

Attachment #1

*NAV Canada*

*Consultation to Feb 2023*



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# Changes to flight paths in Greater Vancouver Region and Southern Vancouver Island

## Quick Facts about the NAV CANADA proposal

### WHO ARE WE?

The core business of NAV CANADA is to provide air navigation services, primarily within Canada. NAV CANADA is responsible for helping aircraft safely navigate the 18 million square kilometres of Canadian airspace and the North Atlantic oceanic airspace under Canada’s control. As one of the world’s largest air navigation service providers, NAV CANADA typically oversees several million flights a year through a network of area control centres, air traffic control towers, flight service stations, flight information centres and navigation aids across the country.

As a not-for-profit corporation, NAV CANADA invests directly into its operations, people, and infrastructure to keep Canada’s ANS as safe, efficient, and innovative as it can be. NAV CANADA is self-sustaining with revenue coming primarily from the fees charged aviation customers for our services. As part of its legislated responsibilities, NAV CANADA has been designated as the authority in Canada for providing aeronautical information services. This responsibility includes design, maintenance and publication of instrument flight procedures (including departure and arrival procedures).

Vancouver International Airport (YVR) is a diverse global hub that connects people, cargo, data, and ideas and serves as a platform for our community to come together and thrive. We are motivated by supporting regional economic development and making a positive difference in the lives of British Columbians. We do this with a focus on serving our passengers, partners, workers, and community through digital modernization, climate leadership, reconciliation, and financial sustainability.

### WHAT IS NAV CANADA PROPOSING?

NAV CANADA is proposing changes to approach procedures at Vancouver International Airport including the addition of new satellite-based procedures, changes to some existing procedures, and changes to some of the arrival routes further away from the airport.

At Vancouver International Airport, the proposed new approach procedures will be deployed to both ends of the two main parallel runways: the north runway (08L/26R) and the south runway (08R/26L). The procedures will be used by aircraft equipped with the technology to conduct the procedures.

The broader airspace structure and existing arrival procedures for other runways will be adjusted to accommodate the new approach procedures but no changes are being proposed for departure procedures. Learn more about the specific procedure here.

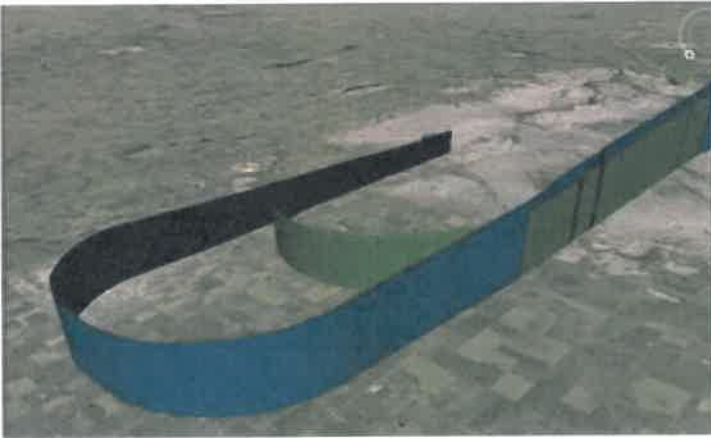
The new arrival routes are designed to meet strict Transport Canada design criteria to ensure a high level of safety. Given the local geography of the region, it is not possible to create new routes that completely avoids residential areas; however, careful consideration was given placing the new routes over industrial and commercial areas, bodies of water, and less populated areas where technically feasible.

**1 to 5  
dB (A)**

is the noise reduction enabled by continuous descent operations, compared to a low-altitude level segment

## WHAT ARE THE BENEFITS OF RNP AR?

Overall, the new procedures would result in fewer people being overflown at noise levels above 60 dB(A) (about the volume of a normal conversation), and enable 'continuous descent operations', which are known to be 1 to 5 dB(A) quieter compared to a low-altitude level segment. Aircraft using RNP AR will follow the defined flight path very precisely, and it supports environmental sustainability efforts by significantly reducing greenhouse gas emissions and delivering noise mitigation to many communities, while reducing flight times and improving operations.



## HOW IS RNP AR DIFFERENT FROM EXISTING ARRIVAL PROCEDURES?

While many procedures in use today leverage satellite-based positioning, RNP AR assures that aircraft can fly a highly predictable and specific flight path. This means that airspace designers have some degree of flexibility as to the flight path location, allowing them to place arrival procedures away from people where these opportunities exist while still meeting strict Transport Canada airspace design criteria. It also often means being able to turn aircraft towards the airport sooner, reducing distance flown and associated emissions compared to more conventional approaches.

RNP AR systematically enables Continuous Descent Operations (CDO) for equipped aircraft with minimal intervention by air traffic controllers and pilots once they are established on an arrival procedure. CDO reduces noise by allowing aircraft to descend continuously and on a reduced engine setting; these procedures have been shown to be 1 to 5 dB(A) quieter when compared to a similar aircraft on a low altitude level segment.

It is estimated that overall approximately 40-50 percent of the aircraft operating at YVR are equipped and certified to fly an RNP AR procedure. This percentage varies based on aircraft type, origin airport/country, and airline operator; it is expected to grow gradually as airlines renew their fleets and acquire more modern and quieter aircraft.

## WHAT DOES THIS MEAN FOR COMMUNITIES?

In addition to some reductions in Green House Gas emissions – which is a key focus of the industry and governments as they work to support greater environmental sustainability in the transportation sector – the procedures were designed to have aircraft overfly fewer homes where possible.

