BERMUDA L.F. WADE INTERNATIONAL AIRPORT
REDEVELOPMENT PROJECT

An Innovative Model for Small Airports

THE CANADIAN COUNCIL FOR PUBLIC-PRIVATE PARTNERSHIPS
2021 NATIONAL AWARDS CASE STUDY

The Canadian Council for Public-Private Partnerships
Le Conseil Canadien pour les Partenariats Public-Privé

The Canadian Council for Public-Private Partnerships 2021 National Award Case Studies

National Award Case Studies Gold Award for Infrastructure (International): Bermuda L.F. Wade International Airport Redevelopment Project

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Contents

Introduction

For nearly 30 years, The Canadian Council for Public-Private Partnerships (CCPPP) and its members from the public and private sectors have played a strong role in refining the P3 model and promoting new approaches to infrastructure development and service delivery.

Governments across Canada are using the public-private partnership (P3) model to build, maintain and operate much-needed infrastructure, from schools and hospitals to bridges and highways. In 2021, there are close to 300 active P3 projects in operation or under construction valued at more than $139.4 billion.

Along the way, the 'made-in-Canada' P3 model has become globally renowned but, as the winners of the 2021 National Awards for Innovation and Excellence in Public-Private Partnerships demonstrate, it has never stopped evolving.

This year, CCPPP is publishing three case studies on these exemplary projects, joining the more than 80 that have been published to date. Designed to inspire others to consider innovative and efficient models for procuring infrastructure, the studies highlight many of the lessons learned about P3s. Each case provides a close look at how a successful P3 has worked, including how the partnership was established, its structure and operation and its resulting benefits.

It is important to learn from these complex projects as we move forward. After all, investment in infrastructure is critical for the future of our communities and country because it creates jobs, drives growth, stimulates productivity, and builds a legacy for us to thrive.

Canadians want — and expect — critical infrastructure to be built quickly and with the best value for taxpayers. Using public-private partnerships is an advantage given their greater potential to offer a fixed price and on time delivery, risk allocation and improved life cycle maintenance and operations.

In 1998, CCPPP established the National Awards for Innovation and Excellence in Public-Private Partnerships to honour governments and/or public institutions and their private sector partners who have demonstrated excellence and innovation in P3s. Gold, silver and bronze Awards of Merit are given in the areas of project development, financing, infrastructure, service delivery or other notable attributes to projects from across the country and at all levels of government.

Winning projects are chosen on the basis of the following criteria:

- Innovative features;
- Relevance or significance as a national and/or international model;
- Economic benefit (job creation, enhanced economic value, export potential, etc.);
- Measurable enhancement of quality and excellence of service or project;
- Appropriate allocation of risks, responsibilities and returns between partners; and
- Effective use of financing and/or use of non-traditional sources of revenue.

2021 Award Winners

Cortellucci Vaughan Hospital, Ontario – Gold Award for Infrastructure

This $1.3-billion project, the first hospital built in the City of Vaughan and the first net new hospital to be built in Ontario in the last 30 years, has a state-of-the-art emergency department, capacity for up to 350 beds with flexibility to expand, and is the first hospital in Canada to feature fully integrated smart technology, enabling systems and medical devices to communicate directly with one another. In February 2021, as it prepared to open, the hospital pivoted to temporarily become a system-wide resource supporting Ontario's COVID-19 response. From its initial opening until its full opening in June 2021, the facility cared for some of the highest volumes of COVID-19 patients in Ontario. The awards committee was impressed by how well the hospital pivoted ahead of its opening and the innovations deployed by the consortium to keep the complex project on time and on budget such as the use of prefabricated bathroom modules.

Partners: Mackenzie Health, Infrastructure Ontario and Plenary Health

Valley Line West LRT, Alberta – Gold Award for Project Development

This $2.67-billion, 14-kilometre light-rail extension is the second stage of the City of Edmonton's Valley Line. The design-build-finance project, which entered its RFP phase and reached financial close during the pandemic in 2020, bundles together design, system integration and construction into one contract. It also is the first to embed a community benefits agreement for a major capital project in Edmonton. With its 14 street-level stops and two elevated stations, the extension will help connect city neighbourhoods and reduce congestion, with LRT stops downtown at all major city hospitals and the city's largest tourist attraction, West Edmonton Mall. Once the west line is operational, both stages of the Valley Line will operate contiguously with no transfer points or perceived break in service for passengers despite the fact both are being delivered using different P3 consortiums, noted the awards committee.

Partners: City of Edmonton and Marigold Infrastructure Partners

L.F. Wade International Airport Redevelopment Project, Bermuda – Gold Award for Infrastructure (International)

By using innovative thinking and Canadian P3 expertise, Bermuda was able to achieve what many small airports in the world have struggled to do — attract private sector investment to finance a major capital redevelopment. The US $300-million project is the largest P3 infrastructure deal in Bermuda's history. The bespoke government-to-government contract and guarantee mechanism, supported by an underlying P3 commercial and financing structure, enabled the new 288,000-square-foot facility to meet the latest international standards while still dramatically lowering the project's initial capital budget. In addition, the new terminal is infused with the latest technology. Built sustainably and factoring in the impacts of climate change, the terminal can now withstand windspeeds of 277 kilometres an hour — equivalent to a Category 5 hurricane. Playing a part in the revitalization of Bermuda's economy, nearly US $400 million in private investment was mobilized, more than 400 Bermudian companies were engaged, and 885 Bermudians worked on the project. The awards committee recognized the success of the project, which not only sets new standards internationally for others to follow but showcases Canadian companies and Canadian innovation on the world stage.

Partners: Government of Bermuda, Canadian Commercial Corporation and Aecon Concessions

New Adult Mental Health Addictions Facility, Newfoundland and Labrador – Silver Award for Project Development

This $330-million project will help transform and destigmatize mental health and addictions treatment in Newfoundland and Labrador, reflecting the move away from an inpatient-centred model to one that balances care and healing close to home. The new 24,000-square-foot facility, co-located at the Health Sciences Centre in St. John's, is replacing a facility constructed in the 1800s. It will house a 102-bed hospital and a new 60-bed hostel. Rooms will be oriented to capture daylight with windows designed to keep out the cold of the province's blustery winter weather. Terraces will also have built-in snow melting systems. This design-build-finance-maintain project was one of the few P3s globally to close during the height of the pandemic, the significance of which was not lost on the awards committee. Lockdowns posed challenges for teams to travel to the island and led the partners to explore ways to optimize risk transfer to avoid supply chain issues and delays.

Partners: Government of Newfoundland and Labrador, the Eastern Regional Health Authority and Avalon Healthcare Partnership

GO Rail Expansion, Highway 401 Rail Tunnels, Ontario – Silver Award for Infrastructure

This $132-million design-build-finance project created twin tunnels under 21-lanes of traffic, without disrupting travel on the busiest highway in North America and the world's busiest truck route — a significant achievement that was recognized by the awards committee. Completed in July 2021, the tunnels will increase capacity on the GO Kitchener Rail Corridor as part of Metrolinx's GO Rail Expansion program. The new 176-metre twin tunnels beneath the access ramps of Highway 401 and Highway 409 will enable the simultaneous passage of two trains travelling in opposite directions without any speed restrictions. The project sets a new standard for tunnel construction and design in Canada, using a new-to-Canada auger borer, as well as a pipe roof system that helped drastically minimize risk, speed up the schedule and protect workers. A sequential excavation method rather than traditional cut-and-cover tunnelling also helped avoid traffic disruption and a complex network of monitors tracked any deviations in the highway and surrounding soil as a safety precaution.

Partners: Infrastructure Ontario, Metrolinx and Toronto Tunnel Partners

Acknowledgements

CCPPP has a team of dedicated Award selection committee volunteers who review the applications, select the winners and provide feedback on the case studies. Using their extensive P3 knowledge and experience, they select the winners from a pool of very qualified applications and then ensure the case studies provide a learning tool for seasoned practitioners, as well as those new to the P3 model. The following panelists comprised the 2021 selection committee:

- Brad Nicpon, Chair of the Awards Selection Committee and Partner, McCarthy Tétrault LLP
- Shariq Alvi, Managing Director, Infrastructure and Project Finance, CIBC
- Rupesh Amin, Managing Partner, Infrastructure & Development, Forum Equity Partners
- Peter Hepburn, Managing Director and Head, Infrastructure and Project Finance, National Bank Financial Markets
- Alain Massicotte, Partner, Blake Cassels and Graydon LLP
- Johanne Mullen, Partner, National Capital Projects and Infrastructure Leader, PwC Canada
- Dr. Alan Russell, Professor Emeritus, Department of Civil Engineering, University of British Columbia
- Lindsay Wright, Senior Manager, Global Infrastructure, KPMG LLP

Mark Schildroth and **Chris Sawczak**, Aecon Group Inc.; **Holly MacNeish** and **Stephanie Williamson**, Plenary Americas; **David Stolte**, Mackenzie Health; and **Shannon Peacocke**, Ernst & Young Orenda Corporate Finance Inc. authored the 2021 Award Case Studies, which were developed with significant input and review from the project partners and procurement agencies as well as the diligent work of the researchers.

