



Wight & Company
Architecture | Engineering | Construction

Sustainability | *Past, Present, Future:* LEED Case Studies

**NAVFAC Midwest – SAME Small
Business Expo 2010
March 11, 2010**

- CAPT J. C. Washington, RA
- Francine Gomes, PE
- Ken Osmon, PE, DBIA, LEED AP
- Lois Vitt Sale, AIA, LEED Faculty

Sustainability | Past, Present, Future



Agenda

- Introduction of Presenters
- A Look at the Past, Present, Future of Sustainability at NAVFAC Facilities
- Role of Small Business in Achieving Sustainable Goals



Introductions



- CAPT J. C. Washington, RA
NAVFAC Midwest
- Francine Gomes, PE
NAVFAC Midwest
- Ken Osmun, PE, DBIA, LEED AP
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NAVFAC | MCPON Plackett Manor 1st LEED NC Pioneer Certification 2000



- **Bachelor Enlisted Quarters (BEQs) at Great Lakes Naval Training Center**
 - One of Eight Pilot Projects at NAVFAC
 - Complex of seven BEQs - \$55.2 Million
 - First Design/Build Project at Great Lakes
 - Partnered Project
 - U.S. Green Building Council (USGBC) Criteria Validation
 - Only Federal Project of 23 chosen
 - Received LEED v. 1 “Bronze” certification



NAVFAC | MCPON Plackett Manor

1st LEED NC Pioneer Certification 2000



- Use of Materials sourced Regionally (300 mi)
- Use of Materials w/ Recycled Content (Steel, fly ash in concrete, mineral wool insulation)
- Recycled existing asphalt and concrete
- Use of native plant materials
- Highly Efficient Envelope: R23 wall, R30 roof, R10 perimeter slab insulation
- Operable windows designed for daylighting and natural ventilation
- Low VOC paints, sealants, adhesives
- Occupancy recycling program



NAVFAC | MCPON Plackett Manor 1st LEED NC Pioneer Certification 2000



Recognized for Sustainability Efforts

- 2000 White House Closing the Circle Award for Model Facility Demonstration
- 2000 Special Recognition for Sustainable Design – Public Sector \$15 Million and over – Design-Build Institute of America (DBIA)
- 2001 Federal Energy Saver Showcase Award
- 2001 Merit Award for New Construction – Suburbs, Chicago Building Congress



NAVFAC | MCPON Plackett Manor 1st LEED NC Pioneer Certification



Delivering a LEED Certified Project in the Dark Ages of Green Building

Challenges for Early Adopters of LEED:

- Lack of Products, Information and Industry Guidance (recycled content, measurement of reflectivity and emissivity, etc.)
- No Infrastructure for Construction Waste Management existed in Lake County
- Early Rating System Designed for Commercial Office Environment (not residential projects)



NAVFAC | Atlantic Fleet Drill Hall 1st LEED NC Gold Certification



- Atlantic Fleet Drill Hall used more stringent LEED Rating System in Benchmarking its Performance:
- LEED NC version 2.2 for New Construction:
- Energy - ASHRAE 90.1-2004; ASHRAE 55
- Water - EPA Act 1992
- But, in comparison with the BEQ project – the Drill Hall now had an industry geared to assist with its delivery



NAVFAC | Atlantic Fleet Drill Hall 1st LEED NC Gold Certification



Project Achievements

Navy's Goal for Low Impact Development met with several of the site design strategies:

- Alternative Transportation:
 - Public Transportation Access
 - Installation of On Site Bicycle Storage
 - NO additional parking for new facility
- 60% of site as Open Space
- Mitigating Urban Heat Island at Roof and at Grade with materials with high SRIs (now measurable)
- Stormwater Runoff Reduction of 35% when comparing pre-development to post-development profile
- Removal of 81% of pollutant load from Stormwater Runoff
- Native Landscaping Supports Water Conservation by Reducing Irrigation Burden – Buffalo Grass used as Turf Alternative



