PORT OF SEATTLE
MEMORANDUM

COMMISSION AGENDA
ACTION ITEM

Item No. 6a

Date of Meeting October 7, 2014

DATE: September 29, 2014

TO: Ted J. Fick, Chief Executive Officer

FROM: Ralph Graves, Managing Director, Capital Development Division
Dave Soike, Director, Aviation Facilities and Capital Program
Wayne Grotheer, Director, Aviation Project Management Group
Janice Zahn, Assistant Director of Engineering, Construction Services

SUBJECT: Centralized Pre-Conditioned Air Project at Seattle-Tacoma International Airport (CIP #C800238)

Amount of This Request:	$5,500,000	**Source of Funds:**	Airport Development Fund, Revenue Bonds and Grants
Est. Total Project Cost:	$55,140,463		
Est. State and Local Taxes:	$3,870,000		

ACTION REQUESTED

Request Commission authorization for the Chief Executive Officer to (1) increase the project budget for the Centralized Pre-Conditioned Air Project (PC Air) at Seattle-Tacoma International Airport by $5,500,000; (2) execute Change Order 220 for Contract MC-0316677, Centralized Pre-Conditioned Air Project, at Seattle-Tacoma International Airport in the amount of $1,850,000 and to extend the contract duration by 156 calendar days for a new contract completion date of May 16, 2014; (3) change the project scope to include Concourse A chilled water piping anchors, guides, and insulation and replacement of chilled water piping anchors and guides at the South Satellite and Concourses B & C; (4) execute professional service agreements for design of the additional scope; (5) advertise, bid, and execute construction contracts to complete work associated with this request; and (6) use of Port Construction Services and small works contracts to complete PC Air installation at four gates.

SYNOPSIS

Instead of aircraft burning fossil fuel, the PC Air project installed a system of chillers, heaters, and pipes that provide both the heating and cooling to the aircraft from a central plant at the Airport. The Airport central plant can more effectively keep aircraft at a comfortable temperature when at any of the Airport's gates compared to use of aircraft auxiliary power units (APUs). The flight crews can turn off aircraft auxiliary engines and plug in at the gate to receive both heated and cooled air, which results in both cost savings to the airlines and significant environmental benefits to local air quality.

On September 13, 2010, the Port executed a construction contract for PC Air with Lydig Construction. During construction, many issues were discovered that were not adequately

addressed in contract documents. Change orders were approved to pay for the difference in cost necessary to resolve individual issues and to extend the project schedule. Change Order 220 will resolve all remaining cost and schedule issues with the contractor. This additional budget request will address remaining issues to complete this project. Work included is as follows:

1. $1,065,000 of budget authorization to fund Change Order 220. (Available construction contingency is $785,000. $1,065,000 + $785,000 = Change Order 220 amount of $1,850,000.) This work corresponds to items (1) and (2) in the action request above.
2. $3,785,000 to replace the chilled water pipe insulation along Concourse A; and for installation of insulated anchors and guides along Concourses A, B, C and South Satellite chilled water piping systems. The Port will advertise, bid, and execute a major work contract to complete this work. This work corresponds to items (3), (4), and (5) in the action request above.
3. $650,000 for completion of construction at four gates by Port Construction Services. It is more operationally effective and cost effective to have our own Port crews perform this work on the four bridges. Future projects where additional aircraft gates are being added to the terminal would either include PC Air within those projects or would be requested separately in the future. This work corresponds to item (6) in the action request above.

The total amount of this request is for $5,500,000 for a total estimated project cost of $55,140,463. Of this total cost, $21,912,679 has been reimbursed to the Airport by an FAA grant.

BACKGROUND

The Centralized PC Air project is a very large and complex project that benefits airlines and travelers. Regardless of the outside weather conditions, a traveler expects the temperature of the inside of an aircraft to be a comfortable 68 to 70 degrees. Generally, an airplane is able to achieve the right temperature inside by running an auxiliary jet engine. To properly condition the inside of the airplane cabin, the auxiliary engine burns fossil jet fuel. If all the jet auxiliary engines across all gates are considered, the carbon dioxide generated over a year equates to about 8,000 cars on the road, or 40,000 metric tons of greenhouse gases. The estimated amount of jet fuel burned is about 5 million gallons per year.