AECON

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EY Building a better working world

CCPPP would like to thank them for their contributions as well as Infrastructure Canada for its research support for the case studies.

Infrastructure Canada

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About CCPPP

Established in 1993, CCPPP is a national not-for-profit non-partisan, member-based organization with broad representation from across the public and private sectors. Our mission is to collaborate with all levels of government, Indigenous communities and the private sector to enable smart, innovative and sustainable approaches to developing and maintaining infrastructure that achieve the best outcomes for Canadians.

Our reports, case studies, guidance and surveys are available on CCPPP's website at www.pppcouncil.ca

Additional resources include: P3 Spectrum (www.p3spectrum.ca), Canada's premier source for up-to-date P3 project info.

Quick Facts – L.F. Wade International Airport Redevelopment Project[1]

Project type

Design-Build-Finance-Operate-Maintain (DBFOM)

Asset/Service

Develop, finance, design and build a new, purpose-built, state-of-the-art airport terminal with improved traffic flow and newly renovated facilities/retail spaces. Assumption of airport operations and maintenance of existing airport and new facilities from financial close to the end of the 30-year concession term.

Construction scope of the project:

- Terminal
- New apron, arrival and departure terminal, taxiways and edge lighting
- Airfield/apron lighting and power supply/generator for existing NAVAIDS
- Passenger boarding bridges, hydrant fueling system, terminal approach/curb roads, road signage, drainage and car parking
- Storm surge mitigation, water collection infrastructure, landscaping, and renovation and demolition of certain existing facilities

Financial close and assumption of all existing airport operations, maintenance, and commercial functions:

March 2017

Construction of new terminal

March 2017 to September 2020

Operations and maintenance period for 30 years:

March 2017 to March 2047

1 Background and facts in this case study rely on the information contained in the award application submitted jointly by the project partners in September 2021 to The Canadian Council for Public-Private Partnerships. Information from the submission has been supplemented and updated with information from the procurement documents, the project agreement, the project report, other sources as noted and personal interviews with project partner representatives.

Status

Operational as of December 9, 2020

Partners

Public Sector

- Bermuda Airport Authority – Grantor
- Canadian Commercial Corporation (CCC) – Prime Contractor

Private Sector

- Aecon Concessions – Project Sponsor, Developer, Investor
- Aecon Construction – Design, Build
- Bermuda Skyport Corporation Limited – Project Company
- Scott Associates, Inc. – Lead Designer

Aecon delivered the new airport terminal and associated infrastructure under a fixed price, date guaranteed design and construction contract. Aecon's contract was a full back-to-back subcontract under CCC's Prime Contract.

Other participants

UBS Securities and CIBC World Markets Corp. – Debt Arrangers

- UBS Securities Canada – Sponsor's Financial Advisor
- McCarthy Tetrault – Sponsor's Legal Advisor
- Mott MacDonald – Sponsor's Technical Advisor
- Mayer Brown, LLP – Lender's Legal Advisor
- Turner & Townsend CM2R Inc. – Lender's Technical Advisor

Project cost, financing, and Value-for-Money (VfM)

Total construction price (present value dollars)

- US $274 million

Financing (nominal dollars)

Financed with an innovative 25-year fixed coupon for U.S. private placement – selling Bermudian bonds with the most extended duration ever offered by any Bermudian entity. Two stages of funding were initiated to come up with both the best terms for the project and the best pricing.

All revenues received by Skyport are ring-fenced, secured, and utilized to pay for capital costs (including development, financing costs and repayment of debt), and, for operations and maintenance.

Value-for-Money (present value dollars)

- A Value-for-Money (VfM) analysis conducted prior to 2017 revealed using the DBFOM model achieved significant savings of more than US $200 million on capital costs alone compared to the costs of delivering the project using a traditional public sector procurement approach.

Project highlights and innovative features

Resilience

- Relocated further inland, the new airport terminal is more resistant to hurricanes and built at a higher elevation.
- Mitigation measures related to storm surges were incorporated based on coastal modelling, which factored in sea level rise as an effect of climate change.
- The terminal now can withstand wind speeds of 277 km/h (172 mph), equivalent to a Category 5 hurricane.

Sustainability

- The new wastewater treatment system produces wastewater adhering to World Health Organization (WHO) environmental standards and enhances greywater recycling.
- A constructed mangrove wetland.
- The latest LED lighting is utilized inside the terminal and on the airfield to consume less energy while providing better light and lasting up to 25 times longer than traditional incandescent lamps.
- Dual panel glazing with an insulated and laminated coating.

Adaptability

- Six new covered boarding bridges, new apron space for parking and refuelling or loading/unloading aircraft, and enhanced taxiways to improve aircraft traffic flow.
- The latest, most-advanced U.S. facility requirements for pre-clearance provides a competitive advantage when seeking new air services to and from the United States.

COVID-19

- Contactless technology, such as e-gates for arriving passengers and check-in kiosks and computerized

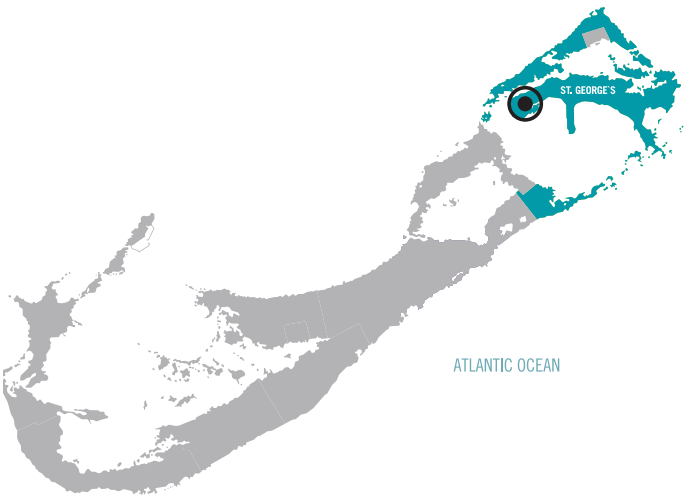
tomography (CT) machines for departing passengers, has ensured minimum to no contact with airport personnel.

- Incorporating a dual filtration air handling system with MERV 8 and MERV 14 filters, significantly filtering out most viral particles.

Project websites

https://www.aecon.com/our-projects/recent/lf-wade-international-airport-redevelopment

https://bermudaairport.com/



Overview

The Bermuda L.F. Wade International Airport Redevelopment Project showcases how Canadian innovators, working together with local partners, delivered a state-of-the-art landmark for Bermuda. Beyond the physical infrastructure, this project demonstrates how a sustainable approach to engineering and construction can successfully be integrated into the blueprint of a public-private partnership (P3).

To deliver the new, larger, state-of-the-art, accessible passenger terminal building, the Canadian Commercial Corporation (CCC)[3] and the Government of Bermuda partnered with Aecon using a unique overarching government-to-government (G2G) contract and guarantee mechanism, supported by an underlying P3 commercial and financing structure.[4] This project marks the third time the CCC and Aecon have worked together to successfully deliver a new airport project outside Canada using this model.[5]

As the private sector partner, Aecon was responsible for the project's development and financing and is also responsible for its long-term operations and maintenance. The airport terminal and associated infrastructure were delivered under a fixed price, date guaranteed design and construction contract. Aecon's contract was a full back-to-back subcontract under the CCC's international prime contractor initiative.[6]

As the project started, Aecon launched Bermuda Skyport Corporation Limited, a special purpose Bermudian company wholly owned by Aecon Concessions, to manage and coordinate the overall delivery of the project and to operate and maintain the airport.

Bermuda, an archipelago of seven main islands in the western North Atlantic, relies heavily on tourism and needed to transform and upgrade its aviation infrastructure and airport services to increase its overall capacity for international flights. It also needed to better protect this critical global transportation link from the growing threat of hurricanes and rising sea levels caused by climate change.

The airport, located in the parish of St. George's northeast of the capital of Hamilton, is the sole point of entry by air to the self-governing British overseas territory. In addition to serving local residents and businesses importing and exporting goods, the L.F. Wade International Airport served 402,925 tourists largely arriving from Canada, the United States and the United Kingdom in 2021.[7] This is a big increase compared to the number of tourists in 2019 (pre-pandemic) which was 191,417.

This project, which used a bespoke approach to successfully attract private sector investment to a small island airport with under one million passengers annually, follows several unsuccessful attempts to launch redevelopment after a government commissioned study in 2008 found the existing terminal had reached the end of its useful life.[8]

In its role, Aecon dramatically lowered the project's capital budget without compromising standards. This was accomplished by selecting a more practical design concept, value engineering and undergoing collaborative exercises with Bermudian stakeholders. In 2008, the initial airport master plan estimated the new terminal would cost US $514 million (in 2008$). At financial close on March 16, 2017, the project's construction cost was US $274.4 million.

