sector are relevant to this antenna study because these negotiated agreements can lead to a reduction in wireless network facilities in general, and radio antenna infrastructure in particular. At the point of writing this report Industry Canada is concluding a national consultation on a policy proposal to extend the current roaming and resale conditions of licence for PCS licensees to the year 2011.[314] The second policy under consideration would be to require that cellular licensees offer analogue cellular roaming and resale to PCS licensees who are not offering analogue cellular services. As the department considers its policy responses to these proposals it is important to consider the antenna tower implications of extending network roaming and resale rules.

The licensing policy for PCS (digital cellular) services, which was announced in 1994, required that future PCS licensees offer PCS resale throughout their service area to other PCS licensees in a non-discriminatory manner. The purpose of this requirement was to ensure that market forces would drive the roll out of these new advanced cellular networks. Generally, this policy has worked well. When in 1997 the CRTC reviewed the state of resale and roaming arrangements made by PCS and cellular services in Canada the Commission decided that it was in

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[314] "Consultation on a New Fee and Licensing Regime for Cellular and Incumbent Personal Communications Services (PCS) Licensees" *Canada Gazette* - Part 1, Notice No. DGRB-004-02, dated 21 December 2002.

the public interest to permit the carriers to decide whether to offer resale and roaming to competitors on an unrestricted basis.[315]

As an example of the potential benefits of the current resale and roaming policies, in October of 2001 Telus Mobility and members of the (now) Bell Wireless Alliance announced that they had entered into a reciprocal roaming and resale agreement to facilitate the sharing of their respective networks in small urban and rural areas of Canada.[316] By sharing their respective infrastructures it was estimated that each of the contracting parties would save 500 million dollars by avoiding a duplication of each others digital service footprint in certain non-urban areas of Canada.

Through this agreement, many areas of Atlantic Canada, Quebec and Ontario gained a new service provider and some different services without experiencing a doubling of the network infrastructure, including antenna towers.[317] To the respective customers of each carrier the service offerings appear to be seamless. The branding of their home carrier appears regardless of which competitor's cell sites are being used to connect for service.

> **Recommendation 33: That Industry Canada consider the ways in which roaming and resale regulations and conditions may lead to a reduction in the total number of cell sites in small urban and rural areas whenever the department has such policies under examination.**[318]

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315 CRTC Order 97-1797.

316 PRESS RELEASE dated 17 October 2001, "TELUS Mobility enters roaming/resale agreements with other Canadian CDMA wireless carriers"

317 The Bell Wireless Alliance made this very point in its Formal Written Submission dated 10 March 2004 at p. 8.

318 Industry Canada will, of course, have to review the proposed network sharing arrangements that have been negotiated between the major wireless carriers to create common standards and protocols in order to establish and share 500 common WiFi hotspots. The industry agreement was announced in the media on 2 March 2004.

Question 6. What evidence exists that property values are impacted by the placement of antenna towers?

Policy Question 6, about the impact of antenna towers on property values, was not one of the original questions posed by the Honourable Allan Rock for the National Antenna Tower Policy Review. It was added by the chairperson of the Advisory Committee and author of this report, Professor David A. Townsend. This was done so that consultations conducted for the review would uncover any useful data on this issue. The question was cast so as not to lead the respondents. It did not presuppose the existence of such evidence or that any evidence provided would support the case that property values tend to go up or down upon the establishment of an antenna tower. The opinions and evidence submitted by those who participated in this national policy review covered all three options: No, there is no evidence that antenna tower impact upon property values, Yes, there is evidence that property values go up and Yes, there is evidence that property values go down.

This section of the final report will begin by discussing the opinions submitted by those who participated in the policy review and then it will discuss evidence tendered by respondents and gathered through other research. The section will conclude by offering a recommendation about how public concerns and evidence related to negative impact (should such exist) be treated within the context of local consultations on the siting of particular antenna installations.

a. Opinions and Evidence Offered by Participants to Policy Review

To those members of the public and community groups who participated in the online Discussion Forum (operated as part of this policy review) the issues of the potential for negative impact upon property values and the potential for negative health effects were their greatest concerns related to antenna installations.[319] Some of the formal submissions filed by municipalities expressed the view that these two concerns dominate the interactions they have with the public when an antenna siting becomes contentious.[320] One contributor to the Discussion Forum, who self-identified as a member of the general public, stated that if evidence of negative impact is found, the antenna proponent should offer compensatory payments to the property owners located next to the antenna installation.

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[319] See generally the qualitative analysis of the comments offered during the Discussion Forum within Appendix A**.**

[320] Red Deer Formal Written Submission, “Report to City Council in 1999".

The vast majority of the written submissions filed on behalf of members of the radio industry held the view that there is no credible evidence that the establishment of an antenna installation negatively impacts upon local property values. Some industry members claimed that they had been maintaining an active watch for such evidence for a considerable period of time.[321] A few of the submissions expressed the view that it was unfair to single out antenna towers when other urban infrastructure may affect property values.[322] Within its submission, Rogers Communications suggested that the loss of property value argument is often made as a negotiating ploy.[323]

Within the Discussion Forum and through their formal submissions, amateur radio users expressed the view that no reputable studies show that amateur antenna towers have a negative impact upon the property values of their neighbours.[324] Many complained that it was discriminatory to prevent the establishment of an amateur tower on such grounds when their neighbours were siting things such as boats and travel trailers on their properties.[325] Within attachments to its formal submission, the Radio Amateurs of Canada (RAC) offered references to various property assessments that the RAC have relied upon for proof that property values are not impacted by the establishment of amateur antenna installations. One such reference was to an Ontario superior court decision where an interlocutory injunction was denied to the neighbours of a radio amateur who were seeking to prevent the amateur from establishing an antenna tower on his own property.[326] One of the grounds advanced by the neighbours was negative impact upon their property values. As evidence the neighbours provided a sworn affidavit from a real estate agent supporting their claim. In reply, the radio amateur filed an affidavit from an accredited land appraiser who offered the opinion that the value of the neighbouring lands would not be impacted.

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321 Canadian Wireless telecommunications Commission Formal Written Submission dated 9 October 2003; Telus Communications Inc. Formal Written Submission dated 10 October 2003.

322 "The CAB believes that communications towers should not be singled out for examination on this point. Clearly, towers are not the only property uses that can have a theoretical impact on the market value of neighboring property. However, we do not find any federal government studies underway elsewhere that are investigating whether property values are adversely affected by neighbors who plant trees that block sunlight, erect ugly fences, refuse to mow their lawns, or paint their houses chartreuse." From: Canadian Association of Broadcasters Formal Written Submission dated 17 October 2003 at p. 13.

323 Rogers Communications, Inc. Formal Written Submission dated October 2003 at pp. 25-26.

324 Contest Club Canada Formal Written Submission; Nora Hague Formal Written Submission dated 17 October 2003; Leo Nikkinen Formal Written Submission dated 28 October 2003; Radio Amateurs of Canada (RAC) Formal Written Submission dated 10 October 2003.

325 For quotes, see the Appendix A summarizing user opinions from the online discussion forums. Radio amateurs generally support the position that local crime, unkept yards and houses, immobile cars and poor choices of paint colours affect property values more than the presence of amateur radio towers. They also cite the positive characteristics of amateur radio towers, such as the emergency services provided.

326 *Page et. al v. Mangaroo* (1987) S.C. 883/87 judgement 26 August 1987.

The judge found the appraiser's evidence to be persuasive and credible and dismissed the application for an injunction. The RAC also attached quotations from two studies done in the U.S.A. that concluded that land values were not impacted by antenna installations.[327] One study examined for impact through property value assessments and the other looked at market transactions (home sales) of properties located near a commercial antenna tower.

b. Discussion of the Opinions and Evidence

On the question of negative impact upon property values, it is clear that individual members of the public are relying upon their intuitive sense of 'disamenity.'[328] To them, if a structure appears imposing and unattractive or blocks scenic viewscapes, then it must have a negative impact on local property values. Land-use planners believe that the public's intuitive sense of disamenity will be reduced to the extent that camouflaging, screening and landscaping techniques are used to make the antenna less obtrusive and the installation is sited as sensitively as possible in the circumstances. It is submitted that the public's sense of disamenity in relation to a particular antenna proposal also may be reduced when the community is consulted and participates in a meaningful way in the siting decision.

Of course, concerns about negative health effects influence concerns about negative impacts upon local property values. Whether or not citizens truly have concerns for the health of their own family and friends, they are worried that the market value of their property may be inversely related to the general perceptions of negative health effects held by the public. Thus, as public concern increases, the market for their property will decrease and the (fewer) willing buyers who are interested in their property will expect to pay less. Generally, this is known as one form of stigmatic effect.[329] Public concerns or fears (particularly of health effects such as cancer) can have a negative effect on property values, even when those fears are found to be unwarranted. However, according to Jaconetty (1996), "public fear can and will affect market transactions [only] so long as market participants actually share those fears."[330] A considerable amount of research has been done on the stigmatic effect associated with electrical transmission lines, contaminated lands and incinerators and their impact upon local property values.[331]

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327 RAC Submission, Annex D at p. D-3 and p. D-8.

328 Real estate appraisers and land-use planners often categorize imposing urban infrastructure, such as antenna towers and electrical power transmission lines, as disamenities or LULUs (local undesirable land-use factors).

329 Robin Gregory, James Flynn & Paul Slovic, "Technological Stigma" in *Risk, Media and Stigma: Understanding Public Challenges to Modern Science and Technology* (London: Earthscan Publications Ltd., 2001) 3 at p. 3.

330 Thomas A. Jaconetty, "Stigma, Phobias, and Fear: Their Effect on Valuation" (1996) 3 Assessment J. 51.

331 See generally, Roger E. Kasperson, Nayna Jhaveri & Jeanne X. Kasperson, "Stigma and the Social Amplification of Risk: Toward a Framework of Analysis" in *Risk, Media and Stigma: Understanding Public Challenges to Modern Science and Technology* (London: Earthscan Publications Ltd., 2001) 9

The evidence submitted within the attachments forwarded by the RAC was useful but it is respectfully submitted that its probity value is low. For example, the judge in the *Page et. al v. Mangaroo* case was merely comparing the respective evidence submitted by the applicant and the respondent and the examination of evidence during an application for an interlocutory injunction is not thorough enough to regard the result of the case as a meaningful endorsement of the evidence supplied by the certified appraiser. Also, the study that examined and compared the real property assessments of residential lands located proximately to a radio amateur living in New York[332] was not compelling because no neighbours had ever raised concerns to the assessment office about the amateur's antenna installations. The issue of the presence of the antennas had never been addressed.

c. Antenna Towers and Property Assessment Value

To the extent that it is possible, residential property value assessments are based upon the market value of the land being assessed. This ensures the most consistency between appraisals and that properties are not assessed at values beyond their worth.[333] Generally, five methods are used to determine the market value of land:

> ...a recent free sale of the property; recent free sales of identical properties in the same neighbourhood and market; recent free sales of comparative properties (the comparative sales method); the price which the revenue-producing possibilities of the property will command (the income-capitalization technique); and finally, the depreciated replacement cost method.[334]

Also, intangible factors such as the reluctance of potential buyers to purchase lands that were contaminated but subsequently reclaimed through remediation activities are considered.[335]

There are at least two instances in Canada where the assessed value of residential properties were reduced due to close proximity to commercial antenna towers. In Red Deer, Alberta, a three percent downward adjustment was made recently to the assessments of eight

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[332] Jeffrey T. Briggs, "Amateur Radio Antennas and Real Property Assessment Values: A Study on Dartantra Drive, East Fishkill, New York, 1977 - 1996." This study is located within the RAC as Appendix 2 to Annex D: Examples of Studies on the Effect of Antenna Support Structures on Property Value Assessments.

[333] Stanley M. Makuch, Neil Craik & Signe B. Leisk, *Canadian Municipal and Planning Law*, 2nd ed. (Toronto: Carswell, 2004) at 63-66.

[334] *Ibid*. at 66.

[335] Canada, Public Works and Government Services Canada, *Appraisers and Valuation Services – Environmental Impacts* online: Public Works and Government Services Canada <http://www.pwgsc.gc.ca/appraisals/content/chap_1c4-e.html>.

residential properties that back directly onto a microwave tower site. The justification for the reduction was the impact of the tower upon the aesthetics of the neighbouring lands.[336]

In 2001, the assessed values of sixteen residential properties located in Colwood, British Columbia were reduced by BC Assessment by an average of 7.2% (approx. $9,500 each) due to the aesthetic impacts of a broadcasting antenna tower installation that had been recently upgraded.[337]

d. Evidence of Antenna Towers' Impact upon House Sales Transactions

The most reliable evidence of the value of land is its market value as determined by the price that a willing purchaser is willing to pay to a willing vendor in a free market. Some research completed recently in New Zealand has used actual sales transaction data to attempt to determine whether market price was negatively impacted by the presence of cellular base stations. Dr. Sandy Bond of the Department of Property at the University of Auckland, in collaboration with colleagues Karen Beamish (2004)[338] and Ko-Kang Wang (2004),[339] has conducted two parallel studies about the effects of cell tower placement on local property values. As the principal research activity, case studies were performed in four suburbs of Christchurch, New Zealand where a cellular base station had been established. Survey data was collected on people's perceptions about the impact of the base station on their property value and, most importantly, that data was combined with actual housing price changes over time. Changes were determined using a hedonic house price approach.[340] The hypothesis of this research was:

> In suburbs where there is a CPBS [cell phone base station] constructed, it will be possible to observe that discounts are made to the selling price of homes located near these structures.

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336 Memorandum from Paul Meyette, principal planner, Parkland Community Planning Services (July 21, 2003) Re: Telecommunications Facilities Guidelines - Planning Report at p. 5.

337 Facsimile from Dave Hitchcock, area assessor, BC Assessment (February 23, 2001) Re: Radio Transmissions and Towers, Triangle Mountain, Colwood, 2001 Assessment Reductions Due to Proximity to Transmission Towers. This document was provided by the Colwood Transmission Towers Citizens Committee at a meeting held on 21 August 2003 in Colwood, BC.

338 Sandy Bond and Karen Beamish, "Residents' Perceptions Towards Living Near Cell Phone Towers" presented to the Twentieth American Real Estate Society Conference, April 20-24, 2004, Captiva Island, Florida.

339 Sandy Bond and Ko-Kang Wang, "The Siting of Cell Phone Towers in Residential Neighbourhoods: Do Home-owners Care?" presented at the American Real Estate and Urban Economics Association (AREUEA), Thirteenth Annual International Real Estate Conference, Fredericton, New Brunswick, July 29-31, 2004.

340 For the study released in July of 2004 the actual prices from 4283 residential house sales were tracked. Approximately 1000 selling transactions occurred within each of the four suburbs examined. The study referred to the approach used as a hedonic house price approach. "Hedonic", as described by *The Canadian Oxford Dictionary*, Katherine Barber, ed. (New York: Oxford University Press, 1998) means the "psychology of pleasant or unpleasant sensations".

The survey data indicated that a major concern of people living proximately to a cell tower was the effect of this tower on property values - a third of the respondents believed it would decrease the price or rent they would be prepared to pay by between 1 to 9% and nearly a quarter (24%) indicated that they believed it would decrease the price or rent by between 10 and 19%. The findings of the market study of actual home prices confirmed the opinion survey results. In the two suburbs studied where towers were built in 2000, the effect of a tower on home prices was a decrease of between 20.7% and 21%. Interestingly, in the two suburbs where the towers were constructed in 1994, the effect was either insignificant or prices actually increased by 12% due to the presence of the tower. A possible explanation for this difference was the significantly increased media coverage and public controversy that surrounded the most recent tower placements in the study. Also, two high profile legal cases, involving cell towers, were decided after 1994 when the two earlier base stations were established.[341]

Finally, the survey questionnaire provided respondents with the opportunity to indicate ongoing concerns they have with cell phone base stations and their location. Based on these comments the researcher concluded that:

> In particular, there is the need for increasing the public's understanding of CPBSs [cell phone base stations], of how radiofrequency transmitting facilities operate, and of the strict exposure standard limits imposed on the telecommunication industry.[342]

While arriving too late to be included in the data analysis, a recent empirical study of a site in southwest London, Ontario, commissioned by Telus Mobility and conducted by R.W. Hughes & Associates Inc.[343] offers further evidence that property values, this time in a Canadian context, are not impacted by proximity of communications towers. They state: "The quantitative data analysis indicates that the proximity of the communication tower has no measurable effect on the price/value of dwellings in close proximity to the tower."[344] They go on to say: "The analysis of the qualitative data indicates that a high percentage of the respondents in the study area do not perceive the proximate communication tower as a negative influence on the quality of their lives or on the price/value of their homes."[345]

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[341] Another explanation may be that a stigmatic effect caused by the towers, if such existed, disappeared over time and house prices rebounded.

[342] *Supra* Sandy Bond and Ko-Kang Wang (2004) at p. 21.

[343] R.W. Hughes & Associates Inc. *Empirical Study of the Potential for Loss in Value to Real Property due to the Proximity of a Communication Tower*. London, ON. (May 31, 2004).

[344] *Ibid* at p. 32.

[345] *Ibid* at p. 33.

Recommendations about Antennas and Property Values

During public hearings, and other interactions between members of the public and antenna proponents and local land-use authorities, those who will live in close proximity to an antenna installation under consideration likely will raise concerns about the possible impact of the proposal upon the value of their properties. These individuals should be permitted to voice their concerns, but it should be explained that the principle purpose of consultations with the public and/or land-use authorities is to consider the visual impact of the antenna proposal upon the immediate environment. Negative impacts should be explored through discussions about the potential for loss of the particular amenities or important visual characteristics of the area.

> **Recommendation 34: That the impact (positive or negative) that an proposed antenna installation may have upon the property values of particular parcels of land should not be the subject of an antenna consultation.**

Generally, land-use planning authorities are not required to take such impacts into account when siting urban and rural infrastructure that concerned members of the public may find objectionable. Almost every planning decision will produce positive and negative impacts upon the value of land located in the immediate vicinity.

This recommendation is consistent with the way in which the telecommunication and planning policies of Wales handle issues related to claims of loss of property values. The planning and development authorities will address the possible impact on property values only if there is evidence of a negative effect on the locality as a whole. To quote from the policy itself:

> Authorities may receive representations about alleged impact of proposed telecommunications development on property values. It is not for the planning system to protect the private interests of one person against the activities of another. Although in a particular case considerations of public interest may serve to protect private interests, the material question is not whether a particular development would cause financial or other loss to owners or occupiers of the neighbouring property, but whether the proposal would have a detrimental effect on the locality generally, and on amenities that ought, in the public interest, to be protected.[346]

Even if the actual or perceived impact on individual property values is not to play a prominent role within public and local consultations in Canada, the concerns of residents about

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[346] Wales, *Planning Policy, Technical Advice Note No. 19 Telecommunications, Policy on Property Values,* National Assembly for Wales, Cardiff, ISBN 0 7504 2900 3, 2002 at para. 48.

their property values should be important to both antenna proponents and to municipalities for two reasons. This information may aid in site selection and planning and help both constituencies to better understand one important source of likely opposition from neighbouring property owners. Additionally, as mentioned earlier, to the extent that the perceived or actual loss of property values relates to the public's intuitive sense of disamenity, that may be reduced through camouflaging, screening and landscaping techniques to make the antenna less obtrusive and by ensuring that the installation is sited as sensitively as possible in the circumstances. It is submitted that the public's sense of disamenity in relation to a particular antenna proposal also may be reduced when the community is consulted and participates in a meaningful way in the siting decision.

For the siting of an antenna tower to have a stigmatic effect upon the actual values of lands located very proximately to it, likely, it is necessary that public concerns about human exposure to radiofrequency fields be strong and pervasive. Those terms could not be used to describe current public perceptions in Canada about this issue, but this could change. It is submitted that another motivation for the proponents of significant antenna installations to develop proper risk communication strategies for their dealings with the public, is to keep the stigmatic effects of their installations to a minimum. Within the section of this report written in reply to Policy Question 2 (What information would best benefit concerned members of the public...) specific recommendations were made about the creation of risk communication strategies by Industry Canada and antenna proponents to address public concerns about human exposure to radiofrequency fields. Hopefully, the case for a risk communication strategy is more compelling when one considers the indirect benefits that may accrue.

Section E - Conclusion

The Canadian radiocommunication sector has grown remarkably over the past 15 years in response to the growing demand for better communication at work and at home, in business, in public services and in support of electronic commerce. These demands and our appetite for advanced wireless and digital broadcasting services are causing a substantial increase in network infrastructure, including the visible aspect of that infrastructure, antenna towers.

The National Antenna Tower Policy Review was mandated to "conduct a thorough study and public consultation on the current environment related to the placement of radio antenna towers in Canada." That study and public consultation were initiated in April 2003 and this report brings them to a conclusion. To that end, this report gathers together information from all relevant sources in order to make recommendations regarding the future direction of telecommunications policy in Canada which embrace the dual objectives of community involvement in tower approval processes and expansion of the economic and social benefits of wireless technologies across Canada.

In particular, recommendations regarding the mandated policy review questions have been made following detailed analyses of all available materials and input, including: Formal Written Submissions, e-town hall data (including survey questionnaires and discussion forum), numerous in-person and teleconference meetings with stakeholders, hundreds of e-mail comments and phone calls, informal submissions, literature review research, legal research, and, importantly, the advice and feedback of the National Antenna Tower Review Advisory Committee.

For many years Canada has had a strong reputation internationally for its approaches to radiofrequency spectrum management issues. Canadian solutions to spectrum challenges are often applied by other nations. In relation to the establishment of network infrastructure it is time for Canada to find an appropriate balance between radio engineering and social objectives within its radio regulatory policies. Hopefully this report will assist in that task.