NAVFAC | Atlantic Fleet Drill Hall 1st LEED NC Gold Certification



- Water Use Reduction 45.6% more conservative than EAct 1992 through use of ultra low flow plumbing fixtures
- Energy Conservation Measures include:
 - Occupancy Sensors
 - Lighting Load < 1 watt per square foot
 - DDC Controls
 - Four Pipe Heating/Cooling
 - Zoned Air Handling System
 - Fully Commissioned Systems
- Low VOC Materials
- Daylight + Views
- Systems Optimized for Thermal Comfort and Operable Windows
- 30% Recycled Content in Material Selection



NAVFAC | Atlantic Fleet Drill Hall

1st LEED NC Gold Certification



• Summary

The Atlantic Fleet Drill Hall achieved **LEED Gold** certification in August 2009

KEY LID Credits:

- Stormwater management quantity control
- Water efficient Landscaping
- Water use reduction
- Site development : Maximize open space

In total 41 LEED credits achieved

The Atlantic Fleet Drill Hall is the new model for future projects melding the US Navy's traditional architecture and prototype design with new sustainable design technologies. The result is a landmark building at the entrance of Camp John Paul Jones and one that sets the tone for the US Navy's commitment to sustainable practices in the design and construction of its future buildings.



Current Sustainable Design Criteria



- LEED Green Building Rating Systems Continue to Evolve:
- LEED 2009 now effective
- First Ever Water Prerequisite
- ASHRAE 90.1-2007 + 10% improvement minimum Energy Benchmark
- Regional Priority Credits
- Benchmarking Energy & Water Use Against Building Performance
- Carbon Foot Printing



Navy Sustainable Development Resources



- Criteria and contract documents
- NAVFAC Sustainable Design Program Website
- 1391 Sustainable Development Cost Tool
- Energy Conservation Measure Selection Toolkit
- Solar Hot Water Decision Tool
- DOE FEMP High Performance Federal Bldgs Database
- LEED-DoD Antiterrorism Standards Tool
- Sustainable Guidelines for Reconstruction of Navy Facilities

Federal Case Studies



Eliminate mistakes and repeat successes
<http://www.eere.energy.gov/femp/highperformance/>



NAVFAC Case Studies



NAVFAC DESIGN-BUILD MASTER (WBDG)

PART TWO – GENERAL REQUIREMENTS

SECTION 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES **11/07**

1.8.3.1 LEED Green Building Rating System (GBRS) Submittals – USGBC Certification

(4) Within thirty (30) days of Beneficial Occupancy Date, develop and submit the project case study for the U.S. Department of Energy's Federal Energy Management Program "High Performance Federal Buildings Database"

NAVFAC USGBC LEED® Buildings



- **Bachelor Quarters, Naval Training Center, Great Lakes, IL – LEED v1 Certified**
- **Building 850, Naval Base Ventura County, Public Works Department, Port Hueneme, CA – LEED v2 Gold**
- **Building 1100 Renovation, Naval Base Ventura County, Port Hueneme, CA – LEED v2 Silver**
- **Bachelor Quarters, Naval Base Kitsap- Bremerton, Bremerton, WA – LEED v2 Certified**
- **Personnel Support Facility, Naval Amphibious Base, Little Creek, VA – LEED v2 Silver**
- **Airborne Mine Countermeasures Facility, Naval Station, Norfolk, VA – LEED v2 Certified**
- **Aircraft Maintenance Hangar, Naval Station, Norfolk, VA – LEED v2 Certified**

NAVFAC USGBC LEED® Buildings



- Bachelor Quarters, Naval Weapons Station, Yorktown, VA – LEED v2 Certified
- **Atlantic Fleet Drill Hall, Naval Training Center, Great Lakes, IL – LEED v2 Gold**
- Police and Special Operations Facility, Naval Amphibious Base, Norfolk, VA – LEED v2 Silver
- Child Development Center, Naval Air Station Oceana, Virginia Beach, VA – LEED v2, Silver – First USGBC LEED certified CDC in DoD
- Bachelor Quarters Camp Lejeune, NC – LEED v2 certified
- Reserve Training Center & Vehicle Maintenance Facility, Camp Lejeune, NC – LEED v2, Silver