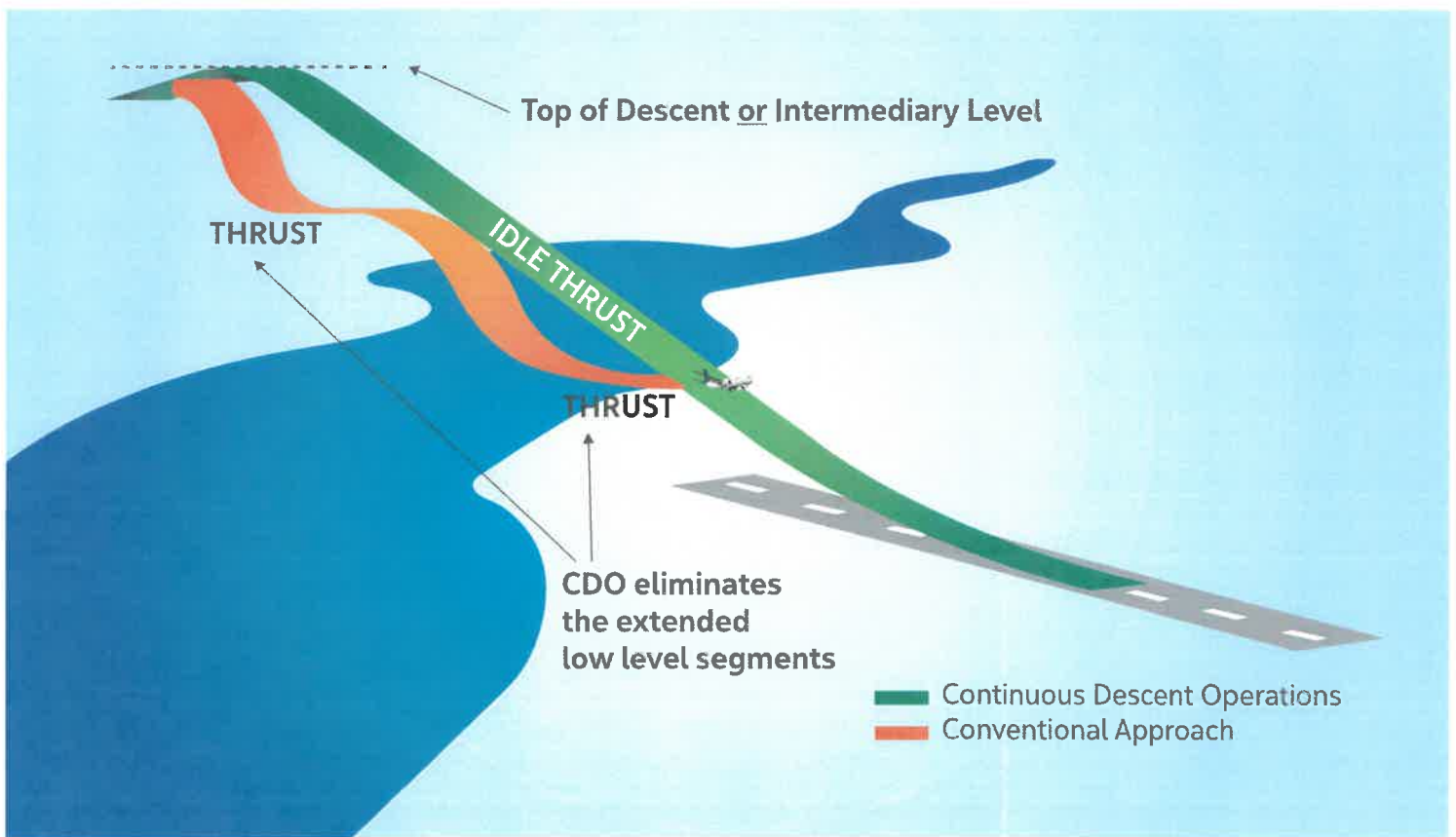
As many as 61,000 fewer residents may be overflown at noise levels above 60 dB(A) when the procedure is used compared to an existing approach procedure.

Despite the noise mitigation inherent in the proposal, it's important to note that entirely avoiding residentially populated areas is simply not possible and that some residents may observe aircraft operating more regularly in certain areas than they had before. Most areas surrounding the airport will continue to observe many of the aircraft operations that they do today, whether they are associated with arrivals or departures.

## WHY ARE THESE PROCEDURES BEING PROPOSED?

There has been a significant shift in aviation technology over recent years with the advent of Global Navigation Satellite Systems (GNSS). The corresponding modernization of aircraft navigation and flight management systems has supported airspace modernization using Performance Based Navigation (PBN).

The current airspace structure was amended approximately 15 years ago but the underlying system is still based on historic traffic patterns derived from the location of ground-based navigation aids. As a result, this increases the need for airspace restrictions and constraints. The new satellite-based airspace environment will offer the opportunity to mitigate many of these constraints and leverage new technology to improve the overall safety and efficiency of the entire region.



Public consultation: December 6, 2022, to February 3, 2023

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For more information about NAV CANADA and Canada's air navigation system, visit [navcanada.ca](https://navcanada.ca)



A wide-angle photograph of Vancouver International Airport (YVR) taken from across the water. The airport's main terminal building is visible in the middle ground, with a prominent air traffic control tower to the right. In the background, there are rolling hills and mountains under a clear sky. An airplane is captured in flight, banking to the right in the upper right quadrant of the image. The text "Changes to flight paths in Greater Vancouver Region and Southern Vancouver Island" is overlaid in a large, white, sans-serif font, enclosed in a thin white rectangular border.