Section F - Appendices A, B, C, D, E & F

Appendix A - User Opinions from the Online Discussion Forums

The qualitative analysis for Appendix A was performed by Student-at-Law (3rd Year), Kirsten Drake-McKnight at the University of New Brunswick.

The online discussion forum on the Antenna Review website was open for comment from September 3rd to October 24th, 2003. Approximately 165 comments were posted in the forum, and comments were viewed approximately 6800 times. While the majority of the users were amateur radio operators, comments were also posted by the general public, EMF sensitive persons, community groups, and there was a small amount of participation from the industry.

Below is a sample of comments posted in the discussion form, categorized generally under the 6 policy questions that the Antenna Tower policy review team was asked to comment on.

1. How can the local consultation process regarding the siting of a specific tower be improved? What are the most appropriate time frames for the processes of approving and resolving debates surrounding specific tower placements?

Participants, in general, seemed to want assurance that consultation would incorporate a true dialogue on the issue. At the very least, they wanted to be assured that their views would be listened to and taken into consideration before making decisions.

"We all want the same things: to be heard, and to have a fair review."
(General Public)

"The big picture for me is not based on a false dichotomy of whether one is for or against cell phone towers. Rather, it's a question of responsible tower siting where the rights of individuals and communities are respected by business and the federal government in the context of a gross power imbalance."
(General Public)

Participants believe that Industry Canada needs to play a stronger role in the consultation process.

"Funny how you will rarely see any Industry Canada representatives at your local town hall meeting. They are always conspicuous by their absence. Small town Canada could be easily being fed a line of BS. At least by having an Industry Canada representative there, the cell companies wouldn't try it."
(General Public)

On a further role for Industry Canada:

"The last step before a site-specific licence is granted should be: 'is the local land use authority fully aware of its rights and knows/understands the process?' 'Did a legal representative for the land use authority sign paperwork to that effect?'"

(Amateur Radio Operator)

A majority of participants expressed a desire to see a standardized consultation process across the country.

"It seems clear that there are pockets across this great country where putting up a tower of any sort has been turned into a political issue, rather than a rational decision making process. I think this highlights the need for a strong centralized approach. … A standardized consultation monitored at the federal level might not appeal to everyone, but it would at least, hopefully, be fair or unfair to everyone. We the public need time to go over these issues – to inform ourselves and our neighbors."

(General Public)

"The real problem is that there is no consistency from one town to the next or from one province to the next."

(Other)

"From start to finish, the consultation process should take no longer than 90 days and the process and guidelines should be standardized across the nation."

(Amateur Radio Operator)

Amateur radio operators are concerned that in some areas they are required to pay a large consultation fee.

"The consultation process has to keep in mind the type of radio use. If we hams are regulated by Industry Canada to be non-commercial (ie. cannot make money at our hobby), then it makes sense that any policy or process cannot ask for any unreasonable fees."

(Amateur Radio Operator)

Amateur radio operators are concerned that public consultation meetings often stir up unwarranted feelings and focus on opinions rather than facts. They would prefer a less emotional consultation process.

"I firmly believe municipal planning staff/engineering dept, should be handling the entire process, start to finish. They are long term employees, unlike politicians who come and go. Town hall meeting open to the public, press, various "rate payers groups", assorted sundry "experts", nimbys [Not In My Backyard], et al, are entirely counter-productive, time

consuming, and are generally used to gauge public anger. A process whereby the public could send in written comments and questions well in advance would be far better. It would then give the tower proponent plenty of time to answer each and every question in a detailed fashion."

(Amateur Radio Operator)

2. What information would most benefit concerned members of the public and how should it be provided?

Amateur radio operators were prompted to participate in the discussion because of difficulties they have had, at the local level, with politicians and residents who are ill-informed about the technical issues surrounding antennas, towers, and RF/EMF issues. In the local consultation process, amateur radio operators would like to see more education about the differences between commercial and amateur antennas. Local community groups also seemed to appreciate the difference between commercial and amateur towers and expressed a need for a distinction between the two.

"In the eyes of the municipalities, amateur radio installations are classified as having the same type of installation as a commercial one. … The land use authorities don't see the distinction between the two. That is the problem."

(Amateur Radio Operator)

"I am not a radio amateur (just a scientist who has worked extensively with RF) but it did strike me upon reading the preamble to the [National Antenna Tower Policy Review] questionnaire that there was an inappropriate lumping together of cell/amateur towers."

(Local Community Group)

Much of the discussion surrounded information that should be provided for high output and cellular towers. Basic information, as well as some technical information, were highlighted as important to educate the general public.

"For high output transmitters there is very little the public needs to know if the antennae are located in unpopulated areas as mandated by the Radiocommunication Act. In the rare and unavoidable event that a populated site is being considered, citizens residing or working near the proposed location must be informed of the following:
Authorities: Which levels of government have the authority to review site selection, grant approval to construct, conduct building inspections and rectify interference problems?
Alternate sites: Why is this site being considered? What other sites were considered? Was co-location considered? Why were the other sites not suitable (financial, access coverage, etc.)?
Health: What levels of power output are planned and what are the estimated/possible thermal

and non-thermal health effects? How do these compare to Health Canada's *Safety Code 6*? Harmful effects: What electronic devices will be affected and how these affects will be remedied?"

(Local Community Group)

"In all cases (high output and cellular) the public must be made aware of the following:
What sort of tower set backs are being considered?
What are the anticipated wind noise levels?
What sorts of structures are being placed on the site and how will it be landscaped?
Will there be noise from the on-site power and generating equipment?
Who will pay for the loss in taxation revenues and property values?"

(Local Community Group)

"What are the thresholds of normal [RF/EMF] tolerance, how is it measured, how and who would a person contact to ask for a testing of an antenna installation, who is responsible for testing, and how long does it take between a request for testing and a response, and any subsequent action that might need to be taken?"

(General Public)

"For the higher power broadcast transmissions there must be a regulatory requirement to provide this information. This regulation must require the applicant do it through public consultation, with Federal and Municipal government representatives in attendance, and with minutes being taken. There should be a simple and practical public appeal process. This process must have some clout and give the public a fair opportunity to review and overturn decisions. "

(Local Community Group)

Local community groups seemed concerned about the health effect of towers on wildlife, particularly migratory birds. Amateur radio operators seemed skeptical about any effects on birds, and seemed to believe that current guidelines are sufficient.

"The current guidelines/rules are plenty. They just have to be followed correctly enforced by both sides."

(Amateur Radio Operator)

3. What means are available to readily identify whether proposed installations may create radio frequency fields in excess of established exposure limits in areas where people live and work?

Many of the radio operators who participated in the online discussion forum were convinced that cell sites are in compliance with, and generally below, Canada's Safety Code

6 limits. The general public, however, is still concerned about the inconclusive results of studies about health effects. They want more information about testing exposure levels and about EMF-sensitivity.

> "It seems premature to say that there are no health risks. … The data seem far too inconclusive to take a strong stand either way, which does not seem to have deterred the cell phone companies and Cell Phone Canada from doing so. There is a lot of material on the web about this. I don't know enough to evaluate how good it is but I found some of it to be informative in raising some issues and possible concerns to research further."
>
> (General Public)

> "I doubt that there are many who are qualified enough, and have researched it enough, to know for a fact that absolutely no one would be sensitive to EMF or anything else. You know how sensitive your skin gets after a sunburn. Maybe there are person specific situations that predispose a person to be sensitive to certain things."
>
> (General Public)

Some users also expressed concerns about the cumulative effects of towers.

> "Another question I would have is to ask is if there are cumulative effects from multiple antennas on the same tower - I have heard that antennas for different uses can have different frequencies so don't necessarily have cumulative effects when placed next to each other - I just want to know that someone is actually keeping track of this and that there is a useful, responsible and accountable process in place that keeps it all in check - what is the process and who enforces it?"
>
> (General Public)

4. Can protocols be arranged between local land-use authorities and antenna proponents regarding the planning and siting of antenna structures, visual guidelines and dispute resolution mechanisms?

The telecommunications industry believes that municipal protocols can be beneficial, provided that municipalities recognize the limits of their protocols and respect the Federal Government's jurisdiction.

> "Some municipalities use their development review processes for consultation, understanding that they are not enforceable. The answer for others is a protocol created in co-operation with the proponents of antennae structures. ... A protocol can reduce controversy by setting realistic expectations, recognizing the Federal Government's jurisdiction, and the balance between the municipality's land use objectives and the benefits of wireless. The delegation of commenting powers to municipal staff based upon the protocol reduces the burden on Council agendas and municipal resources."
>
> (Industry)

Radio amateurs want a clear legal distinction between towers used for commercial and personal use. These distinctions should be reflected in municipal protocols.

> "There needs to be a clear separation of towers used for commercial purposes and those used for 'personal' use… not only amateur radio, but also citizen's band, and receiving antennas for satellite TV, and terrestrial radio and TV signals."
>
> (Amateur Radio Operator)

> "Amateur radio operators are very concerned about being 'side-swiped' by any new regulatory regime."
>
> (Amateur Radio Operator)

Radio amateurs talked at length about the community benefits of antennas, particularly amateur towers, for emergency services. They believe that in establishing local protocols, the potential for emergency services should be considered. (Also see question # 5)

> "Our community's ability to assist in emergencies, such as the BC forest fires, Ontario blackouts, Ontario/Quebec ice storms, Manitoba and Saguenay floods and the Swissair crash at Peggy's Cove all depend on being able to properly function… which we can't do with unreasonable tower restrictions."
>
> (Amateur Radio Operator)

Local community groups see a need for tower approval methods that recognize the need for community involvement.

> "They key I believe is a community review process that requires technological systems to be integrated into the built environment and become part of the standard community development approval system. We can not isolate communication towers from their impacts on the community and the community role in determining adequate solutions to our landscape and viewpoints. I believe that this recognition will automatically provide more creative and satisfactory solutions to the implementation of towers into community fabric."
>
> (Local Community Group)

Radio operators are concerned about visual guidelines in local protocols. (Also see question # 6)

> "Opinions of visual impact are hard to legally define. I may not like the look of a neighbor's shed painted bright pink, but there is nothing I can really do about individual taste. The same

with a tower on private property. Structural safety - yes, Safety Code 6 - yes, but looks - no. Opinions should not be allowed to impede or affect any tower review process, amateur or otherwise."

(Amateur Radio Operator)

"I don't like my neighbor's rusted out cars, rental units, people who paint their entire home an awful orange colour (with lime green trim on the windows), wild parties, stereos at 3 AM, etc. A free standing Trylon (with mast) is more than reasonable."

(Amateur Radio Operator)

5. How and to what extent can tower sharing be utilized in order to reduce the total number of towers?

Tower sharing and co-location for commercial towers is seen as desirable by most of the groups who participated in the online discussion forum.

"Few would argue that towers are not an eye-sore, but they are a necessary evil for delivering wireless services. There are technical arguments for certain mismatches of technologies on a common tower, but for many scenarios mixed technologies and spectrum bands can coexist on a common tower. Sharing of towers can present both an economic benefit to service providers and reduce the negative aesthetic impact of unnecessary towers. ... Any steps that can be taken to reduce the number of towers without undue negative impact on open competition, yet maintaining strict safety standards should be welcomed."

(Other)

Negative financial burdens on the industry as a result of tower sharing were addressed, but many participants held the view that municipalities should erect towers themselves, and lease space to the industry.

"One to two cell phone companies may not want to spend huge money on a tower designed for 4-6 antenna arrays, then wait years on end to see if other cell companies decide to join in and pay their share."

(Amateur Radio Operator)

"Why should the first cell company pay all the start up costs for an oversized tower that will handle all of the competition? Would you? I wouldn't."

(Amateur Radio Operator)

"Either get individual municipalities to install, and pay for the towers (and then lease space on them), or [the federal government can] change the tax write off laws for the company that installs an oversized tower first in each area."

(Amateur Radio Operator)

"The municipalities can get into the tube/tower business. If tubes/towers are going be in their backyards, they could have complete control over ALL of them, and make a ton of money to boot. The least amount of structures would result overall, citizen's concerns would be met way beforehand, and the public would benefit from maximum competition being made available on each site that they own."

(Amateur Radio Operator)

Amateur radio operators expressed the view that while co-location and tower sharing may be effective for commercial towers, it is generally not an option for amateur radio operators. Because it is a hobby, most amateur radio operators erect antennas on their residential property.

"In the case of amateur radio, shared towers are pretty much unworkable unless the hams happen to live on adjacent properties."

(Amateur Radio Operator)

"From a public service/disaster response point of view, having many HAMs with separate stations/towers is a good thing. If ninety percent of them are disabled by a disaster, there are still plenty left to keep communications going, whereas other modes like telephone, cell and public service radios will be either disabled (likely) or overloaded (certainly)."

(Amateur Radio Operator)

Participants recognized that there may be several interpretations of co-location, and they would like to see co-location defined for clarity.

"There appears to be several versions of "co-location". Co-location could mean several antenna arrays sharing a common tower, OR it could mean several broadcast transmitters all sharing the same antenna. This same concept would work for other services as well. OR, it could mean grouping a bunch of towers all located on one site, ie. 5 separate towers all sharing the same mountain top/access road/commercial AC power etc."

(Amateur Radio Operator)

6. What evidence exists that property values are impacted by the placement of antenna towers?

Participants were divided on the issue of property values.

"It should be obvious that a high degree of pleasure is gained by the opportunity for a view, and a premium is paid for land and buildings providing this view. It can easily be shown that view lots with open views of landscape have much higher values than similar lots without the views. Despoiling the view by inappropriate construction creates a loss of benefit and value.

The base issue is not that value is lost, but that value be saved or protected, or alternatively that owners be compensated for a loss of view. The greater issue is the loss of an attractive community for all residents by wanton disregard for landscape values including views of the horizon. It is interesting to note that the Eiffel Tower in Paris was initially considered to be an abomination to the classic City of Paris, but today is considered an emblematic icon for Paris. However, our urban forest of electrical and telephone poles have never been considered beautiful and never will. So clearly there needs to be public discussion about the role, location, cost, and nature of communication towers."

(Local Community Group)

"I think that it's more of a perception that a tower will reduce property values. We have towers for water and power and these seem to be accepted (not much of a choice really). Perhaps the benefits of antenna towers need to be enforced as it seems that people just focus on the tower itself rather than its purpose. Also, any associated health risks need to be addressed."

(General Public)

"My experience supports the idea that any "despoiling of the view" has a negative effect on resale values. This may not be so true in an urbanized area where condos, hydro lines, cell towers and who knows what else are part of the everyday landscape. ... Now that I have a CB/HAM enthusiast as a neighbour, who has erected a 90 foot tower, I am experiencing (along with my neighbours) significant RF interference for the first time – complete cutouts on wireless phones and on several broadcast TV signals. We live in an area not served by cable and rely on antenna reception of TV and recently of broadband internet signals. This annoyance can also affect the desirability of living here, just as much as regular loud parties and properties strewn with junk."

(General Public)

In general, amateur radio operators who participated in the online forum do not think that amateur towers would cause a significant decrease in property values, when compared with other eyesores.

"Amateur radio towers are not for commercial purposes and serve as a great hobby and communications in time of disaster. The tower is generally taken down when the Amateur operator moves or dies. Most towers do not exceed 50 feet in height; many trees exceed that height. Property values are affected more by a dirty, sloppy yard/house on the street, wrecked cars and trucks (in various states of repair) parked on the street and front lawn and/or financial forces totally beyond the control of any home owner."

(Amateur Radio Operator)

"Amateur radio support structures are small and temporary. When the Ham moves, the tower is removed. Because they are small they can often be well disguised with the nearby trees. Developers have built and sold homes in close proximity to such facilities, and while any number of factors can affect the value individual's place on property, there is little evidence

that amateur radio communication facilities cause a decrease in the value of surrounding properties. In addition, evidence from tax assessors and real estate specialists indicates that there is no decline in property values or tax assessment solely due to the presence of amateur radio communication facilities in the area. In some cases property values increase as the proximity of the Ham increases the resources in any emergency/disaster situation, and the speed of response if such occurs."

(Amateur Radio Operator)

"One could sit here all day debating property values, and what causes them to decrease. Everything from high crime, certain population groups, a major employer in town folding up, lousy weather, drinking water gone bad, forest fires destroying the landscape, and on and on."

(Amateur Radio Operator)

Several members of the general public believe that an assessment of property values should be part of the review process, and possibly compensation for property owners, if a decrease in property value is shown.

"An independent review and evaluation should be required to assess the impact of cell phone installations on property values of individual property owners affected. Where property values diminish, cell phone companies should provide compensation to property owners for their loss. It is ridiculous to not recognize the possibility that in some instances a tower installation that is placed adjacent to residential property would significantly lower property value. Assessment of the financial impact on individual property owners should be part of the required review process. … An ombudsman who can represent the rights of individual citizens in these matters and has the authority to order compensation would make cell phone companies much more sensitive to the financial and other impacts of their placements on individual property owners."

(General Public)

Appendices – B & C Data from Questionnaire

Analysis of the Data Obtained from the Questionnaire Administered from the E-Town Hall Web Site (Drs Paul Howe and E Stephen Grant of the University of New Brunswick)

This section of the report is written in two parts. It summarizes the initial findings from the Questionnaire component of the National Antenna Tower Policy Review Web Site. This questionnaire was available on-line from September 3rd to October 24th of 2003. The questionnaire was designed to probe various attitudes and experiences of consultation participants relevant to the six policy questions Industry Canada had asked the research team to investigate. Data were collected from the 235 participants who completed the questionnaire and were provided to researchers at the University of New Brunswick by xwave Solutions, Inc. our partners in the e-town hall project.

Some basic information about respondents, summarized below in the "Profile of Respondents," was gathered when they registered for the Web site. On the questionnaire itself, there were 38 questions divided into four sections:

1) **Your Experience with Antenna Towers;**
2) **Antenna Tower Siting Issues;**
3) **Information about Antenna Towers; and**
4) **The Local Consultation Process.**

Most of the questions were "closed-ended" questions that provided respondents with a fixed number of response categories from which to choose. Six of the 38 questions were "open-ended" in nature. They invited the respondents' to provide detailed answers in their own words. This report is accordingly divided to reflect the two types of survey questions and the differing analysis required.

Appendix B – Analysis of the Closed-Ended Questions from the Data Obtained from the E-Town Hall Web site

Questionnaire Part A

Quantitative analysis of closed-ended Questions by Professor Paul Howe PhD

The quantitative analysis summarizes findings based on the closed-ended questions, answers to which could be coded numerically and summarized in tabular format. Also included in Part A of the section are a small number of questions that were open-ended, but which produced relatively succinct responses that could be coded after the fact into a manageable number of categories and presented in tabular format.

1. Profile of Respondents

In order to facilitate analysis of the questionnaire results, all respondents were asked to ***"select the group that best represents you"*** from a list of twelve when they registered on the Web site. The twelve categories have been collapsed into five for the purposes of this report, in part because some represented finer divisions of a general category (e.g. government officials) and in part because of the low number of respondents in some instances. The resulting categories and number of respondents in each are shown in Table 1.1 (the notes below the table indicate how the initial twelve categories were collapsed into five). In subsequent sections, responses to most questions are broken down by group in order to evaluate how attitudes and experiences vary across different constituencies.

Table 1.1: Respondents by Category

	Number	%
Public	63	27
Radio users	135	57
Communications Industry	10	4
Government	23	10
Other	4	2
Total	235	100

Public: includes registration categories "*General Public*", "*Local Community Group*" and "*Provincial National Citizen Association*"
Radio users: includes registration category "*Radio User*" only
Communications Industry: includes registration category "*Communications Industry*" only
Government: includes registration categories "*Municipal Government*", "*Provincial Government*", "*Federal Government*", "*Municipal Politician*", "*Provincial Politician*", and "*Federal Politician*"
Other: includes registration category "*Other*" only.

Respondents came from all provinces (Table 1.2). As would be expected, there were more respondents from the larger provinces. Among those larger provinces, British Columbia and Alberta had participation rates in excess of their share of the Canadian population, while Quebec had a lower participation rate. None of the participants were from outside the country.

Table 1.2: Respondents by Province

	Number	%
Newfoundland & Labrador	2	1
Nova Scotia	13	6
Prince Edward Island	1	0
New Brunswick	10	4
Quebec	17	7
Ontario	58	25
Manitoba	7	3
Saskatchewan	6	3
Alberta	45	19
British Columbia	71	30
Outside Canada	0	0
Not stated	5	2
Total	235	100

2. Respondent Experience with Antenna Towers

The first set of questions asked respondents about their personal experiences with antenna towers, both in general and with respect to installations that had generated some public opposition.

Table 2.1: *"How many individual tower installations have you had some involvement with?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
None	24	8	10	30	25	15
1	27	19	10	22	25	21
2 to 5	29	38	0	13	0	31
More than 5	21	35	80	35	50	33
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- It is important to note that the figures in table represent the percentages within each group who gave various responses, rather than the numbers of respondents. The exception is the bottom row of each table, which reports the total number of respondents answering the question from each category. With the figures presented in this way, comparing percentages across the rows is the simplest way of assessing the degree to which responses varied across the five categories.
- The final column shows the breakdown of responses for all respondents taken together, again expressed in percentage terms.
- In Table 2.1, relatively few respondents (15%) reported no prior involvement with tower installations. The other 85% reported some involvement with at least one tower installation.

- Many (64%) reported involvement with two or more tower installations. This is particularly true for radio users (73%) and those from the communications industry (80%).

Respondents who indicated some prior involvement with tower installations were then asked about the locations and purposes of those installations. Those who reported involvement with multiple installations (150 respondents) were asked whether these were all in the same city or not.