NAVFAC | Wight & Company Partnering with Small Business



- A key to achieving sustainable success – the trade contracting community
- Knowledge of products
- Experience and knowledge of proper installation
- Commitment to necessary documentation / paperwork
- Creative suggestions and solutions
- Collaboration and Teamwork



Navy Sustainable Policy



- **Reduce the Total Cost of Ownership of shore facilities by implementing sustainable design concepts and principles.**
- **For FY09 and beyond:**
 - LEED Silver Rating
 - USGBC certified (process) – registration by NAVFAC
 - EAct 2005, as codified (US Code 10 CFR 433 & 435)
 - Executive Order 13423
 - Assistant Secretary of the Navy (Installations & Environment) Memos
- **Energy and Independence Security Act (EISA) 2007**
 - Low Impact Design
- **NAVFAC Engineering & Construction Bulletin (ECB) 2008-01**

Future – Direction of Sustainable Design



- **New buildings and major renovations must meet LEED Silver Certification**
- **Implementation of Low Impact Design (LID)**
 - **NAVFAC Policy mandates two LEED Sustainable Site (SS) credits**
 - SS 6.1 Stormwater Design – Quantity Control
 - Limit disruption of natural water hydrology by reducing impervious cover
 - SS 6.2 Stormwater Design – Quality Control
 - Limit disruption and pollution of natural flows by managing stormwater runoff
- **Department of Defense Policy Memorandum implementing Section 438 of the EISA (Jan. 2010)**
 - Applies to footprint greater than 5,000 SF
 - Maintain/restore pre-development hydrology
 - UFC 3-210-10 Low Impact Development (2004 – update in routing)

Future – Direction of Sustainable Design



- **Alternative Energy**
 - Wind
 - Solar
 - Geothermal
 - Wave / tide action
 - Ocean Thermal Energy Conversion (OTEC)
- **Enhanced Use Lease (EUL)**

Future – Direction of Sustainable Design



- “Net- Zero Bases”
- “Bases of the Future”

Integrate sustainable development in a broader context than individual buildings – the installation level.

- Energy efficiency
- Renewable energy
- Water conservation
- Green vehicle solutions
- Recycling/Reuse
- Waste diversion
- Storm water management



Thank You | Q & A



Contact Information

- Capt. Washington julius.washington@navy.mil
- Francine Gomes francine.gomes@navy.mil
- Ken Osmun kosmun@wightco.com
- Lois Vitt Sale lvittsale@wightco.com



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Backup Slides

Building 850

Port Hueneme, CA



Public Works Department administrative building – 10,000 SF renovation & 7,000 SF addition

Sustainable Features

- Prototype natural gas heat pump A/C
- VAV under floor distribution system
- High efficiency pulse boilers
- Natural ventilation
- Solar space & domestic water heating systems
- Photovoltaic power generation system
- Daylighting
- Shading & innovative glazing elements
- Fluorescent lighting
- Occupancy & photo sensors controls



AIA/COTE
2002 Top
Ten
Green
Project

Personnel Support Facility NAB Little Creek, VA



- 37,754 SF Educational/Admin Bldg
- 21% reduction in energy usage over ASHRAE 90.1
- 50% reduction in water usage
- Over 75% construction waste diverted from landfill
- Energy savings = 146,910 kWh/yr > \$11,370/yr
- Water savings = 517,458 gal/yr > \$3,000/yr
- Construction Cost \$7,500,000
- Sust Cost \$150,000 = 2% of Construction Cost
- ROI/Simple payback = 10% / 10 yrs



“Silver”



Airborne Mine Countermeasures Facility & Aircraft Maintenance Hangar, NAVSTA, Norfolk, VA