# Changes to flight paths in Greater Vancouver Region and Southern Vancouver Island

## Changes in communities to the north and northeast of the airport

### INTRODUCTION

The objective of the Vancouver Airspace Modernization Project (VAMP) is to enhance safety, modernize procedures, and ensure the airspace structure can accommodate the demand for air services. The project proposes changes to the instrument approach procedures for Vancouver International Airport (YVR) affecting a broad area around Metro Vancouver, with some places more affected than others.

While the focus of the Project was mainly on designing and introducing new instrument approach procedures for Vancouver International Airport, some procedures will remain the same – such as departure procedures and procedures used by aircraft operating under Visual Flight Rules (VFR) (such as helicopters or floatplanes).

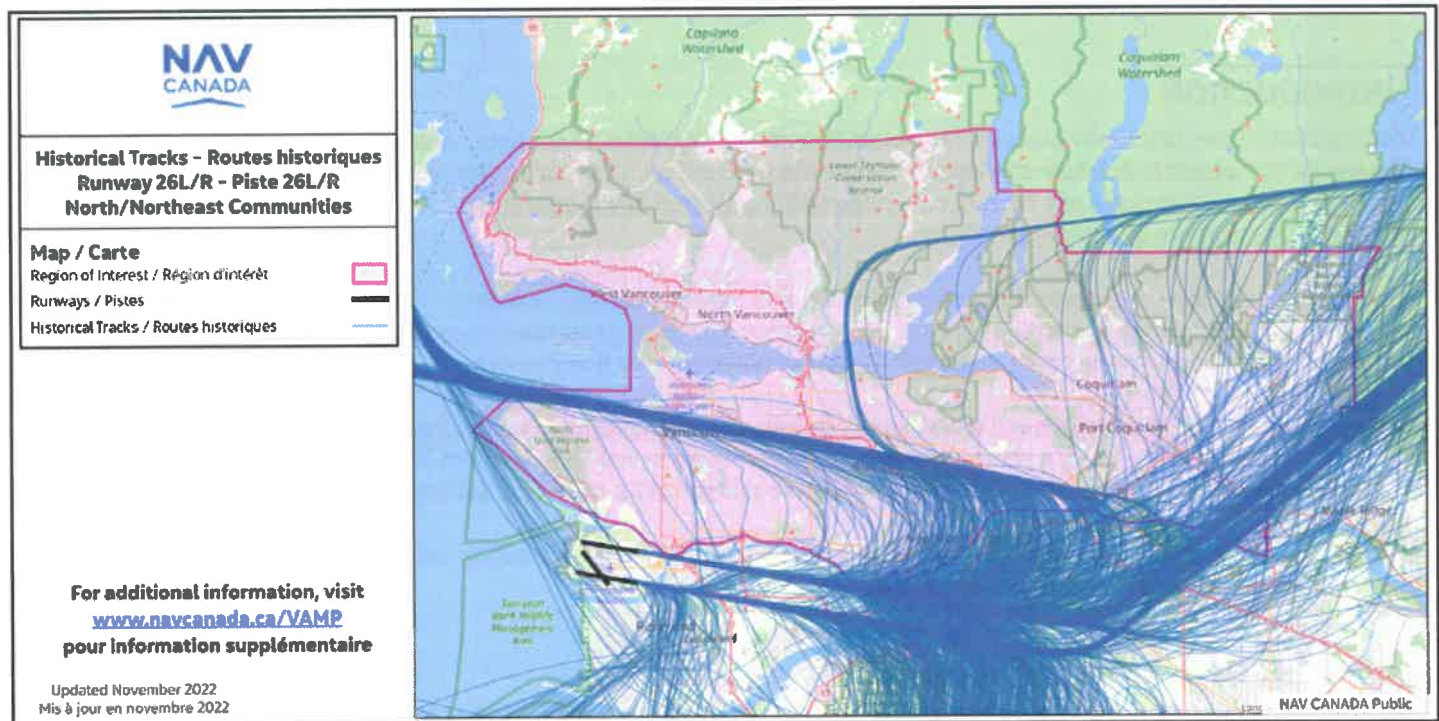
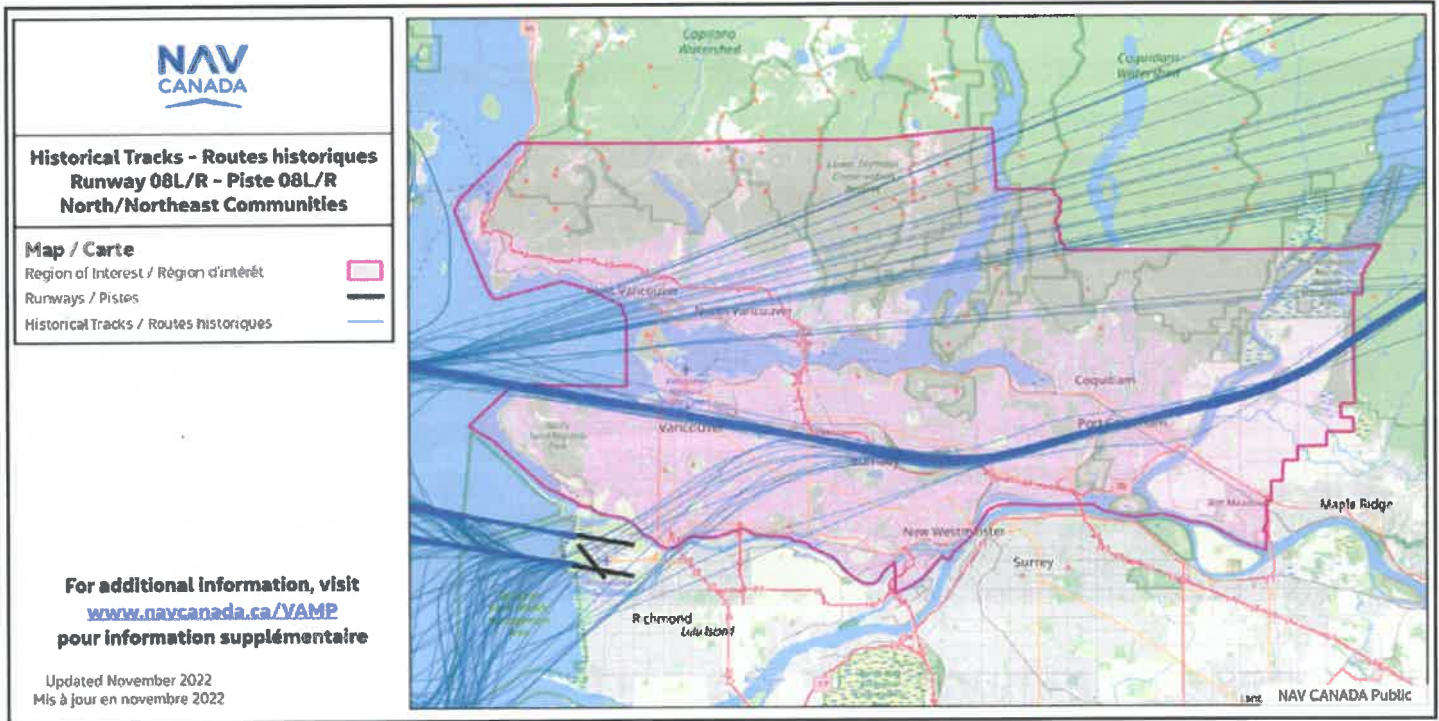
The proposed RNP AR procedures will allow aircraft to line up with the runway sooner than when using a typical procedure today. As a result, aircraft will fly a shorter distance and consume less fuel, and will also be operating on a Continuous Descent profile, which enables an aircraft to descend on a quieter reduced engine setting.

