



**COMMISSION
AGENDA MEMORANDUM**

Item No. 8b

ACTION ITEM

Date of Meeting July 28, 2020

DATE: July 21, 2020

TO: Stephen P. Metruck, Executive Director

FROM: Eileen Francisco, Acting Director Aviation Facilities and Capital Programs
Wayne Grotheer, Director, Aviation Project Management Group

SUBJECT: Electric Ground Support Equipment (EGSE) Charging Stations (CIP #C800335)

Amount of this request: \$12,451,773

Total estimated project cost: \$38,100,000

ACTION REQUESTED

Request Commission authorization for the Executive Director to (1) increase the project budget for the Electric Ground Support Equipment (EGSE) Charging Stations Project in the amount of \$7,400,000 for a revised total estimated project cost of \$38,100,000; and (2) advertise and execute a major works construction contract for the Electric Ground Support Equipment (EGSE) Charging Stations Phase 2B Project at Seattle-Tacoma International Airport.

EXECUTIVE SUMMARY

This project will install a new electrical power center and electric charging infrastructure to support the charging needs of airline electric ground support equipment (baggage tugs, belt loaders, pushbacks). Our airlines currently use approximately 600 Ground Support Equipment (GSE) and about half of those have been converted to electric to-date.

When completed, the full project will reduce approximately 9,000 tons of carbon per year and almost 400 tons per year of criteria pollutant emissions from ground support equipment. It will also reduce airline maintenance costs, save fuel costs, and contribute to the Century Agenda goal to “Be the greenest and most energy efficient Port in North America.” Revenue will be collected from individual Airline use via revenue metered electricity charges at the established Port tenant kilowatt hour (kWh) rate.

The Commission previously authorized funding necessary to complete the full-airport EGSE design documents, as well as the first phase of construction. This request is for approval of budget increase, and authorization for construction of Phase 2B. This project was submitted to the airlines for a majority-in-interest (MII) vote and was approved on May 26, 2020.

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The EGSE charging infrastructure project is being executed in three major phases (Phase 1, Phase 2A, and 2B). Phase 1 (north-end) has been completed, and this request will fund the completion of Phase 2 (south-end). The second phase of the project has incurred a seven-year delay due to airline realignment, major projects construction, and increased duration for Airline transition to electrified vehicles. Following an evaluation of the south satellite, the scope at that location, which included 72 charge ports and a new power center, was removed from this EGSE project; however, 8 charge ports will be installed at the south satellite under phase 2B.

The current approved budget is \$30,700,000. The revised budget is estimated to be \$38,100,000. The budget increase of \$7,400,000 is due to escalation of labor and materials costs since the original estimate was developed eight years ago, added scope for arc flash mitigation, design updates, an increased number of construction packages, and contractor markup on chargers.

BACKGROUND

This project will help complete the vision championed by airlines and the Commission in 2010 to be the first North American airport to offer electric charging infrastructure to all operators. Most airports have implemented electrification on an airline-by-airline basis, whereas this project creates a harmonious system for use by all airlines.

The project will reduce carbon and criteria pollutant emissions from ground support equipment, reduce airline maintenance costs, save fuel costs, and contribute to the Century Agenda goal to “Be the greenest and most energy efficient Port in North America.”

The initial project development in 2012 proposed 512 charge ports airport-wide. Phase 1 included 256 charge ports, which was completed in 2014, with support from a U.S. Department of Energy grant. In 2014, Alaska Airlines deployed 204 electric-powered baggage tractors and baggage belt loaders for use at their Alaska and Horizon gates. Southwest, United and Delta also began using limited numbers of EGSE in 2015, given the growing positive response from the airlines about the operational benefits of using electric equipment.

In 2015-17, before Phase 2 could be implemented, several new construction projects came on-line, including D Concourse Holdroom, North Satellite renovations, and the International Arrivals Facility. This new complexity and changes to the apron and gates led to a delay in EGSE installations. Phase 2A and 2B will complete the majority of the originally planned EGSE charge points in this new, re-configured environment.

Following an evaluation of the south satellite, the scope at that location, which included 72 charge ports and a new power center, was removed from this EGSE project. The construction budget for this south satellite scope was \$3.2M. This remaining EGSE South Satellite (SSAT) buildout will be addressed in the future renovations of the SSAT, thus avoiding costly rework if installed now. The current EGSE project scope includes eight charge ports at the SSAT. The

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electrical load of these eight charge ports can be installed within the existing electrical capacity, as they will not trigger the requirement for a new power center.

The Aviation Project Management Group has identified the following lessons learned during the execution of this project:

- (1) When projects are deferred, the management team will evaluate the estimated duration of the deferral and the potential impacts to cost and schedule. The results of this evaluation shall be reported to commission.
- (2) Projects which include scope within the Airfield Operations Area (AOA), shall include heightened budget and schedule contingencies, which address the dynamic nature of the AOA.
- (3) Port purchased equipment can present challenges for projects with extended schedules or deferments. When it is determined major equipment should be purchased by the Port, the selected vendor contract shall be long enough to support the program schedule including a reasonable contingency.

