

# **2009-2013 Noise Management Plan for Vancouver International Airport**



**Prepared by Vancouver Airport Authority  
2009**



**LARRY BERG**  
PRESIDENT AND CHIEF EXECUTIVE OFFICER

27 February 2009

*Via Courier*

**Mr. Michael Henderson**  
Regional Director General  
TRANSPORT CANADA - Pacific Region  
620 - 800 Burrard Street  
Vancouver, B.C.  
V6Z 2J8

Dear Mr. Henderson:

**RE: 2009-2013 YVR Noise Management Plan**

Please find enclosed a copy of the final draft of the 2009-2013 YVR Noise Management Plan, along with the accompanying documentation described below. As per the provision of the Airport Authority's ground lease agreement with the federal government, we request that Transport Canada review and approve this Plan.

The accompanying documentation includes the following:

- . A summary of the past noise complaints and comments received from previous open houses and information sessions to identify community issues.
- . A summary of a community web survey conducted in the fall of 2008 to identify current community issues.
- . Comments received on earlier drafts of the Plan including from members of the YVR Aeronautical Noise Management Committee.
- . A report from Wyle Aviation Services analyzing noise management best practices in use at other airports. Information from this report will be used to enhance existing noise management practices at YVR and form the basis of future work on initiatives contained in the Plan.

Our efforts to manage noise while maintaining 24-hour airport operations to serve the needs of the community present a difficult challenge. To address current community concerns, the Plan outlines 16 initiatives to be undertaken over the next five years and seeks to balance the competing interests surrounding airport noise.

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The implementation of many of the initiatives will require the cooperation and assistance of a number of stakeholders including Transport Canada. We intend to meet with these stakeholders to prepare detailed actions plans to ensure that the goals of the initiatives are met.

The YVR Aeronautical Noise Management Committee, with its broad representation from citizens, local cities, airlines, industry associations, NAV CANADA, Transport Canada, and the Airport Authority, will serve as the forum to work through the initiatives.

While some initiatives may have implications for noise restrictions, the Airport Authority will ensure that proper consultation with all concerned parties is undertaken before any new noise restrictions are proposed to Transport Canada for official publication.

Please contact Mr. Mark Christopher Cheng, Superintendent Noise Abatement & Air Quality, at (604) 276-6366 should there be any questions about this document. Thank you for your time and consideration to this matter.

Sincerely yours,



Larry Berg  
President & C.E.O.

cc: Members, YVR Aeronautical Noise Management Committee

Minister of Transport,  
Infrastructure and Communities



Ministre des Transports,  
de l'Infrastructure et des Collectivités

Ottawa, Canada K1A 0N5

AUG 31 2009

Mr. Graham Clarke  
Chairman  
Vancouver International Airport Authority  
P.O. Box 23750  
Airport Postal Outlet  
Richmond, British Columbia  
V7B 1Y7

Dear Mr. Clarke:

I am pleased to inform you that the replacement Noise Management Plan covering the period from 2009 to 2013, submitted by the Vancouver International Airport Authority, has been reviewed by Transport Canada and is hereby approved in accordance with Section 18 of the Aviation Services and Facilities Agreement and Subsection 3.04.01 of the Ground Lease.

Sincerely,

A handwritten signature in black ink, appearing to read "John Baird".

John Baird, P.C., M.P.

Canada

## **Executive Summary**

The 2009-2013 Noise Management Plan for Vancouver International Airport (“YVR”) details the core elements of the YVR Aeronautical Noise Management Program and initiatives that will shape and guide noise management efforts over the next five years.

A total of 16 initiatives are identified for the 2009-2013 YVR Noise Management Plan. Initiatives were identified in consultation with the YVR Aeronautical Noise Management Committee, from information gathered through a community web survey, and through an extensive analysis of noise complaints received by the Airport Authority.

The 16 initiatives included in the 2009-2013 YVR Noise Management Plan include (in no particular order):

1. Night-time operations
2. Arrivals and departures
3. Demand Management
4. Run-ups
5. Instrument Landing System flight Inspections
6. Float plane over-flights
7. YVR float plane operations
8. Education and awareness – Industry
9. Land use planning
10. Noise abatement procedures
11. Noise monitoring terminal network
12. Portable noise monitoring terminal
13. Airport Noise & Operations Monitoring System
14. Communication
15. Aircraft technology
16. Roles and responsibilities

Details of the initiatives and tasks to be undertaken will require further work and consultation with affected stakeholders.

As some issues worked on during previous Plans remain a concern to surrounding communities, further work on these issues is carried into this Plan (see Appendix A for a summary of work completed in the 2004-2008 Noise Management Plan). In addition, the flexibility of the YVR Aeronautical Noise Management Program allows for initiatives to be added addressing new community issues and/or new opportunities that may emerge during the course of this five year Plan.

The Plan will be used to meet the challenge of balancing the competing demands for 24-hour airport services with those for enjoyable urban living by minimizing noise disturbances associated with airport and aircraft operations.



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## **1.0 Introduction**

While managing noise impacts on the community is important to the Airport Authority, this is done with the recognition of YVR's contribution to connecting British Columbia to the World, and supporting the economy through jobs and taxes. The 2009-2013 YVR Noise Management Plan will assist the Airport Authority to meet its objective of minimizing the level of disturbance to those living in communities in the vicinity of the YVR, while recognizing the legitimate need for continued airport operations.

The first half of this document provides an introduction to the Airport and the Airport Authority, and provides information on the YVR Aeronautical Noise Management Program. The second half of this document includes a description of the initiatives to be undertaken over the next five years to address community concerns through sustainable solutions.

### **1.1 Vancouver International Airport**

Vancouver International Airport (YVR) is located on the southwest coast of the Province of British Columbia, and is Canada's second busiest airport. YVR is a major entry point to North America from Asia and is a major hub for domestic, transborder (U.S.), and international air travel.

YVR's primary role is to respond to and facilitate the demands of the aviation industry, in a safe, efficient, and environmentally sensitive manner. YVR is an important economic engine for B.C., generating \$1.7-billion in direct Gross Domestic Product (GDP) value added. The total GDP (including indirect and induced) related to the airport is \$3.1-billion, and total output is \$6.8-billion<sup>1</sup>.

YVR occupies approximately 1,340 hectares of federal property on Sea Island within the City of Richmond. The Vancouver downtown core is approximately 12 kilometres from YVR, and the airport is in close proximity to major urban residential developments. This proximity adds to the challenge of operating 24-hours a day to support the economic engine of British Columbia while minimizing disturbance from aircraft operations on its neighbours.

