

HAWAII CONVENTION CENTER – CHILLER REPLACEMENT

OBJECTIVE

The Hawaii Convention Center seeks to replace the following equipment at their facility at 1801 Kalakaua Avenue, Honolulu, HI 96815.

- 2 each 725 ton York centrifugal chillers (R-123) with VFD compressor
 - Primary chilled water pump – 1,450 gpm @ 55' TDH
 - Condenser water pump – 2,175 gpm @ 60' TDH
- 2 each 795 ton York centrifugal chillers (R-123) with constant speed compressor
 - Primary chilled water pump – 1,590 gpm @ 55' TDH
 - Condenser water pump – 2,460 gpm @ 60' TDH
- 1 each 200 ton Trane centrifugal chiller (R-123) with VFD compressor
 - Primary chilled water pump – 400 gpm @ 55' TDH
 - Condenser water pump – 600 gpm @ 60' TDH
- 2 each Secondary chilled water pumps – 3,045 gpm @ 130' TDH

In addition to the equipment above, the following support equipment and systems shall be replaced to support the chillers and pumps.

- Refrigerant monitoring system.
- Upgrade the chiller plant ventilation system to match current ASHRAE 15-2019 safety standard.
- Replace the motor control centers MCC-SF and MCC-SE.
- Include a new primary chilled water manifold to allow the operation of any primary chilled water pump with any chiller.
- Equipment shall be connected to the existing Automated Logic Building Automation System (BAS).

There are four (4) existing Reymsa cooling towers that were recently replaced. Selection and performance criteria is enclosed within the record drawings provided. The cooling towers are not part of the scope of this RFP, however would be used as part of the energy simulation.

Perform a Life Cycle Cost Analysis (LCCA) with parameters as noted below.

- Life Cycle: 30 years
- Discount rate: 6%
- Inflation/Escalation rate: 3%
- Include applicable initial/collateral costs
- Include applicable replacement/costs
 - Periodic testing/maintenance
 - Eddy current testing
 - Bearings
- Include annual costs
 - Load profile by Island Controls (Jason Forester)
 - HECO utility bill (\$/kWh, \$/kW)
 - Maintenance costs

Equipment to be included in the life cycle cost analysis shall be limited to the replacement equipment only, however the cooling towers shall be used in the energy simulation.

Energy simulation software to simulate the energy consumption shall be in compliance with ASHRAE 140 – 2020. The following documents shall be submitted with the LCCA results:

- Energy simulation inputs including load and usage profiles.
- Energy consumption outputs isolating chiller, pump and cooling tower in kWh and kW units.
- Certificate of compliance with ASHRAE 140 – 2020.

MECHANICAL BASIS OF DESIGN

CODES AND REFERENCES

IBC	International Building Code, International Conference of Building Officials, 2012 Edition, with local amendments
ASHRAE	ANSI/ASHRAE Standard 62.1-2019, Ventilation for Acceptable Indoor Air Quality
IECC	International Energy Conservation Code, 2015 Edition and ANSI/ASHRAE/IES Standard 90.1-2013, with local amendments
UPC	Uniform Plumbing Code, 2006 Edition, International Association Plumbing and Mechanical Officials.
DOH	Hawaii State Department of Health, Chapter 39 Air Conditioning and Ventilation 1983, ASHRAE Standard 62.1
SMACNA	Sheet Metal & Air Conditioning Contractor's National Association, Standards
ADAAG	2010 Americans with Disabilities Act for Accessible Design, United States Department of Justice
NFPA	NFPA 13: Standard for the Installation of Sprinkler Systems, 2016 Edition NFPA 101: Life Safety Code

AIR CONDITIONING SYSTEMS

The following record drawings are provided for reference:

- M0.1 – Schedules and Notes
- M.2.0.2 – Intermediate Level VAC Plan
- M.2.0.4 – Meeting Room Level VAC Plan
- M.2.0.5 – Ballroom Level VAC Plan
- M.2.2.E - Intermediate Sector E VAC Plan
- M.2.4.E – Meeting Room Sector E VAC Plan
- M.2.5.E – Ballroom Level VAC Plan
- M10.1 – Piping Diagrams VAC

Design parameters shall be as follows:

- Chilled water supply temperature: 43°F
- Chilled water temperature rise: 12°F
- Condenser water setpoint temperature is 79°F

- Equipment selections will not require upgrade of electrical utility system.

Acoustics

- Chillers shall be provided with seismically restrained vibration isolators (2" min. static deflection), unless manufacturer recommends otherwise.
- Pumps shall be provided with inertia pads and seismically restrained vibration isolators (2" min. static deflection), twin sphere flexible connectors, wye strainer with blowdown valve, non-slam check valve.

Controls

New equipment shall be monitored and controlled by the Automated Logic Building Automation System (BAS). Coordinate new sequence of operations with Island Controls with an emphasis on simplicity.

PLUMBING

Plumbing work shall be limited to any incidental work (temporary or permanent) that may be required to replace the chillers, pumps and piping.

FIRE PROTECTION

Fire protection work shall be limited to any incidental work (temporary or permanent) that may be required to replace the chillers, pumps and piping.

ELECTRICAL BASIS OF DESIGN

CODES AND REFERENCES

IBC	International Building Code, International Conference of Building Officials, 2012 Edition, with local amendments
IEEE	IEEE 242, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems, 2001 IEEE 399, Recommended Practice for Industrial and Commercial Power System Analysis, 1997
NFPA	NFPA 1, Fire Code, 2018 Edition, with local amendments NFPA 70, National Electrical Code, 2017 Edition with local amendments NFPA 70E, Standard for Electrical Safety in the Workplace, 2015 Edition NFPA 101, Life Safety Code, 2015 Edition
ANSI	ANSI C2, National Electrical Safety Code, 2017 Edition
IECC	International Energy Conservation Code, 2015 Edition and ANSI/ASHRAE/IES Standard 90.1-2013, with local amendments
ADAAG	2010 Americans with Disabilities Act for Accessible Design, United States Department of Justice

ELECTRICAL SYSTEMS

The following design drawings are provided for reference:

- EP-2.2E – Intermediate Level, Sector E Floor Plan Power
- EP-2.4E – Meeting Room Level, Sector E Floor Plan Power
- E5.1 – One Line Diagram Central Plant

Design parameters shall be as follows:

- Chiller power: 480/277-volts, 3-phase, 4-wire.
- Pumps (primary chilled water, condenser water) power: 480/277-volts, 3-phase, 4-wire.
- Phase work to coincide with shutdown of mechanical work.
- Incidental related work to accommodate replacement and improvements.
- Perform overcurrent protective device coordination studies to determine overcurrent protective devices and to determine overcurrent protective device settings for selective tripping in accordance with IEEE 242 for calculating short-circuit currents and determining coordination time intervals and IEEE 399 for general study procedures. Field

adjust relays and protective device settings according to recommended settings provided by coordination study.

FIRE ALARM AND DETECTION

As necessary during alterations or renovations devices or any fire-warning system permitted to be made inoperative or inaccessible, a fire watch shall be required.