JUSTIFICATION

Project Objectives

Phase 2 will install EGSE Charging Stations at gates in the south half of Seattle-Tacoma International Airport and will:

- Reduce criteria air pollutants (CO, SO₂, particulate matter, etc.) by almost 200 tons per year and carbon emissions by 4,000- to 5,000 metric tons per year
- Reduce fuel consumption
- Reduce airline maintenance costs
- Take advantage of Washington state sales tax waivers that expire in 2025 for the project elements related to utilizing electrical power versus fossil fuel

Diversity in Contracting

The project staff, in coordination with the Diversity in Contracting department, have set a 7% woman and minority-owned business enterprise (WMBE) aspirational goal for the Phase 2B construction contract.

Scope of Work

Phase 1 has been completed and included Concourses C and D, Central Terminal Bagwell, and the North Satellite, with a total of 256 charge ports. Phase 1 also included rebalancing of electrical loads on the existing Concourse C Power Center, and upgrade of the existing Concourse D Power Center.

To accommodate renewed growth in airline demand for EGSE, Port staff has subdivided the current Phase 2 work into Phase 2A and Phase 2B, with a total of 138 charge ports. To meet the

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immediate needs of the airlines, part of Phase 2B will be completed via small works contracts and includes 68 EGSE charge ports across a limited number of Concourses A and B, and South Satellite gates. Due to the limited power capacity within Concourse B, a new power center is required prior to completion of the remaining 30 charge ports in Phase 2B. Phase 2A will install an additional 40 charge ports on Concourse A.

The EGSE program currently consists of the following:

- (1) Completed to-date \$18.7M.
 - a. Phase 1, which installed 256 charger ports on Concourses C and D, North Satellite and Central Terminal bag well, and modifications to Concourses C and D power centers.
 - b. Initial Phase 2 design.
 - c. Installation of 30 charge ports under Phase 2.
 - d. Charger equipment purchase for Phase 1, and part of Phase 2.
- (2) Phase 2A - Estimated total cost in 2013 was \$4.6M, and the current total cost is estimated at \$6.6M (\$2M increase).
 - a. Install 40 charge ports on Concourse A.
- (3) Phase 2B - Estimated total cost in 2013 was \$7.4M, with the current total cost estimated at \$12.8M (\$5.4M increase).
 - a. Install 98 charger ports on Concourses A and B and the South Satellite.
 - b. Install new Power Center at Concourse B.

This additional budget is required due to the following:

Description	Budget Impact
Escalation of Construction Costs and Soft Costs	\$6.3M
Arc Flash Mitigation (added scope)	\$1.5M
Design Update of the Entire Phase 2 Project	\$2.1M
Execution via Multiple Sub-phases	\$0.7M
South Satellite Scope Reduction	(\$3.2M)
Budget Increase Total	\$7.4M

The additional \$1.5M for Arc Flash Mitigation, is required for improved safety of the Port maintenance personnel, as well as any electrical contractor performing work on the concourse B Power Centers. Over the past 5 years the Port has begun addressing the Arc Flash hazard concerns on the medium- and low-voltage power distribution systems throughout SeaTac airport. This project includes both low- and medium-voltage scope, therefore Arc Flash hazard mitigation is required, which was unknown when the project budget was established.

The additional \$0.7M for execution of Phase 2 via multiple sub-phases requires the same rigorous design, procurement, and construction process for a small project as a larger single project. This scenario was not included when the project budget was established. The project

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was broken into smaller projects to support airline partner needs on a timely basis, as they were identified.

Total EGSE Charge Port Quantities

Project Phase	Charge Ports
Phase 1, Concourses C and D, and North Satellite	256
Phase 2 A&B, Concourses A and B, and South Satellite	138
Total	394

Schedule

The following schedule identifies the three remaining construction contracts: Phase 2B Small Works; Phase 2B Major Works, and Phase 2A Major Works

Activity

In-use date, Phase 2B Small Works	2020 Quarter 3
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Design Complete, Phase 2B	2020 Quarter 3
Construction Start, Phase 2B	2021 Quarter 1
In-use Date, Phase 2B	2023 Quarter 1

International Arrivals Facility Construction Complete	2021 Quarter 1
Design Complete, Phase 2A	2021 Quarter 3
Construction Start, Phase 2A	2021 Quarter 4
In-use Date, Phase 2A	2022 Quarter 3

Cost Breakdown

	This Request	Total Project
Design	\$1,860,000	\$9,400,000
Construction	\$5,540,000	\$28,700,000
Total	\$7,400,000	\$38,100,000

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ALTERNATIVES AND IMPLICATIONS CONSIDERED

Alternative 1 – Complete the Small Works project charger installations currently in construction. Do not proceed with the new Concourse B Power Center, or the remaining chargers identified under Phase 2A and Phase 2B.

