



ENTRY SUBMISSION CHARLOTTETOWN **RUNWAY 10-28**

REHABILITATION APRIL 2013





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CONFIRMATION RECEIPT FOR PROJECT SUMMARY

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PROJECT DESCRIPTION

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Executive Summary

Runway 10-28 is the Charlottetown Airport's secondary runway and had not received a major rehabilitation for more than 25 years. Hatch Mott MacDonald was engaged by the airport authority to plan and implement a rehabilitation strategy that would ensure the runway remains a reliable and safe cross wind facility. Included in the project was the rehabilitation of the runway surface asphalt, improve existing runway grades, new runway edge lighting systems, new runway approach lighting, and a new modern airfield control system.

Due to unanticipated circumstances encountered during construction, several innovations were implemented on short notice that lead to project success.





1.0 Project Background and Objectives

Hatch Mott MacDonald was retained by the Charlottetown Airport Authority to plan and implement a rehabilitation strategy for Runway 10-28. The main objective of the rehabilitation strategy was to ensure the runway remained a reliable and safe cross wind runway. Planning was started in May 2010.

Runway 10-28, a 1524-m long and 60-m wide cross-wind runway had not received a major rehabilitation in its 27-year lifespan. The runway had deteriorated over time due to thermal loading. There were no signs of distortion, rutting or structural failure except at the intersection of the two runways which was in poor condition. It was also felt by some key stakeholders including Nav Canada that if Runway 10-28 was extended to 1829 m there could potentially be a shift of 40-50% in air traffic using the runway. However, the priority of the Charlottetown Airport Authority was to rehabilitate the existing runway and the budget was not available to extend it.

Originally, the Charlottetown Airport Authority was given a construction estimate of approximately \$10 M to fully rebuild the 60-m wide runway. Further review indicated that due to the type of aircraft being carried on the runway, the operational width of the runway could be reduced to 45 m. As such, the planning discussions resulted in a rehabilitation plan which would consist of:

- Mill all deep cracks that were outside the 30m full rehabilitation strip to the depth of the aggregate base and replace with Asphalt Concrete (AC) base and seal for total application of 300 tonnes of AC.
- Mill middle 30 m to gravel base and mill 7.5 m on each side of 30 m to a depth of 50-mm, where the asphalt seal coat was replaced, for a total width of rehabilitation of 45 m.
- Pave 50-70mm of AC in the center 30m strip (7500 tonnes).
- Pave 30-50 mm AC overlay 45 meters wide the entire length of runway (5500 tonnes).
- Install new edge lighting for the 45m wide runway.

The tender closed on March 22, 2012. The original contract amount was \$3.6 M and the contract was awarded to Island Construction Ltd. The final project cost was \$3.7 M due to change orders throughout the construction. Substantial performance of work for the project was granted on September 6, 2012.

During design, Applied Research was consulted on the approach navigation, Morris Land & Engineering Surveys provided surveying services, and Gemtec Consulting provided the initial geotechnical investigation. Fundy Engineering Services provided quality assurance material testing services during construction on behalf of HMM. Stantec Consulting provided quality control material testing services during construction for the contractor.



Transverse Cracking had occurred on the existing runway in several locations. It appeared that the runway had deteriorated over time due to thermal loading.