This document provides information on current procedures and flight paths as well as proposed changes affecting communities located north and northeast of YVR.

### CURRENT OPERATIONS

For context, the images below show samples of arriving traffic over a few busy days in 2019 with existing procedures in place. The active runway is determined by wind conditions at the airport – for safety reasons aircraft must land and take-off into the wind. The first image shows aircraft arriving eastbound using runways 08L and 08R when winds are blowing from the east. The second image shows aircraft arriving westbound using runways 26L and 26R when winds are blowing from the west.

# COMMUNITY-SPECIFIC MAPS:



As can be seen, aircraft do not all follow the exact same path when they are arriving and some are often directed (or "vectored") by air traffic control to operate off the procedures. This is done to ensure safe sequencing or provide for more direct routing and this practice will continue in the future. Determining which end of the runway is used is based on many factors including wind direction and speed. How often each runway direction is used will not change directly as a result of the proposed approach procedures.

# COMMUNITY-SPECIFIC MAPS:

## PROPOSED CHANGES

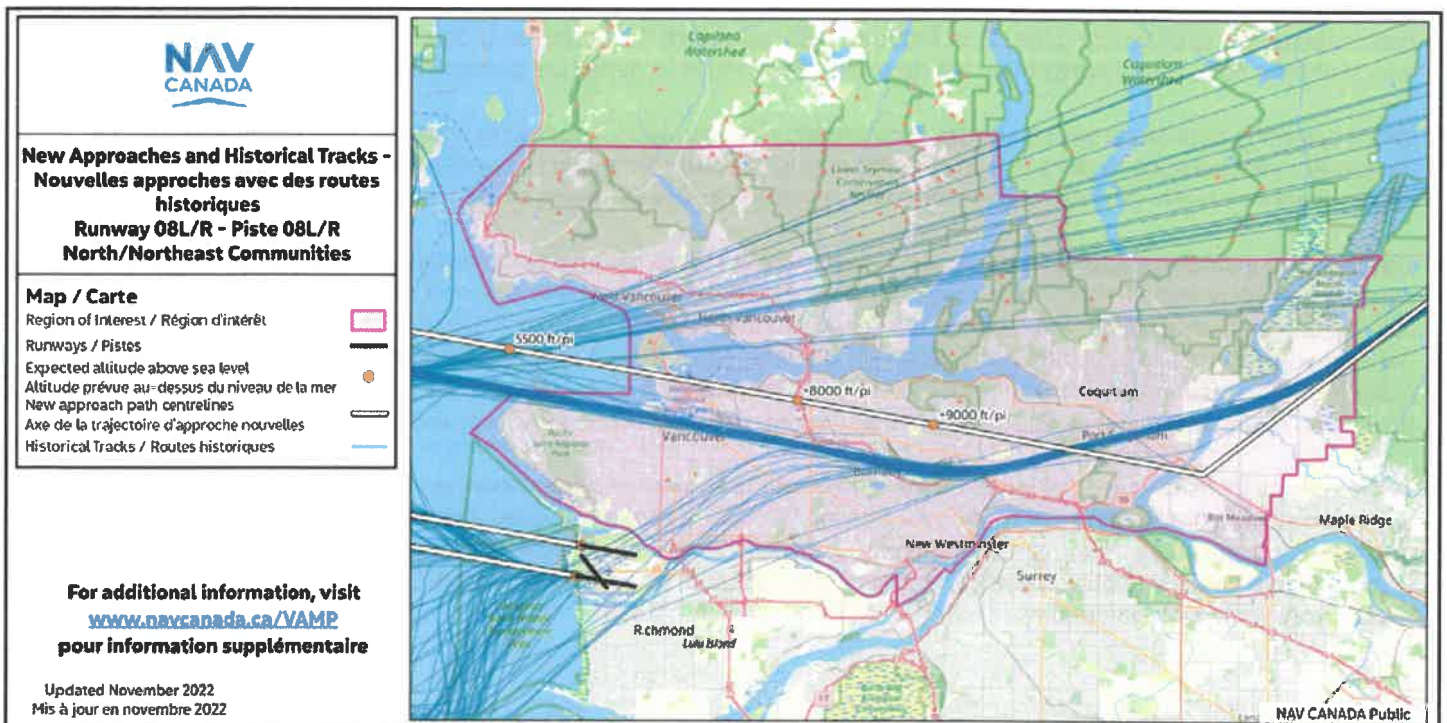
NAV CANADA is proposing changes to instrument approach procedures at YVR including changes to existing procedures, the addition of new satellite-based procedures, changes to some existing procedures, and changes to some of the arrival routes further away from the airport.