Sustainable Features

- 30% water use reduction
- 20% reduction in energy usage over ASHRAE 90.1
- 75% construction waste diverted from landfill
- 20% recycled materials
- 20% local/regional materials
- Low-emitting materials for adhesives & sealants, carpet and composite wood

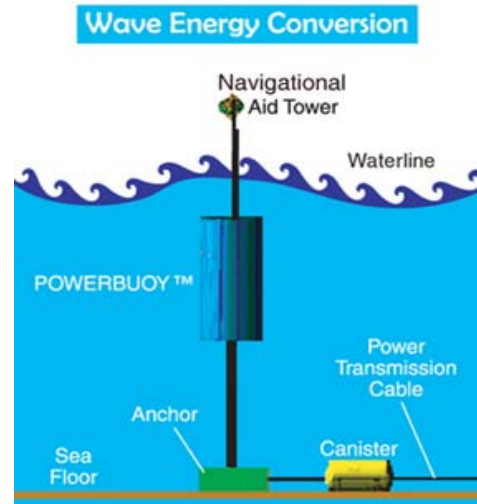


Renewable Energy

- On-site renewable energy techniques provide energy security through self-supply
- Renewable energy reduces environmental impacts from fossil fuels



Photovoltaic Array
29 Palms, CA



Wave Energy Technology
MCB Hawaii



Wind Turbines
Guantanamo Bay, Cuba

LEED-DoD Antiterrorism Standards Tool



DoD requires its buildings to be secure and sustainable. The challenge is to satisfy these design requirements in a balanced, integrated cost-effective solution.

This tool:

- analyzes and integrates LEED and UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings,
- can save design and construction costs,
- and will integrate AT requirements, sustainable strategies/features and aesthetics.



- Design Guidance
 - Building Types
 - Space Types
 - Design Objectives
 - Products & Systems
- Project Management
 - Delivery Teams
 - Planning & Development
 - Delivery & Controls
- Mandates / References
 - Federal Mandates
 - Publications
 - Case Studies
 - Participating Agencies
 - Industry Organizations
 - Related Links
- Tools
- News, Events & Training



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LEED®-DoD Antiterrorism Standards Tool

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[General Issues](#) [Additional Resources](#)

Legend

- Complimentary requirements
- Conflicting and complimentary requirements
- Conflicting requirements
- Not conflicting or complimentary, but have related considerations

Download
 UFC 4-010-01
 DoD MINIMUM ANTITERRORISM
 STANDARDS FOR BUILDINGS

LEED® Credit	Antiterrorism Standard																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Sustainable Sites																						
SS-P1 Erosion & Sedimentation Control																						
SS-1 Site Selection																						
SS-2 Development Density																						
SS-3 Brownfield Redevelopment																						
SS-4.1 Alternative Transportation, Public Transportation Access																						
SS-4.2 Alternative Transportation, Bicycle Storage & Changing Rooms																						
SS-4.3 Alternative Transportation, Alternative Fuel Vehicles																						
SS-4.4 Alternative Transportation, Parking Capacity																						
SS-5.1 Reduced Site Disturbance, Protect or Restore Open Space																						
SS-5.2 Reduced Site Disturbance, Development Footprint																						
SS-6.1 Stormwater Management, Rate and Quantity																						

Defense Intelligence Analysis Center Addition Bolling AFB, District of Columbia



Existing Buildings

EO 13423, Sect 2 (f) (ii)

15% of an agencies existing building inventory comply with MOU's Guiding Principles by end of FY 2015.

Existing inventory = Approximately 50,000 buildings .



Sustainable Historic Preservation

NAVFAC HQ, Building 33

Washington Navy Yard, Washington, DC

Sustainability Guidelines for Reconstruction of Navy Facilities



Improve the facilities and installations rather than simply replacing, using sustainable design concepts and strategies.

http://www.wbdg.org/references/pa_dod_sust_tools.php