Table 2.2: *"Were these all in the same town or city, or were they in more than one town or city?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
All in the same town/city	61	23	13	64	0	33
More than one town/city	39	77	88	36	100	67
(Number)	(31)	(98)	(8)	(11)	(2)	(150)

Percentages may not add to 100 due to rounding

- About two-thirds (67%) of those asked the question indicated that their prior experience was with tower installations in more than one town or city. Radio users and those from the communications industry were the most likely to give this response.

All who had indicated some prior involvement with at least one installation (200 respondents) were asked about the purposes of those towers. Multiple responses were allowed.

Table 2.3: *"What was the purpose of the installation(s)?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Radio amateur	29	99	0	31	67	72
TV/radio	15	13	22	25	67	16
Satellite TV	10	12	0	0	33	11
Cellular phone	58	7	78	63	67	28
Wireless broadband	25	4	33	13	33	12
Municipal and Emergency	0	2	11	31	0	5
Commercial Mobile	4	5	11	0	33	5
Other	0	2	11	6	0	3
Do not know	4	0	0	0	0	1
(Number)	(48)	(124)	(9)	(16)	(3)	(200)

Multiple responses allowed, therefore columns do not add to 100%.

- Based on responses detailed under the "Other" category, two new categories were added to the list: "Municipal and Emergency" and "Commercial Mobile".

- The most common response was radio amateur (144 mentions or 72%), followed by cellular phone (56 mentions or 28%).
- The incidence of particular responses varies across groups. For radio users, the most common purpose noted, not surprisingly, was radio amateur. For other groups, cellular phone was the most common response, with significant numbers also mentioning radio amateur, TV / radio, and wireless broadband.

The next set of questions (questions 4 to 6) were designed to inquire about tower sitings that had generated some degree of public opposition.

Table 2.4: *"Did any of these tower installations generate significant public opposition?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Yes	60	10	56	44	33	28
No	40	90	44	56	67	73
(Number)	(48)	(124)	(9)	(16)	(3)	(200)

Percentages may not add to 100 due to rounding

- Fifty-five respondents (28% of the 200 posed the question) indicated that they had been involved in a tower installation that generated public opposition.
- Radio users, the largest group in the overall sample, were the least likely to have been involved in a controversial installation (only 10%), while members of the public were the most likely (60%).

The next questions (questions 5 and 6) asked respondents to specify the location and purpose(s) of the installations that had stirred public opposition, as well as the eventual outcome. While these controversial installations were scattered in all parts of the country, the largest number were located in Western Canada. Among the cities mentioned by respondents were Edmonton, Calgary, Victoria, Saskatoon and Winnipeg. Sites of public opposition in other parts of the country included Pembroke and Baysville in Ontario, Wolfville, Halifax and New Maryland in the Atlantic region, and Sainte-Adèle and Havelock in Quebec.

Respondents could list up to five locations where public opposition had arisen. Of the 110 locations noted, the most common purpose of the towers in question was cellular phone (57 mentions or 52% of all cases involving public opposition). The second most common purpose was radio amateur (26 mentions or 24% of all cases involving public opposition).

Table 2.5: Purposes of Tower Installations that Generated Public Opposition

	Number of Mentions	*Percent*
Radio amateur	26	24
TV/radio	1	1
Satellite TV	1	1
Cellular	57	52
Wireless broadband	7	6
Municipal and Emergency	2	2
Commercial Mobile	0	0
Multiple use	6	5
Other	2	2
Do not know	0	0
Not stated	8	7
Total	110	

Percentages may not add to 100 due to rounding

Respondents were then asked the outcome of these cases that had generated public opposition. Table 2.6 breaks down responses to this question by the purpose of the installations in question.

Table 2.6: Outcome in Cases Where Installations Generated Opposition (%)

	Radio amateur	*TV/radio*	*Satellite TV*	*Cellular*	*Wireless broadband*	*Municipal and Emergency*	*Multiple use*	*Other*	*Not stated*	*Total*
Tower not erected	12	0	0	33	0	50	50	0	25	25
Tower erected with modifications	15	0	0	19	14	0	0	50	13	16
Tower erected without modifications	54	100	0	26	29	50	33	50	25	35
Outcome pending	0	0	0	12	57	0	17	0	25	13
Tower delayed	4	0	0	0	0	0	0	0	0	1
Other	15	0	100	9	0	0	0	0	13	10
(Number)	(26)	(1)	(1)	(57)	(7)	(2)	(6)	(2)	(8)	(110)

Percentages may not add to 100 due to rounding

- Based on responses detailed under the Other category, two new outcomes were added: "Outcome Pending" and "Tower delayed."
- The most common outcome in cases of public opposition was that "*the tower was erected with no significant modifications*" (35% of all cases). The second most common outcome was that "*the tower was not erected*" (25%), while in another 16% of the cases "*the tower was erected with significant modifications to meet public concerns*."
- There are differences in outcomes between the two usage categories – radio amateur and cellular towers – that account for the largest number of cases. For radio amateur installations, just over half of the 26 cases (54%) ended in the tower being erected without modifications. For cellular, this was the outcome in only

26% of the 57 cases; more commonly the tower was either not erected (33%) or erected with modifications (19%).

Following these questions about personal experiences with antenna towers, all respondents were asked their general feeling about current regulations for these installations.

Table 2.7: *"What is your general feeling about current government regulations for antenna tower installations?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Favour interests of industry	67	12	10	61	25	31
Favour concerns of communities	11	37	20	4	0	26
Strike a good balance	19	39	50	13	75	32
No opinion	3	12	20	22	0	11
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- For respondents as a whole, opinion is quite evenly split between those who feel current regulations "*favour the interests of industry*" (31%), those who feel they "*favour the concerns of communities*" (26%), and those who feel they "*strike a good balance*" (32%).
- Those in the public (67%) and in government (61%) are most likely to believe current regulations favour industry.
- Radio users and those in the communications industry are more likely to feel current regulations favour communities or strike a good balance. Only 12% of radio users and 10% of those from the communications industry believe that current regulations favour industry.

3. Antenna Tower Siting Issues

Respondents were next asked a series of questions designed to gather further information on the specific issues that are sometimes raised in response to the siting of new antenna towers. The first questions addressed the importance of different issues.

Table 3.1: *"How important is each of the following issues to the general public?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Aesthetics						
Very important	49	24	10	78	25	36
Somewhat important	33	55	60	22	50	46
Not all that important	16	20	20	0	25	17
No opinion	2	1	10	0	0	1
Property values						
Very important	51	21	40	57	50	34
Somewhat important	33	32	40	39	0	33
Not all that important	16	46	20	4	50	33
No opinion	0	1	0	0	0	0
Health concerns						
Very important	56	19	40	57	50	34
Somewhat important	21	29	30	22	0	26
Not all that important	24	48	30	17	50	38
No opinion	0	4	0	4	0	3
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- For respondents as a whole, the responses do not show a great deal of variation across issues. About one-third (36%) rate "*the aesthetics or appearance of antenna towers*" as a "*very important*" issue. The same is true for "*the potential effect on the property values of nearby properties*" (34%) and "*concerns about health risks associated with exposure to radio frequency (RF) energy*" (34%). At the other end of the scale, however, respondents are somewhat less inclined to rate aesthetics or appearance" as "*not all that important*" (17%) compared to either property values (33%) or health concerns (38%).
- There is a general tendency for radio users to accord less importance to all three issues than do members of the public or those from government. Among the latter two groups, half or more of respondents consider all three issues to be "*very important*".

Table 3.2: *"What of these three issues would you say is of the greatest concern to the general public?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Aesthetics/appearance	40	48	40	65	50	47
Property values	17	23	20	13	25	20
Health risks	40	21	40	22	25	27
No opinion	3	7	0	0	0	5
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- When asked to identify one issue of the greatest concern to the public, almost half (47%) of the respondents choose aesthetics / appearance. Another quarter (27%) select health risks, while 20% choose property values.
- Members of the public, however, are just as likely to select health risks as they are aesthetics /appearance (40% choose each option).

Questions 12 through 15 asked respondents to provide greater detail, in their own words, about the specific concerns people have with respect to each of the three issues, as well as any other matters that might be of concern. Analysis of these open-ended questions is provided in Part B [Appendix C] of this report.

4. Information About Antenna Towers

Questions 16 through 22 asked respondents their opinions on the knowledge levels and information requirements of the general public with respect to various dimensions of tower installations.

Table 4.1: *"How knowledgeable are members of the general public on each of the following issues?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Aesthetics						
Very knowledgeable	5	2	0	0	0	3
Somewhat knowledgeable	24	12	10	4	0	14
Not very knowledgeable	41	47	70	65	25	48
Not knowledgeable at all	30	36	20	26	50	33
No opinion	0	3	0	4	25	3
Aeronautical regulations						
Very knowledgeable	5	4	0	0	0	3
Somewhat knowledgeable	21	15	30	22	0	17
Not very knowledgeable	44	33	30	30	25	36
Not knowledgeable at all	29	47	30	48	50	42
No opinion	2	1	10	0	25	2
Property values						
Very knowledgeable	8	1	0	0	0	3
Somewhat knowledgeable	48	20	20	30	25	29
Not very knowledgeable	27	46	20	30	25	38
Not knowledgeable at all	16	30	50	39	25	28
No opinion	2	2	10	0	25	3
Health risks						
Very knowledgeable	6	6	0	0	25	6
Somewhat knowledgeable	30	11	10	13	0	16
Not very knowledgeable	33	31	40	26	25	31
Not knowledgeable at all	29	49	50	57	50	44
No opinion	2	3	0	4	0	3
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- The general assessment is that members of the public are not very knowledgeable about any of the specific issues mentioned. The most common response to all questions for respondents as a whole is either "*not very knowledgeable*" (aesthetics / property value effects) or "*not knowledgeable at all*" (aeronautical regulations / health risks). Only a handful of respondents – no more than 6% – consider the public to be "*very knowledgeable*" about any of these issues.
- Members of the public themselves differ somewhat in their views. In the case of property values, the most common response (48%) among members of the public is "*somewhat knowledgeable*", while for health risks, nearly as many pick "*somewhat knowledgeable*" (30%) as "*not very knowledgeable*" (33%). It remains the case, however, that very few members of the public (no more than 8%) select "*very knowledgeable*" for any of the items.

Table 4.2: *"In your experience, what is the primary source of information used by members of the general public to learn about antenna towers and their potential impacts?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Discussions with other people in community	32	29	20	22	0	28
Newspapers and other media	32	37	50	35	75	37
Internet resources	13	4	10	4	25	7
Local government	8	8	0	22	0	9
The federal government / Industry Canada	2	2	10	0	0	2
Owners and operators of antennas	14	19	10	17	0	17
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- The most common sources of information cited are "*newspapers and other media sources*" (37%) and "*discussions with other people in the community*" (28%). The third most common source cited is "*owners and operators of antennas*" (17%). Relatively few respondents cite government, either local or federal, as the primary information source.
- Responses do not differ markedly across groups.

Table 4.3: *"Do you feel that the public has adequate information about antenna towers and their potential impacts?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Public has adequate information	11	16	10	4	25	13
Public needs more information	87	81	80	96	75	84
No opinion	2	4	10	0	0	3
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- The consensus on this question (84%) is that the public does not have adequate information.

Question 22 was an open-ended question asking respondents what information would most benefit members of the public and how it should be provided. Analysis of responses to this question is provided in Part B [Appendix C] of this report.

5. The Local Consultation Process

The largest part of the questionnaire asked respondents a series of questions about consultation processes for the approval of tower installations – both their experiences with such consultations in the past and their views on how these consultations should ideally be organized and administered.

Table 5.1: *"Do you feel that Industry Canada's current procedures for local consultation are being followed in most cases?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Yes	35	45	60	30	50	42
No	51	17	20	35	50	29
No opinion	14	38	20	35	0	30
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- More respondents feel that current procedures are being followed (42%) than feel that they are not being followed (29%). Nearly one-third (30%), however, do not have an opinion.
- Members of the public are the most likely to feel that current procedures are not being followed (51%). Radio users (17%) and those from the communications industry (20%) are less likely to hold this view.

Table 5.2: *"Do you feel that the current procedures place too little emphasis on public consultation, too much emphasis, or about the right amount?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Too little emphasis	63	10	30	52	25	29
Too much emphasis	16	30	20	4	0	23
Right emphasis	19	41	40	26	75	34
No opinion	2	19	10	17	0	13
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- Opinion is quite evenly split on this issue. Just over one-third (34%) feel there is "*about the right amount of emphasis on public consultation*" in the current procedures, while 29% feel there is "*too little*" and 23% believe there is "*too much*".
- There are sharp differences across groups. Members of the public (63%) and those from government (52%) tend to believe there is too little emphasis on public consultation. Radio users and those from the communications industry are much more likely to feel there is too much, or about the right amount, of emphasis.

Table 5.3: *"What is your view on the current 120 day period for the process of approving specific towers? Is this time frame…"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Too short	43	5	30	30	75	20
About right	37	43	30	57	25	42
Too long	13	33	30	0	0	23
No opinion	8	19	10	13	0	15
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- Over 40% feel the 120 day time frame is "*about right*", while roughly equal numbers – around 20% in each case - feel it is either "*too short*" or "*too long*". Members of the public (13%) and those from government (0%) are less likely than other groups to feel 120 days is too long, while radio users are less inclined to believe this time frame is too short (only 5% hold this view).

Table 5.4: *"In your experience, are adequate efforts made to notify the general public of proposals for new tower installations?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Yes	27	42	50	13	25	35
No	65	30	50	61	75	44
No opinion	8	28	0	26	0	21
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- About 35% feel that efforts to notify the public of proposals for new installations are adequate, whereas 44% feel they are not.
- The public (65%) and those from government (61%) are more likely than other groups to believe that notification efforts are not adequate.

The next section of the survey asked respondents different questions depending on the nature of their experiences with antenna tower installations. Those who indicated they were best described as "*a member of the general public who has had an antenna tower either proposed for your community or actually erected in your community*" (66 respondents in all, primarily members of the public and radio users) were asked whether they were aware of the proposal before the tower was erected. About three-fifths (59%) indicated that they did hear of the proposal before the tower went up; 41% indicated they did not.

Those who had heard about the proposal (39 respondents in all) were then asked how it was they had heard about it.

Table 5.5: *"How did you hear about the proposal?"* (%)

Discussions with other people in community	36
Media	10
Announcement by local government	18
Announcement by company	21
Saw tower being erected	3
Mail (or flyer in door)	5
Other	3
Do not remember	5
(Number)	(39)

Percentages may not add to 100 due to rounding

- Of the 39 respondents who indicated they did hear about the proposal before the tower was erected, 14 (36%) heard about it through "*discussions with other people in the community*". Another 15 heard about it via an "*announcement*" by either "*the company making the proposal*" (8 respondents or 21%) or "*the local government*" (7 respondents or 18%).

The 93 respondents who indicated that they were best described as "*someone who has had experience with multiple tower installations (in an official capacity or otherwise)*" were asked two different questions about public notification efforts, questions which spoke to their experiences in general with tower installations. Of the 93 respondents, 79 provided responses to the two questions; many of these 79 respondents (49 in all) were radio users.

Table 5.6: *"In the cases you are familiar with, what is the most common method of notifying the public about a proposal for a new tower installation?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Letter / Flyer	25	18	57	33	50	25
Personal /door-to-door notification	8	39	0	0	0	25
Newspaper notice / newspaper	42	18	14	33	50	24
No notification efforts	8	16	0	22	0	14
Notification of municipality	0	4	14	0	0	4
Other	8	0	14	11	0	4
Public / council meeting	8	2	0	0	0	3
Poster at site / public notice	0	2	0	0	0	1
(Number)	(12)	(49)	(7)	(9)	(2)	(79)

Percentages may not add to 100 due to rounding

- The open-ended responses given to this question were coded into categories. If someone mentioned two methods of notification, both were coded.
- The most common methods of notification were a letter or flyer delivered to people's homes (20 respondents or 25%) or personal / door-to-door notification (another 20 respondents or 25%). Virtually all of the latter responses (19 of 20) came from radio users.
- Another 11 respondents (14%) indicated that there were, in their experience, no notification efforts made. Again, most of these responses (8 of 11) came from radio users.
- In terms of dual responses, 5 respondents indicated newspaper notices as a second method of notification, while 4 indicated letter / flyer.

The same respondents were then asked about the effectiveness of the method of notification they had identified as the most common.

Table 5.7: *"How effective is this method of notification in ensuring that members of the public are aware of proposals for new tower installations?"* (%)

How effective?	*Letter / Flyer*	*Personal / door-to-door notification*	*Newspaper notice / newspaper*	*No notification efforts*	*Notification of municipality*	*Other*	*Public/ council meeting*	*Poster at site / public notice*	*Total*
Very	60	75	21	0	67	0	100	0	44
Somewhat	35	15	47	0	0	0	0	0	24
Not very	5	5	21	9	33	0	0	100	11
Not at all	0	5	11	55	0	100	0	0	15
No opinion	0	0	0	36	0	0	0	0	5
(Number)	(20)	(20)	(19)	(11)	(3)	(3)	(2)	(1)	(79)

Percentages may not add to 100 due to rounding

- The two methods that involve direct contact with affected persons – either by letter/flyer or door-to-door notification – are considered by most to be "*very effective*" (60% and 75%).
- Newspaper notices, on the other hand, are less likely (21%) to be considered "*very effective*".

All questionnaire respondents were then asked what they felt would be the most effective method of notification.

Table 5.8: *"What do you feel would be the most effective way of notifying members of the public about proposals for new tower installations?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Letter / Flyer	41	33	40	39	0	36
Newspaper notice / newspaper	32	30	20	35	0	30
Radio / TV / media in general	24	13	10	9	25	15
Personal /door-to-door notification	5	10	10	9	0	8
Poster at site / Public Notice	10	7	10	4	25	8
Public meeting /council meeting	5	3	10	22	0	6
Web site / Internet	3	7	0	0	0	5
Through notification of municipality	3	4	10	4	0	4
No notification efforts	0	6	0	0	0	3
Through notification of community association	8	0	0	0	0	2
Government	0	1	0	0	0	1
Other	5	1	0	4	0	3
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Multiple responses allowed, therefore columns do not add to 100%.

- The open-ended responses people gave to this question were coded into categories. For those who gave multiple responses, up to three distinct methods were coded.
- Table 5.8 reports the total number of mentions for each category. Since multiple responses were allowed, the percentages add up to more than 100%.

- The method most often mentioned (by 36% of respondents) was "letter / flyer" delivered to homes potentially affected by the antenna tower (in some cases this latter provision was specified, in others it was not). Close behind this was newspaper notices of some sort, mentioned by 30% of respondents. Another 15% mentioned other forms of media notification (TV, radio or the media in general).
- Of these more common responses, "letter/flyer" was more likely to be cited by members of the public and those from both the communications industry and government. Radio users were slightly less likely to mention this method of notification.

The next set of questions spoke to the methods and mechanics of the consultation process itself.

Table 5.9: *"How much time do you feel should be allowed between public notification of a proposed installation and the start of any public consultations on the proposal?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
1 to 2 weeks	8	20	30	9	0	16
2 to 4 weeks	43	36	40	57	50	40
4 to 6 weeks	37	19	20	17	25	23
More than 6 weeks	10	8	10	0	25	8
No opinion	3	17	0	17	0	12
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- The most common response (40%) to this question was "*2 to 4 weeks*". This was true of all groups. Members of the public, however, were somewhat more likely than other groups to opt for "*4 to 6 weeks*".

Table 5.10: *"And how much time should be allowed for public consultations to take place?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
1 to 2 weeks	17	27	30	4	0	22
2 to 4 weeks	17	33	40	48	50	31
4 to 6 weeks	40	17	10	26	0	23
More than 6 weeks	22	5	20	4	50	11
No opinion	3	18	0	17	0	13
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- "*Two to four weeks*" was also the most commonly chosen time frame for consultations to take place, as 31% selected this option. However, 23% chose "*4 to 6 weeks* and 11% chose "*more than 6 weeks*" – in other words, 34% in total preferred a period of 4 weeks or longer.

- Members of the public again tended to prefer longer time frames ("*4 to 6 weeks*" or "*more than 6 weeks*") compared to other groups.

Table 5.11: *"Which method would you prefer for consultations on antenna tower proposals?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Public meetings	59	31	60	61	50	43
Written submissions	35	53	40	22	50	44
No opinion	6	16	0	17	0	13
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- There is an even split on the preferred method of consultation, with differences across groups. Members of the public and those from the communications industry and government prefer "*public meetings*"; radio users tend to prefer "*written submissions*".

Table 5.12: *"And in terms of submitting views in writing, which method of submission would you prefer?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
By mail	37	34	20	35	75	35
Over the Internet	56	50	50	26	25	49
No opinion	8	16	30	39	0	16
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- The preferred method for written submissions is "*over the Internet*" (49%) rather than "*by mail*" (35%), though this preference may, of course, partly reflect the method used for this particular consultation.

Table 5.13: *"Who do you think should be responsible for organizing public consultations on proposed tower installations?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Local municipal authority	33	33	50	35	25	34
Company or individual making proposal	32	13	30	35	0	20
Federal government	35	47	20	22	50	40
No opinion	0	7	0	9	25	5
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- The preferred organizer of public consultations is "*the federal government*", chosen by 40% of respondents. Another 34% prefer "*the local municipal authority*", while 20% choose "*the company or individual making the proposal*".
- The differences across groups are relatively small in this case, with radio users showing a somewhat stronger preference for the federal government.

