3rd Air Support Operations Squadron Facility

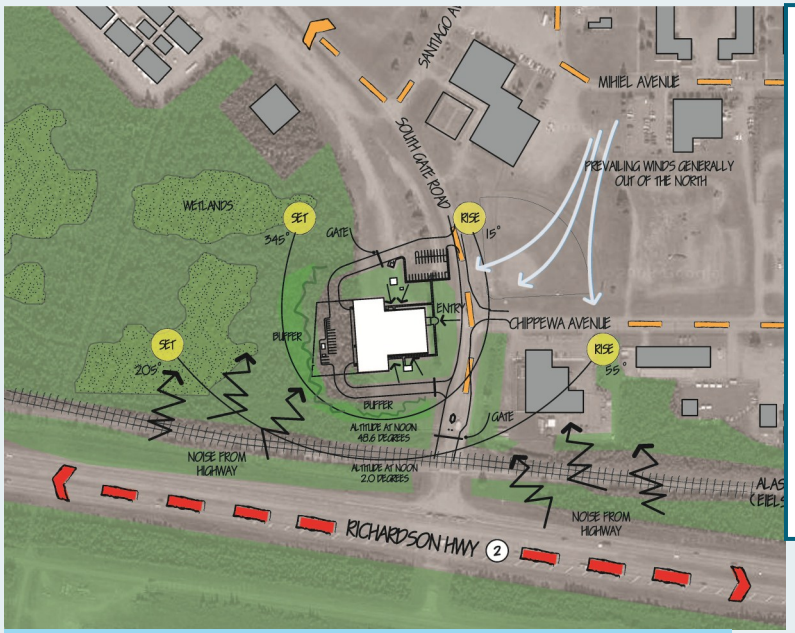
Building 3467
Fort Wainwright, Alaska

LEED Gold
43 points

Sustainable Design Highlights:

- **Reduced energy consumption by over 36% with the use of integrated systems controls, highly-insulated wall and roof assemblies, excellent air sealing, double-pane low-e daylighting panels and efficient lighting and appliances.**
- **Carbon emissions are reduced by using steam from the Post's co-generation power plant for all space heating and hot water.**
- **Low-flow fixtures reduce water consumption by 41%, and recirculating hot water lines provide further savings by eliminating warm-up time. In addition, the landscaping uses native vegetation which does not require irrigation in this arid climate.**
- **Healthy indoor air quality is provided by low VOC finishes and materials, construction dust mitigation and a CO/CO_2 ventilation monitoring system.**
- **Over 75% of construction waste was diverted from the landfill, contributing to the newly formed recycling efforts in this area.**
- **Innovation and Design credits for 5 additional points**

The 34,600 square foot 3rd Air Support Operations Squadron building is a military facility comprised of administrative, training, equipment maintenance, and minor vehicle repair spaces. It houses 40 civilian and military personnel providing close air support for ground soldiers.



Location

Fort Wainwright, Alaska

Situated outside of Fairbanks, Alaska's second largest city, Ft. Wainwright is home to "America's Arctic Warriors", where over 10,000 people work and live.

Project Team

Owner: U.S. Department of the Army

Construction Manager: U.S. Army Corps of Engineers

General Contractor: CH2M Hill Constructors, Inc.

Architect/Engineer/Survey: Design Alaska, Inc.

Geotechnical Engineer: Shannon & Wilson, Inc.

Landscape Architect: The Landscape Co.

ARCTIC CHALLENGE

Sustainability in the far North doesn't come easy

Alaska's interior presents several unique challenges that make designing a LEED certified building especially difficult.

With winter temperatures of –40°F and colder, there is an enormous heating demand that must be met with a superb building envelope and efficient heating systems.

Since there is only 3-4 hours of daylight in the winter, our lighting usage is much higher than usual, demanding efficient light fixtures and intelligent lighting design.

Winter means a lot of time spent indoors, so IAQ is even more important in Alaska. Proper ventilation (with heat recovery), healthy material selection and contaminant source control are vital design strategies.

The remote nature and sparse population of the Alaskan interior makes certain LEED credits, such as Development Density, Public Transportation and Regional Materials, difficult, if not impossible, to achieve.

ENERGY

Alaska's per capita energy consumption is twice the national average[1]. But the high heating and lighting demand are only part of the problem. With very little manufacturing in Alaska, most products are shipped from Seattle (over 1,500 miles away) - adding to the carbon footprint (and expense) of building materials.

