



**COMMISSION
AGENDA MEMORANDUM**

Item No. 9b

BRIEFING ITEM

Date of Meeting June 12, 2018

DATE: June 4, 2018

TO: Stephen P. Metruck, Executive Director

FROM: Wayne Grotheer, Director Aviation Project Management
Jeffrey Brown, Director Aviation Facilities and Capital Programs

SUBJECT: Main Terminal Low Voltage System Upgrade (CIP #C800061)

Amount of anticipated request: \$22,586,000

Total estimated project cost: \$100,300,000

EXECUTIVE SUMMARY

The project replaces the Main Terminal Low-Voltage (MTLV) distribution system, which provides power to every floor of the main terminal and is at the end of its serviceable lifespan.

Since the last commission action in August 2014, the project has completed 30 percent design, including a full physical inventory and condition assessment of the low voltage distribution system in the Main Terminal. This early work demonstrated previous project scoping to be substantially inadequate; as a result the project has effectively been redeveloped and now includes the appropriate level of work and associated budget. The cost and scope is divided among five main areas: additional normal power work, emergency power work, Central Terminal Power Distribution Load Center replacement, metering upgrades, and minimizing airport operational disruption through off-shift work. The project will progress by procuring a designer and a general contractor/construction manager (GCCM) to work together on construction phasing, operational coordination, and execution. This contracting approach will help minimize design, construction and operational risks.

On July 10, 2018, the Main Terminal Low Voltage project team intends to request Commission approval of funding to complete the project design and to advertise and execute a contract with a GC/CM. During design, the Port will negotiate a maximum allowable construction cost (MACC) with the GC/CM. The MACC determination with the GCCM will occur in 2021.

JUSTIFICATION

The Airport's medium voltage electrical distribution system and power centers (primary operating voltage levels of 5,000 to 15,000 volts) have all been renewed and replaced within the last decade. The next phase of the Airport's renewal and replacement program for the

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electrical system is the low-voltage system (operating voltage distribution levels of 120 to 600 volts). This infrastructure is critical to airport operations.

Large portions of the existing low-voltage electrical distribution system have reached the end of their useful operating life, raising concerns over their continued reliability. The useful operating life of electrical equipment primarily depends on age, with 30 years being a reasonable lifespan. Some of the equipment included in this project is well over 40 years old. Equipment maintainability and availability of spare parts are increasing concerns with aging equipment.

Much of the existing equipment is not compliant with the current National Electrical Code (NEC). There are areas in the low-voltage electrical system where the available fault current exceeds the current ratings for the existing equipment, thus creating operating and working condition safety issues. Other safety-related NEC issues exist for these older installations including dedicated equipment space, working clearances, illumination, identification, and the need for Underwriters Laboratory (UL) listing of all equipment. The MTLV project will correct all the issues in this area and bring the installation up to current standards and compliance with current codes. Having adequate and reliable capacity in the low voltage distribution system is also critical in supporting deployment of new technologies that can maximize facility throughput.

The project team explored multiple project delivery methods, strategies, and impact mitigations. Delivery methods investigated included design-bid-build, design-build, progressive design-build, and the selected GC/CM. Impact mitigation investigated included tenant relocation, both in and outside of airport facilities, structured zone wide outages, and use of Port construction crews to complete the work. The current plan of action helps minimize, as much as feasible, the risks to operational impacts in construction.

Since authorization in 2014, the project team has completed both 15% and 30% design which included a full physical inventory and condition assessment of all electrical equipment in the main terminal. The condition assessment has driven the necessary renewals and project scoping. The need for these major work elements is detailed below.

Normal Power Work

The 2014 action for renewal and replacement approached the Main Terminal Power Distribution System with a phased concept. The team assumed that only the worst power distribution panels, roughly 10% or 30 panels, were in need of immediate replacement. The comprehensive year-long condition assessment of this system in 2016 established this to be incorrect. The assessment found that nearly all the panels were in poor and failing condition due to age and there were many more electrical panels than previously assumed. The project now includes the replacement of nearly 300 of the 600 electrical panels; all of these panels are of similar age and condition and are at a similar risk of failure.

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Emergency Power Work

The emergency power distribution system is of similar age, condition and risk of failure as the normal building power: inadequate working clearance, no replacement parts, etc. In addition the emergency power panels are often located in the same electrical closets as the normal building power which is not permitted per current codes.

Central Terminal Power Distribution Load Center

The Central Terminal Power Center is nearing the end of its useful life and will soon be enveloped by new baggage conveyance systems making replacement at a future date exceedingly difficult and costly. It is the only passenger terminal power center that was not upgraded in the mid 2000's and is the only power center that is not configured for maximum reliability.

Energy Metering

Branch circuit metering will allow the Port of Seattle to identify and implement future energy saving projects to comply with Washington State Energy Code for 2015 as adopted by Port Resolution 3745.

Regulated Materials

Most of the work locations for this project are in areas where regulated materials are present. Due to the large geographic areas this project covers, asbestos abatement costs will be significant and have been estimated at \$13,000,000.

DETAILS

Scope of Work

This project covers the renewal and replacement of end of life low-voltage electrical distribution switchboards, feeders, panels, and tenant metering in the Main Terminal served by the five Main Terminal Power Distribution Load Centers. The work will be carried out in a manner that minimizes disruptions to normal airport operations.

Specific Scope Items:

- (1) Normal Power renewal, replacement, optimization, and expansion. (\$61M)
- (2) Emergency Power renewal, replacement, optimization, and expansion. (\$5M)
- (3) Replacement of the Central Terminal Power Distribution Load Center. (\$14M)
- (4) Implement branch circuit level energy metering in new work. (\$7M)
- (5) Minimize disruption to normal airport operations during construction. (Allocated Costs)
- (6) Abatement of regulated materials as incident to the overall scope. (\$13M)

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Small Business

Aviation Project Management has been partnering with the Port’s small business group to ensure proper outreach to small businesses and those owned by women and minorities (WMBE firms) ranging from email outreach and presentations, to those businesses that may be interested in the opportunities this project presents.

