



# Electric Ground Support Equipment (EGSE) Charging Stations

# Agenda

- Vision and Purpose
- Benefits
- Impacts and Delays
- Scope Summary
- Budget
- Lessons Learned
- Risks
- Schedule

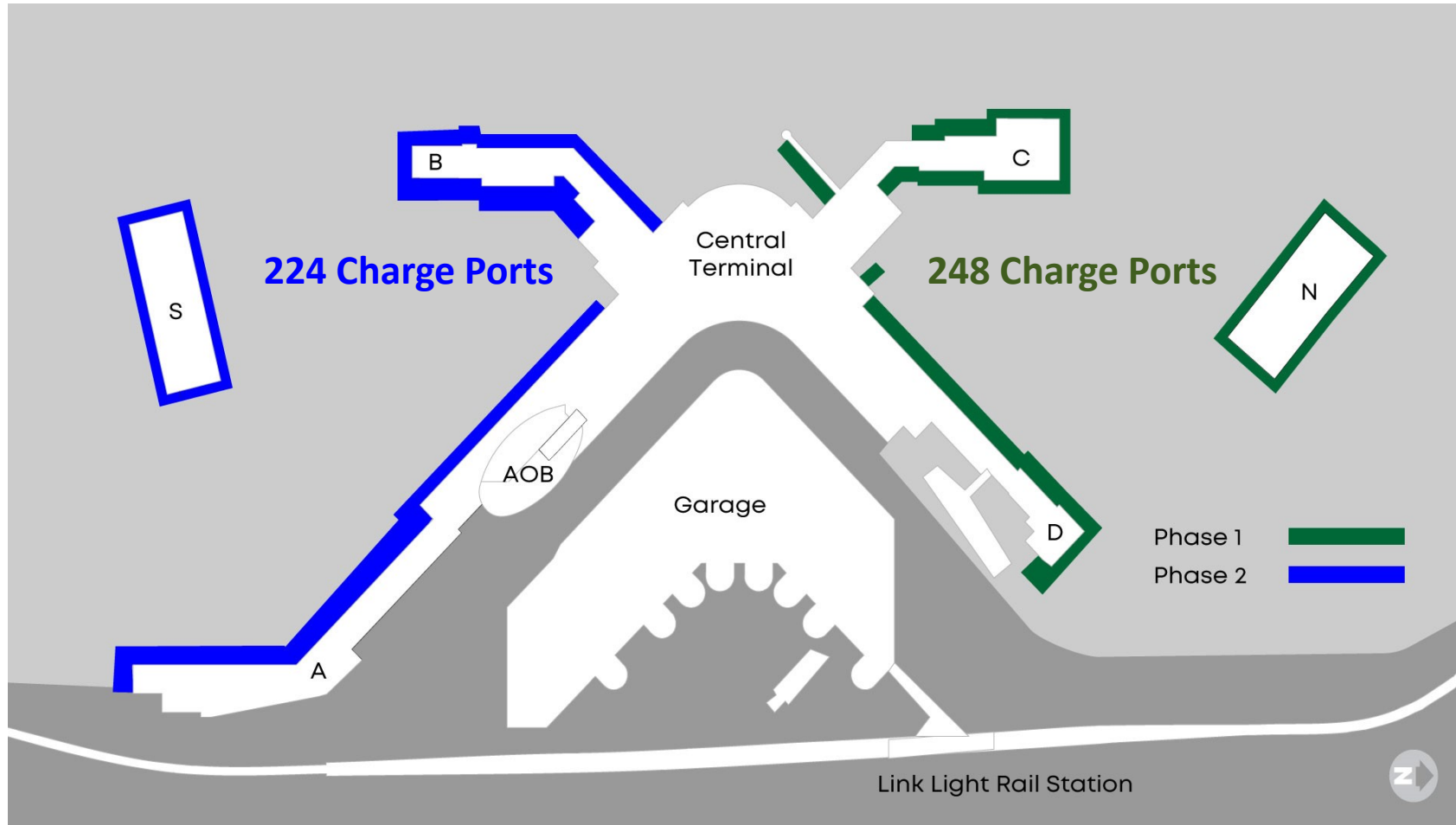
# Today's Meeting Request

Request authorization to:

1. Advertise Phase 2B for Construction;
2. Authorize an increased budget totaling \$7,400,000 for a total project authorization of \$38,100,000.