### **1.2 Vancouver Airport Authority**

The Vancouver Airport Authority (Airport Authority) assumed management of YVR from Transport Canada in 1992 and operates the airport under the provisions of a long-term ground lease with the Government of Canada. The Airport Authority is a not-for-profit corporation established under Part II of the Canada Corporations Act, and has no shareholders. All profits, known as excess of revenues over expenditures, are reinvested in airport development and service improvements.

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<sup>1</sup> Vancouver Airport Authority 2007 Annual Report

The Airport Authority's purpose is to manage and operate YVR on behalf of, and in the best interests of, the region and to expand the contribution which YVR makes to local economic development.

The Airport Authority is governed by a Board of Directors, members of which are appointed by nominating entities, namely: The Association of Professional Engineers and Geoscientists of British Columbia; City of Richmond; City of Vancouver; Government of Canada; Metro Vancouver (formerly the Greater Vancouver Regional District); The Institute of Chartered Accountants of British Columbia; The Law Society of British Columbia; The Vancouver Board of Trade. The Board also includes the Airport Authority's President and CEO, and additional members appointed by the Board from the community-at-large.

The Board oversees the business conduct of the Airport Authority and the activities of management. The Board's fundamental mandate is to ensure that the Airport Authority fulfills its objectives on an ongoing basis and operates in a safe, efficient and reliable manner.

Under the ground lease with the Government of Canada, the Airport Authority is responsible for noise management, including noise complaint and noise monitoring, for aircraft arriving and departing YVR up to 10 nautical miles from the airport. The Airport Authority is required to have a noise management plan that is approved by the Minister of Transport. Aircraft operating outside this 10 nautical mile radius and those travelling to and from airports other than YVR are the responsibility of others.

### **1.3 Key Stakeholders - Transport Canada / NAV CANADA / Local Municipalities**

While the Airport Authority has been delegated the responsibility for managing noise around YVR, there are other key stakeholders that have roles in ensuring a successful noise management strategy.

#### *Transport Canada*

Transport Canada is the federal department that regulates aviation in Canada. The role of Transport Canada is to develop up-to-date, relevant transportation policies and legislation and to maintain a high level of safety and security.

The responsibilities of Transport Canada include: reviewing, approving, and publishing of new noise control measures at airports; and, conducting enforcement of suspected violations of the published Noise Abatement Procedures. Transport Canada is responsible for managing noise issues outside the 10 nautical mile radius from YVR as well as for enroute operations.

#### *NAV CANADA*

NAV CANADA was incorporated in May 1995 as a non-share capital corporation and became responsible for Canada's Civil Air Navigation System ("ANS") in November 1996 under the *Civil Air Navigation Services Commercialization Act*.

NAV CANADA provides air traffic control, airspace design and aeronautical information services throughout Canada. NAV CANADA's primary mission is safe, efficient and effective delivery of air navigation services.

Major facilities operated by NAV CANADA in the Lower Mainland include the control towers at many of the airports (including those at YVR, Boundary Bay, Pitt Meadows, and Vancouver Coal Harbour), and the Area Control Centre located in Surrey.

In addition, NAV CANADA operates and maintains navigation and approach aids and equipment, and is responsible for regular engineering flight checks for all runway landing systems to ensure equipment is operating in compliance with strict standards prescribed by Transport Canada.

#### Local Municipalities

In the Province of British Columbia, the responsibility for land use planning has been delegated to local municipalities. Federal guidelines have been developed to assist in land use planning in the vicinity of airports and associated flight paths. It is the responsibility of the municipality to adhere to these guidelines to effectively reduce the impact on residential and other noise sensitive areas.

Any gains achieved through quieter aircraft technology and airport noise control measures are negated if incompatible, noise sensitive developments are permitted near an airport.

## **2.0 Rules & Regulations Related to Noise Management**

### **2.1 Canadian Aviation Regulations (CARs)**

The *Aeronautics Act* allows the Minister of Transport to regulate aviation in Canada, and the regulations governing aeronautics in Canada are found in the *Canadian Aviation Regulations* (CARs). The CARs can be viewed in full on Transport Canada's website ([www.tc.gc.ca](http://www.tc.gc.ca)) and cover the broad range of areas that Transport Canada Civil Aviation is mandated to regulate, including standards for aircraft noise and air emissions, minimum aircraft altitudes, noise abatement and noise control procedures, and aircraft maintenance requirements.

Figure 1 provides a brief summary of the regulations and relevant guidelines governing aeronautical noise at airports in Canada.

**FIGURE 1**

**Aeronautical Noise at Airports in Canada – Regulations and Guidelines**

*Descriptions are summaries only. The CARs (Canadian Aviation Regulation) section numbers are identified where applicable.*

***Noise Abatement Procedures (NAP)***

Primarily intended for jet aircraft, the NAP specifies departure/arrival procedures, preferential runway determination, altitude restrictions, and night restrictions. Procedures in the NAP are enforceable by Transport Canada. [CAR 602.105]

***Vertical Noise Abatement Procedure (VNAP)<sup>2</sup>***

For jet take-offs, the 'A' or 'B' procedures specify reduced engine power for noise mitigation at prescribed altitudes, consistent with flight safety requirements. The 'A' procedure results in lower noise close to the airfield (slower climb speed), while the 'B' procedure results in lower noise farther from the airfield (faster climb speed). [CAR 602.105]

***Minimum Aircraft Altitudes***

This regulation prescribes 1,000 feet as the minimum altitude that an aircraft may fly over a built-up area (500 feet over water), unless the aircraft is conducting a take-off, approach or landing (other exemptions may also apply). [CAR 602.14-602.16]

***Airworthiness Standards (Chapter 516) - Aircraft Noise***

This standard prescribes the noise certification requirement for civil aircraft in Canada, at the time of manufacture. This standard has adopted the noise classification of ICAO Annex 16, and identifies civil subsonic jet aircraft as either Chapter 2 (old technology, noisier), Chapter 3 (new technology, quieter), or Chapter 4 (newest technology). [CAR 511.01]

***TP1247E - Land Use in the Vicinity of Airports***

Transport Canada document that provides guidance on compatible land uses around airports based on the Noise Exposure Forecast (NEF) contours. Transport Canada discourages residential developments in areas exposed to NEF 30 or greater. In British Columbia, the responsibility rests with the municipalities to incorporate these guidelines into their planning practices.

***Canada Flight Supplement & Water Aerodrome Supplement***

Used as a reference for planning and safe operating procedures at Canadian aerodromes. These supplements detail aerodrome/runway facilities, navigation aids, and hours of operation. There are specific procedures for each aerodrome in Canada.