A key element of the project is the introduction of RNP AR approach procedures that defines a highly precise flight track including a curved segment along the approach which turns aircraft from the downwind segment (aircraft flying north of the airport in an east/west direction) to the final approach segment (when the aircraft lines up with the runway). This curved segment for the RNP AR procedure is different than what you see today as its path over the ground is precisely defined in advance and not subject to change on an aircraft-by-aircraft basis. Not every aircraft will use these curved segments.

To support the introduction of these curved segments, the location of the northern downwind segment would move further north from its current location overtop the city to more over the water. This helps ensure aircraft have enough space to make their 180° turn and line up with the runway.

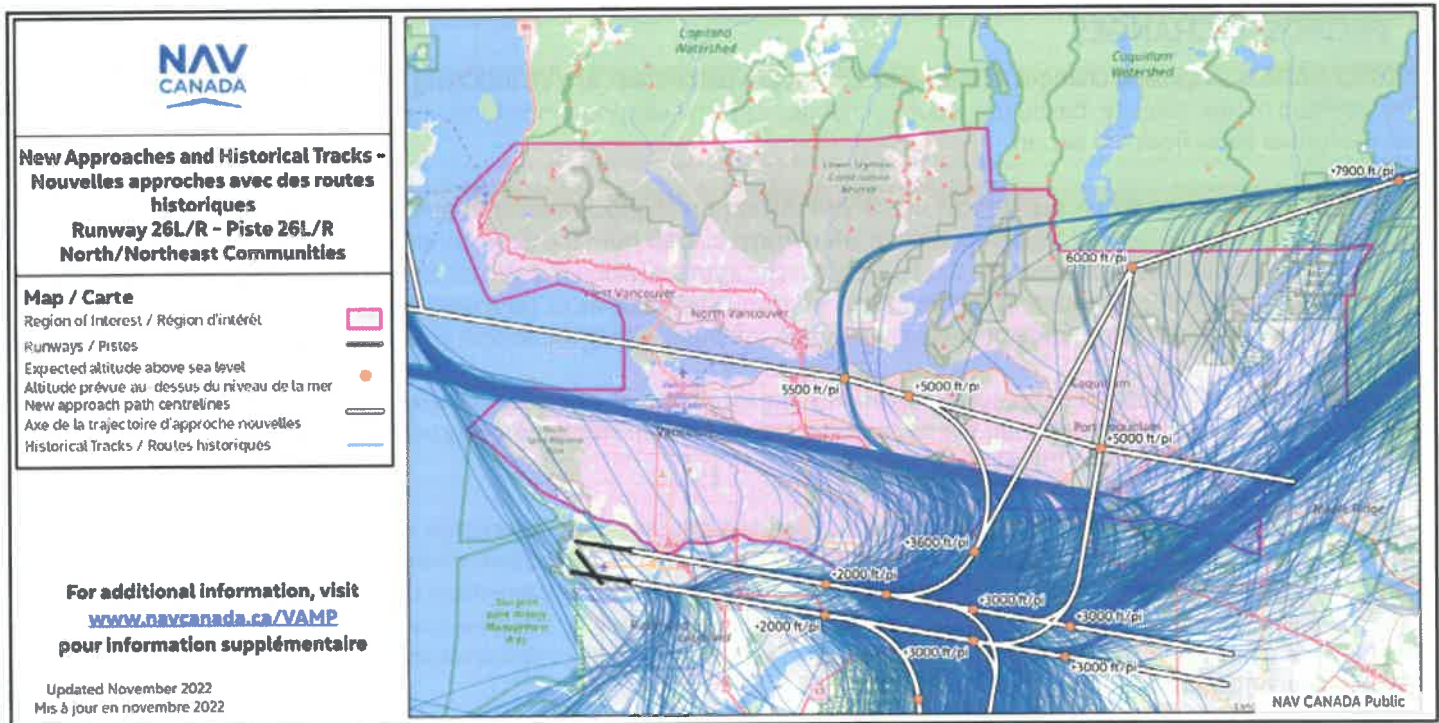
Aircraft in this area will utilize the new downwind location, but only a certain percentage are equipped with RNP AR technology and holding certification from Transport Canada will use the curved part of the approach. Aircraft not using the RNP AR approach procedure will use the downwind and will be instructed to initiate their base turn one-by-one by air traffic control, leading to a high variability for where these aircraft will overfly the area. It is also not expected that 100% of RNP AR-equipped aircraft will fly the curved approach due to operational considerations such as traffic levels, aircraft sequencing, or weather.