3 The Canadian Commercial Corporation, a Crown corporation of the Government of Canada, is an international government-to-government contracting organization, helping governments around the world acquire expertise and proven capabilities available for export from Canada. https://www.ccc.ca/en/news/announcements/ccc-to-redevelop-lf-wade-international-airport-in-bermuda-2017/ (Accessed March 3, 2022).

4 Every contract signed by CCC with a foreign government buyer has an inherent guarantee, backed by the Government of Canada, that the terms and conditions of the contract will be met. This helps mitigate the buyer's risks and provides added incentive to procure from Canada.

5 The first project, Mariscal Sucre International Airport in project in Quito, Ecuador, opened in 2013. It has received more than a dozen international awards celebrating its innovative design and overall operations efficiency as a leading South American airport.

6 See https://www.ccc.ca/en/services/prime-contractor-international/

7 Boston University Hospitality Review. Destination Marketing in a Pandemic: How Bermuda Retained Its Relevance and Found Silver Linings, Boston University School of Hospitality, https://www.bu.edu/bhr/2021/08/26/destination-marketing-in-a-pandemic-how-bermuda-retained-its-relevance-and-found-silver-linings/, August 26, 2021 (Accessed March 2, 2022).

8 https://bermudaairport.com/newterminal/project-faq/

First concrete pour for the project.
PHOTO SUPPLIED BY BERMUDA SKYPORT CORPORATION LTD.

Alongside the Aecon Construction team, 885 Bermudians worked on the site totalling 1.6 million construction hours and almost 400 Bermudian companies, vendors and suppliers were involved in a collaboration of local and international efforts.[9]

"The genesis of today's success story lies in the deep-rooted ties between Canada and Bermuda ...Together, we mobilized nearly $400 million of private investment – drawn to the long-term promise of Bermuda – and the opportunity to play a part in the revitalization of Bermuda's economy. Through innovative thinking, we built and proved the model for how small airports can nevertheless achieve world-class outcomes."

~ Steve Nackan

President, Aecon Concessions —the project's developer, and financier

Completed on-time, on-spec and on-budget, the new passenger terminal building successfully opened on December 9, 2020, during the COVID-19 pandemic and the resulting decline in global air passenger travel. Since its opening, the airport has played a vital role in Bermuda's economic recovery.

This case study will demonstrate how Aecon, through innovative thinking, built and proved that this model for small airports can achieve world-class outcomes. With the CCC, prime contractors and Aecon, a turnkey solution was found enabling Bermuda to do what many small airports in the world have found challenging to do — namely, to successfully attract private sector investment to finance a major capital redevelopment.

In awarding gold to the Bermuda L.F. Wade International Airport Redevelopment Project for international infrastructure, the awards committee for the CCPPP National Awards for Innovation and Excellence in Public-Private Partnerships noted the project not only sets new standards internationally for others to follow but showcases Canadian companies and Canadian innovation on the world stage.

9 Aecon. Aecon Celebrates Opening of Bermuda's New World-Class Passenger Terminal Building at the LF Wade International Airport, December 9, 2020. (Accessed March 7, 2022).

Internationally Recognized Redevelopment Project

2021	2021	2021	2018	2018	2017
CCPPP Gold Award Infrastructure (International)	2021 DFNI Americas Award for the Most Supportive Approach to Retail	Honourary Mention UNECE International PPP Forum Building Better Awards	International Business Award of Excellence Canadian Construction Association	Silver Best Transit Project P3 Bulletin	Winner North America Airport Deal of the Year Award IJGlobal

2021	2021	2021
Best Airport by Size and Region (under two million passengers per year in Latin America and the Caribbean)	Best Hygiene Measures by Region (Latin America and the Caribbean)	Transport Project of the Year from the P3 Awards, presented by P3 Bulletin

Ribbon cutting for the opening of the Bermuda L.F. Wade International Airport's new passenger terminal.

Background and Rationale

The beginning of what became Bermuda's L.F. Wade International Airport dates to the early 1940s when a joint U.S. Army Air Forces (USAAF)/Royal Air Force (RAF) created a land-based airfield during the Second World War. Built at a cost of US $42 million, the airfield was created by amalgamating, dredging and eliminating many small islands in Bermuda's Castle Harbour.[10]

After the war's end, a section of the airfield became a Bermuda government-owned and operated civil air terminal. In 1995, the U.S. military ended its agreement for all its facilities in the country and the entire facility became the Bermuda International Airport, later renamed the L. F. Wade International Airport after the late Bermuda politician in 2007.[11]

Like many small island nations, the airport is vital to Bermuda and plays a critical role in its growth and economic development, particularly for its international business (insurance and other financial services) and luxury tourism sectors. A 2008 Airport Master Plan commissioned by the Bermudian government concluded that major intervention was required to bring the airport's infrastructure up to the latest industry standards and protect it from extreme weather events like hurricanes.[12] The cost associated with carrying out 'band-aid' repairs to maintain the infrastructure's functionality would outpace the cost of inflation by five per cent, the plan estimated, while a complete replacement would cost approximately US $500 million.[13]

In addition, if Bermuda had to raise the required debt itself to fund the airport, the estimated minimum interest costs would have been approximately US $20 million per year, together with roughly US $40 million per year of principal payments. Operations and maintenance costs would also have been substantial.

10 Wikipedia. L.F. Wade International Airport, 26 January 2022, at 00:54 (UTC). (Accessed March 7, 2022)

11 The old terminal building dated back to the 1940s and was augmented in a piecemeal fashion, with expansions and renovations completed over the years, but not in a well-planned, purposeful manner, Lester Nelson, CEO of the Bermuda Airport Authority, told Airport Improvement in July-August 2021. https://airportimprovement.com/article/public-private-partnership-delivers-new-terminal-bermuda (Accessed March 7, 2022).

12 Studies conducted by the Bermuda Weather Service found devastating storms affect the island every six to seven years. Hurricane season, which runs from May through November, sees an average of one storm passing within 180 nautical miles of Bermuda every year. https://www.bermuda.com/bermudas-climate-and-weather/

13 https://bermudaairport.com/newterminal/project-faq/

In 2008, Bermuda was also hard hit by the global economic crisis (debt, rating, job losses in the international business sector etc.), which triggered a six-year recession. As a result, the Bermuda government, which owned and operated the airport, struggled to pin down the financial resources needed to fund a sizable capital improvement program.

Compounding the situation, private lenders tend to have little interest in airport projects the size of Bermuda's (i.e., less than one million passengers) given that industry statistics estimate many of these small airports lose money. The airport also had a diminishing traffic profile over the eight years prior to development and there was limited potential for revenue streams while keeping the airport fees competitive with other airports in the region.

A major intervention was therefore required to keep Bermuda connected to business, tourism, education and trade around the world.

In 2016-17, the CCC, a public-private sector arm of the Canadian government with the express mandate of identifying business development opportunities worldwide, and Aecon brought forward a tailor-made solution to the Bermuda government. The proposal provided a guaranteed, all-inclusive arrangement offering to design, build, finance, operate and maintain the new terminal on a fixed price basis. To complete the proposal, CCC/Aecon were required — at their expense — to prepare a design along with traffic forecasts, environmental and geotechnical testing, financial modelling and other necessary feasibility reports and analysis.

Bermuda agreed to enter into an agreement with CCC to develop and construct a new terminal on-time, on-budget and according to modern, international specifications. Aecon then hired several Bermudian subcontractors to carry out the construction work and set up a special purpose Bermudian company, Skyport, to operate and maintain the airport and to finance and oversee the construction, while Bermuda established an airport authority to provide operational and contractual oversight of Skyport.

The project's long-term P3 government-to-government concession framework is financed through a mix of debt (US $285 million), equity (US $70 million from Aecon) and airport cashflows. This arrangement also enabled the redevelopment project to move from feasibility to financial close in just 2.5 years. A similar project can take up to 10 years to reach these milestones.

As of 2022, the airport redevelopment project is the largest P3 infrastructure deal in Bermuda.

Objectives

Comprehensive economic benefits

- Meet the Bermuda government's objectives through the DBFOM model, particularly regarding local employment and contracting
- Create jobs and maximize engagement of local labour, vendors, suppliers, and other partners

Aerial view of the new passenger terminal building upon commencing operations.