***Noise Mitigation Procedures: Aircraft Engine Run-ups***

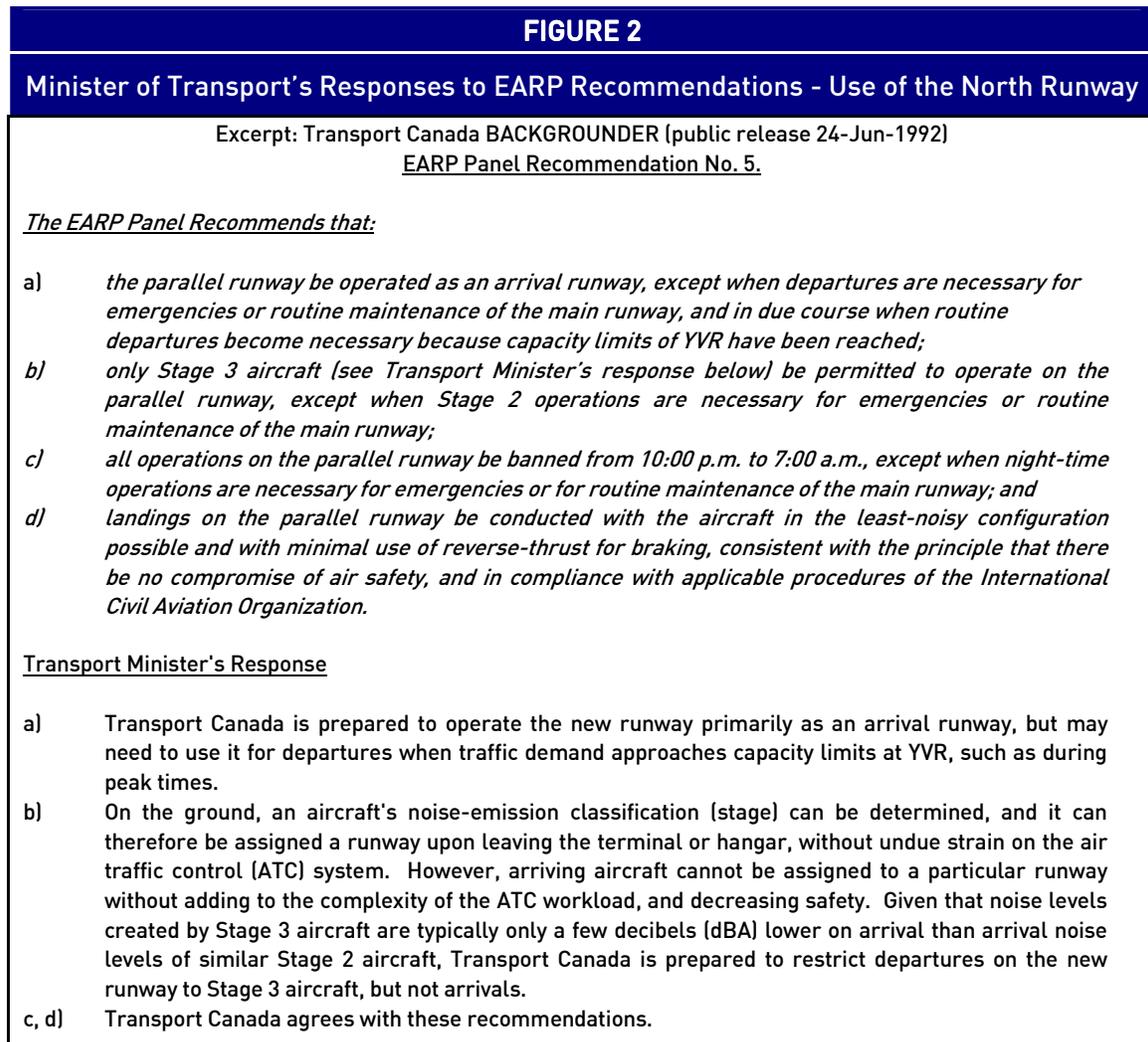
Distributed as an YVR Airport Operations Directive, the procedures are applicable to all operators conducting maintenance engine run-ups for fixed and rotary wing aircraft. The procedures designate run-up locations, required aircraft headings, and permissible power settings based on the time of day.

<sup>2</sup> The VNAP will soon be replaced with Noise Abatement Departure Procedures (NADPs) in accordance with recommendations from ICAO.

## 2.2 North Runway (08L/26R) and Operating Restrictions

The north runway (08L/26R) was opened in November 1996. The project to construct this runway was reviewed extensively as part of the federal Environmental Assessment and Review Process (EARP). The assessment included the preparation of an Environmental Impact Statement and provided for the project to be the subject of public hearings by the EARP Panel.

In 1992, the Minister of Transport responded to the EARP Panel recommendations regarding operational use of the north runway. These responses are summarized in Figure 2.



### **3.0 YVR Aeronautical Noise Management Program**

#### **3.1 Program Objectives**

The goal of the YVR Aeronautical Noise Management Program is to minimize the level of disturbance to those living in the vicinity of the airport while recognizing the need for 24-hour airport operations. From a sustainability perspective, the inherent challenge is to balance the competing demands of enjoyable urban living and the airport services that support the economy of British Columbia.

The Program is based on the fundamental principle that proposed changes for noise control must be objectively analyzed and evaluated in consultation with affected stakeholders.

Program goals are achieved through a variety of means, including:

- Developing policies and procedures in consultation with the YVR Aeronautical Noise Management Committee (which includes community and industry representatives)
- Examining noise abatement procedures governing take-offs and landings, runway use, hours of operations, aircraft type
- Identifying community issues and implementing initiatives outlined in the Noise Management Plan
- Responding to public questions and concerns
- Participating in and supporting international efforts to develop new standards and technologies for noise mitigation

The Program constantly evolves in order to respond to changing industry dynamics, new technologies, and feedback received from the community. The approach to solutions is collaborative in nature, and the Airport Authority will not support a change or a new procedure without first objectively assessing impacts and consulting with stakeholders.

#### **3.2 YVR Aeronautical Noise Management Committee**

The YVR Aeronautical Noise Management Committee (“Noise Management Committee”) was formed in the early 1990s from various technical working groups concerned with noise management at the airport. The Committee’s membership was expanded to include community representatives and now provides the forum for the discussion and consideration of all aeronautical noise management issues at YVR. The Committee is chaired by the Airport Authority’s Vice President of Community and Environmental Affairs. The stakeholder groups represented are listed in Figure 3.

**FIGURE 3**

**YVR Aeronautical Noise Management Committee Membership (as of 2008)**

The Committee is chaired by the Airport Authority's Vice-President of Community & Environmental Affairs and membership includes::

- Airlines and Aircraft Operators
- Air Navigation Services (NAV CANADA)
- Citizens
  - City of Richmond; City of Vancouver; Corporation of Delta
- Community of First Nations
- Industry Associations
- Governments
  - Federal; Municipal (City of Richmond, City of Vancouver, City of Surrey)
- Vancouver Airport Authority

Purpose

The purpose of the Committee is to provide a balanced forum where parties with an interest in noise management issues can discuss aeronautical noise management at YVR.

