

PORT OF SEATTLE
MEMORANDUM

COMMISSION AGENDA
ACTION ITEM

Item No. 4f
Date of Meeting December 8, 2015

DATE: December 2, 2015
TO: Ted Fick, Chief Executive Officer
FROM: David Soike, Director, Aviation Facilities and Capital Programs
Wayne Grotheer, Director, Aviation Project Management Group
SUBJECT: Gate Improvements Loading Bridges Utilities, Concourse B 400Hz (CIP
#C800019)

Amount of This Request:	\$3,567,282	Source of Funds:	Revenue Bonds
Est. Total Project Cost:	\$16,734,282		
Est. State and Local Taxes:	\$511,000		

ACTION REQUESTED

Request Commission authorization for the Chief Executive Officer to advertise for bids, award and execute a major works construction contract for the Concourse B Gate Improvements project. The amount of this request is \$3,567,282 for a total authorization of \$16,734,282.

SYNOPSIS

This project will complete the Gate Improvements Loading Bridges Program by completing the 400Hz ground power system project on Concourse B. The gates on Concourse B are the only remaining aircraft gates that require 400Hz electrical connections upgrades. Upon completion, the aircraft that use these gates will be able to plug-in to the terminal rather than burn fossil fuel to power the aircraft auxiliary jet engine that in turn powers the flight deck controls.

Staff notified the Commission in December 2014 that the electrical power requirements for the new generation aircraft scheduled to use concourse B had been determined, and requested to restart the design process. Staff informed the Commission that the updated design and delay in project implementation would likely increase the cost estimate for construction. Design and construction on Concourse B was delayed to focus on ground power for the South Satellite because ANA Airline's first new 787 aircraft was to begin service between Seattle and Tokyo.

Staff has completed design of the Concourse B 400Hz gate improvements project and updated the cost estimate, and project schedule. The cost increase to complete this last phase of the project is \$1,085,970.

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BACKGROUND

In 2002 the Commission directed that 400Hz Ground Power be provided to North Satellite and the new Concourse A. Upon the successful upgrade of North Satellite, the Commission directed that Concourse B, C, D and South Satellite be provided with 400Hz Ground Power as well.

The project, including this scope of work, was originally authorized in June 2007 under a project wide authorization. The original scope included the installation of 400Hz power and potable water on both the B Concourse and South Satellite. The design was completed to 90% in December 2008 when the project was placed on hold due to the economic environment. In July 2010 the project was reactivated. In December 2012, the Concourse B 400Hz ground power system portion of the scope was placed on hold again since the aircraft types that might utilize that concourse were uncertain, as the new generation of aircraft requires a higher level of electrical service due to recent technology advances.

Since 2012, the Concourse B part of this project has undergone several significant changes. Gates B1 and B4 have been added, the preconditioned air (PC air) project on Concourse B has been completed, and the National Electric Code has gone through two updates. The Concourse B 400Hz ground power system was redesigned to ensure the system will provide the best possible service to the airlines and traveling public and to meet current code requirements. Staff is returning to request Commission authorization to advertise and execute a construction contract and complete the final phase of this program. This project will be the completion of the 400Hz Ground Power to all gates at SeaTac Airport directed thirteen years ago by the Commission

There are several different systems currently providing 400Hz power to many of the B concourse gates. There are old diesel powered generators, there are solid state generators, and there is one old motor generator set. The difference between a solid state power supply and a motor generator is that the latter is a cleaner source of power that is also longer lasting. The solid state power supply depends on transistors and electronic circuits to produce an approximation of a 400Hz power wave and has a life expectancy of fifteen years versus a motor generator that is a pure analog 400Hz wave and have a life expectancy of thirty years.

PROJECT JUSTIFICATION AND DETAILS

Project Objectives

- Advance the Port's Century Agenda objective of reducing aircraft emissions and noise
- Provide sufficient power to the Concourse B gates to support the current and next generation aircraft
- Enable the Airport to maximize the use of each Concourse B gate
- Reduce the possibility of a carrier being assigned to a gate without the same amenities as the rest of the airport

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Scope of Work

The scope of work for this project includes the design and construction of a 400Hz ground power system for all 13 Concourse B airport-owned gates. The project will install two 400Hz motor generator sets, gate-boxes and other equipment to ensure adequate power is provided to all 13 Concourse B gates. The new 400Hz motor generator (MG) sets and gate boxes will provide adequate ground power for current and future generation aircraft that will utilize the Concourse B gates.