Cost Implications: An estimated \$2,300,000 in costs to-date will need to be expensed if this option is pursued.

Pros:

- (1) No additional capital costs.

Cons:

- (1) Most airlines will not be able to take advantage of EGSE.
- (2) The Port of Seattle will not be able to realize the environmental benefits of EGSE on the remaining south half of Sea-Tac Airport.

This is not the recommended alternative.

Alternative 2 – Complete the planned charger installations and new Concourse B Power Center as identified for Phase 2A and Phase 2B projects.

Cost Implications: \$23,930,189 (Total Phase 2 cost)

Pros:

- (1) Installs 138 EGSE charge ports on Concourses A and B and the South Satellite.
- (2) Maximizes the reduction in carbon emissions from ground service equipment.
- (3) Allows most airlines operating out of Sea-Tac Airport to take advantage of EGSE.
- (4) Increases the electrical power capacity on Concourse B

Cons:

- (1) Additional capital costs.

This is the recommended alternative.

FINANCIAL IMPLICATIONS

Cost Estimate/Authorization Summary

Capital Expense Total

COST ESTIMATE			
Original estimate	\$30,198,000	\$502,000	\$30,700,000
Current change	\$7,400,000	\$0	\$7,400,000
Revised estimate	\$37,598,000	\$502,000	\$38,100,000
AUTHORIZATION			
Previous authorizations	\$25,348,227	\$300,000	\$25,648,227
Current request for authorization	\$12,249,773	\$202,000	\$12,451,773
Total authorizations, including this request	\$37,598,000	\$502,000	\$38,100,000
Remaining amount to be authorized	\$0	\$0	\$0

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Annual Budget Status and Source of Funds

This project, CIP C800335, was included in the 2020-2024 capital budget and plan of finance with a budget of \$30,198,000. A budget increase of \$7,400,000 will be transferred from the Aeronautical Reserve CIP (C800753) resulting in zero net change to the Aviation capital budget. The funding source will be revenue bonds.

Financial Analysis and Summary

Project cost for analysis	\$38,100,000
Business Unit (BU)	Gates Utilities
Effect on business performance (NOI after depreciation)	NOI after depreciation will increase due to inclusion of capital (and operating) costs in airline rate base.
IRR/NPV (if relevant)	N/A
CPE Impact	\$.15 in 2023

Future Revenues and Expenses (Total cost of ownership)

Per industry data, EGSE charging equipment lifecycle is estimated between 13 and 20 years. Having not completed a full lifecycle at this point, we are unable to confirm this but anticipate it will fall within this range. At full build-out of the EGSE system, Aviation Maintenance O&M costs (labor and materials) are estimated at approximately \$175,000 annually, based on current costs for Phase 1 equipment and the increase when Phase 2 is fully installed and operational. This does not include "charging cord" repairs/replacements, which are an airline responsibility. Revenue will be collected from individual airline use via revenue-metered electricity charges at the established Port tenant KWh rate.

ATTACHMENTS TO THIS REQUEST

- (1) Presentation slides

PREVIOUS COMMISSION ACTIONS OR BRIEFINGS

September 13, 2016 – The Commission authorized \$4,600,000 to (1) advertise and award a major works construction contract for Phase 2A (Concourse A) of the Electric Ground Support Equipment (EGSE) Charging Stations project (the anticipated cost of \$4.6 million is within the amount already authorized by the Commission); (2) utilize Port crews to perform construction work.

October 23, 2012 - The Commission authorized \$16,200,000 to: (1) advertise and execute a construction contract for Phase 1 of the Ground Support Equipment-Electrical Charging

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Stations Project-Installation of Chargers; and (2) pre-purchase electrified ground support equipment (EGSE) chargers for Phase 2 of the project.

April 3, 2012 - The Commission authorized \$ 8,000,000 to: (1) prepare full design documents for the Electrified Ground Support Equipment charging station Project; (2) for PCS to install approximately 20 chargers as a demonstration project; (3) approve budget for the EGSE overall project; and (4) contract for long lead time electrical equipment for power center upgrades.

September 12, 2011 - The Commission authorized signing no-cost contracts for EGSE vehicles and EGSE chargers.

May 10, 2011 - The Commission was briefed regarding progress on the EGSE project prior to soliciting pricing for rolling stock.

October 26, 2010 - The Commission authorized \$1,510,000 for preliminary design, necessary contracts, and work by Port forces to begin to implement the ultimate project; pre-purchase specialized equipment and materials through competitive bid processes; and to authorize Port Construction Services to perform Regulated Materials Management (RMM) investigations and self-perform necessary associated work.

September 28, 2010 - The Commission was briefed on the 2011 capital budget that included the EGSE projects.

September 8, 2005 - The Commission was briefed on the benefit of changing from fossil fuel based GSE vehicles to EGSE based vehicles at Seattle-Tacoma International Airport.