Scope

The scope of the Committee shall be limited to aeronautical noise generated from operations associated with YVR. The scope of the Committee is to discuss, analyze, and provide advice on or make recommendations about noise management through the airport executives, who are accountable for the operational and business decisions on any matters pertaining to aeronautical noise associated with YVR.

The role of the Committee is to:

- Act as a focal point on aeronautical noise management issues
- Provide an interface between the Airport Authority and its stakeholders
- Enhance awareness and understanding of aeronautical noise management issues
- Discuss, analyze, and provide advice on noise management issues
- Provide a forum for stakeholders to provide input on matters related to changes of airport noise control regulations

The Committee is advisory in nature, providing recommendations regarding noise management activities at YVR.

**3.3 Noise Abatement Procedures**

The Noise Abatement Procedures for YVR are published in the Canada Air Pilot - British Columbia edition. The procedures can be referred to as the "noise rules" for the airport which rely on the co-operation of pilots, air traffic controllers and favourable operating conditions such as weather, runway conditions, and air traffic patterns. The effectiveness of procedures depends on the location of noise sensitive areas in relation to the runways being used for arrivals and departures.

The Noise Abatement Procedures for YVR has sections covering the following main items:

1. Departure and arrival procedures
2. Reverse thrust
3. Night restrictions
4. Preferential runway use
5. Engine run-up restrictions
6. Altitude restrictions

Operating in compliance with the Noise Abatement Procedures is the responsibility of aircraft operators. Suspected incidents of non-compliance can be subject to investigation by Transport Canada Civil Aviation Enforcement.

The Airport Authority regularly conducts audits for compliance, and if an operator is suspected of operating in non-compliance, the incident will be reported to Transport Canada for their review and assessment. If warranted, Transport Canada will conduct an investigation and may assess fines of up to \$5,000 for individuals and \$25,000 for corporations. Transport Canada posts information on their website ([www.tc.gc.ca](http://www.tc.gc.ca)) for incidents where they have levied sanctions to the individual or corporation.

In addition, anyone suspecting an aircraft of operating in an unsafe manner or contrary to published procedures or regulations can forward the details of the incident to Transport Canada at:

TRANSPORT CANADA  
620 - 800 Burrard Street  
Vancouver, BC V6Z 2J8  
Telephone: (604) 666-4916

### **3.3.1 Amending or Introducing a Noise Control Measure at an Airport**

Transport Canada established a protocol<sup>3</sup> to ensure that proposed new or amended noise control measures at an aerodrome have been subject to an impact assessment and that all affected stakeholders have been consulted. Details of the analysis and consultation must accompany the proposed noise control measure when submitted to Transport Canada for review and approval.

Analysis must include:

- A description of the problem
- Proposed solution (including exceptions)
- Alternatives (such as alternative procedures or land uses in the community)
- Costs (such as revenue impact, direct and indirect costs to the community, airport operator and airport users)

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<sup>3</sup> As outlined in the Transport Canada Advisory Circular (AC) – Implementation of New or Amended Noise Abatement Procedures 302-002.

- Noise impacts of the proposed solution
- Effects on aircraft emissions
- Effect on current and future airport capacity
- Implications of not proceeding with the proposal
- Implementation issues (e.g. aircraft technology; availability of replacement aircraft; ground facilities)
- Impact on the Aviation System
- Safety implications
- Air traffic management
- Fleet impact

Consultations must include the following stakeholders:

- Airport management/operator
- Noise management committee (where applicable)
- Community representatives
- NAV CANADA
- Air Transport Association of Canada (ATAC)
- Canadian Business Aviation Association (CBAA)
- Canadian Owners and Pilots Association (COPA)
- All scheduled operators who operate at the airport
- Transport Canada
- All fixed base operators on the airport
- National Airlines Council of Canada (NACC)

If the proposal is supported by all stakeholders, Transport Canada will likely approve the proposal and publish the procedure. If the proposal does not have consensus, the dissenting views must be documented and included with the other information sent to Transport Canada. In these cases, the proposal is reviewed by the Civil Aviation Regulatory Committee, who will either approve or deny the proposal.

### **3.4 Aircraft Noise Monitoring & Flight Tracking System**

Noise monitoring and assessment is a major component of the YVR Aeronautical Noise Management Program. To monitor noise levels and aircraft operations in the vicinity of the airport, the Airport Authority has an Aircraft Noise Monitoring & Flight Tracking System.

The current Aircraft Noise Monitoring & Flight Tracking System, GEMS by Lochard of Australia, was installed in 1995 and replaced the old Brüel & Kjaer noise monitoring system operating at the airport since 1987. Unlike the Brüel & Kjaer system, the GEMS System receives radar flight track information through a dedicated feed from NAV CANADA.

Data from the system allows the Airport Authority to assess noise levels around the airport and in surrounding communities, identify trends, support proposed changes to Noise Abatement Procedures, and check for compliance with published procedures.

### 3.4.1 System Upgrade Project

In 2008, the Airport Authority began a project to upgrade the GEMS System to the ANOMS System, also by Lochard. The project includes upgrades of all software and system hardware, including all the noise monitoring terminals in the community. In addition to the hardware upgrades at the existing 16 noise monitoring terminal sites, 4 new noise monitoring terminals will be added to the network.

The 4 new sites were identified through a site assessment study completed in 2005 and subsequent work with the local municipalities in 2008.

Advanced features of the ANOMS System include:

- Integrated weather and pilot advisory information
- Integrated voice recording of pilot and air traffic control communications
- Better compatibility and data exchange capabilities with MS Office software
- Web tool support - such as WebTrak, a web interface that will allow the community to view dynamic 'real-time' and historical flight tracks, noise levels, and register concerns on-line
- Portable noise monitoring capabilities

Results of noise monitoring are summarized and reported in the annual noise reports made available on the Airport Authority's website.

### 3.5 Public Response and Communication

Providing information on aircraft noise and airport operations to the community and other groups is an important component of the YVR Aeronautical Noise Management Program.

While the Airport Authority is responsible for responding to noise complaints regarding YVR operations within 10 nautical miles of the airport, the management of complaints currently extends beyond this boundary.

The following are the main methods by which the Airport Authority receives noise complaints:

- Email – [noise@yvr.ca](mailto:noise@yvr.ca)
- The 24-hour YVR Noise Information Line (telephone 604-207-7097)
- Letters or faxes (604-276-6699)

Complaints are also relayed from other parties such as members of the YVR Aeronautical Noise Management Committee, NAV CANADA, municipal officials, government departments or airport officials.