Table 5.14: *"Do you feel there should be a common consultation procedure in place for all communities across Canada, or should local communities develop their own consultation procedures?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
Common procedure across Canada	75	83	50	57	50	76
Local communities develop own procedures	21	13	50	43	50	20
No opinion	5	4	0	0	0	3
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- The favoured response on this question (76%) is a "*common consultation procedure for all communities across Canada*." Members of the public and radio users are the most likely to choose this option. Those from the communications industry and government, on the other hand, are more evenly split on the issue, with roughly half in each group preferring the idea that local communities should develop their own procedures for consultation.

Table 5.15: *"Do you feel public consultations should be a requirement for all new tower proposals, or do you feel consultations should only be required if there is a significant level of concern expressed in the local community?"* (%)

	Public	*Radio users*	*Comm Industry*	*Government*	*Other*	*Total*
For all new tower proposals	63	16	40	78	50	36
Only if concern expressed	35	79	60	17	50	60
No opinion	2	5	0	4	0	4
(Number)	(63)	(135)	(10)	(23)	(4)	(235)

Percentages may not add to 100 due to rounding

- The majority of respondents (60%) are not in favour of a requirement for public consultation for all new tower proposals, preferring a more flexible approach based on the perceived need for consultation in particular cases.
- This majority support, however, largely reflects the preferences of radio users. Other groups, specifically the public (63%) and those from government (78%), are strongly in favour of a requirement for public consultation in all cases.

Question 38 was an open-ended question asking respondents for any other specific suggestions for improving the local consultation process regarding the siting of towers. Analysis of responses to this question is provided in Part B [Appendix C] of this report.

6. Conclusions

Several broad conclusions can be drawn from this analysis of the close-ended questions on the e-town hall questionnaire.

- Participants in the e-town hall bring a wide range of experiences and perspectives to bear on the questions at hand. They come from various constituencies with a stake in antenna tower installations and from all parts of the country. Most have had direct experience with tower installations, while a fair number have experience with cases that have generated some public opposition.
- Public opposition to tower installations has resulted, on a number of occasions, in towers either not being erected or being erected with significant modifications. These outcomes are most common in the case of cellular phone towers.
- The issues often raised in conjunction with tower installations – aesthetics, property values and health concerns - are all deemed by questionnaire respondents to be of considerable importance to the general public. Of the three issues, aesthetics is thought to be of greatest concern, although members of the public themselves are equally likely to rate health concerns as the most important issue.
- On a number of issues pertaining to government regulation of tower installations and public consultation procedures, opinion is divided between those who would like to see a looser and more flexible regulatory framework amenable to the interests of the communications industry and radio amateurs and those who would like to see tightened governmental control to safeguard the interests of people

and communities potentially affected by antenna tower installations. This division of opinion is apparent on issues such as:

  - General feelings about current government regulations for antenna tower installations
  - Whether or not current procedures for local consultation tend to be followed
  - Whether current procedures place an appropriate degree of emphasis on public consultation
  - The current 120 day time frame for approving specific towers
  - The adequacy of current notification efforts for new tower installations
  - The amount of time that should be allowed between public notification and the beginning of public consultations
  - The preferred duration of public consultations
  - Whether public consultation should be mandatory for all new tower proposals

- On many of those same issues, respondents from the communications industry and radio users tend to take the position consistent with a looser regulatory framework while members of the public and those from government tend to hold views consistent with a tighter regulatory approach.
- At the same time, there are some issues where respondents from different constituencies tend to concur in their opinions. These include:
  - Knowledge levels and information needs: respondents largely agree that the public does not have high levels of knowledge on the various issues relevant to antenna tower installations and that more information needs to be provided.
  - The most effective method of public notification about tower installations. Direct notification of affected persons (through letters/flyers or door-to-door notification) and media notification (particularly via newspapers) are cited by many in all groups as the preferred methods.

Appendix C — Analysis of the Open-Ended Questions from the Data Obtained from the E-Town Hall Web Site

Questionnaire Part B

Qualitative Analysis by Professor E. Stephen Grant PhD

The qualitative analysis focuses on the open-ended questions that produced more lengthy and detailed responses (specifically questions 12 through 15, 22 and 38). These required a more qualitative method of analysis to detect patterns and trends in opinion.

7. Methodology

A qualitative method known as *content analysis* was used to analyze the text provided in response to the open-ended questions (specifically questions 12 through 15, 22, and 38). The purpose of this analysis was twofold. First, content analysis was necessary to systematically and objectively derive categories of responses that represented homogenous thoughts or opinions. This was done to facilitate interpretation of the large volume of lengthy and detailed responses. The second purpose of content analysis was to identify responses particularly germane to this investigation and deemed worthy of presentation in this report.

The form of content analysis performed is known as *open coding or context-sensitive scheme coding.* This form of analysis involves the researcher in naming categories through a detailed examination of the data. Thus, an a priori scheme of possible responses was not used, but rather the researcher worked with the actual text provided by respondents to generate the categories used to summarize the data. This involved an iterative interpretation process of first reading responses, then re-reading to establish meaningful categories, and finally re-reading select responses to refine the number and meaning of categories in a manner deemed most representative of the respondents' text.

Each response was coded into as many categories as necessary to capture the "full picture" of the respondent's thoughts or opinions. In an effort to reduce potential coding errors, responses deemed incomprehensible within the context of the question were not coded.

The content categories derived were not further allocated into the original twelve or even the five refined respondent categories presented in Part A [Appendix B] of this report. This level of categorization would have produced an unmanageable number of categories with limited diagnostic benefit (e.g., up to 300 categories in the case of data interpreted for Question 38). However, in order to communicate observed patterns of response by respondent groups, footnotes have been added where it was deemed appropriate. Also, all noteworthy respondent quotations that follow are attributed to one of the twelve respondent types as selected by the respondent when they registered on the Web site.

In the first three sections that follow, results will be presented in tabular format. For each of these sections, three or more responses deemed particularly germane to this investigation will be presented in order to communicate respondent insights which could potentially be lost through the simple reporting of categories.

8. Antenna Tower Siting Issues (Questions 12 through 15)

In order to provide respondents the opportunity to provide more lengthy and detailed responses concerning antenna tower siting issues, they were asked: "Can you describe in greater detail the specific concerns people have raised in each of the following areas?:" "The aesthetics or appearance of antenna towers" (Question 12); "The potential effect on the property value of nearby properties" (Question 13); "The health risks associated with exposure to radio frequency (RF) energy" (Question 14), and "Are there any other issues that should be raised in response to new antenna towers?" (Question 15).

Table 8.1 "The aesthetics or appearance of antenna towers"

	Number
Note sensitive to historic areas/tourism sites	1
Too large/too high/therefore don't blend in	27[1]
Just unsightly/ugly structures (emphasis on commercial towers)	43[1]
Location/out of place (in a farmer's field, beside a home)	4
Appearance impacts property value	3
Must look safe	1
Interferes with view/destroys the skyline	20
A new structure represents a change/noticed at first	2[1]
Lights are annoying at night/distraction	2
Lack of care and upkeep at site/ground enclosures appearance	4
Antennas with horizontal elements are more objectionable	1
Advertising on towers	2
Too many towers in a small area	2

[1] Note: Radio Users clearly differentiated their towers as smaller, not unsightly, and several noted that their towers were only noticed when first installed.

Noteworthy response quotations:

"This is of concern in urban/suburban areas, but not in rural areas. Camouflaged towers should be encouraged in cities." **(Communications Industry)**

"The visual appearance of towers is often perceived to be unsightly on the basis of height, the way the towers are finished, or because of methods of illumination (i.e., beacons and strobe lights)." **(Municipal Government)**

"Industry has the ability to make antennas virtually invisible but this incurs additional cost." **(Radio User)**

"Antennas impose additional visual clutter to what is often the only source of aesthetic response with a city, the sky." **(Local Community Group)**

Table 8.2 "The potential effect on the property value of nearby properties"[1]

	Number
Aesthetics/visual impact on buyers perception of value	23
No effect of with amateur tower installations	7
It is an issue of proximity to the installation	23
Tower height and size are the concern	5
Value is directly related to market conditions (towers are used as an issue to negotiate price when the market is slow)	1
Is an issue of proper installation and up keep	2
Electrical interference	2
Health and/or safety concerns devalue properties	9
A lack of towers would decrease property values because of a lack of demanded services	4
No data/failure to prove this issue	4
Data indicates a negative impact on value	2
Towers interfere with residential or economic development	2
Light pollution from strobe lights	1
There can be a negative impact on property tax revenues	1

[1] Question 13 did not differentiate between amateur and commercial tower installations. Radio Users tended to either restrict their response to the effects of amateur towers or they were explicit in noting the distinction between amateur and commercial towers (e.g., see the first two noteworthy response quotations).

Noteworthy response quotations:

"Actually, I've never heard of any decrease in surrounding properties value. Or even my own, in reality I've had most of my neighbours come over and become very interested in amateur radio. And I've even had my neighbours thankful that an emergency communications station was local **(Radio User)**

"From what I have been able to discern there is absolutely zero effect on adjacent property value of HAM tower installations and little effect by cellular radio tower installations." **(Radio User)**

"That depends on the economic demographic of the neighbourhood. Upscale neighbourhoods are usually a lot more uptight about aesthetics than working class ones are" **(General Public)**

"British Columbia assessment has reduced property values by at least 10%" **(Local Community Group)**

Table 8.3 "The health risks associated with exposure to radio frequency (RF) energy"

	Number
Unknown effects/inconclusive evidence	26
Information is needed to clarify real versus perceived health effects	12
Do not believe there is a risk; lack of scientific evidence to indicate this	10
Public is not well informed/educated on this issue	20
With federal regulation this should not be a concern	5
People know or believe there are health risks	25
Not given enough consideration by radio users	2
Risk is low	47[1]
A concern for commercial installations only	2
Mistrust because of the source, vague responses, misinformation, etc.	4
Current regulatory standards are not adequate	2

[1] Of these responses, 14 (30%) were Radio Users who were explicit in their qualification that health risks were only associated with commercial towers.

Noteworthy response quotations:

"There is a lot of myth out there in the general public about the risks of RF exposure, and the public has come to mistrust commercial interests about these matters." **(Radio User)**

"There has been inconclusive research regarding effects of prolonged exposure to high RFI – I would be concerned about siting towers away from areas occupied for significant periods by young children." **(Radio User)**

"There are always the usual suspects which will dog a provider, seeking out the locations they are considering, and then providing false, misleading, misguided information. Most often junk science and fear mongering . . . " **(Communications Industry)**

"I feel the absence of Health Canada reps at public forums greatly contributes to the perception of health issues. There are so many conflicting opinions/studies on the health issues . . . Health Canada is perceived to be hiding behind policy, brochures and video and seem to be unavailable to answer questions in a public forum. I think a more active and public education campaign would go a long way." **(General Public)**

"The public look at the term radiation with much trepidation. They are not educated in these matters and are generally afraid of the unknown, therefore, the fact that these towers are radiating RF energy it becomes a problem. If the public is made aware of existing RF safety standards and the particular installation is in line with these standards, there should be no issue in this matter." **(Radio User)**

Table 8.4 "Are there any other issues that should be raised in response to new antenna towers?"

	Number
Distinction must be made between commercial and amateur/private towers	27[1]
Oppressive rules/costly processes need to be avoided	2
Noise and exhaust from backup generators at tower sites	1
Height restrictions are needed	3
The need for emergency services provided by amateur radio	23[1]
Safety (of site, structure, etc.)	16
Jurisdiction must remain at federal level	11[1]
Existing towers should be treated as new installations when modified	1
Rules of evidence are need for complaining parties	1
Receiving towers should be included	1
Minimize the number of towers/co-location policy	8
Need of services/relevance to the economy	2
Protecting wildlife/natural areas	2
RF interference	2
Restricting strobe lights in residential areas	1
Zoning restrictions/placement in residential areas	3
Removal cost/responsibility once out-of-use	2
More control/approval should be at the local level	6[2]
The approval process/consultation/notification	8

[1] Almost all of these responses were provided by Radio Users. The concern expressed was that local rules could be introduced to stop or restrict amateur radio operations. This was reported to be the case in the United States (e.g., see the first two noteworthy response quotations below).

[2] This response was articulated by two respondent groups: General Public (3) and Municipal Government (3).

Noteworthy response quotations:

" Radio amateurs have provided emergency radio communications during times of local disasters and, as such, the amateur radio community antenna towers should not be subject to local authority regulation but rather continue to be subject to the authority of Industry Canada." **(Radio Users)**

"Please, please, keep regulation of towers out of the hands of local municipal and local government hands. Members of those agencies are elected and are therefore apt to flip-flop in response when going from one year to another depending on the whims of the electorate . . ." **(Radio User)**

"There has to be a process that allows for all involved to voice their concerns. The municipalities zoning must be taken into consideration for location and height restrictions. The public and the tower company could be involved through the zoning

amendments procedures . . . Industry Canada would still be involved for safety and aeronautical compliance." **(Communications Industry)**

9. Information about Antenna Tower (Question 22)

Question 22 asked respondents to identify information needed by members of the public (see Table 9.1) and to indicate how this information should be provided (see Table 9.2).

Table 9.1 Information needed by members of the public

	Number
Factual/unbiased/easy to understand information (emphasise on health information)	64
Awareness of services/value of amateur radio	15
Information explain differences between amateur and commercial applications	8
Rules/basic regulations/approval process information	16
Awareness of the importance of coverage and service benefits	12
Information about placement/why location matters	7
Information on improving aesthetics/design options	2
Education on how to find relevant information	1

Table 9.2 How should this information be provided

	Number
Media/Advertising/Television	11
Website/Internet (with emphasis on this being a federal government; both Industry Canada and Health Canada were identified)	24
Pamphlets/brochures/print material/handouts	14
Via federal offices/federal agencies/post office	7
Community meetings/public forums	11
Ham radio clubs	2
Direct mail	6
By request	3
Public Service Announcements	1
1-800-OCANADA/hotline	2
Community newsletter	3
Federal information bulletins sent with cable bills	1
By industry	1
Educational seminars in area of installation	1
Newspaper	7
Infomercials	1
Signage in the community	1

Noteworthy response quotations:

"Each negative perception needs to be looked at individually: 1) potential health risks, 2) appearance, 3) potential effect of property values; you need to understand the nature of these objections and respond to them with factual and understandable information. People will only be interested in the subject when it may affect them, so you would have to take advantage of media opportunities at the time the discussion is happening around the potential siting." **(Municipal Government)**

"I feel Industry Canada and Health Canada should take a public role in any process - I think it would be a great improvement if residents knew their concerns have been heard by those who will make the final decision. In addition, I think people arrive at public meetings with some questionable information and they certainly are not going to take proponent's opinion that such information may not be correct – IC and HC need to be there." **(General Public)**

"In the case of amateur radio, Industry Canada should publish a leaflet that provides the general public with an overview of the amateur radio service and its benefits to society. It should also provide a website so that the general public can become knowledgeable about emission standards for various frequencies and effective antenna height for communications of various frequencies." **(Radio Users)**

"Industry Canada needs to step up and provide this information on the Internet. It's tough to enough for people working in the industry to find data on the strategis site let alone a layperson. This information, factual data, needs to be presented." **(Radio User)**

10. The Local Consultation Process (Question 38)

Question 38 asked respondents "Do you have any other specific suggestions for improving the local consultation processes regarding siting of specific towers?"

Table 10.1 Consultation Process Recommendations

	Number
The process should recognize the difference between amateur and commercial installations	26[1]
Governments should be educated on the value of amateur radio in the community.	1[1]
Limit consultation to specific installation cases (normally expressed as height)	8
Limit the scope of consultation in the case of rural installations	3
Use federal government professionals to adjudicate sessions	1
Turn over approval powers to municipalities	6[2]
Maintain federal control	7[1]
Make public aware of the reason for the tower	3
Process must provide answers to specific questions and the truth must be told	2

Limit consultation to residents in close proximity (two blocks)	1
Consult when tower will be close to schools, hospitals, etc.	1
Include internet and mail communications in process	4
Consult only when there are many concerned parties (say 10)	1
Make clear in process that approval is not under local jurisdiction	1
A consistent consultation process must be developed	8
Industry Canada must coordinate the process/be involved	8
Place before community associate boards, not public	1
Simplify the process	1
The process must create balanced representation of all groups	1
Require contact with local government (recognize local government is bearing the brunt of location decisions)	2
Require written notification to public of proposed sites	3
Open floor Q&A forum is a must	1
Allow more time between notification and consultation	1
Process should be handled by municipal authority not individual carriers	2
Consultations should be at neutral sites (e.g., community hall)	1

[1] Radio Users spoke as one voice in their desire to see amateur tower approval jurisdiction remain with Industry Canada in order to avoid or minimize local control over their tower installations.

[2] This response was articulated by four respondent groups: Municipal Government (2), Communications Industry (1), Local Community Group (2), and the General Public (1).

Noteworthy response quotations:

"Formal consultation processes should apply only to commercial applications, not to amateur installations. The latter should be required to consult only with immediate neighbours, in accordance with existing Industry Canada (IC) guidelines, with IC, not local authority, being the final arbiter." **(Radio User)**

"Industry Canada (IC) has to be at the table. To often we hear that residents have called IC officials to discuss tower proposals only to be told, Oh, the City approves those ..." **(Municipal Government)**

"I feel Industry Canada (IC) should establish a minimum consultation process but that individual local government may add to this (in consultation with IC) in a way which is more suitable to a particular community. In some cases, the public reaction may indicate that further consultation is necessary so the IC minimums should not be maximums." **(General Public)**

"The federal government needs to recognize that local governments are bearing the brunt of local decisions. The federal government must either empower the local governments with decision making authority or improve the consultation process to include local citizen participation." **(Municipal Government)**

"The consultation process must be coordinated by Industry Canada (IC). It is too confusing for the public and the carriers to have to utilize different consultative processes in neighbouring municipalities. The process should be clearly defined as a set of easily understood defined criteria for consultation, notification processes and procedures, format, timing, location, information media and format, content, recording of comments, form of acceptable responses. Most importantly, the criteria that will be considered by IC before sanctioning construction of a facility. It is also very important that IC take a primary role in facilitating this process including sending notices, facilitating and monitoring any consultation, receiving input and processing the final decision. As well there must be some method of appeal of the decision that allows for the evaluation of the fairness of the content and process, so that there is absolute transparency to the public and the affected carrier." **(Communications Industry)**

"A standard consultation process will ensure that no one is taking shortcuts that in the end only affect the general public – it is not fair to assume that companies or municipalities will take all steps necessary to notify a community when they may lose a site that is in their interest. Many of my neighbours still do not know that a tower is going up less than 3 blocks from our homes – the current consultation process does not work and is not fair to residents." **(General Public)**

"In some communities, the intellectual capacity of the town council may not be sufficient to grasp the complexities and implications surrounding tower placement . . . There may also be bias evident amongst the council. Therefore, to encourage a fair and open process, perhaps Industry Canada could lead the local process . . ." **(General Public)**

11. Conclusions

Several broad conclusions can be drawn from this analysis of the open-ended questions on the e-town hall questionnaire.

- Radio Users perceive their antenna installations as significantly different from commercial tower installations. This perception presented itself in their views of tower aesthetics, property values, health risks, and the tower site approval process. With respect to the latter issue, Radio Users expressed concern about potential changes in existing Industry Canada guidelines. These respondents fear that new approval guidelines (and process) my not differentiate between amateur and commercial tower installations. Moreover, Radio Users fear local authorities could gain approval influence, as has been the case in the United States.
- Respondents (Radio Users and others) tend to agree that the aesthetics of commercial towers is a concern. The appearance of the structure, its height and size, its negative effects on scenic views and the skyline, are commonly held opinions.
- Only a few respondents (6) expressed the opinion that approval authority (or influence) should be transferred to local government. Fifty percent of these respondents reported themselves to be members of municipal government. There is strong support for approval jurisdiction to remain a federal concern.

- There is a recognized need for factual, unbiased, and easy to understand information about: aesthetics, health issues, property values, and the approval process. Health issues are the most widely recognized information concern. The federal government (specifically Industry Canada and to a lesser degree Health Canada) is perceived to be the appropriate source of information.
- Consistent with the conclusion presented in Part A [Appendix B] of this report, the desire for direct notification of affected persons via letter or other print media is indicated. Other than direct notification, a Web site, print media (brochures, handouts, newspapers), and other unspecified media were the most frequently identified means for providing information.
- In the case of commercial tower installations, there is widely held acceptance of the practice of public consultation. Where deemed appropriate to conduct a public consultation, a consistent process is recognized as a necessity. Moreover, those respondents who spoke to issues of process and leadership tend to feel strongly that Industry Canada must coordinate the process and occupy a visible role at each consultation.

Appendix-D New Maryland Tower Site Investigation

Interviews and Newspaper Content Analysis: The New Maryland Tower Site Investigation

Executive Summary Report

Submitted by:

E. Stephen Grant, PhD[1]

June 2003

[1] The author, hereafter referred to as the principal researcher, acknowledges that research assistance was provided by Shirley Von Sychowski. Shirley conducted a literature search, played a significant role in research instrument design, and conducted the majority of the interviews for this study.

Table of Contents

Page

INTRODUCTION

This report provides findings of an exploratory study designed to discover the sentiment, the experiences, the information needs, and suggestions for improvement to the antenna siting process as heard by residents of New Maryland, N.B. The methods utilized to arrive at the reported findings include interviews, and a content analysis of articles and letters published in *The Daily Gleaner*. The specifics of these methods are described.

Context

The Village of New Maryland is located five miles south of Fredericton, N.B., adjacent to the southwest boundary of the City of Fredericton, along Route 101. The region, of which New Maryland is part, is made up of rural and forest lands, giving the Village a distinctly rural character. The population of New Maryland is approximately 4,500 people.[1]

Early in 2002, public consultations were conducted in New Maryland to discuss a tower siting proposal by Rogers Communications, Inc.. Villager's expressed views about the proposal that ranged from extreme opposition to strong support. The tower and antenna were subsequently constructed on the site proposed by Rogers. It is located about 1.2 kilometres from the nearest school and about 600 metres from the closest residence. The tower is 100 metres tall.

