BURNS McDONNELL

CASE STUDY / **JET ENGINE SHOP RENOVATION AND UPGRADE**

IMPROVING BASE PERFORMANCE THROUGH A MORE FUNCTIONAL FACILITY

The Hawaii Air National Guard's 199th Fighter Squadron, located at Joint Base Pearl Harbor-Hickam, had just changed aircraft from the F-15 Eagle to the F-22 Raptor, requiring that the existing jet engine shop be given a major upgrade. Designing and constructing an efficient and sustainable space was top priority.

A COMPREHENSIVE BUILDING RENOVATION SUPPORTS AN ONGOING MISSION

With a new airframe to support, Joint Base Pearl Harbor-Hickam needed the tools and facilities to keep things running smoothly.

PROJECT STATS

CLIENT
Hawaii Air National Guard

LOCATION
Joint Base Pearl Harbor-Hickam, Hawaii

COMPLETION DATE
2017

$150M
WITH 13 PROJECTS COMPLETED

MORE THAN
32K
SQUARE FEET

MORE THAN
30%
REDUCED ENERGY COSTS

CHALLENGE

Built in 1970, the existing jet engine shop at Joint Base Pearl Harbor-Hickam was made up of just over 32,000 square feet, comprised of a two-story steel and concrete masonry unit (CMU) structure. Designed to serve the F-15 Eagle, the facility's features were far out of date.

The team discovered that the building core itself, as well as the surrounding ancillary support buildings, did not comply with Antiterrorism/Force Protection (AT/FP), Americans with Disabilities Act (ADA), or local seismic and wind requirements. Additionally, the facility would need to meet certain environmental requirements for energy savings, water usage and sustainability.

Finally — because the squadron of F-22 Raptors, the Air Force's new stealth tactical fighter aircraft, had been introduced at the base — the redesigned facility would need to provide critical support and maintenance functions for the new aircraft to continue the base's defense mission.

SOLUTION

In order to provide the most effective solutions, it was determined that the demolition of the entire building envelope, three existing CMU stairwells, ancillary buildings, and the existing HVAC system would be required to complete the renovation.

The envelope was replaced with new prefinished insulated metal wall panels and a split-faced

CMU insulated cavity wall system, alongside new thermally efficient aluminum-framed windows and doors. Demolition of existing pavements and replacement with new asphalt access drives, concrete access ramps and pedestrian sidewalks connects the building to adjacent flightline facilities.

Construction of two new exterior steel stairs at each end of the building met life-safety and seismic criteria, replacing interior stairwells. Also required: Installation of new variable refrigerant flow heat pumps and a dedicated outdoor air system to support office spaces, as well as a new ventilation and exhaust system for first-floor high-bay areas.

It was necessary to remove and replace old utility lines, including overhead and underground electrical lines and sewer and water lines. New plumbing with low-flow fixtures and electrical upgrades were added to reduce water and energy usage and a new standing seam metal roof system with gutters and downspouts was installed.

RESULTS

The reconfigured first floor contains a large high-bay area, which houses the engine repair shop with overhead crane, miscellaneous shops, tool storage and issue, and parts storage. The remaining space contains the men's and women's latrines with adjacent shower and locker rooms, a break room, offices, a computer room and building utility spaces.

The second floor primarily consists of administrative areas for the Aircraft Maintenance Unit and includes private and open offices, a conference room, a training classroom, and personnel and building support space. A new stair tower, building entry and elevator were also added for ADA compliance.

Building hardening and updated apron design features were added to meet AT/FP and standoff distance requirements, as well as new HVAC, plumbing, electrical and other building systems to comply with Unified Facilities Criteria.

To make the facility more sustainable, a new stormwater treatment system was installed to improve quality of runoff from surrounding sites. Low-flow plumbing fixtures, high-efficiency lighting and roof-mounted solar hot water heating systems contribute to energy cost savings of nearly 30 percent annually. Finally, sustainable building practices were used to reduce waste at the construction site by 85 percent.

2018 USAF Design Merit Award Winner for Facility Renovations and Additions

BURNS McDONNELL

burnsmcd.com | Offices Worldwide

07282-AFB-1018