Schedule

Design start	2019 Quarter 1
Commission construction authorization	2021 Quarter 3
Construction start	2021 Quarter 4
In-use date	2025 Quarter 1

Cost Breakdown

	This Request	Total Project
Design	\$17,107,000	\$29,754,000
Construction	\$5,479,000*	\$70,546,000
Total	\$22,586,000	\$100,300,000

*Construction costs associated with this request support the GCCM contract during design.

ALTERNATIVES AND IMPLICATIONS CONSIDERED

Alternative 1 –Do not replace the main terminal low voltage distribution system

Cost Implications: \$2,400,000 (30% design costs to date would be expensed)

Pros:

- (1) Defers significant capital spending

Cons:

- (1) Renewal and replacement of the system will be deferred.
- (2) Continued risk of injury to personnel.
- (3) Increased risk of extended unplanned electrical outages.
- (4) Future equipment replacement will cost more as a result of escalation.
- (5) Increased cost to projects in Main Terminal as individual upgrades are needed.
- (6) Existing work will be expensed.

This is not the recommended alternative.

Alternative 2 – Proceed with full replacement scope without branch circuit metering

Cost Implications: \$90,300,000

Pros:

- (1) Reduced project cost due to removal of branch circuit level metering.
- (2) Power distribution system will be replaced in a planned manner.
- (3) Increased reliability of normal and emergency power systems.

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- (4) Outages (planned and unplanned) will be minimized.
- (5) Safe work environment for personnel.
- (6) Increased capacity for support of future projects.

Cons:

- (1) Loss of ability to track detailed energy usage in the Main Terminal.
- (2) No added metering for revenue and energy conservation.
- (3) Operations must be maintained during construction

This is not the recommended alternative. *This alternative is no longer viable due to the adoption of Port Resolution No. 3745 on 2/13/18 adopting the 2015 Washington State Energy Code which requires metering.*

Alternative 3 – Proceed with full scope for design.

Cost Implications: \$100,300,000

Pros:

- (1) Power distribution system will be replaced in a planned manner.
- (2) Increased reliability of normal and emergency power systems.
- (3) Outages (planned and unplanned) will be minimized.
- (4) Safe work environment for personnel.
- (5) Increased capacity for support of future projects.
- (6) Detailed metering for revenue and energy conservation.

Cons:

- (1) Highest cost alternative
- (2) Operations must be maintained during construction.

This is the recommended alternative.

FINANCIAL IMPLICATIONS

Anticipated Authorization Summary

	Capital	Expense	Total
COST ESTIMATE			
Original estimate	\$19,640,000	\$1,090,000	\$20,730,000
Current change	\$67,120,000	\$12,450,000	\$79,570,000
Revised estimate	\$86,760,000	\$13,540,000	\$100,300,000
AUTHORIZATION			
Previous authorizations	\$7,607,000	\$540,000	\$8,147,000
Current request for authorization	\$22,586,000	\$0	\$22,586,000
Total authorizations, including this request	\$30,193,000	\$540,000	\$30,733,000
Remaining amount to be authorized	\$56,567,000	\$13,000,000	\$69,567,000

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Annual Budget Status and Source of Funds

The Main Terminal South Low Voltage system Upgrade #C800061 is included in the 2018-2022 capital budget and plan of finance with a budget of \$19,640,000. The project has completed scoping and the engineer’s estimate shows an increase in project costs and additional scope. The capital budget increase of \$67,120,000 was transferred from the Aeronautical Allowance CIP C800753 resulting in no net change to the Airport capital budget. The regulated material expense will be included the operating budget in the year when the remediation obligated event occurred. The funding sources will be the Airport Development and future revenue bonds. This project was presented to the airlines at an Airport Airlines Affairs Committee meeting on December 7, 2017. The Majority-in-interest (MII) ballot was due to the Port on May 14, 2018 and approved the project increase.

Financial Analysis and Summary

Project cost for analysis	\$100,300,000
Business Unit (BU)	Terminal Building
Effect on business performance (NOI after depreciation)	NOI after depreciation will increase
IRR/NPV (if relevant)	N/A
CPE Impact	\$0.46 in 2023 and 2024 for expense items and \$0.25 by 2025 for ongoing capital costs.

Future Revenues and Expenses (Total cost of ownership)

Renovation is expected to reduce future repair costs and increase the power available and operational availability of the system. The new major assets will include electrical panels, electrical power distribution load center, and miscellaneous electrical equipment. This equipment has a useful life-span of thirty years.

ADDITIONAL BACKGROUND

The Main Terminal Low Voltage Upgrade Project was originally approved by the commission in June 2007 for design and construction of a limited scope. The project completed its design work and was shelved in 2009 prior to construction. In 2013 the project was pulled off the shelf and combined with two others of identical limited scoping that encompassed the entire main terminal. Combining the projects and completing the design was approved in August 2014 by the commission. Since authorization in 2014 the project team has completed both 15% and 30% design which included a full physical inventory and condition assessment of all electrical equipment in the main terminal. The condition assessment has driven the needed renewals and overall project scoping.

ATTACHMENTS TO THIS BRIEFING

- (1) Presentation slides
- (2) Work Area Map

PREVIOUS COMMISSION ACTIONS OR BRIEFINGS

August 5, 2014 – The Commission approved project consolidation and design.
June 28, 2007 – The Commission approved design and construction.