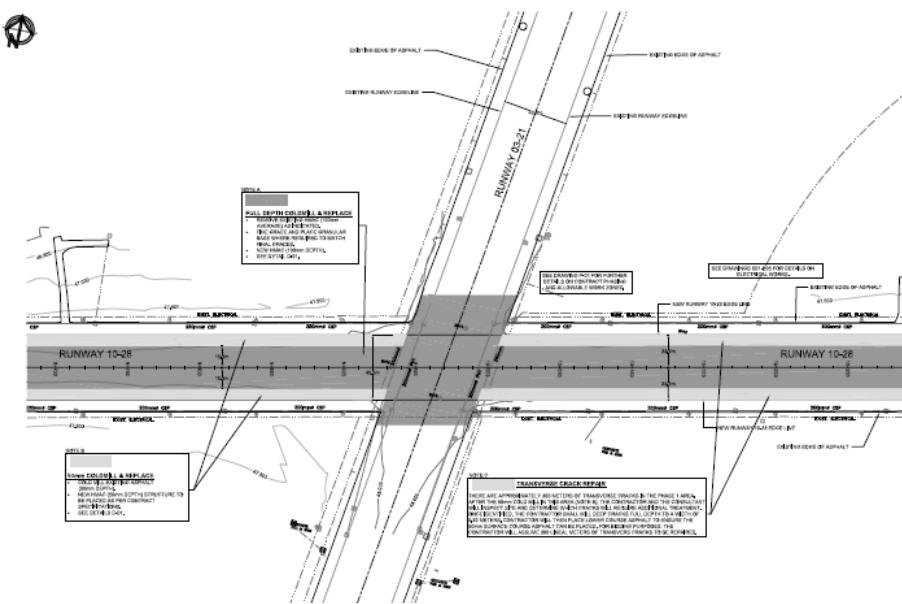


Longitudinal, transverse and joint cracking were prevalent on the pre-existing runway

2.0 Project Highlights

2.1 Planning and Design

The planning of the project involved the consultation of key stakeholders including management and operations staff from the Charlottetown Airport Authority, Nav Canada and General Aviation to fully understand the objectives of the runway rehabilitation process. Planning discussions were used to develop a detailed design that met the objectives of all stakeholders and fell within the available budget constraints. The rehabilitation design was directed toward implementation of a cost-effective solution to meet the needs of the Airport Authority. To achieve this objective only the flight travel path (center section) of the runway was fully milled and repaved to minimize project costs, while providing a sound, practical solution.



The full Tender Package for the project was issued in March 2012.

The project contract was awarded in



2.2 Construction

The construction on site was constrained by the requirement of accommodating regularly scheduled air traffic, particularly during peak periods. Careful planning ensured that, in spite of these constraints, the project went smoothly and stayed on schedule and on budget. Substantial completion of the project was on schedule. The project was also completed on budget, with the exception of approximately \$100,000 in client approved change order, which represented only 3% of the full contract price. During construction, situations arose which were dealt with creativity in order to meet project objectives. Two major examples of these situations were unexpected field conditions with the granular base, and poor weather during paving at the runway intersection.

Due to uneven thickness of the asphalt on the existing runway in the center 30-m wide section, portions of the base gravel surface were disturbed during milling. As a result of this issue, and in combination with larger than expected and surficial aggregate separation, the exposed granular material was not suitable for direct application of the planned asphalt base. To prevent the need to remove and replace the base aggregate HMM devices a plan to reuse the asphalt millings to prepare the surface for asphalt placement, which minimized delays and controlled project costs. It is estimated that if this alternate method had not been applied,

the project would have been delayed two weeks and project costs would have increased by approximately \$300,000.

Paving at the intersection of the two runways that service the airport was coordinated with airport management to minimize interference with air traffic. Work was completed at specific time periods around the clock over three days. No large planes could land during this period, meaning that an extension of this period would result in air traffic scheduling issues and revenue loss to the Airport. The final paving of the intersection was to take place between midnight and 7:00am on September 6, 2012. Rain during this paving event threatened to cause delays in completing the asphalt seal coat due to wet conditions. To prevent delay and Airport revenue losses, a portable heater was borrowed from a nearby ice arena and used to dry the base asphalt surface, thus allowing paving to continue as scheduled.



Paving was completed using asphalt joint heater. The paving schedule was in jeopardy when rain occurred during confined window for construction. A portable heater borrowed from a nearby ice arena helped to dry materials so paving could proceed as planned.