- Transition all existing airport employees to the new special-purpose company (Skyport) for seamless transfer of ownership
- Keep Bermuda connected to business, tourism, education and trade around the world to ensure continued growth and economic development of the country
- Maximize community social investment

Successful partnership

- G2G approach with the Canadian government (CCC) as a strong, bankable, reliable and ethical partner
- Collaborative partnership model to achieve the right outcome for all parties
- Support of Canada's export credit agency, Export Development Canada, as well as the commercial diplomacy of Global Affairs Canada
- Eliminate impacts on Bermuda's sovereign credit rating, and ensure no project-related debt

Leverage private sector innovation

- Tailor international and multilateral financing support
- Generate significant foreign investment
- Attract the right partners and achieve desired project credit ratings
- Demonstrate resiliency and capacity to absorb working capital and risk management requirements

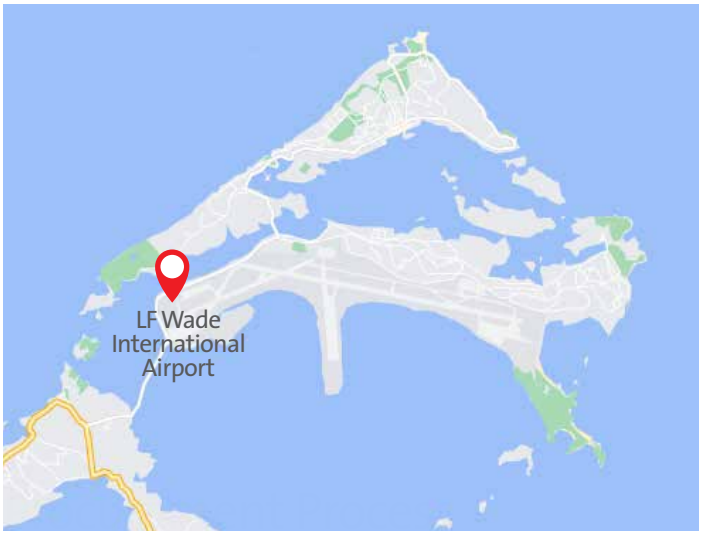
Effective stakeholder engagement

- Holistic approach to address the needs of all stakeholders and minimize impacts
- Proactive engagement through working groups, liaison committees and advisory groups

Gold-standard construction

- First-rate safety performance
- On-time and on-spec delivery
- Deliver quality, resilient infrastructure prioritizing environmental, economic and social sustainability

Figure 1: Location of the project



Description of the Project

The scope of the project included the design and construction of a new state-of-the-art terminal building, an apron, passenger boarding bridges, a hydrant fueling system, taxiways, edge lighting, a water retention pond, a wastewater treatment facility, substations and power supply/generator for existing navigational aids, parking lots and roads.

The new facility is built on a vacant brownfield site located directly north of the old terminal. The site was selected because it enabled the building to be elevated and protected from extreme storm surges.[16] It was also clear of the existing aircraft runway approach zones and enabled construction to take place without interrupting operations at the old terminal.

During construction, Skyport was responsible for operating and maintaining the old terminal at its expense until the new terminal opened. It set funding aside to carry out a refurbishment of the old terminal once the project agreement was entered into to ensure it remained safe, functional and presentable while remaining in operation.[17]

16 The existing terminal was located a mere 11 feet (3.4 metres) above sea level and prone to flooding from storm surges. The new terminal and apron are built one metre higher with fill from a 5,000 sq. metre borrow pit. https://airportimprovement.com/article/public-private-partnership-delivers-new-terminal-bermuda (Accessed March 7, 2022).

17 https://bermudaairport.com/newterminal/project-faq/

Operations scope includes airport management services, airport security, airline management, aircraft movement, cargo operations, general aviation, airport fuel service, parking, revenue collection, ground services and security, commercial and air service development, and the management of all airport commercial services.

Table 1: Side-by-side comparison of new terminal with existing facilities

	Existing Terminal	New Terminal
Function		
Total Arrivals and Departures	2,210 m²	2,630 m² **(a 19% increase)**
Departure Hall and check-in	2,160 m²	1,850 m²
Number of Counters	34	29 common use + 4 future
Concessions pre-security	236 m²	355 m² (not including outdoor patio)
Airline offices	923 m² dispersed	945 m² contiguous block
US screening lanes	2 standalone	4 + 2 future; combined
International screening lanes	1 standalone	
Number of staff and material screening lanes	1	2
Queue area for screening	140 m² + 36 m²	280 m² combined
US Customs, Border Protection, and Departures (CBP)		
Overall area of USCBP	1,350 m²	1,795 m²
Number of counters	10	12 (counters and podiums combined)
Number of kiosks	4	22
Departures lounge seating area	960 m²	1,130 m²
Concessions and lounges	830 m²	910 m²
Total US area	1,790 m²	2,040 m² **(a 14% increase)**
International Departures		
Departures lounge seating area	540 m²	1,090 m²
Concessions and lounges	610 m²	1,020 m²
Total INT area	1,150 m²	2,110 m² **(an 83% increase)**
Immigration and Arrivals		
Number of contact stands with passenger loading bridges	0	6
Number of immigration e-gates	0	6
Area of bag claim hall	890 m²	2,020 m²
Inbound duty free	54 m²	100 m²
Total terminal area	24,220 m²	29,930 m² **(an overall 24% increase)**

One of the first groups of travellers inside the new passenger terminal upon its opening in December 2020.

Design

The new airport terminal is an accessible facility with design elements that reference classical Bermudian architecture such as sloping roof angles and triangles. Light and open spaces give an airy impression, with ocean views on display and walls styled to represent coral reefs. The steeply sloping 45-degree west wall of the terminal even resembles a cresting wave.

Passenger comfort was top of mind for designers, with six new covered passenger boarding bridges, modern lounges, improved concessions, restaurants and duty-free offerings. Outside, passengers can enjoy an expansive patio with lush views of indigenous flora and sustainable water features. There's even a putting green and nature trail to make the airport a pleasant place to wait for flights, especially for passengers who may have had early checkouts from their hotel. These guests also have the option to store baggage and shower at the airport as they shop and dine.

The use of vibrant colours and a display representing Bermudian culture, including stylized kites and birds together with other contributions from local artists, also provide a unique ambiance. The airport's design is flexible and adaptable to changing needs and traffic patterns. None of the interior walls are load bearing and its six gates can swing to service any combination of flights.

Streamlined and modernized pre-clearance for U.S. departures, security screening and immigration enable more efficient check-in and arrivals, while a new apron provides space for parking and refuelling or loading/unloading aircraft, and enhanced taxiways improve aircraft traffic flow.

Improvements to aircraft traffic flow also included:

- construction and operation of additional apron space
- installation of apron lighting systems
- modifications to taxiway interconnects and interface
- installation and operation of a new aircraft hydrant refuelling system, and
- decommissioning of the majority of the existing terminal, the remainder of which may be used for airport operations and office space.

The airport now meets modern safety standards and growing demand for passenger capacity, which could not be achieved by modifying the existing terminal. The new terminal uses modern materials and technology and helps to save energy and reduce maintenance costs, while responding to future demands.

Automated kiosks help staff to improve efficiency in moving passengers through the terminal and departure is more compact and efficient due to adoption of common use counters. Expanded commercial space for food and retail business have also enhanced the passenger experience.

Accessibility for disabled and elderly travellers was challenging in the old facility. The new terminal is completely accessible, including enclosed passenger boarding bridges.

Table 2: Construction metrics

Building area	Ground floor: 17,000 m²
	Upper floor: 8,500 m²
	Total building area: 25,500 m²
Volume of concrete	Building: 7,500 m²
	Bus canopy: 220 m
	Tanks: 1,350 m³
	Apron: 4,200 m³
	Total volume of concrete: 13,270 m³
Number of piles	719 piles at 35 m in length
Structural steel	3,475 MT
Cladding (metal wall and soffits)	5,998 m²
Glazing & Curtain wall	6,250 m²
Important granite aggregate	114 T (45,000 m³)
Earthwork cut	115,000 m³
Earthwork filled (includes imported aggregate)	170,000 m³
Roofing	20,000 m²
Baggage conveyors	1 km
Blockwork	5,000 m²
Drywall	45,000 m²
Metal ceilings	10,000 m²
Sprayed fireproofing	5,000 m²
Granite flooring	8,000 m²
Terrazzo flooring	3,000 m²

May 2018: Aerial photo.

May 2018: Steel structure progress.

The last piece of structural steel for the new terminal building is lifted into place in September 2018.

A traditional Bermudian roof wetting to celebrate the completion of the roof for the new passenger terminal building in January 2019. The occasion was marked with pours from a special bottle of Gosling's Black Seal Rum.

Aerial photo at substantial completion in October 2020.

Innovative Features

Aecon dramatically lowered the project's capital budget without compromising standards. This was accomplished by selecting a more practical design concept, value engineering and undergoing collaborative exercises with Bermudian stakeholders.

Geotechnical studies were conducted and used to inform the design of foundations to ensure a structurally sound solution that met all applicable building codes. Annie's Bay and Airport Finger are the known locations of bunkers that are not within the new terminal area. In fact, the new terminal is far from those sites, however, the ESIA included soil sampling in the development area to determine if there were any contaminants.

Sustainability and Promotion of Environmental Measures

The new passenger terminal building was built with a collaborative approach — leveraging innovation to maximize resiliency, sustainability and adaptability.