No modifications were made to alter the antenna or the tower structure as a result to public concerns. However, in response to some residents' concern about human exposure to RF radiation, Rogers offered to co-site the Village's fire communications equipment to aid in the reduction of radiation being emitted at ground level via the antenna that had been located on top of a single story building. Rogers installed this equipment on its support structure without cost to the Village.[2]

Background

To aid in the development of a national web-based e-Consultation designed to capture the national sentiment associated with radio antenna siting and approval, it was determined that a focus group should be conducted with New Maryland residents. Residents of New Maryland recently experienced the site approval process for antenna tower in their neighbourhood. A secondary outcome of the focus group data would be enlightenment with respect to recommendations to be made to Industry Canada concerning antenna siting and approval in Canada.

After consultation with the Village of New Maryland and a potential focus group participant, it was determined that face-to-face interviews rather than the focus group method would be appropriate. This determination was based on participant scheduling concerns that could not be resolved and the discovery of extreme opposite positions held by potential participants. This discovery rendered a single focus group less viable because of the likelihood that persons of opposing positions would use the group forum as an opportunity to argue their position, debate the validity of alternative points of view, and/or dominate discussion on specific issues.

Methodology

This study began with phone conversations with a resident of New Maryland known to the principal researcher and the Village Clerk for New Maryland. These conversations provided the tower site location, background information concerning the consultation process, and insights into how best to recruit interview participants. Subsequent to these conversations, the principal researcher visited the area of the antenna site location and initiated a participant recruitment strategy.

The recruitment strategy involved three steps. The first step was a search for relevant articles published in *The Daily Gleaner*. The articles found were reviewed to capture the sentiment and experiences of New Maryland residents. This review also revealed the names of residents who were either in opposition or in favour of the proposed tower site. All of these individuals were contacted and asked to participate in an interview. This process resulted in two (2) completed interviews.

The second step of the recruitment strategy involved an e-mail being sent by the Village Clerk, as approved by New Maryland Council, to twenty New Maryland residents known to have expressed a position on the antenna siting issue (10 opponents and 10 proponents were sent the e-mail). This e-mail informed recipients of the study, and asked those willing to participate in an interview, to contact the principal researcher. All residents who contacted the researcher were responded to by the principal researcher. This process resulted in four (4) completed interviews.

The final participant recruitment step involved a snowball sampling procedure, i.e., the researchers asked respondents and others known to be potential respondents if they knew of anyone who could be approached with an interview request. All leads were followed-up. This process resulted in two (2) completed interviews.

Face-to-face interviewing (also referred to as informant interviewing) was deemed appropriate because this method provides “an inside view.” In this case, an inside view is defined as New Maryland residents’ experiences with antenna site approval in their neighbourhood. The questions asked of all interview respondents are provided in Appendix A. Appendix B provides the consent form that was signed by all respondents. Prior to implementation, this study received the approval of UNB’s Research Ethics Board (REB File # 2003-058). Signed consent forms and interview transcripts have been filed for safekeeping and are available upon request to the principal researcher.

Although not a planned methodology, a content analysis of the above mentioned newspaper documents was undertaken because the content of these documents was deemed of value to the purpose of this investigation. Availability of the newspaper data provides insights into the same issue via an alternative data set, thus providing the potential benefit of triangulation, i.e., the researcher can infer validity if agreement between the data-sets is discovered.

Subsequent sections of this report detail study findings and discuss relevant implications.

DETAILED FINDINGS

Content Analysis

Three articles, one editorial, and one opinion letter were discovered by way of a literature review of *The Daily Gleaner*. Select quotations from these published documents are provided here with source names deleted. Quotations are organized under topic headings:

Health Risk:

> "To say they don't (have adverse health affects) is wrong . . . to say they do (have adverse effects) is still up in the air." (A1, May 16, 2002)
>
> "The company has diligently brought forward information about health risks that such a tower could pose." (B3, April 18, 2002)
>
> "Governments have been wrong before. Look at thalidomide . . . look at tobacco . . . there have been no longitudinal studies, we don't know what the effects will be. These studies (studies against the towers) say that we are human guinea pigs." (B 3, April 18, 2002)
>
> "Since the long-term health effects are not known, we must not expose our school children and residents to these towers." (A6, May 18, 2002)
>
> "Government is reactive, not proactive . . . Usually we find out too late that something is deadly." (October 22, 2002)
>
> "This sounds like the tobacco industry to me. Cellular phones are in vogue right now just like cigarettes were in vogue 50 years ago." (A1, May 16, 2002)

Safety (of structure):

> " . . . putting a tower halfway into the woods would make it dangerous to monitor and patrol." (A1, May 16, 2002)

Property Value:

> "The people who are appraising the houses here and selling them don't seem to have a problem with it (the tower)." (October 22, 2002)

Consultation Process and Information:

> ". . . to decide against the tower without a formal process would be unfair to Rogers AT&T, just as approving it would be unfair to the residents." (B3, April 18, 2002)

" . . . the village is only getting documentation from industry-sponsored studies that Rogers AT&T has provided." (B3, April 18, 2002)

"Public information will be crucial to forcing government's hand. The more taxpayers express safety concerns, the more likely our powers-that-be will listen." (A6, May 18, 2002)

"It (the tower issue) has once again exposed the village as a haven for NIMBY, not in my back yard." (Opinion Letter, May 21, 2002)

Interviews

In this section a brief summary of question responses is provided using a question-by-question format. A copy of the interview form is provided in Appendix A. Care was taken to select comments to reflect the full-range of respondents' opinions and experiences.

When you hear the words 'antenna towers' what comes to mind?

" . . . just plain ugliness."

"Danger, unsightliness"

"Not in my backyard."

"A tower is a tower - just another structure"

What are you hearing people in your community say about the siting of the new antenna tower?

". . . depends on who you talk to."

". . . once the decision was made by council, the issue disappeared."

Think back to the recent opposition to the installation of an antenna tower in New Maryland.
- Would you describe your position at the time as: opposed, neutral or in favour?

Opposed	6
Favour	2

- What were your concerns?

"Number one concern is health."

". . . research to date is inconclusive especially in terms of long-term health effects."

" . . . it can never be aesthetically pleasing."

". . . value of residential property decreases."
" . . . heard . . . about the vandalism and drinking that occurs at these towers."

". . . they pretended that it was a health issue but I know that they don't want a tower in the area of their $200,000 homes."

- What prompted those concerns?

"Prompted because ladies were going around with research and clippings."

"A leaflet sent in the mail about Council considering a request by Rogers to build a tower in the neighbourhood."

"Have known parents of cancer victims."

- Do you continue to have these concerns?

Interview notes, and the consistency between these notes, and *The Daily Gleaner* content indicate that concerns (for or against) have not changed as a result of public awareness and the consultation process.

Of all the concerns you mentioned (summarize . . .), which do you feel is the most important to address?

Those opposed were consistent in their concerns about potential health risks.

What information do you need to know about the siting of a new antenna tower in order to accept it?

"Would accept medical information that is valid research, i.e., NOT industry sponsored."

"I would need a 100% guarantee that there are no health risks."

"Tell us why they (Rogers) chose that spot. And then site good evidence for why it has to be sited in that area or land."

". . . how far away from a populated area; whether maintenance of the tower is done timely and properly."

- How should this information be provided?

"Why not put a page in the local newspaper."

"Public meetings."

- Who should provide this information?

"Government."

"The carrier should provide information (Site Information). Do so in plenty of time – before it comes to council."

"I don't think people on council (don't take this the wrong way) have the ability to get this information. They should have done their own research but they lack the skills – I don't think they are capable of interpreting some of the medical research."

"Not industry." (Medical/Research Information)

- When should this information be provided?

"Do so in plenty of time - before it comes to council"

"Should be provided to the people at least 6 months in advance of the 1st meeting/reading being held on the siting of the tower. When they had this little propaganda session, they only told the community 7 days in advance. We only had 7 days but council and the professionals who flew in knew well in advance."

What kinds of information should be gathered to make good decisions about the siting of antenna towers?

"Have to provide both the pros and cons. Conduct a health risk assessment, do research on property values, explain why this site in particular, and are there any alternate sites."

". . . a cost benefit analysis for the people in the community."

"You need hard data; facts to make good decisions"

"Health concern information . . . The government should provide this information, for example at the level of Environment or Health Canada . . . Have a brochure, flyers, a public meeting in residents' area as soon as (the consideration of site) and before any voting is done."

Can you give me any examples of your experiences with Industry Canada in terms of the local consultation process?

Many residents reported no experience with Industry Canada. Comments indicated that many of the respondents did not view the consultation process as an Industry Canada related exercise.

How can the local consultation process regarding tower site locations be improved?

"Such issues should be put to a public vote."

"You have to involve the community right from the start . . ."

"Decisions should be made by residents of a community . . . No one wants it in their backyard."

"People were very limited in the meetings in New Maryland, they had to ask for formal permission in advance to speak and only a limited number were allowed to speak. It was a very limiting process."

". . . objective party present as consultants . . . some sort of panel discussion."

"The government (federal and other levels) should be out there. They are so wishy-washy. No body seems to know what is going on. And nobody is dealing with it."

If you were the government official in charge of tower site approvals, what would you do differently?

"I would insist on independent research."

"Give people ample time to state their opinions, and make decisions that err on the side of caution."

"I would have a pamphlet made available to explain the process. Also, something to let people know what exactly are our limits and how much input the municipal council really has."

"Look at areas where they propose to put the towers and put them outside of residential areas."

In an ideal situation, how should decisions regarding the site of antenna towers be made?
- ***Who should make them?***
- ***When should they be made?***

"Solely on public opinion."

"Government has to do something, have clear guidelines that a tower cannot be placed in a residential area."

"Not sure (who should make decisions) but definitely only can be so if decision is based on good information."
"Decisions should be made by government after appropriate studies have been done, after holding a public forum where facts are given and then having a vote by residents."

"Village council with a solid consultative process with its constituents."

"Could have a number that people could call or a web-site for more information."

"Ideally, decisions would be made according to economic reasons . . . the carrier has the responsibility to disguise the tower and make it aesthetically pleasing . . . place in remote areas (if can) . . . studies that raised concerns (health) out of Europe do not apply here (mixing apples and oranges)."

". . . research should be done at the federal level to hold them (government) responsible but also show that they are serious, that they wouldn't't put something out there unless the statistics and information are valid . . . or at least I would hope that to be the case."

". . . room for consultation process between people and council, not between industry and people. People from industry are not particularly good at understanding the emotional concerns that people raise in an issue like this."

In cases of local concerns regarding tower site locations, what are reasonable time limits: For resolving disputes? For final approval?

"60 days" (sited costs of extended delays as in the case of New Maryland)

"Resolve disputes and settle as fast as possible, within a month's period."

"Up to a year until final approval."

" . . . need enough time to gather information before a vote . . . to the final yey-nay, I would say maybe 6 months."

"No more than a year - 3 to 6 months would be ideal."

"This thing has been going on for more than a year but I would say the appropriate time-frame should be 6 months or less."

Is there anything that you feel we should have talked about but didn't?

No notable responses were received.

DATA QUALITY

Although the number of willing respondents proved disappointing, there are two factors that indicate this study has successfully captured the sentiment, the experiences, the information needs and suggestions for improvement by concerned citizens. First, the sampling methodologies successfully captured a full range of citizen positions and experiences with the siting issue. For example, an opponent to the New Maryland tower reported being one of the principal organizers of the public opposition. Likewise, a proponent reported being a key spokesperson for those in favour of the tower site. Another indicator of the range of positions and experiences captured is the inclusion of a respondent who reported being a member of the village council. This respondent spoke openly about his/her experiences with the political process.

The second factor that provides an indication of data quality is the consistency between the above cited interview comments and data provided from the literature review. Although same source comments have not been parcelled out, the clear inference drawn from the consistency in this data suggests the sentiments, experiences, information needs, and suggestions of New Maryland residents have been fully captured via this exploratory investigation.

IMPLICATIONS

One of the most insightful findings of this study may be the difficulty experienced in securing willing interview participants. Given that the New Maryland situation reached resolution after council extended the decision making process, it appears likely that many potential respondents felt this to be an historical issue (a done deal), thus they did not wish to invest time answering questions. If this is a valid conclusion, it can be expected that response to the national e-consultation opportunity will vary significantly as a function of the degree of active, on-going public debate about specific sites.

This study has provided evidence to indicate that the proposed web-site survey should be amended to ad one additional antenna tower site issue. This issue is safety at the site. Both the literature review and interviews captured comments concerning the need for, and difficulty of, policing antenna sites when they are secluded. To amend and remain consistent, this change will require three additional questions (i.e., one question needs to follow questions 10, 13, and 18). See Appendix C.

This study provides a notable implication concerning the e-consultation web-site information component. A consistent theme echoed by multiple respondents, who identified themselves as opponents, was the need for information (with an emphasis on health effects) that could be easily understood and perceived as objective. Industry-supplied and/or -sponsored research information is not perceived as valid, i.e., it lacks objectivity because of the perceived self-interest of industry. Therefore, an effort should be made to supply information from sources that a reasonable person would deem as objective. With respect to presenting objective information in an easily understood way, multiple respondents used either the phrase "pros and

cons" or "cost-benefit" to describe their information needs. This suggests a possible presentation format for objective information statements to be posted on the national e-consultation web-site.

Finally, this study provides the following insights into residents' needs and desires concerning antenna siting and approval:

- **There needs to be a consultation process that is perceived as a real process that will impact the site approval decision. Residents close to the site want to have their opinions heard and deemed relevant.** The following comments provided by opponents illustrate their perspective of the New Maryland consultation experience:

  "People were very limited in the meeting . . . , they had to ask formal permission in advance (to speak) and only a limited number were allowed to speak. It was a very limiting experience. How can such an experience be honest and sincere? . . . we elect people to council to make decisions on our behalf but it should be a decision that is informed and that represents the people."

  "It was not a transparent process at all. The whole thing was a fait accompli, then council was faced with a bunch of irate people and said wow, then they went around the process and got their way anyway."

  This comment illustrates a proponent's perspective on public consultations concerning this issue:

  "Community and the carrier (Rogers) held a public meeting for input which is just a courtesy. Council understands it doesn't make any difference - but it's a political process because people need to be re-elected."

- **The consultation process needs to be standardized in such away that time-lines are known to the public and voting procedures are deemed fair.** The New Maryland experience seemed prolonged and opponents questioned the appropriateness of the approval process followed by village council. Council voted on the approval issue, then at a later date, decided to return to the issue in order to hear the voice of proponents. The following opponent responses indicate frustration with this process:

  ". . . the vote was to not approve the towers. Then we had another vote. It was like the referendum in Quebec, keep voting until they get the right answer."

  "Both the carrier as well as the Council should have distributed information on the possibility of putting up the tower – not just after it was almost a done deal. They may have put an ad in the newspaper but I didn't read it. An information packet would probably reach more people."

- **Reasonable time limits need to be established for resolving disputes.** Respondents varied greatly with respect to their estimates regarding the amount of time needed to resolve disputes and arrive at final site approval. It is clear from the data that proponents

perceive a need for an expedited process, whereas opponents perceive a need for a more prolonged consultation. The following responses that were cited earlier illustrate the extremes:

"Resolve disputes and settle as fast as possible, within one month's period."
"60 days" (sited costs of extended delays)

"No more than a year - 3 to 6 months would be ideal."

"Up to a year for final approval"

- **Information needs to be perceived as objective, it must be easily understood, and it needs to be readily available to the public.** This respondent's comment notes the need for quality information at the community level:

  "Should have Q & A sheet upfront to head off any concerns, or a brochure. Consultation is a good thing, for example, with council to have a public meeting. I don't think you have to go beyond that - consultation works with council. Could have a number that people could call or a web-site for more information."

- **Siting approval should force alternative site identification to enable site approval authorities to err on the side of caution if there are valid concerns with site proposals.** A consistent theme identified from both methodologies used in this study is that information available to the public concerning the relevant issues, such as potential health concerns and property value, is mixed and perceived by the public to be open to interpretation. The following respondents' comments reflect concerns with a single site decision and extreme interpretations of available information, respectfully:

  ". . . brain-washed council in the end to the point where they told us there was no other site available."

  ". . . told them the whole thing was shanghai-ed, that the points of the opposition were non-issues, not based on good research (so-called studies were things found on the Internet and anyone can publish anything on the internet, not peer reviewed or scrutinized and had no basis in fact or foundation."

These insights are based on responses from a small sample of residents and are site specific, therefore, it is not appropriate to generalize these findings to other communities; however, these insights that can be confirmed via the national e-consultation.

REFERENCES

1. Facts and figures about New Maryland found at: Http://www.geocities.com/ Heartland/Plains/ 8730/.

2. Information about Rogers Communications, Inc.'s New Maryland tower provided by Rachel Cassidy, Roger's Geographic Team Leader for New Site Development.

Appendix A - Interview Questions

- Explain purpose of project
- Sign consent form

A. About yourself

a. How long have you been a resident of New Maryland?
b. What do you value the most about living in New Maryland?

B. Recent opposition to antenna siting

a. When you hear the words 'antenna towers' what comes to mind?
b. What are you hearing people in your community say about the siting of the new antenna tower?
c. Think back to the recent opposition to the installation of an antenna tower in New Maryland.
- Would you describe your position at the time as: opposed, neutral or in favour?
- What were your concerns?
- What prompted those concerns?
- Do you continue to have these concerns?

d. Of all the concerns you mentioned (summarize . . .), which do you feel is the most important to address?
e. What information do you need to know about the siting of a new antenna tower in order to accept it?
- How should this information be provided?
- Who should provide this information?
- When should this information be provided?

C. Future of the Consultation Process

a. What kinds of information should be gathered to make good decisions about the siting of antenna towers?
b. Can you give me any examples of your experiences with Industry Canada in terms of the local consultation process?
c. How can the local consultation process regarding tower site locations be improved?
d. If you were the government official in charge of tower site approvals, what would you do differently?
e. In an ideal situation, how should decisions regarding the site of antenna towers be made?
- Who should make them?
- When should they be made?

f. In cases of local concerns regarding tower site locations, what are reasonable time limits: for resolving disputes? For final approval?

Is there anything that you feel we should have talked about but didn't?

Appendix B - Consent Form

Antenna Site and Approval Project

A team of University of New Brunswick (UNB) researchers have been contracted by Industry Canada to conduct a national policy review of antenna siting and approval in Canada. This interview is part of the first data collection phase of the research being conducted to help the UNB researchers capture the sentiment, the experiences, the information needs and suggestions for improvement by concerned citizens.

Please detach the attached form so that you can retain a record of the researchers and their respective affiliations with UNB.

Your comments will be used to inform the researchers of your experiences, concerns and suggestions. Do not feel pressured to respond to any of the questions asked.

This interview will not last more than one hour. Feel free to excuse yourself from this session at anytime.

The entire interview is being audio taped. We anticipate a transcription of his tape will be made to provided the principal researchers with a record that can be reviewed for relevant content. Statements from this transcription may appear in the teams final report, however, comments will not be attributed to individuals.

I understand the purpose of this interview and consent to allow the researchers to use the comments I provide in the manner described:

_____

Print Name Signature

Witness: E. Stephen Grant

If you would like a summary of the results of this project, please provide your e-mail or civic address below. This report may not be sent until after completion of the project in December 2003.

INTERVIEW
Antenna Site and Approval Project

The policy review team consists of multiple University of New Brunswick (UNB) researchers who represent faculties and departments at UNB (law, political science, administration), the Centre for Social Innovation Research (CeSIR), and the Centre for Property Studies. Should you have any concerns about this research project you should contact David Townsend. If you have concerns about the interview session or further comments to provide, you should contact Steve Grant.

David Townsend
Professor of Law
453-4720
townsend@unb.ca

E. Stephen Grant (Steve)
Associate Dean (Research and Outreach)
Faculty of Administration
458-7327
grants@unb.ca

If you have concerns about this research and wish to contact a person not directly involved in the research, you may contact Dan Coleman.

Daniel F. Coleman, Dean
Faculty of Administration
453-4869
dan@unb.ca

Appendix C - Web-site Survey Questions

Your Experience with Antenna Towers
First, we'd like to ask a few questions about your own experiences with antenna tower installations.

1. How many individual tower installations have you had some involvement with, either in an official capacity or as a concerned member of the public?

- None
- 1
- 2 to 5
- More than 5

2. Were these all in the same town or city, or were they in more than one town or city?

- All in the same town/city
- More than one town/city

3. Did any of these proposed tower installations generate significant public opposition?

- Yes
- No

4. What is the location (or locations) of the proposed installations that generated significant public opposition?

Town/City
Neighbourhood
[need to allow for multiple entries]

5. And what was the outcome in each of those cases?
The tower was not erected in the proposed location

- The tower was erected in the proposed location with significant modifications to meet public concerns
- The tower was erected in the proposed location with no significant modifications.
- Do not remember

6. What is your general feeling about current government regulations for antenna tower installations? Do they:

- Favour the interests of industry in erecting towers in desired locations?
- Favour the concerns of communities about the negative impact of tower installations?
- Strike a good balance between the interests of industry and the concerns of communities?
- No opinion

Antenna Tower Siting Issues
A number of issues are sometimes raised in response to the siting of new antenna towers. In your experience, how important is each of the following issues to the general public?