Instead of burning fossil fuel, the PC Air project installed a system of chillers, heaters, and pipes that provide both the heating and cooling to the aircraft from a central plant at the Airport. The Airport central plant can more effectively keep aircraft at a comfortable temperature when at any of SeaTac's gates. The flight crews can turn off aircraft auxiliary engines and plug in at the gate to receive both heated and cooled air. This will lower costs to the airlines while producing significant environmental benefits by reducing the release of tens of thousands of tons of carbon dioxide emissions each year. This project is an effective way to aid the airlines while improving the quality of the environment. The airlines approved funding for this project, and a Federal Aviation Administration (FAA) provided grant funding in the amount of $21,912,679 for this project.

PC Air is fully installed on the majority of the Airport's gates; only four gates remain to complete the project. Work on the four remaining gates was unable to be completed as part of the original contract because the end of the construction period neared the busy holiday season. The gates were not able to be taken out of service for the length of time required by the contractor to do the work. Using port crews and small contractors to complete the work on these four gates will allow for flexibility in construction scheduling thereby limiting the impact to airport operations. PC Air construction at the gates will be completed during 2014 and the first quarter of 2015. Chilled water piping insulation, anchors, and guides work would continue through the middle of 2016.

The PC Air chilled water system is designed to operate at 20 degrees Fahrenheit. The construction contract was unclear about the type of anchor and guides to be used on chilled water piping systems routed to the concourses. To prevent water condensation on the pipe, subsequent freezing, and damage to the insulation and piping, insulated anchors and guides should have been more clearly specified. The anchors and guides installed on the South Satellite, Concourse B, and Concourse C chilled water piping are not insulated and are not suited for the application. The system cannot be operated at the design temperature of 20 degrees without damage to insulation and piping. The project team is currently reviewing this item as a potential Designer Errors and Omission claim. As directed by change order, the contractor installed the correct insulated guides and anchors on the chilled water piping system in Concourse D and North Satellite.

The fiberglass insulation and uninsulated guides and anchors on the Concourse A chilled water lines were installed during the South Terminal Expansion Project in 2003, based on the assumption the future chilled water system would operate at about 36 degrees. The PC air system as designed in 2010 uses chilled water at 20 degrees. For the actual operating temperature of 20 degrees, the insulation, anchors and guides need to be replaced with products suitable for 20 degree chilled water service. As an interim fix to minimize damage, the PC-Air contractor wrapped the piping with a vapor barrier to keep moisture from penetrating the insulation. However, at guides and anchors, where there is metal pipe to metal guide connection, moisture is getting into the insulation. Each time the system cycles from temperatures below freezing to above freezing some amount of damage progresses. This summer the systems are cycling several times each week. The result is lost efficiency and reduced system life. The inadequate insulation on Concourse A also impacts system operation at the South Satellite since chilled water from the Preconditioned Air Central Plant flows through Concourse A en route to the South Satellite. System cooling capacity, due to thermal losses, is noticeably reduced when temperatures exceed 80 degrees. Staff is requesting $3,290,000 to advertise, bid and execute a major work contract to replace the chilled water system insulation on Concourse A and for installation of insulated anchors and guides on Concourse A, B, C and South Satellite chilled water piping systems.

The issuance of Change Order 220 resolves all remaining disputes with the contractor. Additionally, it reconciles the contract duration to the actual contract completion date of May 16, 2014.

CHANGE ORDER NO. 220 DESCRIPTION

The following information relates to the pending change order scope and cost:

Scope of Work

This Change Order, for the amount of $1,850,000, resolves all remaining cost disputes between the Port and the contractor and reconciles the contract duration with a time extension of 156 calendar days, to the final completion date.

Justification

This change order is an agreed settlement concluding formal negotiations that resolves $3.4 million in outstanding contractor change requests and claims. Included are costs related to the contractor and subcontractor extended field office overhead due to Port-caused delays, contractor inefficiencies due to the amount and nature of the changed work throughout the project, and disputes related to the pipe insulation and support requirements. Included in the amount was consideration from the contractor in lieu of Liquidated Damages due to their own unexcused delay in achieving contract completion on time.

CONTRACT INFORMATION

The following information relates to the contract and competitive award:

Contract award date:	September 13, 2010
Original period of performance:	September 13, 2010 – December 11, 2012
Previous contract extensions:	367 Days
Current Contract Complete Date:	December 13, 2013
Contract extension this change order:	156 Days
Revised Contract Completion Date:	May 16, 2014

Original contract amount:	$27,013,400.00
Previous Change Orders Executed:	$8,159,872.00
Current contract amount	$35,173,272.00
This request, Change Order No. 220	$1,850,000.00
Revised Contract Amount	$37,023,272.00

PROJECT JUSTIFICATION AND DETAILS

Although the cost of the project has increased, the financial benefits remain attractive. While the capital costs are paid by the Port, the benefits are realized by the airlines. The “payback” is therefore a combination of Port costs and airline benefits. The following is based on the 2014 jet fuel price of $3.06 per gallon minus 10% for energy costs, which is a rough percentage estimate.