The Airport Authority treats all complaints seriously and information provided by the complainant is kept confidential.

### **3.5.1 Complaint Handling - Investigation**

An investigation is conducted if a complainant cites a specific incident and provides sufficient information. During an investigation, the radar flight track of the aircraft will be reviewed for compliance with the published Noise Abatement Procedures and applicable regulations. Further information may be gathered through discussions with air traffic control or the aircraft operator.

If the complaint deals with a specific incident, the complainant is provided an explanation. The majority of complaints, however, are either of a general nature, for example - “the airport noise level is increasing”, or about fully complaint operations for which only general information can be provided.

In incidents where the Airport Authority suspects an operator of not properly following procedures, the incident is reported to Transport Canada for further investigation and possible enforcement action. During the course of Transport Canada’s investigation, the Airport Authority will assist and provide information requested by inspectors.

In addition, the Airport Authority will forward complaints associated with aircraft not operating to or from YVR to Transport Canada.

### **3.5.2 Complaint Data Analysis and Reporting**

Information provided by the complainant is entered into a database, which is used to further analyze complaints in order to identify recurring events and general trends. Information requested from the complainant includes: name; address; contact information – telephone and email; and details of the incident. With this information, complaints to be analyzed by date/time, activity, complaint location, aircraft type, time of event and time of call.

A report summarizing complaints received during the quarter is presented to the YVR Aeronautical Noise Management Committee during the quarterly meetings. These reports provide a brief summary of complaint statistics, significant incidents, and noise management activities undertaken. Committee members may recommend measures to address particular issues, where applicable.

At year-end, a comprehensive annual noise management report is produced, and made available to the public on the Airport Authority’s web site. Information contained in this report includes:

- Summary of work on initiatives contained in the YVR Noise Management Plan
- Statistics on aircraft operations
- Analysis of noise complaint trends and noise monitoring data
- Results of studies recommended by the YVR Aeronautical Noise Management Committee or directed by the Airport Authority

## **4.0 Five Year Action Plan**

### **4.1 Identifying Current Community Issues**

To identify current community issues during the early phases of preparing the 2009-2013 YVR Noise Management Plan, the Airport Authority reviewed and analyzed noise complaint records, consulted with the YVR Aeronautical Noise Management Committee, and canvassed the community via a web survey.

#### *Analysis of Noise Complaint Records*

An analysis of over 2,500 complaints received in 2007-2008 was undertaken to identify and categorize the main issue(s) of concern. In addition, comments received at various open houses and community meetings were also analyzed.

#### *Web Survey*

An online survey was conducted during the fall of 2008. The survey was accessible directly off the airport's website homepage. Advisory notices were placed in the local papers informing the community of the survey. The survey contained open ended questions to solicit thoughts and inputs on whatever issues the participant in the survey might have. Approximately 340 individuals completed the survey during the two month period it was posted.

The issues identified from all these sources of input were then broadly grouped into categories correlating the responses to the geographic area. Table 1 illustrates a summary of the issues by community.

A more detailed summary of the web survey is available as a separate report and can be provided on request.

TABLE 1					
Current Community Issues Identified during Plan Preparation					
Issue	Richmond	Vancouver	Delta	Surrey	Burnaby / Others
Night-time operations	■	■	■ (1)	■	
Run-ups	■	■			
Take-offs/departures	■	■			
Use of north runway for departures and at night*	■	■			
Low flying aircraft	■	■	■	■	■
Flight routes	■	■	■	■	■
YVR float operations	■				
Non-YVR aircraft Operations	■ (2)	■ (2)	■	■	■
ILS flight inspections	■	■			
Older Chapter III aircraft				■	
2007/2008 Lower Mainland airspace changes			■	■	

\* Use of the north runway at night occurs during emergencies or periods of maintenance

Notes: (1) Majority of complaints are related to aircraft on westerly routes that depart eastbound due to winds.  
 (2) Majority of complaints related to float planes operating from Vancouver Coal Harbour.

## 4.2 2009-2013 Initiative List

A list of initiatives has been generated to address the issues identified. This list was augmented with input received through members of the YVR Aeronautical Noise Management Committee, the community via the web survey, a review of work on initiatives in the 2004-2008 Noise Management Plan (see Appendix A for a summary of work completed), and a comprehensive review by Wyle Aviation Services on noise management practices at other airports. The review by Wyle attempted to identify effective noise management practices used at other airports for consideration at YVR.

### *Analysis of Noise Management Best Practices*

Wyle Aviation Services was selected to conduct this review due to their extensive experience in performing aviation noise studies for the U.S. Federal Aviation Administration (FAA), the National Aeronautics and Space Administration (NASA), and the U.S. Department of Defense, domestic and international airports (including several in Canada), local governments, and private entities.

As part of their work, Wyle examined management activities in the following topic areas:

- Alternative noise metrics to supplement the Noise Exposure Forecast
- Area Navigation (RNAV)/Required Navigation Performance (RNP)
- Communication
- Continuous descent arrivals (CDA)
- De-rated thrust departure procedures
- Flight tracking system
- Float plane noise abatement
- Ground run-up enclosure/hush house
- APU usage
- Nighttime restrictions/curfew
- Noise complaint management system
- Noise disclosure in real estate transactions
- Noise program web portal
- Noise stakeholder advisory committee/roundtable
- Non-acoustic mitigation measures
- Operator compliance with Noise Abatement Procedures
- Preferential runway use
- Restrictions on ground run-up operations
- Stakeholder outreach and education
- Thrust reverse – reduction and monitoring

The Wyle report identified best practices in these areas. This information will be used to enhance existing noise management practices at YVR and form the basis of future work on the initiatives contained in this Plan.

*Initiative List*

Based on all information collected from the YVR Aeronautical Noise Management Committee, the web survey, and the review by Wyle the following 16 initiatives identified for the 2009-2013 YVR Noise Management Plan and the year in which work is anticipated to commence are presented in Table 2.

TABLE 2					
Initiatives for the 2009-2013 YVR Noise Management Plan					
Initiative	2009	2010	2011	2012	2013
Night-time operations	✓				
Arrivals and departures		✓			
Demand Management			✓	✓	✓
Run-ups	✓	✓	✓		
ILS flight Inspections	✓				
Float plane over-flights	✓				
YVR float plane operations	✓	✓	✓		
Education and awareness – Industry			✓		
Land use planning		✓			
Noise abatement procedures	✓	✓	✓	✓	✓
Noise monitoring terminal network			✓		
Portable noise monitoring terminal	✓	✓			
Airport Noise & Operations Monitoring System	✓				
Communication	✓	✓	✓	✓	✓
Aircraft technology	✓	✓	✓	✓	✓
Roles and responsibilities	✓				

These initiatives and a description of their supporting tasks are presented in Table 3. The YVR Aeronautical Noise Management Committee will continue to play an integral role in implementing the proposed tasks.