7. The aesthetics or appearance of antenna towers?
   - Very important
   - Somewhat important
   - Not all that important
   - No opinion

8. The potential effect on the property values of nearby properties?
   - Very important
   - Somewhat important
   - Not all that important
   - No opinion

9. Concerns about health risks associated with radio frequency (RF) exposure?
   - Very important
   - Somewhat important
   - Not all that important
   - No opinion

10. Which of these three issues would you say is of the greatest concern to the general public?
   - Aesthetics / appearance
   - Property values
   - Health risks associated with radio frequency (RF) exposure
   - No opinion

Can you describe in greater detail the specific concerns people have in each of these areas?

11. The aesthetics or appearance of antenna towers
   - Open-ended text box

12. The potential effect on the property values of nearby properties
   - Open-ended text box

13. The health risks associated with radio frequency (RF) exposure
   - Open-ended text box

14. Are there any other issues that should be raised in response to new antenna towers?
   - Open-ended text box

Information About Antenna Towers

We are interested in knowing whether members of the public have access to adequate information concerning antenna towers. Based on your experience, how knowledgeable are members of the general public on each of the following issues?

15. The aesthetics of antenna towers and possible methods of improving their appearance?
- Very knowledgeable
- Somewhat knowledgeable
- Not very knowledgeable
- Not knowledgeable at all
- No opinion

16. Regulations on tower markings, such as beacons, that are needed to ensure aeronautical safety?
- Very knowledgeable
- Somewhat knowledgeable
- Not very knowledgeable
- Not knowledgeable at all
- No opinion

17. The potential effect of tower installations on the property values of nearby properties?
- Very knowledgeable
- Somewhat knowledgeable
- Not very knowledgeable
- Not knowledgeable at all
- No opinion

18. Health risks associated with radio frequency (RF) exposure?
- Very knowledgeable
- Somewhat knowledgeable
- Not very knowledgeable
- Not knowledgeable at all
- No opinion

19. In your experience, what is the primary source of information used by members of the general public to learn about antenna towers and their potential impacts?
- Discussions with other people
- Newspapers and other media sources
- Local government
- The federal government / Industry Canada
- Companies that own and operate antenna towers
- Other (please specify)
- No opinion

20. Do you feel that the public has adequate information about antenna towers and their potential impacts?

- Yes, the public has adequate information
- No, the public needs more information
- No opinion

21. What information do you think would most benefit concerned members of the public and how should it be provided?

- Open-ended text box

.

The Local Consultation Process

The following section of the survey asks about local consultation processes for the approval of new antenna towers. Under current procedures, Industry Canada requires a company wishing to erect a new tower to consult with local authorities. The company is expected to work with local authorities to examine the proposal, consider local concerns and when needed, attempt to arrive at alternative solutions. Local authorities represent the community in discussions with the company. However, issues relating to the proposal may be raised and discussed through formal proposals, public meetings and/or direct representation from citizens.

Industry Canada expects the local land-use authority to make its views known to a company within 60 days of receiving a proposal and that all aspects of the consultation should be completed within 120 days of receiving a proposal.

22. Do you feel that the current procedures place too little emphasis on public consultation, too much emphasis, or about the right amount?

- Too little emphasis on public consultation
- Too much emphasis on public consultation
- About the right amount of emphasis on public consultation
- No opinion

23. What is your view on the current 120 day period for the process of approving specific towers? Is this time frame:

- Too short
- About right
- Too long
- No opinion

24. In your experience, are adequate efforts made to notify the general public of proposals for new tower installations?

- Yes
- No

For the next section of the survey, we need to determine which questions to ask you by knowing which of the following best describes you. Are you:

- A member of the general public who has had an antenna tower either proposed for your community or actually erected in your community
- Someone who has had experience with multiple tower installations (in an official capacity or otherwise)
- Neither of the above

25a. When a new tower installation was proposed for your community, did you hear about the proposal before the tower was erected?

- Yes
- No

26a. And how did you hear about the proposal?

- From discussions with other people
- From the media (newspaper, radio or TV)
- Announcement by the local government
- Announcement by the company making the proposal
- Other (please specify)
- Do not remember

The following two questions are for people who have experience with multiple tower installations:

25b. In the cases you are familiar with, what is the most common method of notifying the public about a proposal for a new tower installation?

- Open-ended text box [with responses to be coded later]

26b. How effective is this method of notification in ensuring that members of the public are aware of proposals for new tower installations?

- Very effective
- Somewhat effective
- Not very effective
- Not effective at all
- No opinion

27. What do you feel would be the most effective way of notifying members of the public about proposals for new tower installations?

- Open-ended text box [with responses to be coded later]

28. How much time do you feel should be allowed between public notification of a proposed installation and the start of any public consultations on the proposal?

- 1-2 weeks
- 2 – 4 weeks
- 4- 6 weeks
- more than 6 weeks
- No opinion

29. And how much time should be allowed for public consultations to take place?

- 1 - 2 weeks
- 2 – 4 weeks
- 4- 6 weeks
- more than 6 weeks
- No opinion

30. One type of consultation involves people gathering together for a public meeting to express their views. Another method of consultation involves allowing people to submit their views individually in writing over an extended period of time. Which method would you prefer for consultations on antenna tower proposals?

- Public meetings
- Written submissions
- No opinion

31. And in terms of submitting views in writing, which method of submission would you prefer?

- By mail
- Over the internet
- No opinion

32. Who do you think should be responsible for organizing public consultations on proposed tower installations?

- The local land-use authority
- The company making the proposal
- The federal government
- Other (please specify)
- No opinion

33. Do you feel there should be a common consultation procedure in place for all communities across Canada, or should local communities develop their own consultation procedures?

- Common consultation procedure for all communities across Canada
- Local communities should develop their own consultation procedures
- No opinion

34. Do you feel public consultations should be a requirement for all new tower proposals, or do you feel consultations should only be required if there is a significant level of concern expressed in the local community?

- Consultations should be required for all new tower proposals
- Consultations should required only if a significant level of concern is expressed
- No opinion

35. Do you have any other specific suggestions for improving the local consultation process regarding the siting of specific towers?

- Open-ended text box

Appendix E - Municipal Antenna Protocols (created by Kirsten Drake-McKnight)

Issue	Total # of protocols (out of 19)	Langley BC June 2001	Oakville ON April 1998	Oakville ON 2004 - draft	Delta BC April 2002	Surrey BC Dec. 2001	North Saanich BC January 1999	Airdrie AB Jan. 2002	Guelph ON ?	Port Moody BC May 1998
Remove tower if deactivated & unused for a specified period of time	6		✔							
Consultation										
No public consultation requirement for non-residential private property locations	1				✔					
No public consultation requirement for towers with specified height exemptions	7	✔		✔				✔		
Public consultation many not be required for non-residential areas a certain distance from residential areas	7					✔		✔		
No public consultation if zoning by-laws met	1					✔				
No public consultations required for co-locations or antennas on existing structures	3			✔						
No public consultation for temporary structures (less than 6 months)	1			✔						
Public consultation if greater than specified distance	2							✔		
Public consultation if greater than specified height	3	✔						✔		
Public information meeting may not be required (there are exemptions & consultations which can be waived at the locality's discretion)	6			✔		✔	✔			
Required for co-locations	1	✔								
Public consultation may be required, even if requirements met - assess impact	1									
City must take minutes at consultation meetings	1									
Carriers must take minutes at consultation meetings	11			✔		✔	✔	✔		
City must keep a record of citizens' contact information	1									
Carriers must keep a record of citizens' contact information	9			✔		✔	✔	✔		
Carriers must give minutes to locality	10					✔	✔	✔		
Carriers must give locality any changes to the proposal & explain how to address concerns / why didn't address some concerns	12			✔		✔	✔	✔		
Proof & copies of notice must be given to local authority	3						✔			
Proof of posting of notification sign required	1									
Citizens' responses to notice must be given to local authority	4						✔			
Multiple public meetings may be required	1									
Follow-up evaluation of consultation process by carriers & local authority	1	✔								
Local authority may recommend an environmental assessment if there are unresolved health issues/concerns after consultations	1							✔		
To facilitate ongoing consultation, a plaque with contact information must be attached to the base of the facility	2									

Issue	Total #	Langley	Oakville	Oakville	Delta	Surrey	North Saanich	Airdrie	Guelph	Port Moody
Parties to be contacted										
City / Township / District council	10	✔			✔		✔			
Local Member of Parliament	1									
Industry Canada	2									
Property owners within a specified distance	13	✔		✔		✔	✔	✔		
Condominium corporations within a specified distance, rather than every condo resident	2			✔						
Community groups within a specified distance	6	✔								
Any other potentially affected interest group	2	✔								
All affected residents	2									
Adjacent municipalities within a specified distance	2			✔						
Information given to public										
Proposed location	11			✔			✔	✔		
Name & address of property owner	1						✔			
Physical details of tower & structures	11			✔			✔	✔		
Power and frequency output	2									
All associated equipment & facilities	1						✔			
Date, time & locations of public meeting(s)	9			✔						
Name & telephone number of a contact person from the carrier	8			✔				✔		
Local authority contact name and telephone number	4			✔						
Industry Canada contact information	1									
Photos, drawings or maps of the area showing location of tower and distances	4							✔		
"Information Package" (not specified - information given to city by carrier (same as below)?)	1									
All information provided by the carrier to the city	1									
Health & environmental information	1									
Municipality shall give recommendation letter to property owners / interested parties after consultation	2									
How to give information										
Open meeting in the general area affected	10	✔			✔					
Community information session	1			✔						
City council meeting	1									

Issue	Total #	Langley	Oakville	Oakville	Delta	Surrey	North Saanich	Airdrie	Guelph	Port Moody
Newspaper	8	✔					✔	✔		
Regular Mail	9			✔						
Mailing List (provided by municipality, paid for by carrier)	6			✔		✔				
Sign close to proposed location	3						✔			
Hand Delivered	1									
"In writing" (no method specified)	1						✔			
"Delivered" (no method specified)	1							✔		
Time periods										
Notice to citizens: 1-2 weeks before meeting	2					✔				
Notice to citizens: 2-4 weeks before meeting	8	✔					✔	✔		
Application review by local authorities: -1 month	4							✔		
Application review by local authorities: -2 months	3			✔						
Application review by local authorities: -3 months	1									
Application review by local authorities: +3 months	1		✔							
15 working days: D.O. advise I.C. whether consultation requirements met, and opinion on licence based on land-use	1									
14 days: Pre-consultation - other carriers must respond in writing	1	✔								
Follow-up between carriers & local authorities to evaluate the consultation process: meet within one year	1	✔								
Co-Location										
Carriers must contact other carriers & request information on their interest in locating in the same area & discuss co-location	9	✔			✔		✔			
Send a copy of the correspondence to the local authorities	4						✔			
Meeting between carriers if more than one want to locate in the area	1	✔								
Encouraged	9	✔	✔		✔	✔				
Co-location OR stealth designs (mutually exclusive)	1			✔						
Specified radius towers are encouraged to co-locate	1	✔								
Carriers must explain why co-location is not a viable alternative to a new tower	10	✔	✔		✔	✔		✔		
New towers may be placed on the same site if co-location is not possible (structurally or technologically)	9	✔	✔		✔	✔			✔	
Applications for towers in 'co-location areas' must be accompanied by letters from other carriers agreeing to co-location	1					✔				
Carrier may be required to make a commitment to accommodate other providers where feasible	1									

Issue	Total #	Langley	Oakville	Oakville	Delta	Surrey	North Saanich	Airdrie	Guelph	Port Moody
Siting Location & Design										
Design towers based on the number of co-locating carriers	1				✔					
Towers should be designed for additional users (even if no prior co-location agreements)	2					✔				
Towers on roofs & existing structures are encouraged	11		✔	✔		✔				✔
Monopoles and/or stealth designs encouraged	4				✔	✔			✔	
Distance / setback requirements (from residences, institutions and/or roads)	12		✔	✔		✔			✔	✔
Distance requirements (from other towers)	1		✔							
Discouraged locations	11				✔	✔			✔	
Prohibited locations	2									✔
Height Requirements	7		✔		✔	✔				✔
Carrier must give reasons for the tower height	1									
Requirements for siting on district-owned land	2									
Specified number of towers per parcel of land	1									✔
Mitigation of visual aspects of towers by painting, decorative fencing, screening, landscaping, etc.	17		✔	✔	✔	✔	✔	✔	✔	✔
Avoidance of significant natural features to the extent possible (not defined)	1			✔						
Protect natural vegetation	5						✔		✔	
Protect birds	2									
Try not to detrimentally affect views from surrounding properties	4								✔	
Parking space(s) and/or access from road	5		✔							
Lighting limitations. Lighting discouraged unless required for safety	5		✔						✔	
No signs or material not directly related to the equipment / towers shall only accommodate telecommunications facilities	8		✔	✔						
Emergency service providers should be given priority	1									
Site Plan / Tower Proposal										
Include a 'before' and an 'after' picture	4		✔							

Issue	North Vancouver BC May.1999	Caledon ON ?	Bighorn AB Jan.1999	Markham ON June.2002	Colwood BC May.2002	Sudbury ON Jan.2002	Strathcona AB Dec.2001	Chatham / Kent ON 2000	Edmonton AB 1997	London ON 2003 - draft
Remove tower if deactivated & unused for a specified period of time		✔	✔	✔			✔	✔		
Consultation										
No public consultation requirement for non-residential private property locations										
No public consultation requirement for towers with specified height exemptions				✔		✔	✔	✔		
Public consultation many not be required for non-residential areas a certain distance from residential areas	✔			✔		✔	✔	✔		
No public consultation if zoning by-laws met										
No public consultations required for co-locations or antennas on existing structures				✔		✔				
No public consultation for temporary structures (less than 6 months)										
Public consultation if greater than specified distance									✔	
Public consultation if greater than specified height									✔	
Public information meeting may not be required (there are exemptions & consultations which can be waived)				✔		✔	✔			
Required for co-locations										
Public consultation may be required, even if requirements met - assess impact									✔	
City must take minutes at consultation meetings										✔
Carriers must take minutes at consultation meetings		✔		✔	✔	✔	✔	✔	✔	
City must keep a record of citizens' contact information										✔
Carriers must keep a record of citizens' contact information		✔			✔		✔	✔	✔	
Carriers must give minutes to locality		✔		✔	✔	✔	✔	✔	✔	
Carriers must give locality any changes to the proposal & explain how to address concerns / why didn't address concerns		✔		✔	✔	✔	✔	✔	✔	✔
Proof & copies of notice must be given to local authority		✔					✔			
Proof of posting of notification sign required		✔								
Citizens' responses to notice must be given to local authority		✔	✔	✔						
Multiple public meetings may be required					✔					
Follow-up evaluation of consultation process by carriers & local authority										
Local authority may recommend an EA if there are unresolved health issues/concerns after consultations										
To facilitate ongoing consultation, a plaque with contact information must be attached to the base of the facility		✔		✔						

Issue	North Vancouver	Caledon	Bighorn	Markham	Colwood	Sudbury	Strathcona	Chatham / Kent	Edmonton	London
Parties to be contacted										
City / Township / District council		✔		✔	✔	✔	✔	✔	✔	
Local Member of Parliament					✔					
Industry Canada		✔				✔				
Property owners within a specified distance	✔	✔		✔	✔	✔		✔	✔	✔
Condominium corporations within a specified distance, rather than every condo resident				✔						
Community groups within a specified distance		✔		✔	✔		✔		✔	
Any other potentially affected interest group									✔	
All affected residents		✔			✔					
Adjacent municipalities within a specified distance				✔						
Information given to public										
Proposed location		✔		✔	✔	✔	✔	✔	✔	✔
Name & address of property owner										
Physical details of tower & structures		✔		✔	✔	✔	✔	✔	✔	✔
Power and frequency output					✔	✔				
All associated equipment & facilities										
Date, time & locations of public meeting(s)		✔		✔	✔	✔	✔	✔	✔	✔
Name & telephone number of a contact person from the carrier				✔	✔		✔	✔	✔	✔
Local authority contact name and telephone number				✔				✔		✔
Industry Canada contact information					✔					
Photos, drawings or maps of the area showing location of tower and distances		✔			✔	✔				
"Information Package" (not specified - information given to city by carrier (same as below)?)				✔						
All information provided by the carrier to the city					✔					
Health & environmental information					✔					
Municipality shall give recommendation letter to property owners / interested parties after consultation								✔		✔
How to give information										
Open meeting in the general area affected		✔		✔	✔	✔	✔	✔	✔	✔
Community information session										
City council meeting					✔					
Newspaper		✔			✔	✔	✔			✔

Issue	North Vancouver	Caledon	Bighorn	Markham	Colwood	Sudbury	Strathcona	Chatham / Kent	Edmonton	London
Regular Mail		✔		✔	✔	✔	✔	✔	✔	✔
Mailing List (provided by municipality, paid for by carrier)						✔	✔	✔	✔	
Sign close to proposed location		✔					✔			
Hand Delivered					✔					
"In writing" (no method specified)										
"Delivered" (no method specified)										
Time periods										
Notice to citizens: 1-2 weeks before meeting					✔					
Notice to citizens: 2-4 weeks before meeting	✔	✔					✔		✔	✔
Application review by local authorities: -1 month				✔ if no consultation				✔		✔ if no consultation
Application review by local authorities: -2 months		✔								✔ if consultation
Application review by local authorities: -3 months				✔						
Application review by local authorities: +3 months										
15 working days: D.O. advise I.C. whether consultation requirements met, and opinion on licence based on land-use									✔	
14 days: Pre-consultation - other carriers must respond in writing										
Follow-up between carriers & local authorities to evaluate the consultation process: meet within one year										
Co-location										
Carriers must contact other carriers & request information on their interest in locating in the same area & discuss co-location			✔		✔	✔	✔	✔		✔
Send a copy of the correspondence to the local authorities					✔		✔	✔		
Meeting between carriers if more than one want to locate in the area										
Encouraged			✔	✔		✔	✔			✔
Co-location OR stealth designs (mutually exclusive)										
Specified radius towers are encouraged to co-locate										
Carriers must explain why co-location is not a viable alternative to a new tower		✔			✔	✔		✔		✔
New towers may be placed on the same site if co-location is not possible (structurally or technologically)			✔		✔	✔	✔			
Applications for towers in 'co-location areas' must be accompanied by letters from other carriers agreeing to co-location										
Carrier may be required to make a commitment to accommodate other providers where feasible				✔						

Issue	North Vancouver	Caledon	Bighorn	Markham	Colwood	Sudbury	Strathcona	Chatham / Kent	Edmonton	London
Siting Location & Design										
Design towers based on the number of co-locating carriers										
Towers should be designed for additional users (even if no prior co-location agreements)							✔			
Towers on roofs & existing structures are encouraged	✔	✔	✔	✔		✔	✔			✔
Monopoles and/or stealth designs encouraged								✔		
Distance / setback requirements (from residences, institutions and/or roads)	✔	✔	✔	✔	✔	✔	✔			
Distance requirements (from other towers)										
Discouraged locations		✔	✔	✔	✔	✔	✔	✔		✔
Prohibited locations							✔			
Height Requirements			✔	✔			✔			
Carrier must give reasons for the tower height						✔				
Requirements for siting on district-owned land	✔	✔								
Specified number of towers per parcel of land										
Mitigation of visual aspects of towers by painting, decorative fencing, screening, landscaping, etc.	✔	✔	✔	✔	✔	✔	✔	✔		✔
Avoidance of significant natural features to the extent possible (not defined)										
Protect natural vegetation		✔					✔	✔		
Protect birds			✔				✔			
Try not to detrimentally affect views from surrounding properties	✔	✔		✔						
Parking space(s) and/or access from road		✔		✔		✔				✔
Lighting limitations. Lighting discouraged unless required for safety			✔		✔		✔			
No signs or material not directly related to the equipment / towers shall only accommodate telecommunications facilities				✔	✔	✔	✔	✔		✔
Emergency service providers should be given priority					✔					
Site Plan / Tower Proposal										
Include a 'before' and an 'after' picture		✔						✔		✔

Appendix F - Comparative Regulatory Material

This comparative analysis was written by Student-at-Law (3rd Year),
Kirsten Drake-McKnight at the University of New Brunswick.

Comparative Regulatory Material: Antenna Siting in Australia, New Zealand, the United Kingdom and the United States of America

In this subsection of the final report, an overview of the regulatory treatment of antenna siting in four countries is provided. The terms of the National Antenna Tower Policy Review request that policy recommendations be made for six policy questions related to the siting of radio antenna towers in Canada. To this end, it is sensible to look at how these policy questions would be addressed in countries similar to our own.

Australia, New Zealand, the United Kingdom and the United States were chosen for this policy comparison because of their cultural and economic similarities with Canada. The markets and the technological development and adoption of all five counties are quite comparable. Canada, the United Kingdom and Australia have a shared legal heritage. Australia and Canada have very similar radio regulatory provisions. Due to the continual flow of people, products and communications across the Canada/ U.S. border, both countries have often been regarded and treated as one market for goods and services, including radiocommunication-based products and services. With some exceptions, the broadcasting and other radiocommunication industries, and radio users generally, in Canada and the U.S.A. are very much alike and the vast majority of the radio regulatory policies of these countries have been harmonized.

Australia

a. Regulation

Australian state parliaments are subject to the national Constitution as well as their state constitutions, but federal laws are paramount. Local government bodies are created by legislation at the state and territory level. In practice, the levels of government cooperate in many areas, such as telecommunications and radio regulation. The Australian Communications Authority (ACA) is responsible for regulating telecommunications and radiocommunications, including promoting industry self-regulation and managing the radiofrequency spectrum.