# Program Vision and Purpose



- Install 472 charge ports
- Enable airline use of EGSE rather than fossil-fuel
- Reduce carbon and other air emissions

# Project Benefits

- Phase 1 completed in 2014
  - Demonstrated emission reductions of ~4,000 metric tons CO<sub>2</sub>/yr
- Phase 2 will
  - Reduce CO<sub>2</sub> emissions by 4,000 to 5,000 metric tons per year, and criteria air pollutants (particulate, SO<sub>2</sub>, NO<sub>x</sub>, etc.) by almost 200 tons per year
  - Reduce fuel consumption
  - Reduce airline maintenance

# Airline Benefits

- Alaska now uses more than 200 EGSE for SEA
- Delta, Southwest, and United collectively, have ~100 EGSE in-use
- Ground crew reception is positive
- High demand for new charger locations on south half of airport.



# Impacts and Delays

- 2013 - Phase 2 deferred
  - Airline realignment
  - Major project construction (e.g., IAF)
- 2016 – Phase 2 separated into multiple projects
  - Maximize installation on Concourse A, B and South Satellite locations, based on existing power capacity
- 2017 - South satellite scope deferred
- Currently planning for full seismic upgrade at SSAT

# Scope Summary



# Typical GSE Charger Corrals

The electrical charging system allows the airlines to use electrically powered ground service equipment.