<b>TABLE 3</b>			
<b>2009-2013 YVR Noise Management Plan Initiatives</b>			
<b>No.</b>	<b>Initiative</b>	<b>Proposed Task</b>	
<b>1</b>	<b>Night-time Operations</b>	<b>1.1</b>	<b>Review current guidelines for granting approval for operations for jet aircraft between the hours of mid-night and 0700 local.</b>
		<b>1.2</b>	<b>Prepare a study assessing the impacts of extending the current prior approval requirement for jet operations between the hours of mid-night to 0700 local to <u>all</u> aircraft.</b>
		<b>1.3</b>	<b>Explore the feasibility of developing a night-time Standard Instrument Departure (SID) procedure for aircraft on westerly routes departing runway 08.</b>
<b>2</b>	<b>Arrivals and Departures</b>	<b>2.1</b>	<b>Support and work with NAV CANADA during the implementation of Area Navigation (RNAV) and Required Navigation Performance (RNP) procedures in an effort to minimize over-flights of populated areas wherever possible.</b>
		<b>2.2</b>	<b>Support Transport Canada in their project to replace the current Vertical Noise Abatement Procedures with Noise Abatement Departure Procedures.</b>
		<b>2.3</b>	<b>Explore the use of de-rated thrust take-off procedures.</b>
<b>3</b>	<b>Demand Management</b>	<b>3.1</b>	<b>Develop scope of work and undertake an airside capacity study to assess various demand management strategies to conserve YVR's airside capacity.</b>
		<b>3.2</b>	<b>Collect information and statistics on aircraft ground operations, including actual taxi times and delay. This information would feed into models and simulations needed for demand management studies.</b>
		<b>3.3</b>	<b>Work with partners to establish a strategy for regional airports with ongoing mechanisms for coordinating Lower Mainland airport activities and encouraging dialogue at both the operational and senior management/governance levels.</b>

<b>TABLE 3</b>			
<b>2009-2013 YVR Noise Management Plan Initiatives</b>			
<b>No.</b>	<b>Initiative</b>	<b>Proposed Task</b>	
<b>4</b>	<b>Run-ups</b>	<b>4.1</b>	<b>Assess engineering noise control measures for propeller engine run-ups and build a dedicated run-up facility of propeller aircraft if feasible.</b>
		<b>4.2</b>	<b>Explore the use of multi-lateration technology and CCTV cameras to monitor compliance with the Engine Run-up Directive.</b>
		<b>4.3</b>	<b>Review other possible control mechanism for enforcement of Engine Run-up Directives.</b>
		<b>4.4</b>	<b>Assess further restrictions on run-up activities - hours / duration.</b>
<b>5</b>	<b>ILS Flight Inspections</b>	<b>5.1</b>	<b>Develop education and awareness web material explaining the ILS system and required flight inspections.</b>
		<b>5.2</b>	<b>Enhance community web-based notification of upcoming ILS flight inspections.</b>
<b>6</b>	<b>Float Plane Over-flights</b>	<b>6.1</b>	<b>Develop education and awareness web material explaining over-flight routes and encourage Transport Canada to address these non-YVR operations.</b>
<b>7</b>	<b>YVR Float Operations</b>	<b>7.1</b>	<b>Enhance education and awareness of community issues through regular meetings with the float plane operators.</b>
		<b>7.2</b>	<b>Create "preferred" arrival and departure routes for the Fraser River, monitor use, and report to operators.</b>
		<b>7.3</b>	<b>Review and assess voluntary restrictions on float plane operations, e.g. 2 vs. 3-bladed propeller, time of day.</b>
<b>8</b>	<b>Education and Awareness - Industry</b>	<b>8.1</b>	<b>Develop a training module on noise management for flight schools to raise the awareness of noise issues within the pilot community.</b>
<b>9</b>	<b>Land Use Planning</b>	<b>9.1</b>	<b>Develop material for the web that provides clear concise information for areas affected by aircraft noise. Link this to the municipal websites.</b>
		<b>9.2</b>	<b>Support and encourage municipalities to prohibit new residential development in high noise areas. Encourage municipalities to implement covenants, notification, and insulation standards should they permit developments in high noise areas .</b>
		<b>9.3</b>	<b>Continue with reviews of municipal development plans and discourage non-compatible land uses in high noise areas.</b>

<b>TABLE 3</b>			
<b>2009-2013 YVR Noise Management Plan Initiatives</b>			
<b>No.</b>	<b>Initiative</b>	<b>Proposed Task</b>	
<b>10</b>	<b>Noise Abatement Procedures</b>	<b>10.1</b>	<b>Undertake annual review of published procedures with the aim of continual improvement.</b>
<b>11</b>	<b>Noise Monitoring Terminal Network</b>	<b>11.1</b>	<b>Undertake a regular review of the Noise Monitoring Terminal network to determine if additional terminals are required.</b>
<b>12</b>	<b>Portable Noise Monitoring Terminal</b>	<b>12.1</b>	<b>Perform routine monitoring using the portable Noise Monitoring Terminal and report publically on the monitoring results.</b>
<b>13</b>	<b>Airport Noise &amp; Operations Monitoring System</b>	<b>13.1</b>	<b>Explore the use of WebTrak and other web-based tools to enhance information exchange with the community.</b>
<b>14</b>	<b>Communication</b>	<b>14.1</b>	<b>Review the Terms of Reference for the YVR Aeronautical Noise Management Committee.</b>
		<b>14.2</b>	<b>Increase use of the web to provide information and updates on noise management activities.</b>
		<b>14.3</b>	<b>Prepare and publish regular web-based noise monitoring reports.</b>
		<b>14.4</b>	<b>Develop and trial a community liaison program.</b>
		<b>14.5</b>	<b>Develop an email notification system that advises the community of particular operations at the airport – e.g. maintenance, north runway departures to reduce delay, ILS flight checks, etc.</b>
<b>15</b>	<b>Aircraft Technology</b>	<b>15.1</b>	<b>Provide input through national (Aircraft Noise &amp; Emissions Committee) and international (Airports Council International) groups to promote increased noise certification standards and lobby for phase out of older noisier Chapter III aircraft.</b>
<b>16</b>	<b>Roles and Responsibilities</b>	<b>16.1</b>	<b>Meet with NAV CANADA, Transport Canada, and local Cities to develop detailed work plans to implement initiatives identified in the Noise Management Plan.</b>
		<b>16.2</b>	<b>Clarify roles and responsibilities between Airport Authority, Transport Canada, and NAV CANADA regarding noise management activities.</b>

Upon approval of the Plan by Transport Canada, the Airport Authority will identify the key stakeholders who have a role in the successful implementation of these initiatives and create detailed action plans. Results of work will be summarized in annual noise management reports.