Schedule

Advertise for bid and award construction contract:	2 nd Quarter 2016
Construction start:	3 rd Quarter 2016
System in use:	4 th Quarter 2017

FINANCIAL IMPLICATIONS

Budget/Authorization Summary for Entire Gate Improvements Loading Bridges Utility Project

	Capital	Expense	Total Project
Original Budget	\$9,385,000	\$0	\$9,385,000
Previous Changes	\$5,093,969	\$1,169,343	\$6,263,312
Current Increase/(Decrease)	\$1,635,000	\$(549,030)	\$1,085,970
Revised Budget	\$16,113,969	\$620,313	\$16,734,282
Previous Authorizations (Phase 1)	\$8,686,969	\$381,313	\$9,068,282
Art Pool Transfer	(\$44,000)	\$0	\$(44,000)
Previous Authorizations (Phase 2)	\$3,789,688	\$353,030	\$4,142,718
Current request for authorization	\$3,681,312	\$(114,030)	\$3,567,282
Total Authorizations, including this request	\$16,113,969	\$620,313	\$16,734,282
Remaining budget to be authorized	\$0	\$0	\$0
Total Estimated Project Cost	\$16,113,969	\$620,313	\$16,734,282

Project Cost Breakdown for Concourse B 400 Hz (Phase 2 program elements to be completed)

	Capital	Expense	Total Project
Design Phase	\$1,006,000	\$218,000	\$1,224,000
Construction Phase	\$5,954,000	\$21,000	\$5,975,000
Sales Tax	\$511,000	\$0	\$511,000
Total	\$7,471,000	\$239,000	\$7,710,000

The current budget increase is the result of discovering many changes from the original design due to ~~three~~ two electrical code revisions, and airport layout changes that have occurred since the design was originally completed. The construction estimate has also been revised to account for

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the current construction market. The budget reduction shown is the RMM that was planned to be done has been done by previous projects.

Budget Status and Source of Funds

This project, C800019, was included in the 2016 – 2020 capital budget and plan of finance with a budget of \$14,478,969. The budget increase will be transferred from the Aeronautical Allowance CIP (C800404), resulting in no net change to the airport capital budget. The funding source for the remaining scope of work will be revenue bonds.

Financial Analysis and Summary

CIP Category	Renewal/Enhancement
Project Type	Renewal & Replacement
Risk adjusted discount rate	N/A
Key risk factors	N/A
Project cost for analysis	\$7,710,000
Business Unit (BU)	Terminal – Airline Equipment
Effect on business performance	NOI after depreciation will decrease
IRR/NPV	N/A
CPE Impact	CPE will increase by \$.03 in 2018. The Airlines will realize lower operating and maintenance costs as a result of this project.

Lifecycle Cost and Savings

Annual operating and maintenance costs have been calculated by Aviation Maintenance at approximately \$3,450 per gate per year. This results in a total cost for the entire system of 13 gates at Concourse B of \$44,850 for the first year. We anticipate an estimated 3% inflation escalation thereafter. This is based on the level of repair currently being performed on other similar systems based on actual costs for 2012 – 2015 year to date. The additional gate equipment added will result in an additional work load equivalent to one half of a Full Time Equivalent (FTE). Any request for FTE is not part of this request, and if necessary will be incorporated in the overall Aviation Maintenance budgeting process.

STRATEGIES AND OBJECTIVES

The Gate Improvements Loading Bridges Project supports several of the Port Strategies and Objectives, notably:

This project promotes the Port's Century Agenda objective of meeting the region's air transportation needs at the Airport for the next 25 years. Flexible gate operations will allow for more efficient utilization of the airport's existing facilities. This project will reduce aircraft emissions and noise by providing 400Hz ground power so that the aircraft need not operate the onboard, jet fueled auxiliary power units.

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TRIPLE BOTTOM LINE

Economic Development

This project supports the Airport's initiative to standardize equipment and provides the flexibility the airport needs to assign gates and to operate more efficiently.

Environmental Responsibility

This project will reduce the amount of emissions and noise generated by aircraft by eliminating the need to use the aircrafts' onboard auxiliary power units to operate the aircrafts electronics before and after gate arrival. The project will increase our electricity use.

Community Benefits

This project supports the Airport's strategy to operate a world class international airport by anticipating and meeting the needs of our tenants, passengers and the region's economy. Minimizing new facilities construction requirements by making new operational improvements with up-to date equipment and technology helps to minimize costs to the airlines, thereby supporting the Airport's strategy to reduce airline costs. The program manager will collaborate with the Office of Social Responsibility (OSR) to maximize small business participation throughout this project.

ALTERNATIVES AND IMPLICATIONS CONSIDERED

Alternative 1) – Do not upgrade the 13 Concourse B Gates with a 400Hz Ground Power System at the time:

Pros:

- No capital investment required.
- Defers costs to future.

Cons:

- This alternative will result in the airlines on Concourse B not having the same level of service as all the other concourses and gates here at the Airport.
- Airlines on Concourse B will continue to use emission and noise producing systems to generate aircraft power.
- The current redesign would be expensed at a cost of approximately \$425,000. The previous design was previously expensed at a cost of \$218,000.
- Redesigning the project at a later date will likely result in significant costs to comply with electric code changes, increased equipment and labor cost and other unknown changes to Concourse B.
- Existing 400Hz systems and equipment are near the end of their life cycle.
- Contrary to previous Commission direction to provide 400Hz Ground Power to all gates.