[1] US Energy Information Administration

SUSTAINABLE SITES

8 points

Sustainable building starts with site selection and layout. The 3rd Air Support Operations Squadron Facility is built on previously developed land, preserving native forests and nearby wetlands.

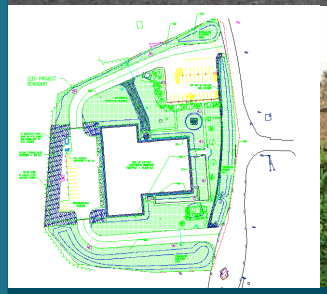
After construction, the site was heavily vegetated with native and adapted plants to maintain habitat integrity.

The site is designed to contain 100% of its stormwater runoff with the use of vegetated retention areas, which allow water to percolate into the soil.

Vegetated open spaces (more than twice the building footprint) and open-grid paving reduce the heat island effect and minimize ecological impacts.

All indoor lighting is designed to stay inside the building and all exterior lighting is hooded to reduce light pollution.

Special parking spaces for carpools and low-emission vehicles encourage building users to reduce their transportation footprint. Bicycle storage and showers are provided for bike commuters, further reducing the building's associated carbon footprint.



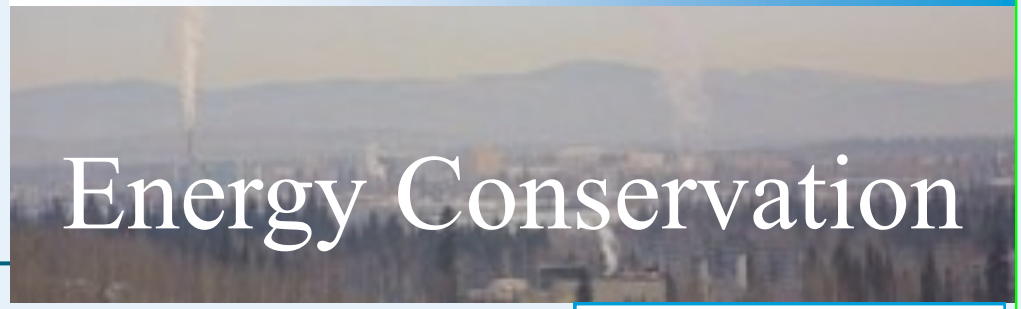
OPEN-GRID PAVING

A HIDDEN DRIVEWAY

By incorporating an open-grid paving system for mechanical room access, open space is maximized, heat island effect is reduced and stormwater management is improved. But you wouldn't notice, by looking, because the paving is hidden by the continuous native plantings (shown here just after seeding).

11 points

3rd Air Support Operations Squadron Facility



Energy Conservation

Over 36% Energy Savings

- Superior windows, high levels of insulation and air sealing reduce heat loss.
- Optimal lighting power density, task lighting, occupancy sensors and efficient, low-mercury fixtures reduce energy demand.
- Thermal and ventilation systems are automated and on-demand.
- Efficient motors and variable frequency drives (VFDs) improve the efficiency of mechanical systems.
- Enhanced Commissioning ensures optimal performance of energy systems and assists proper maintenance for long-term efficiency.

"Build it Tight, Ventilate Right"

In the winter, when the outside air is **100 degrees** colder than the inside air, it is essential to build a very tight building. A lot of effort goes into providing a continuous vapor retarder and effective air sealing to prevent heat loss through exfiltration. With such a tight building, though, it is very important to provide adequate ventilation to maintain healthy indoor air and prevent moisture migration problems, such as mold. Since this can create a lot of heat loss, this building uses a heat recovery ventilation (HRV) system which recaptures 70% of the heat from exhausted air to pre-heat the fresh air supplied to occupied rooms.

ENERGY SOURCE

In addition to conserving energy from efficient devices, integrated controls, and an improved envelope, the energy source is itself a product of conservation efforts.

100% of the hot water and space heating for this building is provided by steam from Ft. Wainwright's co-generation power plant , reducing fuel consumption and atmospheric emissions.

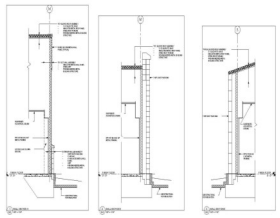
Automated Building Systems

A fully integrated Direct Digital Control (DDC) system manages the building's thermal and ventilation systems to optimize performance.

