FTW 336B Barracks

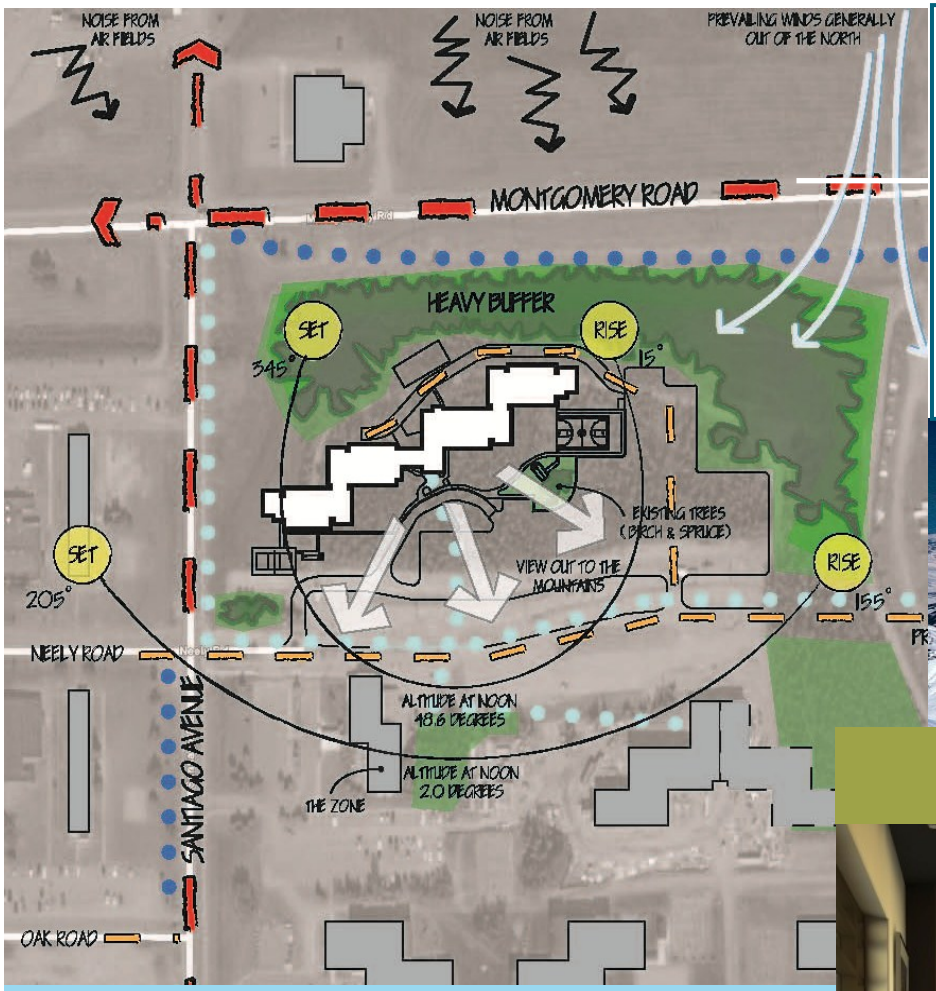
Kiewit Building Group / Design Alaska

Building 3200
Ft. Wainwright, Alaska
LEED Gold
41 Points

FTW 336B Barracks is a 100,006 SF, three-story building housing 276 soldiers in 138 two-bedroom apartments. A centralized core includes the lobby, mail room, recycling and vending areas. The second floor of the core also houses generously sized activity spaces, one of which is graced with large south-facing windows that provide a commanding view of the Alaska Range. Exterior recreation spaces including volleyball, basketball, and barbecue pavilions.

Sustainable Design Highlights:

- **Reduced energy consumption by over 50% with the use of integrated systems controls, highly-insulated wall and roof assemblies, excellent air sealing and triple-pane, Argon-filled, low-E windows.**
- **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 34%, 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_2-monitoring ventilation system.**
- **Over 75% of construction waste was diverted from the landfill, contributing to the newly formed recycling efforts in this remote location.**
- **Innovation and Design credits for 5 additional points**



Ft. 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.