This is not the recommended alternative.

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Alternative 2) – Upgrade only the Concourse B gates that are using fossil fuel burning ground power units and systems nearing life cycle end and provide 400Hz with solid state units

Pros:

- Reduces investment by the Port of Seattle. Alternative only upgrades gates B4 & B11 at a cost of approximately \$1,630,000 in design and construction.
- Reduces aircraft noise and emissions at gate B4.
- System in use date remains 4th quarter 2017.

Cons:

- Does not significantly increase flexibility of gate usage on Concourse B.
- Does not significantly reduce aircraft noise, fuel usage and aircraft emissions throughout Concourse B.
- Current 100% redesign effort would be expensed at a cost of approximately \$425,000
- This alternative although simple in concept requires redesign (cost included above)
- Existing 400Hz systems that would not be replaced under this alternative (are near the end of their life cycle.
- Concourse B will not provide the same level of 400Hz service as all the other concourses at the airport.
- Short life of portable solid state units and increase costs with solid state units and lower power quality.
- Additional ramp space must be found and longer connection to aircraft if portable solid state units must be repositioned for different aircraft.

This is not the recommended alternative.

Alternative 3) – Upgrade all 13 Concourse B gates with new solid state 400Hz units.

Pros:

- Reduces aircraft noise and emissions throughout Concourse B.
- Optimizes gate flexibility for all the airlines.
- Will provide the ground power systems that current and future aircraft require.
- Reduces emissions and noise.
- Replaces systems and equipment on Concourse B that are near the end of their life cycle.
- Project is aligned with the Port's strategy to operate a world class international airport.

Cons:

- Current 100% design effort would be expensed at a cost of approximately \$425,000.
- Life cycle for solid state units is 50% less than motor generator (MG) sets (15 years vs. 30 years).
- Long term maintenance costs increase with solid state units.

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- Concourse B will not provide the same level of service as all the other Concourses at the airport in terms of power quality and full gate power capacity to meet new aircraft needs.
- This alternative would need to be designed and the system in use date would be delayed until the 2nd quarter of 2018.
- Requires investment by the Port of Seattle for an estimated cost of \$7,740,000 to redesign and construct.

This is not the recommended alternative.

Alternative 4) – Upgrade all 13 Concourse B gates with only one new MG set instead of two in order to provide 400Hz ground power.

Pros:

- Reduced investment by the Port of Seattle - estimated cost \$7,302,000.
- Optimizes gate flexibility for all the airlines.
- Will provide the ground power systems that current and future aircraft require.
- Reduces emissions and noise.
- Replaces systems and equipment on Concourse B that are near the end of their life cycle.
- Project is aligned with the Port's strategy to operate a world class international airport.

Cons:

- Portions of the current 100% redesign effort would be expensed at a cost of approximately \$425,000.
- No 400Hz redundancy on Concourse B (all other Concourses have redundant systems; North Satellite has two MG sets, South Satellite has three MG sets).
- This alternative though simple in concept would require redesign effort (cost included above).
- Concourse B would not provide the same level of service as all the other Concourses and Satellites (no 400Hz redundancy).

This is not the recommended alternative.

Alternative 5) – Upgrade all 13 Concourse B gates with two new MG sets to provide in order to provide 400Hz ground power.

Pros:

- Optimizes gate flexibility for all the airlines.
- Will provide the ground power systems that the current and future aircraft require.
- Reduces emissions and noise.
- Current redesign scope is to provide two new MG sets.
- Replaces systems and equipment on Concourse B that are near the end of their life cycle.
- Systems in use date remains 4th quarter 2017.
- Project is aligned with the Ports strategy to operate a world class international airport.

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Cons:

- Requires capital investment of \$7,710,000 by the Port

This is the recommended alternative.

ATTACHMENTS TO THIS REQUEST

- Computer slide presentation.

PREVIOUS COMMISSION ACTIONS OR BRIEFINGS

- December 1, 2014 Commission authorized the restart for the design of the Concourse B 400Hz Gate Improvements project.
- December 4, 2012 Commission authorized the advertisement, award and execution of a major construction contract not to exceed \$8,242,000.
- March 6, 2012 the Commission authorized \$328,000 expense funding to CIP 800019.
- October 11, 2011 Commission authorized a major construction contract in the amount of \$6,144,000 of the authorized \$12,883,000.
- June 14, 2011 Commission authorized an additional \$3,489,000 to CIP 800019 increasing the total project budget to \$12,883,000.
- June 28, 2007 Commission authorized \$9,385,000 (CIP 80019) to replace the 400Hz Ground Power systems at the South Satellite and Concourse B plus upgrade 29 gates with 400Hz equipment and Potable Water Cabinets.
- December 10, 2002 Commission authorized \$2,614,000 (CIP) 102102 to replace and upgrade the 400Hz Ground Power system at the North Satellite.