2 Charge Ports

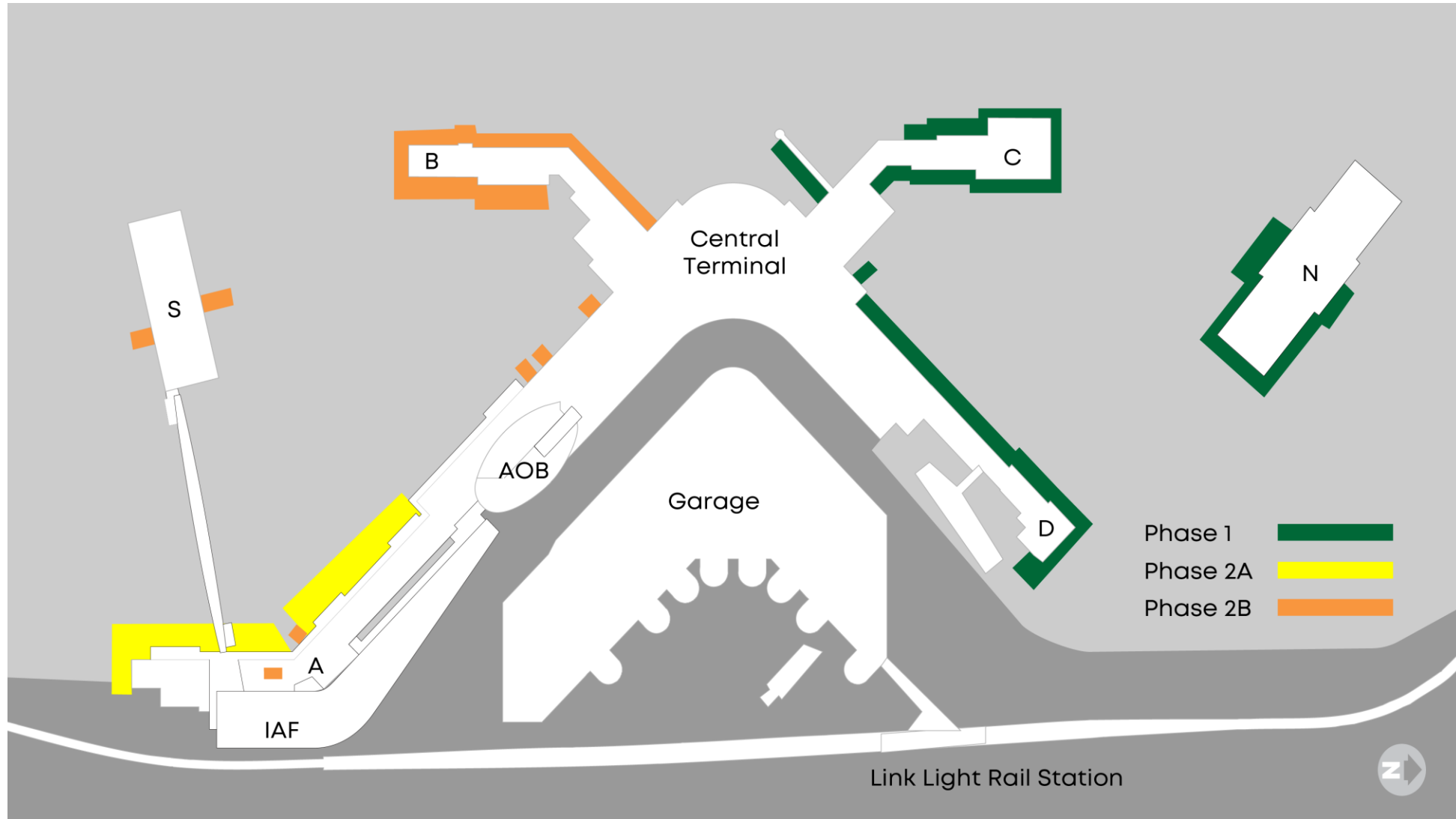


4 Charge Ports

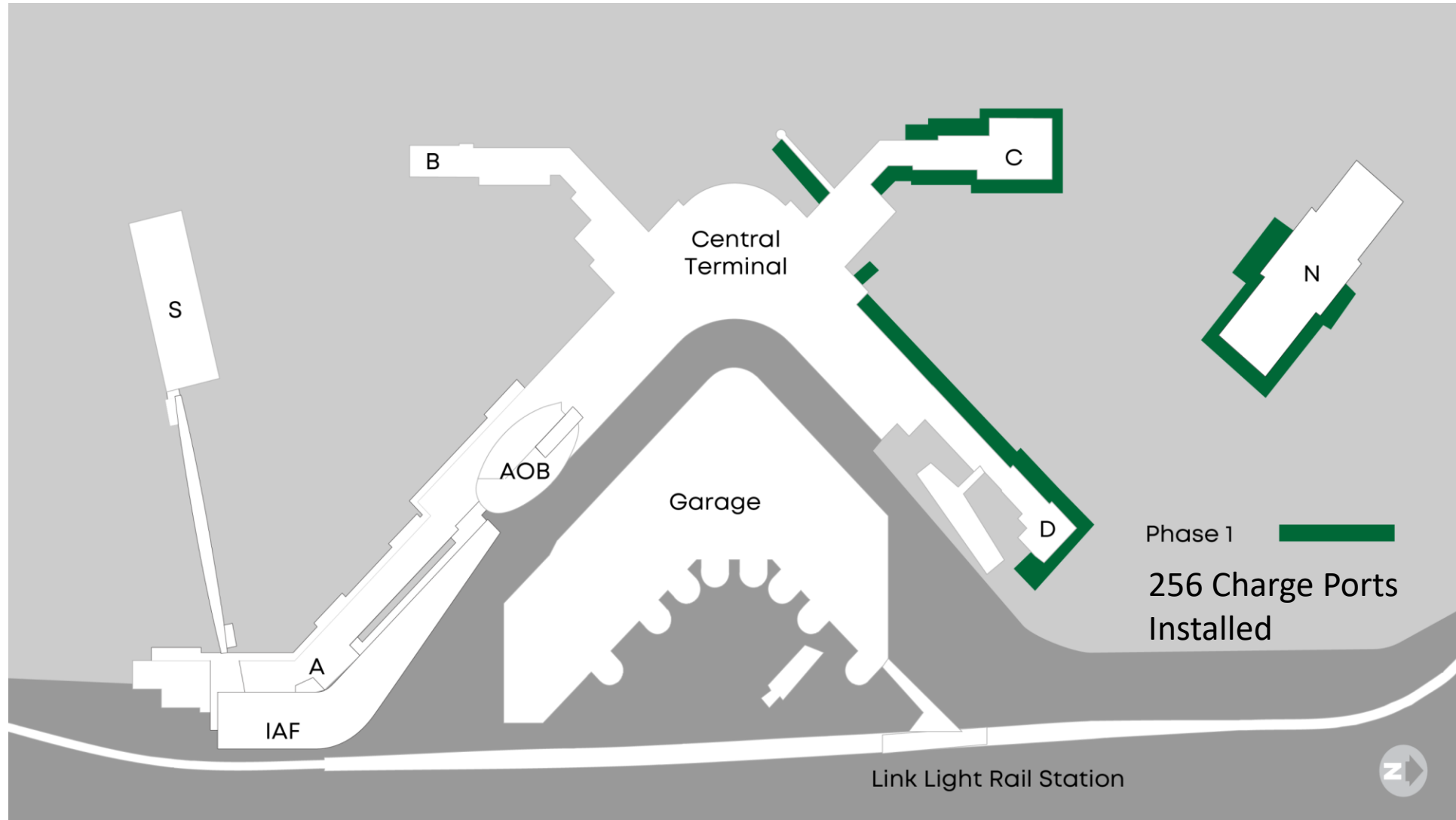


6 Charge Ports

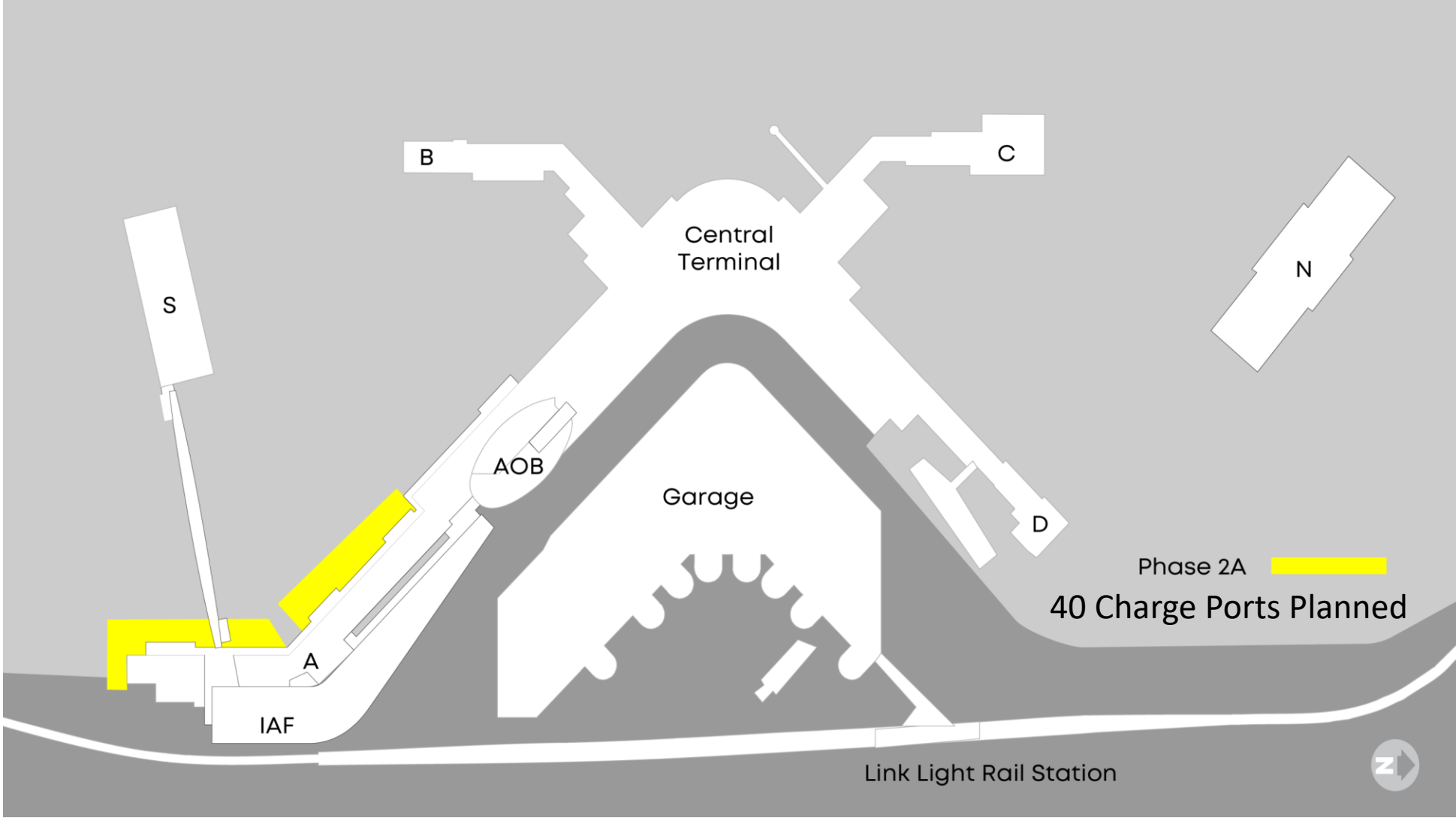
# Full Project Buildout



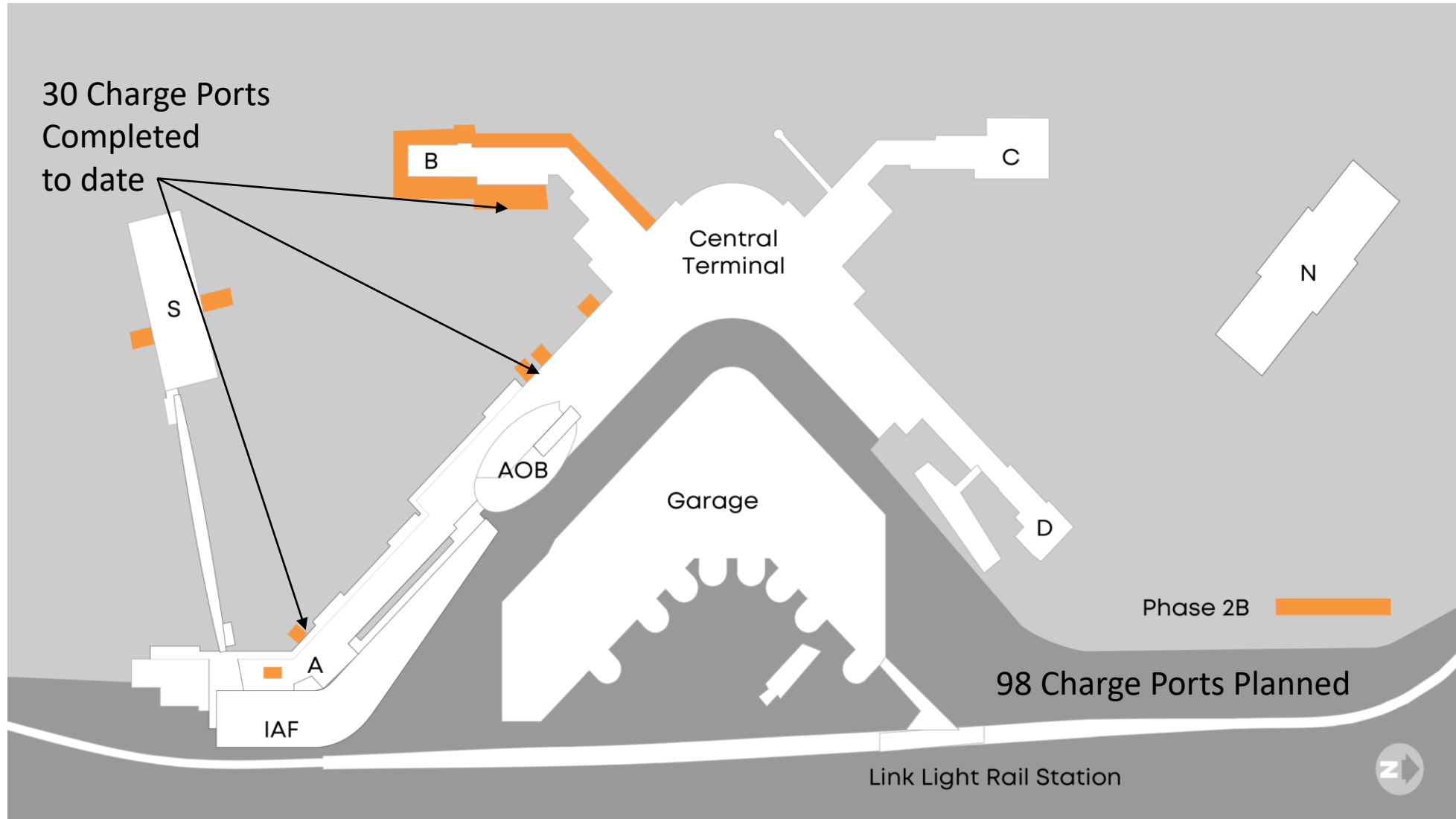
# Phase 1 Installations



# Phase 2A



# Phase 2B





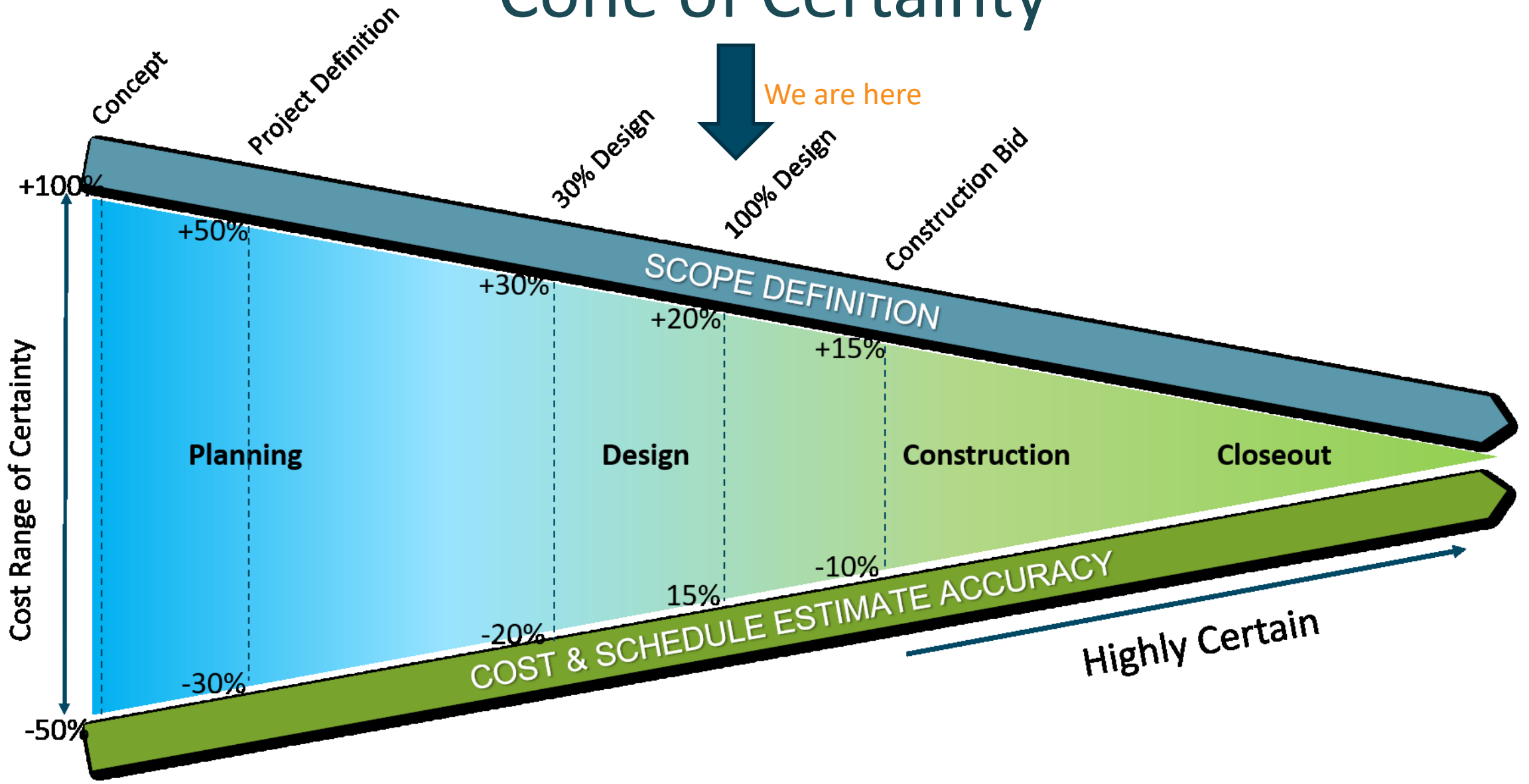
# Budget

	Original Budget	Expended to-date	Estimate to Complete	Budget Increase	Revised Budget
Design	\$7.54M	\$6.2M	\$3.2M	\$1.86M	\$9.4M