## 5.0 Contact Information

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## APPENDICES

**APPENDIX A**

The Airport Authority, in collaboration with the YVR Aeronautical Noise Management Committee and other stakeholders, completed many of the 17 initiatives identified in the 2004-2008 YVR Noise Management Plan.

Some of the main highlights of work include:

- Completed the construction of a dedicated run-up area at the western most end of Sea Island.
- Introduced the YVR Fly Quiet Awards, awarded to airlines with the lowest average annual noise levels, to promote education and awareness among the operators. The awards are presented at the annual YVR Chief Pilot’s Meeting and the names of the winners are published on the airport’s website and in other media.
- Worked with NAV CANADA to trial and assess a RNAV (Area Navigation) approach procedures at night.
- Initiated the upgrade of the Aircraft Noise Monitoring and Flight Tracking System, including the addition of 4 new noise monitoring terminals to the current inventory of 16.

To address community concerns raised about float plane operations at YVR, a new initiative (#18 - YVR Float Operations) was added during the course of the 2004-2008 YVR Noise Management Plan.

A summary of work completed on all 18 initiatives can be found in the table below. More detailed summaries can be found in past annual noise reports.

Review of Past Work – 2004-2008 YVR Noise Management Plan		
No.	Initiative	Completed Actions
1	Night-time Operations	<ul style="list-style-type: none"> <li>▪ Completed a study assessing the market and regulatory factors influencing the frequency and type of night-time operations at YVR. Factors assessed included the Canada-U.S. Open Skies Agreement, fifth freedom rights between countries, and increasing flight range of new aircraft.</li> </ul>
2	Capacity and Delay Reduction	<ul style="list-style-type: none"> <li>▪ Worked with NAV CANADA to assess various options for standard instrument departure procedures to accommodate simultaneous parallel independent departure operations.</li> <li>▪ Prepared seasonal demand forecast and compared against guidelines for use of the north runway for departures to reduce delays. These guidelines were established as a result of an extensive airside capacity study completed in 2000.</li> </ul>

Review of Past Work – 2004-2008 YVR Noise Management Plan		
No.	Initiative	Completed Actions
3	Engine Run-ups	<ul style="list-style-type: none"> <li>▪ Completed construction of a dedicated run-up area at the western end of Sea Island.</li> <li>▪ Updated the YVR Engine Run-up Airside Directives to incorporate the new run-up area and improve clarity.</li> <li>▪ Met annually with aircraft maintenance engineers to discuss various issues, including noise abatement and run-ups.</li> <li>▪ Issued Operations Bulletins related to run-up noise to all aircraft operators</li> <li>▪ Conducted periods of night patrols to check for compliance with the YVR Engine Run-up Airside Directives.</li> <li>▪ Met with individual maintenance operators to discuss noise complaints and reassign run-up locations to mitigate noise disturbances.</li> <li>▪ Completed a study of run-up operations in 2008 to identify current maintenance trends and to help assess further noise control options, including the potential to construct a ground run-up enclosure for propeller aircraft.</li> </ul>
4	Compatible Land Use Planning	<ul style="list-style-type: none"> <li>▪ Provided input and information to the City of Richmond to assist with the development of their Aircraft Noise Sensitive Development Policy. While the Policy does restrict noise sensitive developments in certain parts of the City, the Airport Authority is concerned that it does permit increased residential development in some areas exposed to high levels of aircraft noise and is not consistent with the Transport Canada land use planning guidelines.</li> <li>▪ Measures implemented as part of the Policy include - construction regulations, public disclosure mechanism, provisions of notice, and lawsuit-prevention measures.</li> <li>▪ Provided comments on proposed developments in areas exposed to aircraft noise in an attempt to discourage residential and other noise sensitive developments in high noise areas.</li> </ul>
5	International Noise Standards	<ul style="list-style-type: none"> <li>▪ The Airport Authority participated in International Civil Aviation Organization's (ICAO) Committee on Aviation Environmental Protection meetings through its membership in the Airports Council International. Noise related issues discussed at this meeting included: requirements for noise re-certification of aircraft engines; problems associated with increased population encroachment around airports; and use of alternative noise metrics and modeling.</li> </ul>
6	YVR Aeronautical Noise Management Committee	<ul style="list-style-type: none"> <li>▪ Updated the Terms of Reference for the YVR Aeronautical Noise Management Committee to improve the Committee's function and membership, formalize its scope, mandate and governance structure. This process included soliciting input and comment on the Committee from the community via notices in local papers and on the airport's website.</li> <li>▪ Adopted a process that allows residents to present their concerns directly to the Committee.</li> <li>▪ Invited the City of Surrey to join the Committee.</li> </ul>
7	Social Survey	<ul style="list-style-type: none"> <li>▪ Conducted an annual community survey that includes several questions related to aircraft noise. The survey helps the Airport Authority to understand community annoyance caused by aircraft noise as well as identify ways the community prefers to provide input and receive information.</li> </ul>

Review of Past Work – 2004-2008 YVR Noise Management Plan		
No.	Initiative	Completed Actions
8	Air Traffic Control Procedures	<ul style="list-style-type: none"> <li>▪ Worked with NAV CANADA to trial and assess a RNAV (Area Navigation) approach procedure between the hours of 11:00pm and 7:00am. The procedure provided aircraft with a continuous descent profile, thereby reducing fuel burn and noise. Following the successful completion of the trials, a proposal was sent to Transport Canada to amend the Noise Abatement Procedures to allow aircraft to fly the approach. The amendment was published in the Canada Air Pilot.</li> <li>▪ As a result of the airspace changes implemented in May 2007, the Airport Authority met with numerous residents and municipal staff to explain the changes to aircraft operations over the Lower Mainland.</li> <li>▪ Signed a new radar license agreement with NAV CANADA that allows greater use of radar flight tracks when responding to questions and concerns from the community. The previous agreement limited the use of radar flight tracks to internal use within the Airport Authority.</li> </ul>
9	Noise from Non-Aeronautical Developments	<ul style="list-style-type: none"> <li>▪ Completed a study that assessed potential noise-mitigation options for future developments near Templeton Street.</li> </ul>
10	New Noise Metrics	<ul style="list-style-type: none"> <li>▪ While providing input into the City of Richmond's Aircraft Noise Sensitive Development Policy, the Airport Authority augmented the Transport Canada Noise Exposure Forecast information with various noise metrics that evaluated speech interference and sleep disturbance to help identify different planning areas for the City.</li> </ul>
11	New Technologies	<ul style="list-style-type: none"> <li>▪ Partnered with the University of British Columbia – Department of Mechanical Engineering to support a graduate student studying engine run-ups and outdoor sound propagation to help assist with assigning run-up locations and headings.</li> <li>▪ Conducted sound spectrum and directivity measurements on a CRJ200 jet aircraft. Data from this measurement were added to a database that includes two propeller aircraft, measured previously at YVR. Data was used to assist with assessing various sound propagation models.</li> <li>▪ Began a project to upgrade the current Aircraft Noise Monitoring and Flight Tracking System. This project started in 2008 and is expected to be completed in early 2009. The project includes upgrades of the software and all hardware in the field. An additional four noise monitoring terminals will be added to the network of sixteen terminals already located in the community.</li> </ul>
12	Airport Directive Enforcement	<ul style="list-style-type: none"> <li>▪ Updated the YVR Engine Run-up Airside Directives to incorporate the new run-up area and improve clarity.</li> <li>▪ Issued Operations Bulletins related to run-up noise to all aircraft operators</li> <li>▪ Conducted periods of night patrols to check for compliance with the YVR Engine Run-up Airside Directives, and forwarded incidents of non-compliance to Transport Canada.</li> </ul>