The benefit is the potential annual savings of 5 million gallons of jet fuel.

5,000,000 gallons of jet fuel saving per year @ $2.75 net benefit = $13,750,000 per year.

- $50 million project cost minus $21.9 million VALE Grant: $28.1 million Port cost.
  Previous payback period = 2.0 years
- $55 million project cost minus $21.9 million VALE Grant: $33.1 million Port cost.
  Payback period with this request = 2.4 years

Project Objectives

Project objectives remain as follows:

Construct the PC Air system, with an associated central plant including individual PC Air gate units at all passenger loading bridges that will accomplish the following:

- Decrease the amount of energy used to heat and cool the aircraft.
- Significantly reduce the amount of CO_2 and other air emissions produced.
- Provide aircraft with cabin heating and cooling while eliminating the need for using the onboard APU, which consumes jet fuel.
- Minimize lifecycle costs.
- Minimize fuel consumption.
- Minimize ramp noise.

Scope of Work

Successfully negotiate construction related disputes.
Complete the PC Air installation at gates S-3, S-16, D-1, and N-6.
Initiate a new work project and execute a major works contract to replace the insulation on Concourse A, and the anchors and guides on Concourse A, B, South Satellite and North utility tunnel.

Schedule

- Re-install PC-Air at gates S-3, S-16 and D1 – 4Q, 2014.
- Install PC-Air Unit and Telescoping Air Duct at Gate N-6 –1Q, 2015.
- Design and prepare contract documents for anchors, guides and insulation on Concourse A, B and South Satellite. 3Q, 2014 – 2Q, 2015.
- Bid – 2Q, 2015.
- Install anchors and guides–4Q, 2015-2Q, 2016.

FINANCIAL IMPLICATIONS

Budget/Authorization Summary	Capital	Expense	Total Project
Original Budget	$40,010,000	$590,000	$40,600,000

Budget Increase/(Decrease)	$14,710,463	$(170,000)	$14,540,463
Revised Budget	$54,720,463	$420,000	$55,140,463
Previous Authorizations	$49,220,463	$590,000	$49,810,463
Current request for authorization	$5,500,000	0	$5,500,000
Total Authorizations, including this request	$54,720,463	$590,000	$55,310,463
Remaining budget to be authorized	$0	$0	$0
Total Estimated Project Cost	$54,720,463	$420,000	$55,140,463

Project Cost Breakdown	This Request	Total Project
Construction	$4,585,000	$46,070,463
Design	$550,000	$5,200,000
State & Local Taxes (estimated)	$365,000	$3,870,000
Total	$5,500,000	$55,140,463

Budget Status and Source of Funds

This project (CIP #800238) was included in the 2014-2018 capital budget and plan of finance with a budget of $47,235,000. Since that time, the Commission approved budget increases of $965,000 in October 2013 and $850,000 in February 2014. In addition, savings of $170,000 from an authorized expense portion of the project was transferred to the capital budget. The current budget of $5,500,000 will be transferred from CIP #C800404, Aeronautical Allowance, resulting in no net change to the 2014-2018 capital budget. The funding plan includes $21.9 million in VALE program grants, existing revenue bonds, and the Airport Development Fund. This project was reviewed by the airline representatives and approved through a Majority-In-Interest vote in June 2008.

Financial Analysis and Summary

CIP Category	New/Enhancement
Project Type	Infrastructure
Risk adjusted discount rate	10%
Key risk factors	Realization of savings due to lower jet fuel usage
Project cost for analysis	$33,240,000 (total cost excluding grants)
Business Unit (BU)	Terminal cost center
Effect on business performance	NOI after depreciation will decrease due to recognizing depreciation on the full cost yet recovering capital costs for the non- VALE funded portion only
IRR/NPV	NPV range of net saving to airlines: $5 million to $30 million. (calculated in 2010)
CPE Impact	CPE will increase by $.16 in 2014; however, this cost will be offset by decreased airline operating costs. This project was included in the business plan forecast.

STRATEGIES AND OBJECTIVES

The PC Air project supports the following Port strategies:

***Ensure Airport Vitality*:**

This project will provide a cost effective and efficient heating and cooling system for aircraft parked at the gates. It will have a positive effect on the airline's operating costs by reducing fuel consumption through reduced APU operation.