Aligning the project's priorities and work with five of the United Nations Sustainable Development Goals (affordable and clean energy, decent work and economic growth, industry, innovation and infrastructure, sustainable cities and communities, and responsible consumption and production) was of critical importance to the Bermuda government and Aecon.

The implementation of an environmental management plan was prioritized during all project phases. Aecon applied a holistic approach to the project and was intently focused on ensuring the project would become a showcase of sustainability by incorporating the following features:

- **Storm Surge Mitigation:** The relatively low-lying elevation of the old terminal and its location resulted in vulnerability to the impacts of hurricanes and their associated storm surge. Therefore, mitigation measures related to storm surges were incorporated based on coastal modelling by WSP in 2016, which factored in sea level rise as an effect of climate change. Relocated further inland, the new airport terminal is built at a higher elevation than the existing terminal and can now withstand wind speeds of 277 kilometres an hour (172 mph), equivalent to a Category 5 hurricane. [18]
- **Stormwater Management:** A constructed mangrove wetland, which existed historically in the area, naturally provides stormwater management features, a natural windbreak and assists in storm surge mitigation. These natural filters provide an additional benefit with respect to water quality through the filtration and assimilation of pollutants from runoff prior to the infiltration of stormwater via the subsoil into the aquifer and surrounding ocean.
- **Wildlife Protection:** The project is located near several small islands, collectively called the Castle Harbour Islands, that provide refuge to the Bermuda petrel, known locally as the cahow. Thought to be extinct until 1951, there are only 300 known cahows worldwide. Although the project has not been identified as a significant threat to cahows, there are regular consultations with scientists monitoring the birds to identify any changes to the cahow's behaviour.
- **Sustainable Landscaping:** All landscaping associated with the project follows sustainability principles of sourcing and reusing local materials, low water and power consumption, and habitat and open space creation.
- **Wastewater Treatment:** The new system produces wastewater that adheres to World Health Organization (WHO) environmental standards and enhances greywater recycling. The treated water is recycled back to the terminal and used in a separate non-potable water system that serves terminal washrooms.
- **Energy Efficiency:** The latest in LED lighting is utilized inside the terminal and on the airfield. LEDs consume far less energy while providing better light, and they last up to 25 times longer than traditional incandescent lamps, helping to reduce waste and maintenance requirements. Dual panel glazing with an insulated and laminated coating also allows ample natural light to enter the terminal, while minimizing radiant and convective/conductive heat transfer and reducing the amount of lighting and air conditioning required.

18 The airport suffered flooding from Hurricane Fay in 2014, which was only a Category 1 storm. Hurricane Fabian in 2003 was listed as a Category 3 storm when it hit the island. Bermuda hadn't seen a Category 3 hurricane capable of damaging small buildings and destroying waterfront homes since 1953 when Hurricane Edna arrived with 115 mph winds. Hurricane Dean, a Category 2 storm in 1989, caused damage to 648 buildings and washed out a parking lot at the airport, along with several vehicles.

- **High-Performance Façade Design:** The airport terminal's west facing façade has been designed with sloped glazing that will reduce heat gain by approximately 20 per cent compared to a purely vertical installation.
- **Ceramic Frit:** This has been applied to tinted glass used within the building envelope to help reduce reflection and positively affect solar absorption, shading and appearance.
- **Daylight Dimming Sensors:** These sensors control indoor lighting fixtures at glazed facades and skylights for daylight harvesting.

The Bermuda petrel, commonly known as the cahow, is the second rarest seabird on the planet.

Navigating COVID-19

The COVID-19 pandemic caused unprecedented challenges globally, particularly in the aviation industry. The rapid spread of the virus forced governments to take exceptional measures, including closing many international borders. However, in a year marked by global lockdowns, airport shutdowns and travel restrictions, the L.F. Wade International Airport Redevelopment project team remained agile and focused on an essential service, to ensure Bermuda saw its new passenger terminal building open for operations on December 9, 2020.

Bermuda's Ministry of Health was engaged from the onset of the pandemic in early 2020. Government guidelines were put in place to ensure the health and safety of project employees and the public. The use of face coverings was mandatory and continuously monitored on site; the shift schedule was revised to allow for social distancing; work bubbles were established to ensure business continuity in the event of an outbreak; and daily self-declaration health forms and mandatory temperature checks were implemented. In compliance with the health ministry requirements, a regular testing regime for all overseas contractors and visitors was enforced before site access was allowed. Ultimately, these mitigation measures permitted the project to avoid outbreaks during construction and ensure no additional delays occurred.

A COVID-19 information poster displayed at the airport.

The experience of managing COVID-19 during the final construction phase also prepared staff for the operation of the new terminal. Mitigation measures were adopted for airport operations that addressed the new operating environment, restored passenger confidence and met passenger expectations for safe travel.

The project's partnership with the health ministry was not limited to information sharing and adhering to public health requirements. An agreement was also reached with the Bermuda government for fitting out an area within the new terminal building to provide appropriate space for a testing facility in compliance with the U.S. Center for Disease Control and Prevention. In addition, this partnership provided airport staff with the opportunity to get tested regularly at no added cost.

The project design also incorporated the use of contactless technology such as e-gates for arriving passengers, along with check-in kiosks and computerized tomography (CT) machines for departing passengers. This allowed for departing and arriving processes in which minimum to zero contact with airport staff is required. The air handling system at the new terminal building is a dual filtration system with MERV 8 and MERV 14 filters, resulting in optimal filtration of particles 0.3 to one micron in size, the typical size range of most viral particles.

These mitigation efforts were recognized in September 2020 with the Airports Council International (ACI) Airport Health Accreditation, a milestone achievement that verified the airport's COVID-19 and other health mitigation measures aligned with ACI guidance and industry best practices. The airport also won ACI's 2021 Airport Service Quality Award for having the Best Hygiene Measures by Region (Latin America and the Caribbean).

Procurement Process

Selecting the P3 model

If Bermuda had moved forward with a traditional procurement process, it would have incurred costs, estimated at more than US $20 million to develop the same level of due diligence as CCC/Aecon did to compile a comprehensive request for proposal package, and years of delay.[19]

Instead, in light of its existing debt obligations and minimal interest amongst private lenders, the Bermuda government decided to move forward with a tailor-made, customized solution, utilizing a unique overarching government-to-government (G2G) contract and guarantee mechanism, supported by an underlying P3 commercial and financing structure, with the Government of Canada.

Through discussions between the Canadian government (represented by the CCC) and the Bermuda government, complemented by Aecon Concessions' development and financing acumen, the parties were able to arrive at a tuned equilibrium of public support and private ability to deliver. The DBFOM model made the strongest strategic, financial, and economic case, while ensuring Bermuda's objectives, particularly in relation to local employment and contracting, were met.

In turn, Canada's 'AAA' credit rating supported Aecon/Skyport in raising affordable financing for the project, which helped ensure the Bermuda government's debt burden and sovereign credit rating would not be impacted.[20]

Although there was not a public tender process, a broad panel of independent international experts determined (i) the terms agreed to with CCC/Aecon were fair, balanced and in line with comparable transactions in the market; (ii) achieved all the public policy objectives of the government; and (iii) delivered better value-for-money than a public procurement would have.[21]

In 2018, the Bermuda government commissioned LeighFisher to assess the deal. In its findings, the global management consulting firm concluded the terms and conditions of the project agreement were broadly consistent with similar contracts, proportionate with the underlying risk involved, and reflected a return of investment and an interest rate on the debt that is within the market range.

Leading U.S. architectural firm HNTB, the authors of the government's 2008 Airport Master Plan, concluded, based on a line-by-line pricing review, that Aecon's costs for construction were below market benchmarks, while CIBC concluded Skyport's financial model and financial plan were sound and all costs and assumptions were reasonable and in line with international benchmarks.

The United Kingdom government concluded the process and structure of the project agreement with CCC and Aecon satisfied the terms and conditions it required of Bermuda for a deal that involved a foreign government. The arrangement was also endorsed by the U.K.'s Foreign, Commonwealth & Development Office (FCDO) and Aviation Security.

Understanding the model and procurement

Financing the project through the P3 model ensures Bermuda does not incur project-related debt and its sovereign credit rating is not impacted. The Bermuda government was also supported by an experienced suite of P3 advisory experts including CIBC to monitor, benchmark and negotiate the deal.

19 https://bermudaairport.com/newterminal/project-faq/

20 https://bermudaairport.com/newterminal/project-faq/

21 Airports Council International, LeighFisher Project Agreement Review, February 11, 2018 and Steer Davies Gleave Value-for-Money Assessment, November 17, 2016

The project moved from feasibility to financial close in just 2.5 years — on average, a project of this size can take up to 10 years to reach these milestones. This accelerated timeline is evident when looking at the following dates of when significant project milestones were achieved:

Table 3: Project timeline

March 2, 2017

Creation of the Bermuda Airport Authority

March 15, 2017

Government of Bermuda signs project agreement with Canadian Commercial Corporation.