The images below show the location of the new arrival paths including the downwind segment and the curved path from downwind to the final approach along with the historical aircraft tracks shown in the earlier image. Another way to think about it is the aircraft shown in blue using the old routes would in the future fly the new routes and new downwind and some of those aircraft would take the shorter curved path.





# COMMUNITY-SPECIFIC MAPS:



## WHAT IT MEANS FOR COMMUNITIES

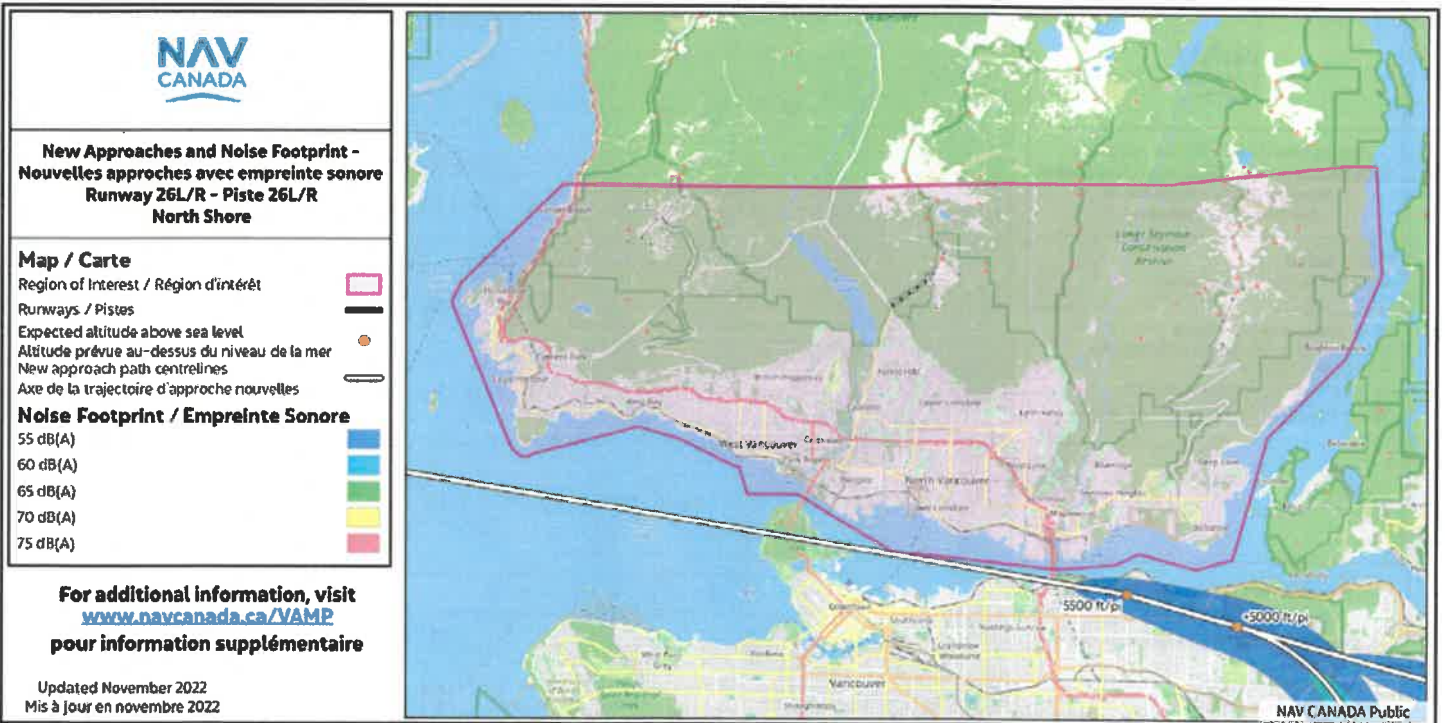
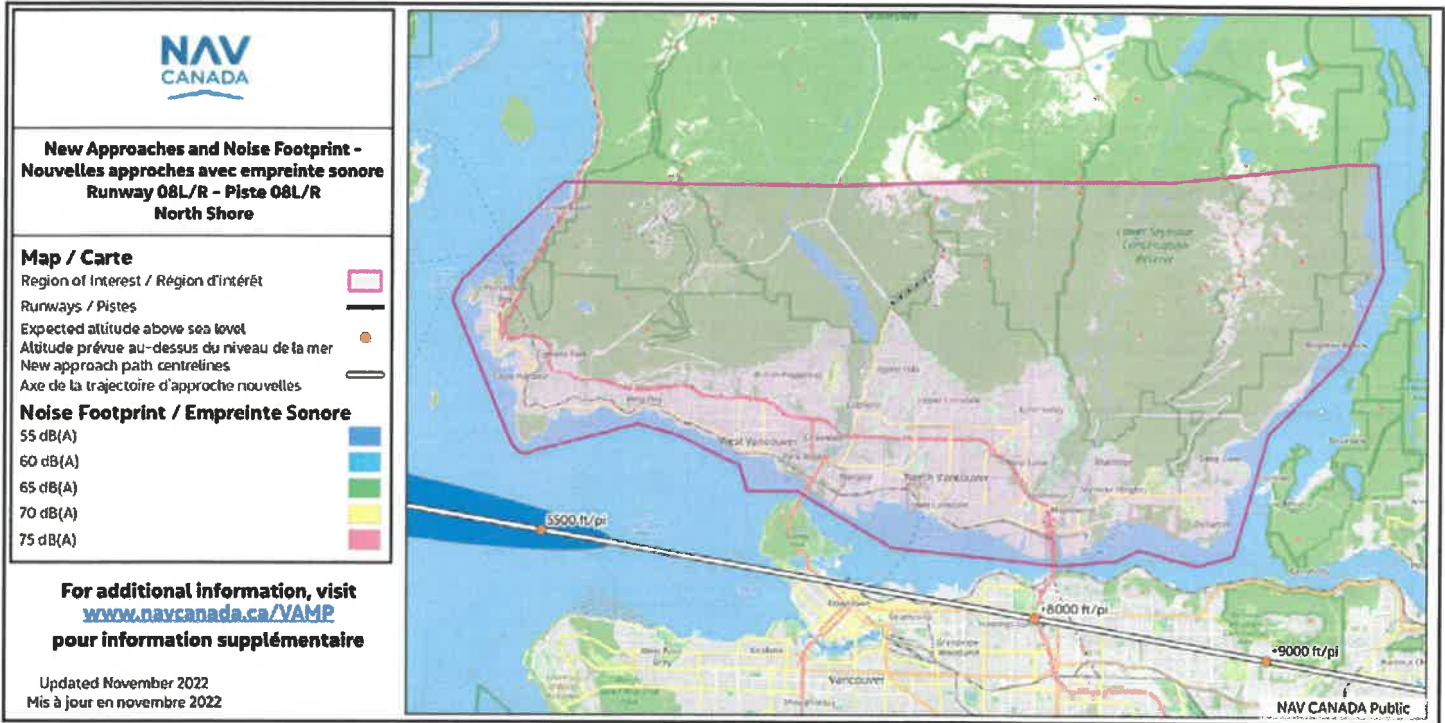
NAV CANADA assembled detailed information on aircraft operations for arrivals to YVR. This included specific aircraft fleet mix information such as aircraft type, arrival and departure times, and routes of flight. Using this data, noise modeling was conducted to better understand the noise footprint associated with the proposed procedures. Departures from YVR are excluded from noise modeling as there are no proposed changes to departure procedures.

