JUNEAU INTERNATIONAL AIRPORT
CITY & BOROUGH OF JUNEAU
ALASKA'S CAPITAL CITY

ATTACHMENT #2

TO: Jeannie Johnson,
JNU Airport Manager

DATE: May 5, 2011

FROM: Catherine Fritz, AIA
JNU Airport Architect

FILE: 1382.16

RE: Terminal Renovation Project Update
Snow Removal Equipment Facility Project Update

Terminal Renovation.
Renovation of the Check-In Lobby is nearly complete. The work includes Alaska Airlines' new 2-step system, new interior finishes, and energy efficient lighting.

Design work on the remaining exterior portion of the 1984 building face continues. We expect to have documents ready for construction in a few weeks and are working with the contractor to identify the costs. Some materials (eg steel columns, glass, metal panels) will require many weeks to develop shop drawings and be fabricated prior to shipment. The actual on-site work will begin in mid-September, after the peak passenger loads. The construction is expected to be complete by the end of December, 2011.

Main Entry facade.

Grout installation at Check-In lobby.

Snow Removal Equipment Facility.
Concerns about the specific location of the phase I building on the NE development area led us to re-visit the building site plan. The result was a much more compact footprint that allows more flexibility for developing surrounding lands in the future. The design team will incorporate the modifications into the construction documents for the Site Infrastructure project that is now expected to be ready for bidding early June. Once this design work is complete, the team will be able to finish the building design documents, currently estimated to be bid ready by late summer.

Miscellaneous.
I attended the Business of Clean Energy conference in Anchorage on April 28-29. The geothermal heat pump project received positive reference by several of the invited dignitaries including Senator Lisa Murkowski and Lieutenant Governor Mead Treadwell. My presentation of the terminal project was very well received, as well.

Business of Clean Energy in Alaska Conference 4.29.2011

Geothermal Conversion at Juneau International Airport

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Project Overview.

The use of geothermal energy at the Juneau International Airport is a part of an overall terminal improvement plan. Portions of the existing building date back to the original construction of 1948. Prior to this project, no significant work had been done on the terminal for over 25 years, despite dramatic changes in the aviation industry for many decades. The existing architecture was simply outdated and failed to serve the contemporary demands upon it; the systems that keep it running were inefficient and obsolete.

The Airport Board initiated a planning study in 2003 that identified the deficiencies of the terminal. The Board recommended that renovation and expansion of the 1984 portions of the building and replacement of the older sections was preferred over construction of an entirely new terminal. In the study, engineers noted the serious need to increase energy efficiency and improve air quality. The operational analysis accurately predicted that escalating energy costs caused from rising oil prices would compound the inefficiencies of outdated equipment and systems. By 2007, a mix of local, state, and federal funding sources totaling approximately $23 million had been secured to begin a multi-phase approach to renovation and expansion that would reduce operating costs, modernize infrastructure, and improve passenger experiences.

In 2007, the Airport initiated a Feasibility Study that compared a traditional boiler system to a geothermal application. The results of the analysis by consultant mechanical engineers Doug Murray and Jim Rehfeldt concluded that using geothermal energy in a heat pump configuration was both feasible and desirable.

A closed loop system was designed that circulates a methanol fluid through 16 miles of HDPE piping in 108 borings, each 360 ft. deep. The fluid absorbs heat from the earth and transfers it at each of the 29 electric heat pumps inside the building. Electronic controls allow each heat pump to respond to specific heating, cooling, and ventilation needs throughout the terminal. The geothermal system also provides energy for heating water and maintaining an exterior ice-melt system in sidewalks. Combined with other energy improvements in the terminal including improved R-values in the envelope and new lighting systems, the airport has set a positive tone for future modifications.

Results.

As we near completion of the first phase of Airport Terminal Improvements, we are confident that the primary benefit of the geothermal system will extend directly to airport users and the traveling public through reduced operating costs. As a locally owned airport, JNU's mission reflects a balance of providing needed public services and offering reasonable tenant lease rates that allow private businesses to do the same. A significant portion of the terminal's operating budget is found in utilities and maintenance. As the building ages and fuel costs increase, added costs are passed on to users. Conversely, lower energy operating costs will provide savings that benefit the diverse array of tenants and airport users.

JNU Airport is located on a sensitive natural environment. The beauty of this area and its important role in the ecosystem is balanced with the human need to have safe and modern air facilities. Extensive ongoing review of environmental issues occurs at the Airport that includes many local, state, and federal agencies and citizen groups. This geothermal project further demonstrates Juneau's commitment to balancing natural and human needs at the Airport.

Finally, the GSHP system reduces carbon dioxide emissions, provides a system of substantially higher efficiencies, and is a living demonstration of a viable alternative renewable energy and contemporary applications of sustainable building design. The airport is a place of public pride that serves an essential role to travelers and residents. This project has inspired other designers and owners to consider geothermal energy and has raised awareness of the importance of taking a holistic approach to capital projects.

ATTACHMENT #2
Juneau International Airport
Geothermal Loop Field Project Photo Journal

6.4.09: Drilling is nearly complete. U-Bend assemblies of ¾" HDPE pipe set in each bore hole; backfilled with pea rock.

6.25.09: Trenching between rows of borings is complete; bedding material will be spread to rest the horizontal pipes upon.

7.02.09: Manifolds are moved onto the site by Harri's Plumbing & Heating crew. Each pipe assembly was pre-assembled with fused joints off-site.

8.15.09: 8 Insulated supply and return lines are routed from the loop field to the existing building.

9.3.09: In-slab piping provides an ice-melt system through the concrete sidewalks in front of the terminal. Manifolds terminate in an accessible under-slab vault.

02.18.10: Manifolds are connected in vaults for ice-melt system.

A total of 26 Water-to-Air Heat Pumps are installed in ceiling spaces inside the building.

Water-to-Water Heat Pumps heat fluid for sidewalk ice melt system.