Chargers	\$7.0M	\$6.9M	\$1.3M	\$1.2M	\$8.2M
Misc. Equipment	-	\$0.4M	\$0.1M	\$0.5M	\$0.5M
Port Construction Services (Small Works)	-	\$2.0M	\$0.6M	\$2.6M	\$2.6M
Construction (Major Works)	\$16.16M	\$4.4M	\$13.0M	\$1.24M	\$17.4M
<b>Total</b>	<b>\$30.7M</b>	<b>\$19.9M</b>	<b>\$18.2M</b>	<b>\$7.4M</b>	<b>\$38.1M</b>

# Budget Increase

• Escalation of construction costs & 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
• <u>South Satellite Scope Deferral</u>	<u>(\$3.2M)</u>
TOTAL	\$7.4M

# Cone of Certainty



# Lessons Learned

- When a Project is deferred
  - Evaluate impact to cost and schedule then report to commission.
- Project designed within dynamic Airfield Operations Area
  - Establish budget and schedule contingencies on this heightened level of risk for delays and/or design updates.
- Port purchased equipment
  - Selected vendor contract shall be sufficient in length to support the project/program schedule including a reasonable contingency.

# Risks

Project Risk	Budget/Schedule Impact	Mitigation Plan
Phase 1, Owner furnished chargers. Remaining Phase 2 chargers contractor furnished	Contractor markup.	Budget includes contractor markup. Specification includes salient characteristics required by the Port.
International Arrivals Facility (IAF) construction	Phase 2A delayed until completion of IAF	Begin design ASAP based on final configuration of IAF
Ramp is Dynamic	Potential for operational changes between design and installation	Close coordination with Port and Airline Operations staff.



# Schedule

- Phase 2B Small Works In-Use Q3 2020
- Phase 2B
  - Design Complete Q3 2020
  - Construction Start Q1 2021
  - In-Use Q1 2023
- Phase 2A
  - IAF substantial completion Q1 2021
  - Design Complete Q3 2021
  - Construction Start Q4 2021
  - In-Use Q3 2022



Questions?

# Appendix

# 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 \$2,200,000 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 Concourse A, 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.**