March 16, 2017

Commercial and financial close

March 2017

Creation of Bermuda Skyport Corporation Limited

April 2017

Ground breaking

July 2017

First concrete pour for project

September 2018

Completion of terminal's steel structure

January 2019

Final installation of terminal's roof

October 2020

Substantial completion

December 8, 2020

Operations at existing terminal ceased

December 9, 2020

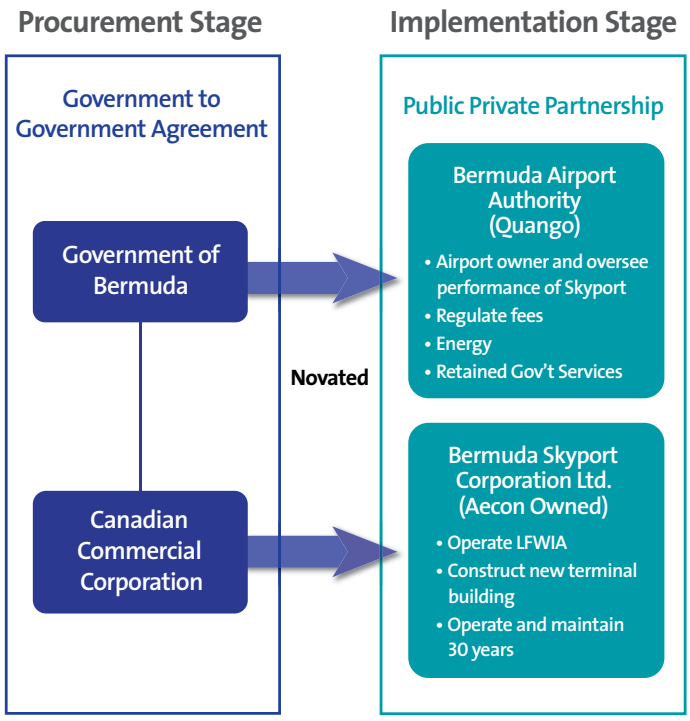
New passenger terminal opens

March 2047

End of **30**-year operations and maintenance term

Overall Structure of the Agreement

Figure 2: Partnership structure



In this deal, the total revenue risk was passed onto the private sector. However, to fine-tune the risk profile, taking into account value-for-money, financial feasibility and financial ability, the project agreement was developed to pass back some risks and other areas of responsibilities to the government that could not be retained by the project company, such as energy costs, air traffic control, airport fire rescue services and meteorological services. These, and other mechanisms, were designed to enable a relatively large, financially feasible capital program for a small airport.

The Bermuda Airport Authority was established as an authority under the Bermuda Airport Authority Act 2017 on March 2, 2017. The principal functions and powers of the authority are to oversee the administration, maintenance, management, operations and redevelopment of L.F. Wade International Airport.

The authority has direct responsibility for retained services at the airport, including air traffic control, airspace communications navigation and surveillance, meteorological services, ground electronics and fire rescue services. It is also responsible for ensuring compliance with international aviation safety and regulatory requirements and regulating passenger fees, aircraft servicing fees and other ancillary service fees associated with airport operations.

Financial Arrangements

Financed with an innovative 25-year fixed coupon for U.S. private placement — selling Bermudian bonds with the longest duration ever offered by any Bermudian entity. Two stages of funding were initiated to come up with both the optimal terms for the project and the best pricing.

Stage 1

Identified the key anchor investors who would be directly negotiating the terms for the deal.

Stage 2

Structured more broadly to identify the complete lender list and determine allocations based on pricing.

Financing through the P3 model ensured Bermuda did not incur project-related debt and its sovereign credit rating was not impacted. The guarantee of the CCC, rated 'AAA' for on-spec, on-time, and on-budget delivery, eliminated the risks of project overruns.

Under the contract model, Skyport took over the airport's operations, maintenance and commercial functions, and manages and coordinates the overall delivery of the redevelopment project over a 30-year concession term. Skyport will yield a market-based Return on Investment for Aecon, reflective of risk exposure. Skyport also funds required maintenance and capital expenditures relating to the terminal building, cargo facility, parking lots, runways, taxiways, and aprons during the life of the concession. Overall, Skyport is expected to invest more than US $630 million in the airport, spread out over the duration of the 30-year term.

According to the government's independent assessment in 2018, carried out by LeighFisher, "Skyport's target IRR is considered modest but reflective of risk exposure and is within market range."[22]

A Minimum Revenue Guarantee (MRG) was necessary to enable Skyport to raise all of the capital required to finance the airport redevelopment from private sources and spare the Government of Bermuda from having to borrow further to pay for the project, or in any way impact its sovereign credit rating. As the only source for repayment of private investments would be the airport's future revenues, principally from passengers and airlines, the 30-year downward trend in traffic at the airport did not present a viable business case for financing.

Around the time the project was being contemplated, the airport was at best a break even business, incapable of funding necessary maintenance, adequate staffing levels and any capital program. A revenue floor was set at a highly conservative level, below which the airport would be unable to operate and service its debt. This revenue protection does not apply to Aecon's profits or investment returns.

Similarly, it did not subsidize the construction cost of the project, all of which was financed by Aecon. The minimum revenue guarantee ensures that in the event of continued decline or economic shock (e.g., the COVID-19 pandemic), the project remains viable and can service its debt. So long as revenues meet or exceed the minimum target, there is no requirement for government to make any payments to the lenders. Once the debt is paid, the MRG feature in the project agreement will fall away completely.

All airport revenues received by Skyport are ring-fenced secured and utilized to pay for capital costs (including development, financing costs and repayment of debt) and operations and maintenance. This includes capital improvement projects (runway resurfacing, terminal expansion, renovations, etc.) during the 30-year concession

22 LeighFisher Project Agreement Review, February 11, 2018

term. As part of its 2018 review of the airport redevelopment project deal, LeighFisher addressed concerns about revenues being transferred off-island and concluded "revenues are being used to fund the design, construction and financing of the new airport terminal building, as well as operating and maintaining the airport, including the existing terminal, and once complete, the new terminal."

Funds are applied first towards the cost of airport operations and maintenance, then to the repayment of debt (interest and principal) raised to help build the new terminal; then, any monies left over go towards recouping investments and realizing a return. Should revenue then exceed an agreed upon target, the Bermuda government will have the right to receive 50 per cent of that excess amount. This model is also used at other international airports, including Heathrow, Gatwick, Lisbon, Montego Bay and Kingston.

To assuage the lenders, given the volatility of the global tourism market, the agreement also includes a minimum Regulated Revenue Guarantee, which holds the Bermuda Airport Authority responsible for payments to Skyport if passenger numbers do not meet a specified threshold.

The Bermuda government did not provide upfront funding to the project and the bulk of the financial burden held by the former government department of airport operations was transferred to Skyport. However, to make the project financially viable, the Bermuda government is responsible for costs associated with retained government services, the energy subsidy and overhead costs associated with the Bermuda Airport Authority. These costs do not consider any potential revenues that it could generate to offset those costs, nor the revenue share it might earn.

Sources of Capital

The project was financed through a mix of debt, equity and airport cashflows:

- US $285 million: 25-year fixed coupon rate bond raised in U.S. private placement market
- US $69.6 million equity committed by Aecon
- Airport cashflows ring-fenced and structured to supplement.

Lenders

The project lenders consisted of nine U.S. private placement financial institutions with varying experience in the airport asset class and Caribbean projects. Raising financing was supported by a suite of sponsor and lender advisors.

Payments during construction and operations

All revenues received by Skyport are ring-fenced, secured and utilized to pay for capital costs (including development, financing costs and repayment of debt) and for operations and maintenance.

Responsibilities and Risk Allocation

The G2G model involves two government entities contractually signing the project agreement and handing over key construction, operations and financial obligations to the private sector in a set of second-tier contracts. This structure provided the client, the public in Bermuda, and airport users the comfort and assurance they will receive the asset on-time and on-budget, with the highest rated accountable counterparty.

The total revenue risk was passed on to the private sector. However, to fine-tune the risk profile – taking into account value-for-money, financial feasibility and financeability, the project agreement was developed to pass back some of the risks and costs to the government that the project company could not retain, such as energy cost, air traffic control, airport fire rescue services and meteorological services. These, and other mechanisms, were designed to enable a relatively large, financially feasible capital program for a small airport.

Allocation of responsibilities between the partners

Aecon is the private sector partner responsible for the project's development, financing and long-term operation and maintenance.

The Canadian Commercial Corporation (CCC) and the Bermuda government partnered with Aecon utilizing a tailor-made, customized solution with a unique overarching G2G contract and guarantee mechanism, supported by an underlying P3 commercial

and financial structure. CCC delivered the new airport passenger terminal and associated infrastructure under a fixed price, date guaranteed design and construction contract. The CCC fully subcontracted the work to Aecon.