The aim of the *Telecommunications Act 1997*[1] is to balance the needs of telephone companies with the rights of owners, occupiers and local residents. The Act provides for the approval of most telecommunications facilities, such as broadband overhead cable and the majority of mobile telecommunications towers, to be dealt with by the relevant state and territorial authorities, usually at the local level. Much of Australian telecommunications infrastructure requires development approval under local planning schemes, and local planning authorities may develop their own process and consultation requirements for sites requiring Development Applications. The Australian Communications Industry Forum's Industry Code: Deployment of Radiocommunications Infrastructure,[2] outlines the steps that carriers must take when deciding on base station locations for low impact facilities, which are defined in the *Telecommunications (Low Impact Facilities) Determination 1997*.[3] The Industry Code is a supplement to existing local, state or federal regulatory schemes, but it cannot change them. In general, local government development permission must be obtained, and there must be compliance with state and territorial laws. State and territorial governments are increasingly introducing statutory controls for telecommunications, which provide, for example, design and siting guidelines and heritage preservation controls. The *Telecommunications Code of Practice 1997*[4] also deals with the notification process for low-impact facilities, and requires compliance with certain provisions of the Industry Code. Much of the information in the Industry Code and the Telecommunications Code of Practice seems to overlap, and they contain similar language. While the codes are voluntary, industry participants are expected to sign the relevant codes, and once they do so, they are bound by the provisions and are subject to any sanctions for non-compliance.

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1 *Telecommunications Act 1997* (Cth.) online: SCALEplus: Australian Attorney General's Department <http://scaleplus.law.gov.au/html/pasteact/2/3021/top.htm>.

2 Australian Communications Industry Forum, *Industry Code: Deployment of Radiocommunications Infrastructure*, 2002, online: <www.acif.org.au> [Industry Code]. It is expected that the Industry Code will be amended in late 2004 or early 2005.

3 Telecommunications (Low Impact Facilities) Determination 1997 (Cth.) online: SCALEplus: Australian Attorney General's Department < http://scaleplus.law.gov.au/html/instruments/0/30/0/2003111101.htm >. Also see Australian Communications Authority, *Fact Sheet: Installation of Telecommunications Facilities – A Guide for Consumers*, online: <http://www.aca.gov.au/consumer_info/fact_sheets/consumer_fact_sheets/fsc30.htm> for clarification of "low impact facility".

4 *Telecommunications Code of Practice 1997* (Cth.) online: SCALEplus: Australian Attorney General's Department < http://scaleplus.law.gov.au/html/instruments/0/30/0/2003102801.htm>.

b. ***Consultation***

Local planning authorities may develop their own process and consultation requirements for sites requiring Development Applications, and most local governments in Australia require carriers to consult with community members under their Development Application process. The Industry Code requires that carriers develop plans for local community consultation before commencing work on the proposed tower. While the Industry Code applies only to low impact facilities, it is a useful tool for communities developing consultation plans for all types of facilities. Appendix D of the Industry Code gives guidance on how to develop a consultation plan, and contains a list of required elements for community consultation plans.

i. Notice

While carriers do not have to notify the general public of proposed Low RF Power Infrastructure and fixed radio links because of the low power used, they are required to notify the council, manager, and the owners and occupiers of land in close proximity.[5] The Industry Code specifies that if the proposed site is near multiple residences, notice must be given to all occupants.[6] In addition, carriers must consult with the owner of the site, the council, and other interested and affected parties, such as tenants, progress associations, parent groups, sports groups, occupational heath and safety committees, and residents who live in adjacent council areas but are living in close proximity to a proposed site. The Industry Code suggests that carriers contact local councils for information about potentially affected parties and how to best notify them. For a proposed installation at an existing site, a community consultation plan is not required. Instead, the carrier must publish a proposed work notice in a newspaper circulating in the area.[7]

ii. Information

The Industry Code specifies that the public should have access to up-to-date information about standards and potential health risks. To that end, the Australian government provides at least one million dollars a year for research, and the Australian Communications Authority monitors scientific developments abroad. In addition, the Industry Code specifies that the industry should also keep abreast of scientific developments and share new information with the public, but there is little information that a carrier is required to give to the public. Instead, information must be supplied at no charge, upon request. Mandatory information includes a

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5 Industry Code at 5.3.

6 *Ibid*. at 5.5.6.

7 *Ibid.* at 5.6.3.

description of the RF infrastructure, operating frequency, RF hazard areas, compliance declarations and EMR exposure levels. Carriers must supply the source for scientific information or quotes used in their communication and supply additional sources of information about the topic. In addition, carriers must not communicate that an absence of scientific proof means that there is no possibility of health problems arising from RF.[8]

With regard to how to provide information, the Industry Code requires that the carrier provide a contact phone number. The carrier is also required to place a notice of the proposed work on the site in a location visible to the public, and leave it up until construction is finished. This notice must include information about how to submit comments. If the construction is in a residential area and a sign is not feasible, carriers must notify adjoining landowners and occupiers.[9] A list of 'consultation tools' is also provided in Appendix D. These methods of providing information to the public are only suggestions; it is recognized that the type and number of tools used will vary depending on the proposal, the stakeholders and the level of concern raised by the community. The most important goal is that information be easy to understand, and opportunities for feedback be clearly stated. After consultation has been completed, carriers must comply with the Industry Code and give the council a report about the responses obtained from consultation, which will also be made available to the public upon written request.[10]

iii. Time frames

According to the Code of Practice, written notice must be given at least ten (10) days before the carrier intends to engage in the low-impact activity. The Industry Code specifies that council has five (5) business days from the date of notification to comment, in writing, on the carrier's proposed community consultation plan. The carrier cannot start consultation until it has considered and responded in writing to all of the issues about consultation raised by council.[11] After construction is proposed, the carrier must give council no less than 20 business days to comment on the proposal; and the community not less than ten business days. The carrier must

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8 *Ibid.* at 6.

9 *Ibid.* at 5.5.6.

10 *Ibid.* at 5.5.10.

11 *Ibid.* at 5.4.

respond to information requests in a "timely matter" (although this is not defined), but complaints must be acknowledged in writing within ten working days of receipt.[12]

c. Health and Safety Standards

Under the Industry Code, carriers must design site infrastructure to minimize EMR exposure, complying with exposure levels. They must also submit an estimate of exposure levels before a project begins, and EMR assessment information must be provided to the public upon request. The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)'s standard *Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields – 3kHz to 300 GHz*[13] applies to all mobile phone transmitters and antennas. It sets levels which may not be exceeded at any point where the public could reasonably be exposed. The standards incorporate significant safety margins and have been set well below the level at which health effects have been shown to be caused. The *Telecommunications Act 1997* requires carriers to comply with industry standards and the Code of Practice.

The Australian Communications Authority has created a mandatory standard for human exposure to electromagnetic radiation, *Radiocommunications (Electromagnetic Radiation – Human Exposure)*,[14] which provides exposure limits for mobile and portable radiocommunications transmitters, as well as broadcast towers, mobile base stations and certain amateur radio stations. The Australian Communications Authority inspects installations and audits compliance records randomly and also if they receive a written complaint or interference with communications occurs.[15]

d. Precautionary Approach

A precautionary approach is followed in Australia. The Industry Code requires carriers to consult with the community and adopt a precautionary approach in planning, installation and

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[12] *Ibid*. 5.5.9, 5.5.6, 7.3.

[13] *Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields – 3kHz to 300 GHz* online: Australian Radiation Protection and Nuclear Safety Agency <http://www.arpansa.gov.au/rps_pubs.htm>.

[14] *Radiocommunications (Electromagnetic Radiation – Human Exposure) Standard 2003* online: Australian Communications Authority <http://www.aca.gov.au/aca_home/legislation/standards/emrstd1_2003.pdf>

[15] Australian Communications Authority, *Human Exposure to Radiofrequency Electromagnetic Radiation: Information for Licencees of Radiocommunication Transmitters*, (Melbourne: Australian Communications Authority, 2003) at 6, 11.

operations, with the objective of minimizing unnecessary or incidental RF emissions.[16] This is despite the fact that ARPANSA has conducted audits of mobile phone base stations and has found that radiation is much lower than the allowable limits.[17] Carriers must take into account: the power levels needed, minimization of EMR exposure to the public, community sensitive locations (e.g. schools, hospitals, etc.), heritage locations, physical characteristics of the land, planning policies, the outcomes of consultation processes, RF interference, and obligations or opportunities to co-locate. Carriers' written procedures for site selection must be made available to the public upon request.[18]

e. Dispute Resolution

Siting requirements are to be negotiated between councils, community members and the industry. The *Telecommunications Code of Practice 1997* provides for a Telecommunications Industry Ombudsman who is available to provide alternative dispute resolution for small businesses and residential consumers. The ombudsman focuses primarily on service delivery issues, but can hear disputes about breaches of industry codes of practice. It is considered "an office of last resort", and the carrier must comply with his/her direction.[19] As another form of dispute resolution, the Federal Court can place financial penalties on the carrier if it breaches direction from the Australian Communications Authority to comply with the code.[20]

f. Siting

The *Telecommunications Act 1997* sets limits on low-impact facilities' height and noise, and addresses restoration of land. It requires the owner to act in accordance with good engineering practice, to protect the environment, to protect the safety of individuals and property, to interfere as little as possible with traffic and the use of land, to do as little damage to the land as possible, and to take all reasonable steps to return that land to a condition similar to that which it was in before the activity began. Many of these terms, however, are not defined. Low impact facilities may be installed without consent from local government, but they must

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16 Industry Code at 5.2.

17 Australian Communications Authority, *Electromagnetic Radiation and 3G Mobile Phones* (Consumer Fact Sheet), 2003, online: <http://www.aca.gov.au/consumer_info/fact_sheets/consumer_fact_sheets/fsc87.htm>.

18 Industry Code at 5.1.

19 Telecommunications Code of Practice 1997 at 2.37.

20 Australian Communications Authority, *Frequently Asked Questions: Deployment of Radiocommunications Infrastructure Industry Code*, 2004, online: <http://www.aca.gov.au/consumer_info/frequently_asked_questions/radcomdeployment.htm>.

comply with the *Telecommunications Act 1997*, the *Telecommunications Code of Practice*, and the Industry Code. Other facilities (including telecommunications towers), are governed by territorial and state laws. The Industry Code does not deal with the merits of a site. Carriers must take into account many factors when deciding on a site, and all factors are deemed to be equally important. After all factors are considered, carriers may place infrastructure in what they determine is the best location. The Industry Code also does not specify setback distances. It is left to industry and local authorities to balance distance and RF strength.

g. Co-location

The Industry Code recognizes positive and negative aspects of co-location. It requires that the possibility of co-location be considered, but not at the expense of other considerations identified as important to councils and communities.[21] Carriers must discuss the possibility of co-location with other carriers and give council their assessment of information regarding co-location. The *Telecommunications Code of Practice 1997* requires that carriers take all reasonable steps to determine whether existing facilities can be used. Often, however, carriers will install low-impact facilities rather than obtain the required planning approval to co-locate.

h. Property Values

The Industry Code recognizes that there is community concern about property values, but the code does not deal directly with the issue. The issue is addressed through consideration of community input on visual impacts in the consultation processes, and through the application of the precautionary approach.[22]

New Zealand

a. Regulation

New Zealand's parliamentary system is very similar to that of Australia, and the New Zealand government also benefits from the policy advice of its ministries. The Ministry for the Environment (MOE) works closely with the government, giving advice on New Zealand's environmental laws, policies, standards and guidelines. The MOE also monitors how they are working in practice, and takes any action needed to improve them. The Ministry of Health is the Government's principal agent and advisor on health and disability. The Ministry of Economic

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[21] Industry Code at e.

[22] *Ibid*.

Development produces and co-ordinates policy advice about economic, regional and industry development, and advises the government about the operation and regulation of specific markets and industries, including energy and telecommunications.

Jointly, the Ministry of Health, the Ministry for the Environment and the government created New Zealand's National Guidelines for Managing the Effects of Radiofrequency Transmitters,[23] which explain the country's strategy towards antenna towers and consultations between industry, citizens and the government. Each district may design and implement its own plan for antenna siting, as each district's objectives, policies and methods will vary. The *Resource Management Act 1991*[24] *(RMA*), contains rules which must be followed when siting antennas, predominantly focusing on environmental issues. Each district must comply with the *RMA*. The Guidelines, although not mandatory, are generally followed, as there is considerable room for each district to tailor the Guidelines to its district plan. Standards New Zealand's safety standards[25] are also not mandatory, but are generally followed.

b. Consultation

The determination of specific methods of information delivery is left to be decided by the communications experts from the community and industry, as they are in the best position to determine what will be most effective in each district. Almost all elements of public consultations, including the level of consultation and the time frames, are left to be determined between the local authorities and the industry.[26] Most districts require some form of public consultation, and some districts have made consultation a mandatory requirement in the siting process.[27]

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[23] New Zealand, Ministry for the Environment & Ministry of Health, *National Guidelines for Managing the Effects of Radiofrequency Transmitters* online: Ministry for the Environment <www.mfe.govt.nz/publications/rma/radio-freq-guidelines-dec00.pdf> [National Guidelines].

[24] *Resource Management Act 1991* (N.Z.), 1991/69 online: Public Access to Legislation Project <http://www.legislation.govt.nz/>.

[25] Standards New Zealand, *Radiofrequency Radiation – Maximum Exposure Levels 100kHz – 300 GHz* NZS6609:1990 Part 1 (1985). For a summary, see Industry Code at 67-68, 16-24.

[26] National Guidelines at 31-32, 36.

[27] New Zealand, Christchurch City Council, "Council Develops New Option for Mobile Phone Sites" online: <http://archived.ccc.govt.nz/mediareleases/2001/July/CouncilDevelopsNewOptionForMobilePhoneSites.asp>.

i. Information

It is recommended that up-to date information about health risks be provided to the public, particularly information about how scientists assess whether RF exposure is likely to cause health effects, how scientists determine what levels of exposure are generally considered safe, and how scientific evidence is used to set public health policy exposure levels. Other recommended information includes information about the industry's compliance with best practice procedures, information about why there are differences of opinion on health risks within the scientific community, and information about the varying levels of exposure from different types of towers (e.g. cell phone, radio, TV, etc.). The Guidelines also recommend that carriers and councils publicize information about any random monitoring programs and the results, and publicize successful industry/community communication.[28]

While the Guidelines do not specify particular methods of providing information to the public (e.g. newspapers, leaflets), they are specific about the manner in which industry, council and planning authority representatives should interact with citizens.[29] They are very specific that neither government nor industry members should dismiss health concerns as unscientific or irrational, as they are relevant to the public. Risk communication is advocated, a process which involves giving the public current information about health risks, information about how to manage the risks, and acting on citizens' concerns where there are low or no-cost alternatives. The Guidelines advise industry representatives to be cautious when comparing RF risks to other risks, so as not to trivialize citizens' fears. The public should be involved as a legitimate partner, and representatives should be clear about the public's expected role in the process. Detailed suggestions regarding industry/public interaction are offered:

* Citizens respond best to a single representative from the industry who is honest and trustworthy, and who will treat community members with respect.
* This person should be skilled in risk communication and really listen to people.
* He or she must be able to communicate without being too technical or defensive, but without omitting important information.
* Having only one industry contact for an antenna proposal will reduce conflicting messages, and reduce citizens' feelings that they never make any progress because they must keep explaining themselves to different representatives.

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[28] National Guidelines at 16, 49, 52.

[29] *Ibid*. at 48, 91-92.

In the Guidelines, representatives are urged to deal with uncertainty directly, as avoiding uncertainty will promote distrust. They are also urged to deal with concerns the industry has control over, and identify how other concerns can be managed.

ii. Time frames

Although the Guidelines specify that the government and industry should communicate with the public early in the process, there is no definition of "early."[30]

c. Health and Safety Standards

Standards New Zealand has implemented safety guidelines for RF,[31] and while they are not mandatory, they are generally followed. A safety factor of 50 has been implemented, which means that the public exposure limit is set 50 times below the exposure levels that are considered to be harmful. The standard suggests that RF be minimized when it is incidental to service delivery and can be done at a modest expense, and suggests that antenna proponents demonstrate that installations have been planned and are operated in accordance with the best practice of the industry.[32]

The Guidelines recommend that computer modelling be used to predict the RF levels of the tower, and cumulative effects of all RF in the area.[33] If initial modelling predicts that exposure will exceed 25% of the reference level, an additional evaluation of RF should be performed after the antenna is functioning, to give assurance to the community. In some circumstances, the Guidelines recommend that an additional evaluation be carried out once the antenna is operational, and random monitoring for compliance is also recommended. The Guidelines recommend that district plans require that the company which owns the antenna pay for any testing for compliance, as this will make carriers ensure that their levels are well below the reference level. Initial testing should consider the cumulative effects of all RF in the area, especially when towers are co-located.

There is currently no record of where all towers in New Zealand are located, so the Ministry for the Environment suggests that local authorities keep a record of the location of all

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30 *Ibid.* at 92.

31 Standards New Zealand, *Radiofrequency Fields: Maximum Exposure Levels – 3 kHz to 300 GHz*, NZS 2772.1 (Wellington: Standards New Zealand, 1999).

32 National Guidelines at 23-24.

33 *Ibid.* at 39-40.

present and future antennas that have been approved, so they will be aware of the cumulative effects of RF when considering new towers. The district authorities should ensure that new tower owners know about all other antennas in the area, so that they can make sure they are in compliance. If a tower is not in compliance after it has become operational, local authorities can use the enforcement provisions in the RMA to require compliance to the standard.[34]

Antenna proponents must submit an outline plan to local/territorial authorities which addresses aesthetic and environmental issues. According to the National Guidelines, The Ministry for the Environment does not consider RF a "contaminant", thus, RF need only be considered in district plans, not regional plans. The Ministry does not support the position that the positive effects of antennas will balance unacceptable environment damage; however, both acceptability and whether the *RMA* requirements are met are to be determined in each situation by local authorities and antenna proponents.[35]

d. Precautionary Approach

Although the precautionary principle is not embodied in New Zealand legislation or guidelines, the Ministry for the Environment encourages the voluntary application of low-cost or no-cost measures to reduce or avoid exposure, through design or siting alternatives. The National Guidelines specify that if an alternate site or an alternate option for mounting an antenna on a building is available, carriers should choose the option that will result in the lowest exposures. They are also urged to design facilities to avoid and reduce exposure, and provide evidence that this has been done, for instance, in the form of coverage maps and transmitter tests.[36]

e. Dispute Resolution

The New Zealand Environment Court[37] serves to resolve disputes over antenna siting issues. The Environment Court is required to be consistent with the decisions of higher courts: The Australian High Court, Court of Appeal and the UK Privy Council. It strives for consistency with its own decisions, and UK House of Lords decisions are also highly persuasive.

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[34] *Ibid.* at 46.

[35] *Ibid.* at 35.

[36] *Ibid.* at 39, 42, 47.

[37] General information about the Environment Court is available at <http://www.courts.govt.nz/environment/>.

f. Siting

Siting requirements may be determined by local authorities. They may also advocate a best-practice approach which they ask carriers to follow, and publicize whether the antenna owner has followed them.

g. Co-location

Under the *Telecommunications Act 2001*,[38] co-location is not required, but it is allowed.

h. Property Values

In the National Guidelines, the New Zealand government seems to accept that towers may reduce property values, but elaboration and evidence are not provided.[39] Effects on property values are indirectly considered in the *RMA* under "amenity effects", but again, they are not specifically addressed.[40] Although not necessarily related to views expressed by the New Zealand government, Sandy Bond of the Department of Property, University of Auckland, has written extensively on the subject of stigma associated with contaminated land and antenna towers. She has concluded in numerous papers that prior or present contamination and proximity to towers has a negative effect on property values.[41]

United Kingdom

a. Regulation

The office of the Deputy Prime Minister, a central department of the UK government, is responsible for giving planning guidance and advice to localities in the United Kingdom, including guidance on antenna tower siting. Although guidance is given by the federal government, local land-use authorities have the ability to create their own development plans. The UK's *Planning Policy Guidance Note 8*[42] gives direction on how to facilitate the growth of

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38 Telecommunications Act 2001 (N.Z.), 2001/103 online: Public Access to Legislation Project <http://www.legislation.govt.nz/>.

39 *National Guidelines* at 85.

40 *Ibid.* at 32.

41 *For more information in Dr. Bond's work, see section D, Question 6 of this report concerning the effect of antenna towers on property values.*

42 U.K., Office of the Deputy Prime Minister, *Planning Policy Guidance Note 8* online: <http://www.odpm.gov.uk/stellent/groups/odpm_planning/documents/page/odpm_plan_606918.hcsp>.

the telecommunications industry while protecting the environment. The government recommends that local planning authorities take the guidelines into account as they prepare their development plans, but it is not mandatory. These should be viewed in conjunction with the Code of Best Practice on Mobile Phone Network Development,[43] which was developed by the industry, along with the central and local governments of the United Kingdom. The code is also not binding, but is generally followed by government and the industry, as they jointly produced the document. Guidelines about which towers require local approval and which do not are outlined in the *Town and Country Planning (General Permitted Development) Order 1995.*[44] Once approval has been granted, permitted development rights cannot generally be withdrawn unless there is a real and specific threat to the locality in which the development is to take place.

b. Consultation

According to the *Planning Policy Guidance Note 8*, the installation of masts over 15m or any mast in certain zones (e.g. National Parks) requires a full planning application, to be decided by the local planning authority. This can involve any relevant representations either for or against the appeal, and appeals are decided by the Secretary of State. Carriers should consult with schools or colleges regarding plans for masts near their property, before plans are submitted.[45] In Scotland, all masts require full planning permission.

The *Town and Country Planning (General Permitted Development) Order 1995*[46] stipulates that specified apparatus can be installed without the need to consult local authorities, but certain types of development (e.g. ground-based masts up to 15 feet) are subject to local authorities' approval of siting or appearance details, and the local authority can refuse approval if the development poses a serious threat to amenity. Although local authorities approve the details of applications, they do not issue licences. In addition, they must consult the public.