Review of Past Work – 2004-2008 YVR Noise Management Plan		
No.	Initiative	Completed Actions
13	Communications & Awareness	<ul style="list-style-type: none"> <li>▪ Prepared annual noise management reports which were subsequently posted on web, mailed out to residents requesting a hardcopy and provided to members of the YVR Aeronautical Noise Management Committee.</li> <li>▪ Held several Community Open Houses and Information Sessions</li> <li>▪ Placed community notices advising of planned activities or irregular operations such as runway closures, use of the north runway for departures during peak times, flight inspections of runway instruments, or public information sessions.</li> <li>▪ Targeted e-mail alerts and information bulletins were sent to individuals who registered to receive noise related messages through the new YVR Air Mail e-mail notification system.</li> <li>▪ Introduced the YVR Fly Quiet Awards, which has the goal of raising awareness of noise issues within the aviation community in a friendly manner. Awards are presented at the annual YVR Chief Pilot's Meeting to airlines with the lowest annual average measured noise level. Categories include: propeller and rotary wing aircraft; narrow body jets; and, wide body jets.</li> </ul>
14	Roles and Responsibilities: Vancouver Airport Authority vs. Transport Canada	<ul style="list-style-type: none"> <li>▪ Updated and signed a Memorandum of Understanding (MOU) that outlines and clarifies roles and responsibilities between the Airport Authority and Transport Canada with regards to suspected violations of published Noise Abatement Procedures.</li> </ul>
15	Noise Monitoring Terminal Assessment	<ul style="list-style-type: none"> <li>▪ Completed a study to assess possible sites for additional noise monitoring terminals. Based on the results of this study, new sites were selected for the installation of permanent noise monitoring terminal as part of the project to upgrade the current Aircraft Noise Monitoring &amp; Flight Tracking System.</li> </ul>
16	Master Plan	<ul style="list-style-type: none"> <li>▪ Conducted preliminary noise assessments for the various runway options considered for the 2007-2027 YVR Master Plan.</li> <li>▪ The 2027 YVR Mater Plan (the land use plan) was approved by the Minister of Transport, and two future runway options are reserved: a South Parallel Runway or a Foreshore Runway (into the ocean). When a decision is made on which option to exercise, further noise assessments will be undertaken.</li> </ul>
17	5-Year Review	<ul style="list-style-type: none"> <li>▪ Completed</li> </ul>
18*	<i>YVR Float Plane Operations</i>	<ul style="list-style-type: none"> <li>▪ <i>Met with YVR Float Plane Operators to discuss noise issues.</i></li> <li>▪ <i>Created preferential arrival and departure routes from the river in consultation with the float plane operators, NAV CANADA, and Transport Canada.</i></li> <li>▪ <i>Created signage for the docks and information brochures that identify the preferential routes and advising pilots of community issues.</i></li> </ul>

\* This was a new initiative added within the time period of the 2004-2008 YVR Noise Management Plan to address community concerns over float plane operations at YVR.

**APPENDIX B**

The following is a calendar of events during the preparation of the Plan.

Date	Event
11 June 2008	<p><i>YVR Aeronautical Noise Management Committee Meeting</i> Requested Committee members for their assistance in reviewing the current Plan, and identify new initiatives to include in the new Plan.</p> <p>Preliminary input subsequently received from the Canadian Business Aviation Association.</p>
July-August 2008	Review and analysis of noise complaint records to identify current community issues.
September 2008	<p>Preparation of initial initiative list to address community concerns identified through the analysis of complaint records.</p> <p>Retained Wyle Aviation Services to review noise management practices at other airports. Information from this review will help guide future work on the various initiatives contained in the Noise Management Plan.</p>
1 October 2008	<p><i>YVR Aeronautical Noise Management Committee Meeting</i> Community issues and initial initiative list shared with Committee members. Requested Committee members review material and identify any community issues not captured and to provide comments on the initiatives.</p> <p>Input subsequently received from City of Vancouver (citizen representatives and staff), and City of Richmond staff.</p>
November – December 2008	Web survey posted to solicit comments and input from the Community.
10 December 2008	<p><i>YVR Aeronautical Noise Management Committee Meeting</i> Final draft initiative list shared with Committee members. Additional initiatives and tasks added to reflect comments and input received from Committee members and via the web survey.</p>
5 January 2009	Draft Plan distributed to YVR Aeronautical Noise Management Committee for review.
26 January 2009	Draft Plan and results of web survey posted on-line for community review and comment.
February 2009	Final document submitted to Transport Canada for ministerial approval.

## APPENDIX C

### Supporting Documents and Materials

The following supporting documents and materials are provided as background information to this Plan:

- Web survey report
- Summary of noise complaint analysis
- Review of noise management best practices (report by Wyle Aviation Services)
- Comments received from members of the YVR Aeronautical Noise Management Committee

**APPENDIX D**

## Acronym List

ANOMS	Airport Noise & Operations Monitoring System
ANS	Air Navigation Systems
CARS	Canadian Aviation Regulations
CCTV	Closed Circuit Television
EARP	Environmental Assessment and Review Process
GDP	Gross Domestic Product
GEMS	Global Environmental Monitoring System
ILS	Instrument Landing System
NAP	Noise Abatement Procedure
NMT	Noise Monitoring Terminal
RNP	Required Navigation Performance
RNAV	Area Navigation
SID	Standard Instrument Departure
VNAP	Vertical Noise Abatement Procedure
YVR	Vancouver International Airport