The recycled asphalt millings were spread onto the pre-compacted rough aggregate base. The millings were then compacted onto the aggregate base following application



3.0 Complexity

The planning process developed for the project considered input from key stakeholders including Charlottetown Airport Authority management and staff, Nav Canada needs and protocols, and general aviation considerations. Previous background assessments and studies were used as the basis for discussions with stakeholders with the challenge of developing a solution that addressed the immediate need for runway rehabilitation while considering financial constraints and the CAA's future plans and objectives.

A key challenge was to facilitate efficient project construction within a project schedule restraints while considering highly restrictive construction timing constraints. To prevent delays and maintain a tight project budget, the team developed and implemented innovations quickly as challenges arose. This required excellent communication, coordination and cooperation between all project team members, including the Owner's representative (CAA management and staff), the Contractor (Island Construction Ltd.) and the project engineers (HMM). This project represents an example of excellence in project team collaboration with a mutual objective of delivering a high quality project within schedule and on budget.



Construction on Runway 10-28 was not allowed to impact air traffic operations on the primary runway except during the work at the intersection of runways, during which air traffic was limited to smaller aircraft.

4.0 Social and Economic Benefits

Efficient operation of the Charlottetown Airport has a large impact on the overall economics of not only the City of Charlottetown but Prince Edward Island as a whole. Convenient air access is crucial to the tourism industry and everyday business operations within the province.

The rehabilitation of Runway 10-28 was critical to the continued service provision at the Airport after 27 years of service without major rehabilitation. The secondary runway is also clearly important, as it carries approximately 10 percent of the air traffic at the airport and functions as an alternative runway when issues arise with the primary runway. The rehabilitation also set the stage for the eventual extension of Runway 10-28, which will increase airport capacity and make it more competitive with other regional air service providers.



Multiple crews and equipment from the local contractor were working at any given time in order to keep the tight construction schedule.



This runway rehabilitation project also represented a significant contribution to local economic development with the local communities. The general construction was carried out by a local Contractor, Island Construction Ltd., based in Charlottetown, PEI. Project subcontractors were also local, consisting of Island Coastal Services Ltd. (earthworks) and Hansen Electric, also based in Charlottetown. The project had a positive economic impact to the surrounding community by sustaining or creating jobs in the construction industry.

5.0 Environmental Impact

Environmental stewardship was required throughout the entire project. The construction contract required adherence to the Prince Edward Island Environment Act and Regulations, the Canadian Environment Act and Regulations, the Federal Fisheries Act, and the Canadian Environmental Assessment Act. The Contractor was required to provide and adhere to pollution control, dust control, sediment and erosion control, and smoke control plans. They also submitted an overall environmental protection plan for the project for approval by the appropriate authorities.

The use of recycled asphalt millings instead of additional work of removing and replacing granular material not only saved time and budget but also reduced the overall carbon footprint of the project. It is estimated this innovation saved approximately two weeks of construction activity and the associated carbon emissions associated with the additional construction activity. Since the granular material required would need to be brought in from off the island, the impact of hauling the needed material would be greater and would have also involved barges.



The base aggregate following the milling of the existing asphalt surface. Innovation to handle the poor gradation and surficial aggregation saved not only budget and schedule but the carbon emissions that would be caused from additional hauling and equipment operations.

6.0 Meeting Client's Needs

The client, Charlottetown Airport Authority, was very pleased with project results and outcomes. During the planning and design stage there was great emphasis on developing an efficient and effective rehabilitation program that met the immediate and future needs. The budget for the project was developed based on the client's requirements and where possible cost savings measures were incorporated into the design, such as the option to re-pave only the center travel path of the runway.

During construction, there was daily communication with the CAA, which allowed this project to meet tight schedule and budget demands. Schedule was a clear priority for the client, as any delays in construction could have resulted in further loss of access to their primary runway (i.e., 10-28) and, depending on the timing of delays, also impact access to their secondary runway. This was especially crucial during the construction in the intersection of runways, which required coordination with airline schedules and restricted aircraft usage to only small aircraft during the three days of construction required to complete construction at the intersection.



At the end of the project, flood tests were conducted to identify any ponding areas. The project went very smoothly and was completed on budget and on schedule.

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