Bermuda Skyport Corporation Limited, a special purpose Bermudian company wholly owned by Aecon Concessions, was launched as the project began to manage and coordinate the overall delivery of the project, and to operate and maintain the airport until 2047. From its launch in March 2017, Skyport assumed all existing airport operations, maintenance and commercial functions

Partnership advantages or strengths brought to the project

In addition to the 885 Bermudians who worked on the site (60 per cent of all workers) and almost 400 Bermudian companies engaged, hundreds of Canadian companies participated — more than half were directly involved in construction activities. Other Canadian companies involved provided advisory, technical, financial, legal, environmental, logistical and technology services.

In many cases for these Canadian companies, Bermuda is a new, untapped market. By entering through one of the most significant infrastructure projects ever undertaken in Bermuda, a strong reputation has developed with Canadian companies viewed as reliable suppliers or service providers. Using its decades of experience in airport redevelopment projects, Aecon was also able to mitigate the risks associated with exporting the goods and services of other organizations.

Companies from the United States, United Kingdom, Ireland, New Zealand, China, and Israel were also involved in construction operations as subcontractors. They provided services such as roofing, curtain wall and window work, metal cladding, mechanical/electrical, millwork, flooring, glass, and balustrades, as well as airport systems and furniture. Many of these partnerships with expat subcontractors are directly linked to relationships previously established by the technical leaders on the project.

As these subcontractors carried out work for Aecon, they also subcontracted work to local Bermudian companies. In some cases, these expat companies had as many as eight Bermudian subcontractors. The value of the knowledge transfer that occurs in these arrangements is immense for Bermuda. This creates lasting positive benefits locally concerning sustainable business development, workforce training, expanding service offerings and relationship building for future business opportunities.

Table 4: Allocation of key risks

Risks and Responsibilities	Government of Bermuda	CCC	Aecon	Shared
Permits & Approvals				
Project approvals				■
Construction permits			■	
Site Condition/ Environmental				
Geotechnical			■	
Contamination	■			
Utility relocation			■	
Environmental condition of site	■			
Design and Construction				
Scope changes			■	
Design & construction cost overruns		■	■	
Weather (excl. supervening events)		■	■	
Construction delays		■	■	
Traffic and safety management		■	■	
Design errors and omissions		■	■	
Resource/labour availability		■	■	
Deficiencies and latent defects		■	■	
Interim O&M services			■	
Force majeure				■
Change in law	■			
Operational				
Ministry initiated scope changes	■			
O&M cost overruns			■	
Service delivery			■	
Force majeure				■
Change in law	■			
Life cycle				
Life cycle cost overruns			■	
Meeting hand back requirements			■	
Latent defects in existing infrastructure			■	

Benefits

Cost Savings/Value-for-Money

Aecon dramatically lowered the project's capital budget without compromising standards. This was accomplished by selecting a more practical design concept, value engineering and undergoing collaborative exercises with Bermudian stakeholders. To put this into perspective, in 2008, the initial airport master plan estimated the new terminal would cost US $514 million. At financial close on March 16, 2017, the project's construction value was US $274 million.

In 2017, the Bermuda government commissioned Steer Davies Gleave (SDG) to undertake an independent VM assessment. The assessment found the selected DBFOM option aligned with the government's goals and objectives.[23]

In the following areas, the G2G DBFOM was considered equal or superior to other options considered for the project directly related to effective risk management and transfer:

- Transfers commercial and financial risks of the airport operations and maintenance to the private sector
- Ensures airport operations are overseen by the Bermuda Airport Authority and a management contract including "market standard" terms and conditions, risk management rights and remedial protections
- Does not require third-party government financial guarantees
- Does not require government capital investment and minimal ongoing expenditures
- Involves airport operations being undertaken/ managed by internationally respected experts
- Maintains government ownership and oversight of critical airport infrastructure
- A "fixed price/design specific" airport construction guarantee from a AAA credit-rated entity to build the airport "on-time, on-spec and on-budget"
- Provides protection to the Bermuda government from the airport operator earning excessive profits by allowing the government direct participation in upside revenue sharing
- Avoids any sale, assignment or transfer of government-owned land, buildings or real estate.

Community socioeconomic benefits

Economic: Local Job Creation and Buying Local

To ensure the project achieved the Bermuda government's goal of ensuring local people and companies benefit from the investment in its international airport, Skyport employed 885 Bermudians over the course of the four-year project — totalling 60 per cent of all workers on site and a total of 1.6 million construction hours.[24] These jobs ranged from entry level and mid-level to senior roles in both construction and administrative support services.

The Aecon team developed labour and training plans for all employees working on the project during the construction phase — an approach ensuring Bermudians received sustainable employment, training and procurement opportunities.

In addition, the project engaged almost 400 Bermudian companies, vendors and suppliers. For example, Aecon engaged OBM International (OBMI), a local architectural firm, for the design of the new terminal. Their knowledge and understanding of the island's environment and climate helped the design team in selecting materials that will improve the new terminal's performance and prolong its life.

At the same time, Aecon worked to transition existing airport employees and successfully transitioned over 85 per cent of the workforce to Skyport for the operational term following financial close. After negotiations, there were also improvements made to the workforce's terms of employment.

In addition, the employee base was strengthened through the expatriate program. Aecon implemented a gradual workforce adjustment to take place over 1.5 years, which intends to gradually evolve the workforce composition including the original workforce and non-expatriates.

23 Steer Davies Gleave. Value-for-Money Assessment Government of Bermuda L.F. Wade Airport Redevelopment Project Final Report 17 November 2016 https://www.gov.bm/sites/default/files/VFM-final-report_v1-0.pdf (Accessed May 24, 2022).

24 Aecon. Aecon Celebrates Opening of Bermuda's New World-Class Passenger Terminal Building at the LF Wade International Airport, December 9, 2020. https://www.aecon.com/press-room/news/2020/12/09/aecon-celebrates-opening-of-bermuda-s-new-world-class-passenger-terminal-building-at-the-lf-wade-international-airport (Accessed May 24, 2022).

Aecon's success in employing the existing workforce, combined with the gradual adjustment period, allowed for a seamless transition of ownership. This model is applicable to any brownfield project with existing operations, or any infrastructure project with cross-border elements.

Social

Building sustainably, and creating positive impacts for the environment, local economy, social fabric and the community were hallmarks of the project. The L.F. Wade International Airport Redevelopment Project embraced this responsibility and demonstrated through its delivery how it can be built into all aspects of a project to deliver positive outcomes.

Sense of Place

The community was invited to participate in a contest to design Bermudian kites for the new terminal. The 10 winning designs were incorporated into actual kites that float overhead in the arrivals area from the sloping ceilings welcoming travellers. An alluring display of sculpted cahows and long tails also bid a fond farewell to departing passengers. The sense of place at the new terminal building is also provided using photography by local artists to reflect Bermuda's beautiful scenery, flora and fauna, and diverse culture. The objective was to highlight the qualities that make Bermuda unique and memorable, while developing an iconic design that Bermudians are proud of.

Community Engagement

Members of the community representing arts and cultural and educational organizations were invited to meetings to discuss design elements. In parallel, a series of public design open houses were held throughout the island. With this community involvement, the themes of "longing to return," "capturing the essence of Bermuda," "flora and fauna," "landscapes and aerial views of Bermuda," "artwork prepared by schoolchildren," "local artwork" and "sense of mystique and wonder" were developed.

Community Investment

More than $285,000 was invested by Skyport over four years (2017, 2018, 2019 and 2020) in different social programs and initiatives, including support to St. George's and St. David's primary schools, sports clubs, the Bermuda Institute of Ocean Sciences, youth support charities, the Construction Association of Bermuda, Bermuda Sloop Foundation, and Bermuda End-to-End, among others.

Internship Program

The Aecon-Bermuda Internship Program placed several Bermudian candidates with various companies across Ontario involved in the project. The intern backgrounds included civil, mechanical, and electrical engineering and architecture. Following completion, all interns obtained employment in the industry, and several interns were placed with Aecon Constructors and Skyport to continue working on the project. This innovative program has provided Bermudians with the opportunity to gain international experience and pursue opportunities across Canada.

Communications

Between the partners

- A communications working group was established in 2017 for weekly calls chaired by Skyport.
- A staff advisory committee was created in 2017 with representatives from senior staff, the project team, union, and non-union staff meeting quarterly. The members helped champion the project and address questions or misinformation before it reached a critical level.
- Inter-project information was shared constantly by the construction leadership team.

With the public

A community liaison committee was established in 2017 for monthly meetings. The Bermuda government was also updated weekly by the president of Skyport. Information flowed freely to vital external stakeholders throughout the construction term.

Members of Parliament were more formally engaged in creating an environment of stronger support and neutralizing concerns regarding the P3 model, affecting perceptions of the airport construction project.