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[43] U.K., Office of the Deputy Prime Minister, *Code of Best Practice on Mobile Phone Network Development* online: <http://www.odpm.gov.uk/stellent/groups/odpm_control/documents/contentservertemplate/odpm_index.hcst?n=2348&l=2> [Code of Best Practice].

[44] *Town and Country Planning (General Permitted Development) Order 1995,* S.I. 1995/418.

[45] *Planning Policy Guidance Note 8* at ss. 11, 13.

[46] *Town and Country Planning (General Permitted Development) Order 1995* at schedule 2.

i. Notice

During pre-application, local planning authorities are advised to consider the interests of parties who might be affected by the application, and notify them. Local authorities should also notify the public, possibly including residents outside of their jurisdiction.[47]

ii. Information

The *Planning Policy Guidance Note 8* lists information that should be provided to the public.[48] It includes: whether a particular development would cause financial or other loss to owners and occupiers of neighbouring property; whether a particular development would have a detrimental effect on the locality in general or on amenities that ought, in the public interest, to be protected; environmental considerations regarding public environmentally-sensitive areas; an assurance of visual amenity; information about health considerations such as exposure to EMF, headaches, sleep disturbance, depression, stress, and long-term health effects such as cancer and interference with medical devices.

On a recommendation from the Stewart Report,[49] a leaflet has been made widely available wherever mobile phones were sold, to provide cellular users and potential purchasers with information. In addition, the Office of Communication's Sitefinder website[50] contains public information about currently operational sites, including a site-based map that identifies the locations of masts in the U.K., results of audits at schools in the proximity of masts, and technical information such as the name of the operator, the height of the antenna, the frequency range, the transmitter power, the maximum licensed power and the type of transmission. This site was created as a result of recommendations in the Stewart Report.

iii. Time frames

The *Planning Policy Guidance Note 8* specifies that the approval period for all towers is 56 days.[51]

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47 *Planning Policy Guidance Note 8* at Appendix Supporting Guidance, s. 61.

48 *Ibid.* at Appendix Supporting Guidance para. 56, 87.

49 Independent Expert Group on Mobile Phones, *Mobile Phones and Health* (2000) online: <http://www.iegmp.org.uk/report/text.htm>.

50 U.K., Office of Communication - Sitefinder online: <http://www.sitefinder.radio.gov.uk/>.

51 Planning Policy Guidance Note 8 at Annex 1 para. 9.

c. Health and Safety Standards

An Independent Expert Group on Mobile Phones was established by the government in 1998.[52] The group produced a report on mobile phones commonly referred to as the 'Stewart Report.' The recommendations made in this precautionary report were integrated into the amended *Planning Policy Guidance Note 8*. Changes draw heavily on National Radiological Protection Board (NRPB) guidelines, International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines and legislation such as the *Safety at Work Act 1974*[53] *and the Management of Health and Safety at Work Regulations 1999*.[54] The NRPB guidelines impose values, called 'basic restrictions,' that should not be exceeded. Although the NRPB guidelines contain wide safety margins, the Stewart Report recommended that as a precautionary approach, the ICNIRP guidelines for public exposure should be adopted for use in the UK instead of the NRPB guidelines. The EU Council of Health Ministers recommended the same, and the mobile phone industry has readily accepted this change. The ICNIRP guidelines are five times more restrictive than NRPB guidelines. If ICNIRP guidelines are met, the local planning authority should not be concerned about health issues. Legislation places the onus on operators of telecommunications apparatus to assess any risk that may arise. The Health and Safety Executive enforces this legislation, and follows NRBP guidelines.

d. Precautionary Approach

The Stewart Report suggested a number of specific precautionary actions, which have been accepted by the government and implemented into guidelines. Local planning authorities were advised not to augment these by implementing their own precautionary policies.[55]

e. Dispute Resolution

Disputes regarding tower sharing are handled by the Director General of Telecommunications. If the Director General considers it appropriate, he may direct the relevant telecommunications operators to share.[56]

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[52] For more information, see Independent Expert Group on Mobile Phones, *Mobile Phones and Health* (2000) online: <http://www.iegmp.org.uk/report/text.htm>.

[53] *Safety at Work Act 1974* (U.K.), 1974, c. 37.

[54] *Management of Health and Safety at Work Regulations* 1999, S.I. 1999/3242.

[55] *Planning Policy Guidance Note 8* at Appendix Supporting Guidance para. 101.

[56] *Ibid.* at Appendix Supporting Guidance para. 71.

f. Siting

The Code of Best Practice on Mobile Phone Network Development encourages operators to develop tower designs that allow blending into the landscape.[57] Local plans should also include general policies on siting appearance, including any location and landscaping requirements designed to mitigate negative amenity effects.[58]

g. Co-location

The Stewart Report recognized the possibility of negative aspects of sharing, such as technology interference, or amenity issues. Current UK government policy is that towers should be kept to a minimum and, whenever possible, tower sharing should be encouraged. In the *Planning Policy Guidance Note 8,* tower sharing is encouraged,[59] and applicants should explore this possibility before applying. If they do not consider tower sharing, they can be rejected by local planning authorities for failing to do so. Site sharing agreements can be developed between operators and local authorities. Site sharing as opposed to mast sharing may be more appropriate in come cases, and should be considered. The UK government suggests that where a mobile phone station is added to an existing mast or site, the operator should confirm that the cumulative exposure will not exceed ICNIRP guidelines. The government has suggested that an independent audit of emissions should be established to improve public confidence, and such an audit is now being performed by the Office of Communications.

The *Telecommunications Act 1984*[60] provides for the licensing of telecommunications operators. These licences require network operators to take all reasonable steps to investigate using or replacing an existing tower or other structure before erecting a new tower. Where a new tower is required, operators must investigate collaborating with another operator in erecting a mast for joint use. Tower sharing policy also includes the need to consider erecting antennas on existing buildings, rather than erecting new towers.

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[57] Code of Best Practice at 28-31.

[58] *Planning Policy Guidance Note 8* at Appendix Supporting Guidance para. 40.

[59] *Ibid.* at Appendix Supporting Guidance paras. 66-73.

[60] *Telecommunications Act 1984* (U.K.), 1984, c. 12.

h. Property Values

The Planning Policy Guidance Note 8 stipulates that individual property values are not to be the concern of the planning authorities – public amenities are, however.[61]

United States of America

a. Regulation

The Federal Communications Commission (FCC) is an independent non-governmental agency which is responsible to the United States Congress. The FCC has jurisdiction over all transmitting devices in the USA except those operated by and for the federal government. There are no comprehensive federal policy documents or guidelines on consultation in the USA for antenna towers, thus requirements for antenna siting and consultation vary greatly throughout the country. As the FCC licences most wireless communication services to operate in a general area rather than a specific site, state and local governments may establish their own siting and consultation guidelines, with reference to the legislation and guidelines surrounding historic and environmental areas. Such legislation involves the FCC rather than the local governments, but local governments may mirror some of the provisions in their local siting policies. State and local tower siting policies must adhere to the requirements in the federal *Telecommunications Act*,[62] and local governments cannot specify RF exposure or interference requirements that differ from those specified by the federal government. The purpose of the *Telecommunications Act* is to balance the goals of the telecommunications industry with the goals of local governments. Wireless carriers are encouraged to enter the telecommunications field, but local governments remain the guardians of their communities through the use of zoning and other land-use measures.

Two federal Bills, which would give the local governments more authority over siting issues, were proposed in 2002, but not passed. They were: the *Local Control of Broadcast Towers Act*[63] *and the Local Control of Cellular Towers Act.*[64]

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[61] *Planning Policy Guidance Note 8* at Appendix Supporting Guidance para. 56.

[62] *Telecommunications Act*, U.S.C. § 332(c)(7) (1996).

[63] *U.S., Bill S. 3102, Local Control of Broadcast Towers Act*, 107th Cong., 2002.

[64] *U.S., Bill S. 3103, Local Control of Cellular Towers Act*, 107th Cong., 2002.

b. Consultation

i. Notice

As mentioned above, siting and consultation requirements vary greatly throughout the country, and there are few elements that are consistent throughout all (or virtually all) local plans. In 1998, an agreement was made between local governments and industry associations, addressing issues related to moratoria on siting of wireless telecommunications facilities. The agreement states that public notice and participation in accordance with the local government's standard practices should be followed.[65]

ii. Information

The information provided to members of the public will differ with each local plan, as there are no national guidelines stipulating required elements. Antenna proponents generally create extensive information packages to be presented to local councils and concerned citizens in order to secure ultimate approval for their respective antenna proposals.

iii. Time frames

The *Telecommunications Act* s. 704(b)(iii)[66] states that "any decision by a State or local government or instrumentality thereof shall act on any request for authorization to place, construct, or modify personal wireless service facilities within a reasonable period of time after the request is duly filed…;" however, "reasonable time" is not defined.

c. Health and Safety Standards

The FCC has adopted the health and safety recommendation of The National Council on Radiation Protection and Measurements.[67] The FCC does not monitor the emissions for all towers in the USA, but has instrumentation for evaluating RF levels. If there is evidence of potential non-compliance with exposure guidelines for an FCC-regulated facility, the FCC can conduct an investigation and, if appropriate, perform actual measurements.

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[65] "Federal Guidelines for Local and State Government Authority over the Siting of Personal Wireless Service Facilities" *FCC* online: <http://wireless.fcc.gov/siting/local-state-gov.html>; *FCC* online: <http://www.fcc.gov/statelocal/agreement.html>; Kenneth S. Fellman, "Press Statement" (5 August 1998) online: FCC <http://www.fcc.gov/statelocal/kf080598.html>; "Chairman William E. Kennard Announces Historic Agreement by Local and State Governments and Wireless Industries on Facilities and Siting Issues" *FCC* (5 August 1998), online: <http://www.fcc.gov/Bureaus/Wireless/News_Releases/1998/nrwl8032.html>.

[66] Also cited as U.S.C. § 332(c)(7)(b)(iii) (1996).

[67] National Council on Radiation Protection and Measurements, online: <http://www.ncrp.com/>.

Under the *National Environmental Policy Act*,[68] the FCC requires its telecommunications licensees to review their proposed actions for environmental consequences. The FCC rules list areas and situations which are considered environmentally sensitive and require an Environmental Assessment to be prepared before construction. [69] An Environmental Assessment includes a description of the facilities and the area; a statement as to whether construction has been a source of local controversy on environmental grounds; and a discussion of considerations in site selection, alternative sites, and the nature and extent of any environmental effects on the proposed site.

d. Precautionary Approach

Municipalities may not individually apply a precautionary approach and deny tower applications based on health concerns regarding RF if the towers meet the FCC's RF limits.

e. Dispute Resolution

The 1998 agreement between local governments and industry associations, addressing issues related to moratoria on siting of wireless telecom facilities, includes guidelines for siting and a set of "best practices" to follow.[70] The agreement also provides for a non-binding alternative dispute resolution procedure that may be invoked either by the local governments or by the carriers. The parties must contact the FCC's Wireless Telecommunications Bureau to have two volunteers assigned to the dispute - one representing industry, one representing local government. The volunteers will listen to the explanation of issues from the group they are representing. They will then discuss the issues among themselves, and contact each party individually to inform them of their recommendations regarding compliance with moratoria guidelines. The recommendation and mediation process should be concluded within 60 days. If this alternative dispute resolution does not resolve the dispute, the parties may then seek legal remedies.

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68 *National Environmental Policy Act*, 42 U.S.C. § 4321 (1969).

69 FCC Rules, online: FCC <http://www.fcc.gov/oet/info/rules/> at s. 1.1311.

70 "Chairman William E. Kennard Announces Historic Agreement by Local and State Governments and Wireless Industries on Facilities and Siting Issues" *FCC* (5 August 1998), online: <http://www.fcc.gov/Bureaus/Wireless/News_Releases/1998/nrwl8032.html>.

f. Siting

The *Telecommunications Act* preserves local authority on the placement, construction and modification of towers, subject to some restrictions.[71] Localities may not discriminate between providers of "functionally equivalent services," even if they only want to limit the number of towers, not specific providers. They may not reject all facilities completely, or have the effect of prohibiting all facilities, for example, by excessively restrictive zoning. Local authorities must act on requests for tower authorization "within a reasonable period of time," and rejections of requests must be in writing and supported by "substantial" evidence in a written record. Courts have interpreted this to mean that the governing body should err on the side of caution and make findings of the sort made by administrative agencies.[72] The written denial should be separate from the written record, and the written denial should contain a sufficient explanation of the reasons for denial so that a court reviewing the decision can evaluate the evidence in the record that supports those reasons. State or local law generally determines what is relevant as "substantial evidence," because local land-use zoning decisions are tested under local standards. The evidence must, however, be strong enough that a reasonable mind might accept it as sufficient to support the conclusion. The 'reasonable mind' used is often the reasonable mind of the local resident, not the 'reasonable mind' of the legislator. As such, widely shared views of community members will be compelling. It is important to note, however, that under the *Telecommunications Act*, local authorities cannot reject tower requests based on health concerns if the tower meets the FCC's RF regulations. The Act treats types of antennas differently with respect to local authority. Local authorities retain control over cellular antenna siting, but they cannot prohibit service. With regard to satellite TV and wireless cable, the FCC broadly preempts local requirements that impair reception.

At the federal level, the U.S.A. has created special antenna siting contexts for historically significant areas and Native lands through the *National Historic Preservation Act* (NHPA).[73] This legislation is noteworthy, as up to 25% of the towers built in the United States each year face historic reviews.[74]

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[71] *Telecommunications Act*, U.S.C. § 332(c)(7) (1996).

[72] For case names and summaries, see Miller & Van Eaton, *Tower Toolkit 2004*, online: <http://www.millervaneaton.com/feature_toolkit2004.html>; and Jim Baller & Casey Lide, Baller Herbst Law Group, "Wireless Tower Siting: The Local Perspective" online: Municipal Research & Services Center of Washington <http://www.mrsc.org/subjects/telecomm/towermemo.pdf> (2003).

[73] National Historic Preservation Act, U.S.C.A. § 470.

[74] Paul Davidson, "Cell Phone Tower Rules May Loosen Up" USA Today (9 September 2004) online: USA TODAY <http://www.usatoday.com/money/industries/telecom/2004-09-09-cell-tower_x.htm>.

Section 106 of the NHPA requires that federal agencies consider the effects of undertakings (which include antenna towers and other communication devices) on historic properties, and allow the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings.[75] Historic properties are defined as those that are eligible for inclusion in the National Historic Register.[76]

In addition to allowing an opportunity for the Council to comment, federal agencies also must consult with the appropriate State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Officer (THPO), and follow the Council's procedural rules for historic preservation reviews. These rules include requirements for the participation of the public, local land-use authorities, Native tribes, and National Historic Officers.[77]

On October 4, 2004, the FCC adopted a Nationwide Programmatic Agreement for reviewing the effects of towers on historic properties.[78] The goal of the agreement, several years in the making,[79] is to "improve compliance and streamline the review process for construction of towers and other Commission undertakings, while at the same time advancing and preserving the goal of the NHPA to protect historic properties."[80] Since the late 1990s, there have been increasing backlogs and delays in deploying communications infrastructure, and the Programmatic Agreement is expected to provide greater certainty and ease burdens on the

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[75] FCC, Report and Order (FCC 04-222), "Nationwide Programmatic Agreement Regarding the Section 106 National Historic Preservation Act Review Process" (5 October 2004) online: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-222A1.doc> at 4.

[76] Paul Davidson, "Cell Phone Tower Rules May Loosen Up" USA Today (9 September 2004) online: USA TODAY <http://www.usatoday.com/money/industries/telecom/2004-09-09-cell-tower_x.htm>.

[77] FCC, Report and Order (FCC 04-222), "Nationwide Programmatic Agreement Regarding the Section 106 National Historic Preservation Act Review Process" (5 October 2004) online: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-222A1.doc> at 4.

[78] FCC, "Nationwide Programmatic Agreement for Review of Effects on Historic Properties for Certain Undertakings Approved by the Federal Communications Commission" (September 2004) online: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-222A3.pdf>.

[79] Discussions about such an agreement began in 2001. On June 9, 2003, the FCC announced the completion of a draft and sought public comment. See FCC, Report and Order (FCC 04-222), "Nationwide Programmatic Agreement Regarding the Section 106 National Historic Preservation Act Review Process" (5 October 2004) online: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-222A1.doc> at 5-6.

[80] FCC, Report and Order (FCC 04-222), "Nationwide Programmatic Agreement Regarding the Section 106 National Historic Preservation Act Review Process" (5 October 2004) online: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-222A1.doc> at 3.

system. Officials predict that they will be able to manage the increasing number of towers while protecting historically significant areas, including those with Native religious significance.[81] The agreement includes standards for identification, a process for identifying eligible properties not listed on the National Register, deadlines for SHPO and FCC review, forms to standardize SHPO filings, procedures for communicating with federally recognized Indian tribes, and defines the categories of undertakings that are excluded from section 106 review.[82] Of particular note, the Programmatic Agreement does not apply to co-locations of antennas on existing towers, buildings or structures, which are exempt from section 106 review under the Collocation Agreement.[83]

To coincide with the Programmatic Agreement, the FCC and the United South and Eastern Tribes, Inc. have adopted voluntary best practices to aid in the review of the impacts of towers on historically and culturally significant property.[84] The voluntary guidelines were created through consultations with industry, tribes, and various levels of governments.

In addition, The FCC has implemented a Tower Construction Notification program,[85] under which companies can voluntarily submit information about towers, which will then be distributed to Native organizations and Historic Preservation Officers by the FCC. Groups can then respond directly to the companies with their concerns. This increases communication required by s. 106 of the NHPA, but is a facilitation tool; it can not be used in place of s. 106 consultation.

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81 FCC, News Release "FCC Adopts Nationwide Programmatic Agreement to Streamline Review process for Communications Towers" (10 September 2004) online: FCC <http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-252063A1.pdf>.

82 Excluded undertakings include: enhancements to existing towers, replacement towers, temporary towers, certain towers on industrial or commercial property, or utility rights-of-way, and construction areas designated by a SHPO. See FCC, News Release "FCC Adopts Nationwide Programmatic Agreement to Streamline Review process for Communications Towers" (10 September 2004) online: FCC <http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-252063A1.pdf>.

83 FCC, "Nationwide Programmatic Agreement for the Collocation of Wireless Antennas" online: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-222A4.pdf>.

84 CC & United South and Eastern Tribes Inc., "Voluntary Best Practices for Expediting the Process of Communications Tower and Antenna Siting Review pursuant to Section 106 of the National Historic Preservation Act" online: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-253516A2.doc>.

85 FCC, Tower Construction Notification, online: <http://wireless.fcc.gov/outreach/notification/index.html>.

g. Co-location

Under the *Telecommunications Act*, local governments can set their own requirements for co-location and tower sharing. Some local governments offer reduced permit fees and faster processing to companies that agree to co-locate or disguise their towers. Some municipal planners advocate a siting map for communities that will attempt to promote co-location by showing tower locations, size and antenna capacities.

The FCC recognizes that on-tower exposure due to nearby co-located towers may be significant when work is needed on a tower. Power reduction agreements may be signed to ensure that all tower licensees jointly comply with FCC guidelines for exposure levels.

h. Property Values

In interpreting the *Telecommunications Act,* U.S. Courts of Appeal have not been consistent; more questions have been raised than answered.[86] The cases seem to show, however, that testimony by residents affected by antennas is not generally considered good evidence of the antenna tower's effect on property values. Proof of an adverse effect on property values requires qualified expert testimony, not merely the evidence/opinion of residents affected by the antenna. Expert testimony about the impact or about siting alternatives is very persuasive. Objections based on general aesthetics are also less persuasive than engineering considerations or particular characteristics of the proposed antenna, and an examination of the company's business plan. However, substantial evidence of negative aesthetic impact may be enough for a local authority to deny a tower request.

Conclusion

There are many common elements between the antenna siting regulations of Australia, New Zealand, the United Kingdom and the United States. In each of the countries, local land-use authorities may create their own siting and consultation plans. Australia, New Zealand and the United Kingdom have the most in common, as all three of these countries have national guidelines regarding antenna siting and consultations. While these are not mandatory, they are generally followed and serve an important role in helping to standardize local plans throughout their respective countries. Each of the three country's guidelines specify the type of information

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[86] See Miller & Van Eaton, *Tower Toolkit 2004*, online: <http://www.millervaneaton.com/feature_toolkit2004.html>; and Jim Baller & Casey Lide, Baller Herbst Law Group, "Wireless Tower Siting: The Local Perspective" online: Municipal Research & Services Center of Washington <http://www.mrsc.org/subjects/telecomm/towermemo.pdf> (2003).

that should be provided to citizens, and give some suggestions about how to do this, recognizing that different communities will find different methods of communication more effective.

In contrast, because the United States does not have a national guideline, there is great variation in regulations across the country. Australia is the only country that has officially implemented the precautionary approach into their guidelines. It may be said that New Zealand and the UK have some elements of the approach present in their guidelines, but it has not been officially adopted. New Zealand, the UK and the USA have the common position that local land-use authorities are not to implement the precautionary approach into their individual siting plans, as this will lead to arbitrary requirements that are not standardized between regions. While co-location is generally encouraged in each of the four countries, it is encouraged more strenuously in the USA and the UK. In the legislation and guidelines of New Zealand, Australia and the UK, property values are not addressed directly. While no legislation in the USA has addressed property values, court decisions have shown that there is a link between antenna towers and a decrease in property values. Finally, in each of the four countries, precise time frames are only present for some situations. For others, ambiguous terms such as “reasonable,” “early,” and “timely manner” are used in guidelines and legislation.