Second floor Activity Room with views of the Alaska Range and south facing winter sun on the low horizon

Project Team

Owner: U.S. Department of the Army

Construction Manager: U.S. Army Corps of Engineers

General Contractor: Kiewit Building Group, 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

9 points

FTW 336B BARRACKS

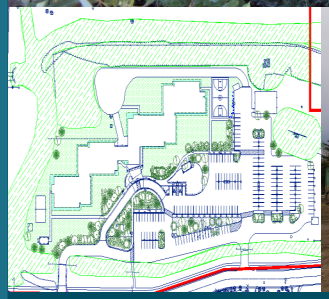
Sustainable Sites

Sustainable building starts with site selection and layout. This 276-person barracks facility is built on previously developed land, reducing human impacts on local pristine forests, wetlands or other greenfields.

Vegetated open spaces (more than twice the building footprint) 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.

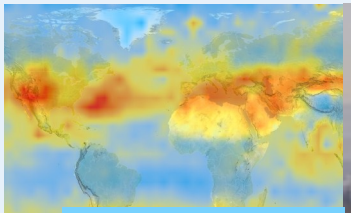
Special parking spaces for carpools and low-emission vehicles, as well as a centralized ride-sharing board, encourage building users to reduce their transportation footprint. Bicycle storage is provided for residents and visitors, further reducing the building's associated carbon footprint.



SITE PRESERVATION

BUFFER ZONES & RESTORATION

While this site was previously developed, there were significant stands of spruce, birch and aspen that were protected by buffer zones (48% of the site) which prevent disturbance from construction activities. Post-construction restoration of the site with native and adapted plants will contribute to an impressive area of vegetated open space (over 71% of the site).



12 points

FTW 336B Barracks

Energy Conservation

Over 50% Energy Savings

- Superior doors, windows, insulation and air sealing reduce heat loss.
- Radiant slabs provide stable heat delivery where it is needed the most, and variable frequency drives (VFDs) control the pumps based on temperature needs, reducing energy loads and heat loss.
- Exterior lighting is hooded and reduced by over 60%.
- Advanced motors improve the efficiency of mechanical systems.
- Cooling is provided by window shading and an economizer-controlled system using a non-ozone-depleting refrigerant.
- 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 condensation and 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 mold growth. Since this can create a lot of heat loss, this building uses a heat recovery ventilation (HRV) system which recaptures 54% of the heat from exhausted air to pre-heat the fresh air supplying the building.

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.
- CO_2 sensors adjust the amount of ventilation air brought into the building based on room temperature and CO_2 levels, reducing energy loads.

Intelligent Parking Lot Controller



The extreme Alaskan winter makes cars so cold that many won't start without an electrical heater that warms the engine. These heaters reduce warm-up idle emissions by 59%[1] (CO is reduced by almost **1 pound** per start[2]), but if not controlled wisely, it uses a lot of electricity.

This building has 196 outlets in the parking lot, and all of them are controlled by an Intelligent Parking Lot Controller (IPLC), which drastically reduces energy consumption. Through temperature-regulated power delivery and a programmable power schedule, this innovative device is projected to save over **65,000 kWh** of electricity!!

A Better Building Envelope

- R-41 walls, R-15 slab, R-62 roof
- Doors: R-11
- Glazing: triple pane, Argon, low-E, U = 0.17

Sources: [1]Municipality of Anchorage, Environmental Services; [2]Missoula City-CAQAC

FTW 336B Barracks

Water Efficiency

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.

34% 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

-Toilets: 1.3 GPF

-Showers: 1.6 gpm

-Bathroom faucets: 1.5 gpm

-1,142,059 GALLONS SAVED EACH YEAR

WATER = ENERGY

The **1.1 MILLION GALLONS** of water saved each year in this building, amounts to almost **7,000 kWh** of energy savings associated with the treatment and distribution of water.

MATERIALS & RESOURCES

3 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.

8 points

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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 and casework are certified to be low-VOC.

Walls are finished with paperless drywall to prevent mold growth.

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_2 levels in the building, 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 laundry rooms are kept negatively pressurized to prohibit building contamination.

USER COMFORT

Bedrooms are supplied with temperature controls and operable windows for passive ventilation, as well as light-darkening shades to reduce unwanted "daylight" from the midnight sun.

Acoustical attenuation is accomplished by sound-dampening walls and floors that are STC50/ IIC55.