TRIPLE BOTTOM LINE

Economic Development

Net savings to airlines from reduced fuel usage is $13,750,000.

Environmental Responsibility

There are significant air quality improvements achieved by installing a centralized pre-conditioned air system. Carbon dioxide emissions and other emissions could be reduced by more than 69,000 metric tons per year, which represents 2% of emissions from aircraft at the Airport and is roughly equivalent to taking 13,500 cars off the road.

Community Benefits

Airport noise will also be reduced with reduction in APU usage.

ALTERNATIVES AND IMPLICATIONS CONSIDERED

Alternative 1) – Reduce the project scope to eliminate PC Air at four gates and do not replace chilled water piping insulation on Concourse A; and guides and anchors on Concourse A, B, C, and South Satellite chiller water piping. With PC Air available at the gates, fuel saving from not running auxiliary power units varies from approximately $50,000 to $200,000/year depending on gate use. Cost to install PC Air at these gates is approximately $100,000/gate.

Operating the system with the existing Concourse A insulation and uninsulated guides and anchors cause inefficiencies and system damage. During operation this summer the system was unable to meet cooling needs because of inadequate Concourse A insulation. The freezing condensation will progressively damage the insulation resulting in greater inefficiencies and significantly shorter system life. This is not the recommended alternative.

Alternative 2) –Complete the reinstallation of PC Air at the four gates and replace the chilled water pipe insulation on Concourse A, and guides and anchors on Concourse A, B, C, and South Satellite. This will take advantage of the potential fuel saving and environmental benefits. It will also improve the system efficiency and eliminate damage caused by the thermal cycles. **This is the recommended alternative.**

ATTACHMENTS TO THIS REQUEST

- PowerPoint Presentation

PREVIOUS COMMISSION ACTIONS OR BRIEFINGS

- On February 25, 2014, the Commission authorized a budget increase of $850,000 to replenish construction contingency. Additionally, the Commission authorized the execution of Change Order No. 181 in the amount of $531,930 to resolve costs for subcontractor extended overhead expenses related to a schedule and contract extension.
- On October 22, 2013, the Commission authorized a budget increase of $965,000 to replenish construction contingency due to disputed costs. Additionally, the Commission authorized the execution of Change Order No. 173 in the amount of $453,143 to resolve the costs related to changes to the pipe hangers/supports and seismic restraints for the PC Air mechanical plant piping.
- On September 10, 2013, the Commission authorized a budget increase of $600,000 for the project design consultant and Port staff support through the completion of the project.
- On May 28, 2013, the Commission authorized execution of Change Order 166, a contract extension of 221 days, which established a new project completion of August 26, 2013.
- On November 27, 2012, the Commission authorized a budget increase of $1,100,000 to replenish construction contingency due to disputed costs. Additionally, the Commission authorized the execution of Change Order No. 121 in the amount of $344,558 to resolve the remaining disputed costs related to Change Order No. 113 due to changes in the routing of PC Air piping at Concourse D.
- On October 2, 2012, the Commission authorized a budget increase of $2,000,000 to cover additional costs related to construction, design support, and Port Construction Services and Port Maintenance support for the project. Additionally, the Commission authorized the execution of Change Order 119 in the amount of $509,013 for additional costs related to the North Satellite Tunnel pipe routing.
- On September 11, 2012, the Commission authorized execution of Change Order 113 in the amount of $776,910 for changes to the pipe routing at Concourse D. Total project funding authorization remained at $40,600,000.
- On September 27, 2011, the Commission authorized a budget increase $3,525,000 to cover additional costs to the construction budget, outside professional services and project management soft costs. Total project funding authorization increased to $44,125,000.
- On May 24, 2011, the Commission authorized execution of a $400,000 amendment to the professional service agreement with Stantec Consulting. Total project funding authorization remained at $40,600,000.
- On May 11, 2010, the Commission authorized staff to advertise for bids, apply a Project Labor Agreement (PLA), and authorize Port Construction Services to perform pre-construction work, including moving tenants, for Phase I and Phase II of the PC Air Project (CIP # C800238) at the Airport and execute a construction contract. This authorization was for $36,830,000. The estimated total project cost is $40,600,000.
- On January 13, 2009, the Commission authorized procurement and execution of service agreements with consultants to perform design, prepare contract documents, and perform contract administration for the Pre-Conditioned Air project at Seattle-Tacoma International Airport in the amount of $3,770,000.