- ◊ A night set-back allows the building to get colder in the winter and warmer in the summer when it is unoccupied, drastically cutting heating and cooling energy usage.
- ◊ A variable air volume (VAV) system and CO2 sensors adjust the amount of ventilation and cooling air brought into the building based on room temperature and CO2 levels, reducing energy loads.
- ◊ A user override is provided for the ventilation system when the vehicle maintenance doors are left open for long periods of time.

A Better Building Envelope

- R-36 walls, R-39 roof, R-20 slab
- Daylight Panels: U = 0.15, low-E, double pane
- Exfiltration: less than 0.25 cfm/sq. ft. @ 75 Pa.



WATER

4 points

Although Alaska is known for its stunning glaciers and pristine lakes, the Interior of Alaska is actually less than 1 inch of annual precipitation away from being classified a desert. Conserving water is essential to sustainable building in this semi-arid climate.

41% The percentage of water saved by low-flow fixtures. Recirculating hot water to eliminate water wasted during the "warm up" period accounts for additional savings.

100% The percentage of irrigation water saved by using native vegetation that can withstand the long, dry days of the Interior Alaska summer.

Low-flow fixtures

-Urinals: 0.125 GPF

-Toilets: 1.3 GPF

-Showers: 1.5 gpm

-Bathroom faucets: 0.5 gpm

MATERIALS & RESOURCES

6 points

OVERCOMING REMOTE BARRIERS

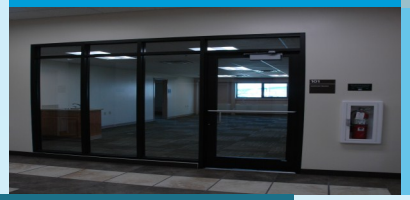
Recycling is in its infancy in the Alaskan Interior due to its distance from processing facilities. Despite this challenge, **over 75%** of construction waste was diverted from the landfill.

Despite the difficulty of obtaining specialty products in Alaska, a significant portion of the building materials contain recycled content.

As much as possible, the building used regional materials to cut down on the tremendous impacts of shipping to Alaska.

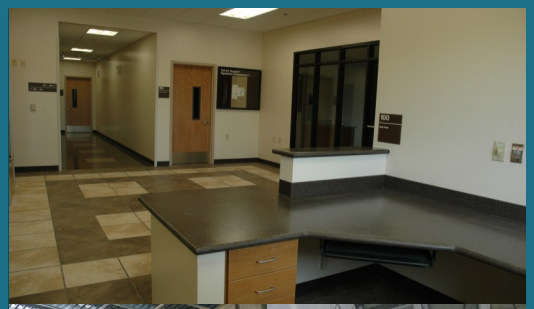
9 points

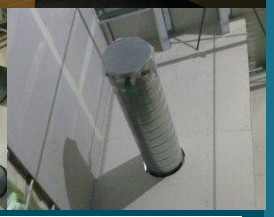
3RD AIR SUPPORT OPERATIONS SQUADRON FACILITY



Indoor Environmental Quality

In order to provide healthy indoor air for building occupants, a strategy of "Reduce, Eliminate, and Contain" was incorporated in the design and construction practices.





REDUCE

START WITH A HEALTHY BUILDING

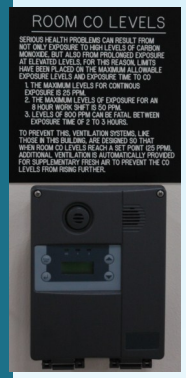
All paints, adhesives, coatings, carpeting and casework are certified to be low-VOC.

All HVAC equipment and ducts were sealed during construction to prevent dust infiltration.

A pre-occupancy "flush out" of the building ensures a healthy IAQ.

ELIMINATE

REMOVE POLLUTANTS FROM BUILDING



The ventilation system is controlled by CO levels in the vehicle maintenance shop and CO_2 levels in other areas, providing supplemental fresh air as needed to improve the performance and health of building occupants.

The use of high efficiency MERV 13 filters prevent environmental contaminants such as vehicular exhaust and forest fire smoke from entering the building.

Smoking is prohibited within 50 feet of the building.

CONTAIN

PUT POLLUTANTS IN THEIR PLACE

Many pollutants enter buildings from visitors' shoes.

A permanent slotted grate system contains dirt and chemicals in the entryways, and can be easily cleaned.

Rooms with chemical storage, such as the janitorial and battery rooms are kept negatively pressurized to prohibit building contamination.

USER COMFORT

In addition to healthy indoor air, building users are provided with control of environmental conditions.

The training area is supplied with local user controls for the cooling system, and office areas are provided with task lighting and operable windows.