A particular focus was placed on:

- Adjacent properties, immediate neighbourhood, local community
- Airport passengers
- Unions (Bermuda Industrial Union, Bermuda Public Services Union)
- Bermuda Civil Aviation Authority
- Utility companies
- Chamber of Commerce
- Businesses adjacent to the airport
- Local businesses
- Bermuda Hotel Association
- Bermuda Tourism Authority
- Student interns
- Construction Association of Bermuda
- Media
- Arts, cultural and educational programs

For example, just one month after the ground-breaking and following excavation, crews completed the loudest part of the project — the driving of piles. Working seven days a week, crews completed this work four months ahead of schedule, an outstanding achievement for a project of this size. A proactive, transparent micro-communications plan was implemented and successfully supported the advanced schedule.

Communications channels and issues management

- Proactive positive social media posts
- 'Taking Off' video updates on YouTube
- Advertisements on radio and television
- Project section on airport website
- Dedicated phone and email contacts
- Mail and community notices
- Frequently Asked Questions (FAQs)
- Community town halls/open houses
- Community liaison meetings
- News releases

- News articles and media relations
- Newsletters

A dedicated communications officer remains in place to lead communications throughout the operations and maintenance term.

Dispute resolution

For minor and medium level issues and complaints involving the public, the communications department is responsible for liaising with the construction, operations and other applicable teams to reach a resolution. For construction, operations and maintenance disputes, a formal dispute resolution protocol is included in the project agreement that provides steps to resolve the dispute on several levels before commencing arbitration.

Lessons Learned

Stakeholder coordination

The three-stage development process allowed close monitoring of development costs while maintaining collaboration between governments, sponsors, third parties and all stakeholders.

Access to funds

Accessing United States funds versus Canadian or another foreign currency was a highly structured process. Although Aecon is a Canadian company, the project operated in U.S. funds only to achieve efficiency as an international project and because Bermuda is a jurisdiction that uses USD.

Design collaboration

The collaborative development of the airport's design allowed for an innovative outcome. From the initial work by lead designer, Scott Associates, Inc., to the members of the community representing arts, cultural and educational organizations that participated in design meetings, open houses, and more.

Community benefits

The effort to create jobs for local Bermudians and existing Bermudian employees fostered a sense of community throughout the project and increased employment amongst the locals.

Labour transition impacts

Aecon was committed to the transition of all existing airport employees and successfully transitioned more than 85 per cent of the workforce for the operations term. After negotiations, there were also improvements made to the workforce's terms of employment. In addition, the employee base was strengthened through the expatriate program. Aecon implemented a gradual workforce adjustment to take place over 1.5 years, which intends to gradually evolve the workforce composition including the original workforce and non-expatriates.

Aecon's success in employing the existing workforce, combined with the gradual adjustment period, allowed for a seamless transition of ownership. This model is applicable to any brownfield project with existing operations, or any infrastructure project with cross-border elements.

Concluding Comments

A tailor-made solution for Bermuda, the project exceeded expectations on several fronts. The agility and resiliency exhibited throughout the project ensured on-time and on-spec delivery of this critical infrastructure. Bermuda's new, world-class passenger terminal building was delivered with first-rate safety performance amid the pandemic, gold-standard construction, and an unwavering commitment to environmental, economic and social sustainability that is creating lasting positive benefits.

The project is a story of true partnership, empowered by collaboration between all stakeholders to successfully overcome a challenging year and ultimately produce a state-of-the-art landmark that showcases the best of Bermuda to the world.

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Appendix: CCPPP's National Award Case Studies 1998-2021

Defence
Communications Security Establishment Canada Long-Term Accommodation Project (**2011**)

Education
Quad at York University, Ontario (**2018**)
Saskatchewan Joint Use School Projects (**2015**)
Alberta School Alternative Procurement – Phase **1** (ASAP I), Alberta (**2010**)
O'Connell Drive Elementary School, Nova Scotia (**1998**)

Energy
Energy Services Acquisition Program (ESAP)/Energy Service Modernization (ESM) Project, Ottawa-Gatineau (**2020**)
Fort McMurray West **500**-kV Transmission Project, Alberta (**2018**)
John Hart Generating Station Replacement Project, B.C. (**2014**)
Britannia Landfill Gas to Electricity Project, Ontario (**2005**)
Vancouver Landfill Gas Cogeneration Project, B.C. (**2003**)
Bruce Nuclear Power Facility, Ontario (**2000**)
Waterloo Landfill Gas Power Project, Ontario (**2000**)

Government Services
Archives of Ontario – Offsite Archival Storage (**2006**)
Cook Chill Food Production Centre, Ontario (**2005**)
DriveTest: Ontario Driver Examination Services (**2004**)
Transforming the Delivery of Ontario's Social Assistance System (**2003**)
Emergency Service Mobile Communications in Ontario (**2000**)
Electronic Child Health Network, Toronto, Ontario (**1999**)
Teranet, Ontario (**1998**)

Health
Cortellucci Vaughan Hospital, Ontario (**2021**)
New Oakville Trafalgar Memorial Hospital, Ontario (**2016**)
Humber River Hospital, Ontario (**2015**)
BC Cancer Agency Centre for the North and Fort St. John Hospital & Residential Care Project, B.C. (**2012**)
Centre Hospitalier de l'Université de Montréal Project (**2012**)
Glen Campus – McGill University Health Centre, Quebec (**2010**)
Women's College Hospital Redevelopment Project, Ontario (**2010**)
Royal Jubilee Hospital Patient Care Centre, B.C. (**2009**)
VIHA Residential Care and Assisted Living Capacity Initiative, B.C. (**2007**)
Abbotsford Regional Hospital and Cancer Centre, B.C. (**2008**, **2005**)
Facility Management for the Royal Ottawa Health Care Group, Ontario (**2000**)
Devonshire Care Centre, Alberta (**2000**)
Shaikh Khalifa Medical Centre, United Arab Emirates (**2000**)

IT Infrastructure
Connecting Small Schools in Newfoundland (**2003**)

Justice & Corrections
Forensic Services and Coroner's Complex, Ontario (**2016**)
Okanagan Correctional Centre, British Columbia (**2015**)
Elgin County Courthouse, Ontario (**2014**)
Ontario Provincial Police Modernization Project (**2013**)
Surrey Pretrial Services Centre Expansion, B.C. (**2011**)
Durham Consolidated Courthouse, Ontario (**2007**)
Central North Correctional Centre, Ontario (**2002**)
Five Corners Project, B.C. (**2002**)

Real Estate
Aurora College Family Student Housing, Northwest Territories (**1999**)
Legislative Chamber, Offices and Housing, Nunavut (**1999**)

Recreation & Culture
L'Adresse symphonique, Quebec (**2011**)
SHOAL Centre: Seniors Recreation Centre, B.C. (**2004**)
John Labatt Centre, London, Ontario (**2002**)
Skyreach Place, B.C. (**2000**)

Social Housing
Single Room Occupancy Renewal Initiative Project, B.C. (**2013**)

Transportation
L.F. Wade International Airport Redevelopment Project, Bermuda (**2021**)
Valley Line West LRT, Alberta (**2021**)
Waterloo LRT ION Stage **1**, Ontario (**2020**)
Regina Bypass, Saskatchewan (**2020**)
Gordie Howe International Bridge Project (**2019**)
Tłı̨chǫ All-Season Road Project
North Commuter Parkway & Traffic Bridge Replacement, Sask. (**2018**)
Iqaluit International Airport, Nunavut (**2017**)
Southwest Calgary Ring Road, Alberta (**2016**)
Disraeli Freeway and Bridges Project, Winnipeg, Manitoba (**2012**)
Canada Line, B.C. (**2009**)
Confederation Bridge, PEI (**2009**)
Highway **407** ETR, Ontario (**2008** & **1999**)
Autoroute **30**, Montreal, Quebec (**2008**)
Northwest Anthony Henday Drive, Alberta (**2008**)
William R. Bennett Bridge, B.C. (**2008**)
Autoroute **25**, Montreal, Quebec (**2007**)
Kicking Horse Canyon Project –Phase **2**, B.C. (**2007**)
Golden Ears Bridge, B.C. (**2006**)
Anthony Henday Drive Southeast Leg Ring Road, Alberta (**2005**)
Sea-to-Sky Highway Improvement Project, B.C. (**2005**)
Sierra Yoyo Desan Resource Road , B.C. (**2004**)
Fredericton-Moncton Highway Project, New Brunswick (**2003**)
Belledune Port Authority, New Brunswick (**2000**)
Retendering Alberta's Highway Maintenance Contracts (**2000**)
Cobequid Pass Toll Highway, Nova Scotia (**1998**)

Water, Wastewater & Biosolids
Calgary Composting Facility, Alberta (**2017**)
City of Saint John Safe Clean Drinking Water Project, New Brunswick (**2017**)
Regina Wastewater Treatment Plant Upgrade Project, Saskatchewan (**2014**)
Biosolids Management Facility, Sudbury, Ontario (**2013**)
Britannia Mine Water Treatment Plant, B.C. (**2006**)
Goderich Water and Sewer Services, Ontario (**2000**)
Port Hardy Treatment Project, B.C. (**2000**)

These case studies can be obtained through CCPPP's website at www.pppcouncil.ca

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