When operating outside certain categories of controlled airspace, aircraft operating under Visual Flight Rules (VFR) are not always required to be in contact with air traffic control. Because these aircraft operate at the pilot's discretion along non-defined and highly variable routes, they have also been excluded from noise modeling.

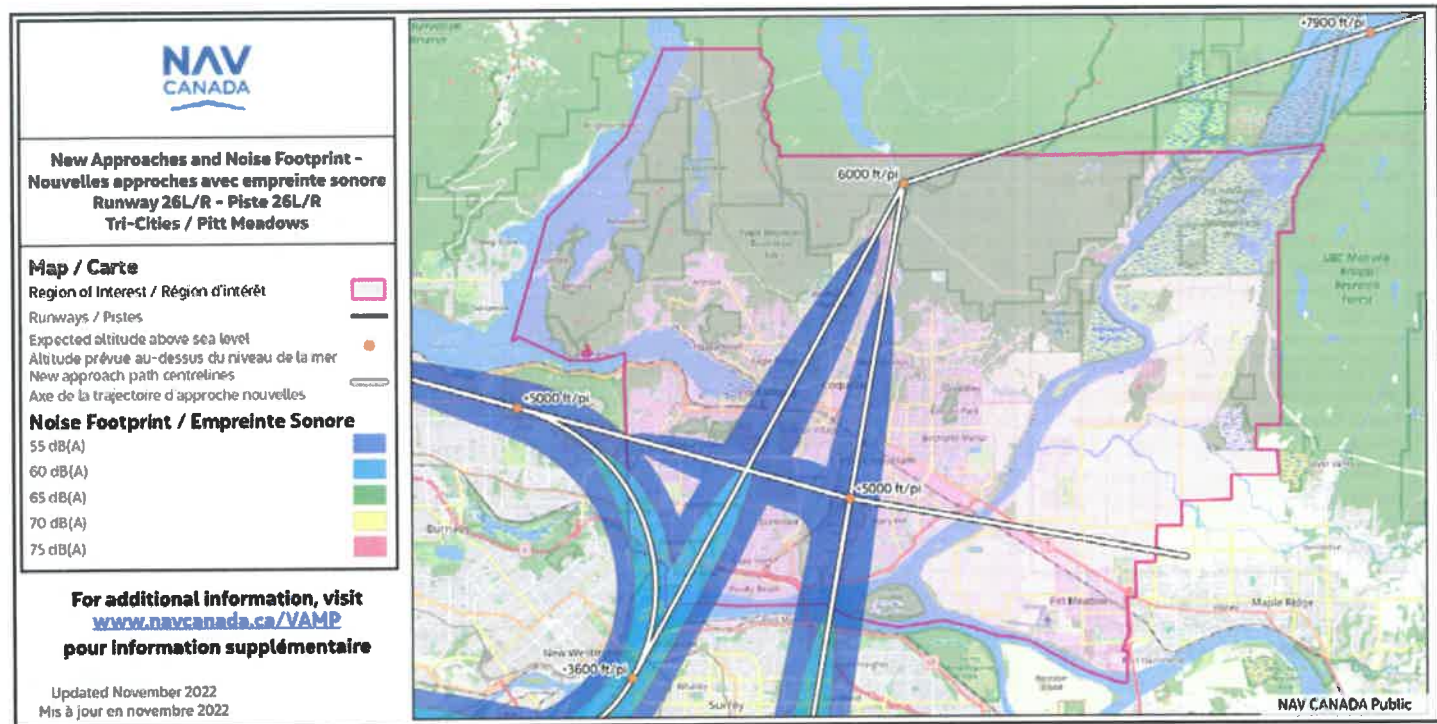
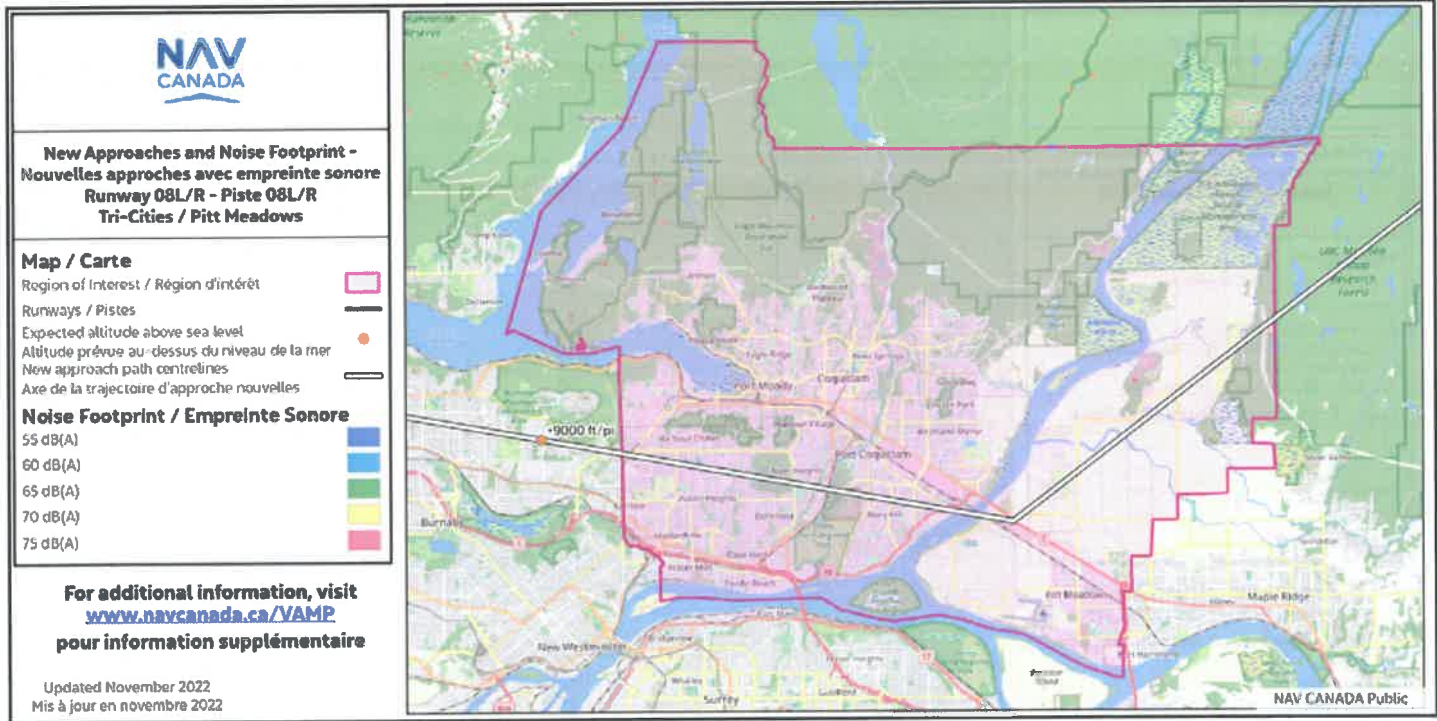
The design of instrument approach procedures must meet stringent national and international standards to meet a high level of safety and all efforts were made to mitigate noise whenever it was safe and technically feasible. Despite incorporating a number of noise mitigation measures into the proposal, it is important to note that entirely avoiding overflight of residentially populated areas is simply not possible and that some residents may observe aircraft operating more regularly in certain areas than they had before. Most areas surrounding the airport will continue to observe many of the aircraft operations that they do today, whether they are associated with arrivals or departures.

The images below show the location of the new downwind segment and the curved path from downwind to the final approach along with the noise "footprint" of a Boeing 737-800—a commonly used aircraft at YVR—conducting the arrival and approach procedure. Maximum sound level—expressed in decibels as dB(A)—is shown at various intensities using colours. Single-event noise level metrics represent the maximum noise level at a receptor location, considering a particular set of aircraft operations.

# COMMUNITY-SPECIFIC MAPS:



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