6. Appendix B: Case Studies

6.1 HEALTH CARE FACILITIES

6.2 COMMERCIAL INTERIORS

6.3 CEMETERIES

As part of the development of this manual, a number of sustainably designed projects were reviewed. This study helped the project team determine appropriate and applicable strategies that can be widely applied.

Case study facilities came from a variety of sources including existing VA facilities, consultant team projects, GGHC projects, and LEED projects.

The case study section is divided into three portions: health care facilities (applicable to VHA projects), commercial interiors (applicable to VBA projects), and cemetery projects (applicable to NCA projects).

6.1 HEALTH CARE FACILITY CASE STUDIES

The following health care projects were LEED rated as of January 2007:

- The Patrick H. Dollard Discovery Health Center, Harris, NY – LEED-NC, v.2.0 Certified
- Boulder Community Foothills Hospital, Boulder, CO – LEED-NC, v.2.0 Silver
- Lacks Cancer Center at Saint Mary's Health Care, Grand Rapids, MI – LEED, NC, v. 2.0 Certified
- Isaac Ray Treatment Center, Logansport, IN – LEED, NC v. 2.0 Silver
- Providence Newberg Medical Center, Newberg, OR – LEED, NC v. 2.0 Gold
- Jewish Hospital Medical Center South, Hillview, KY – LEED, NC v. 2.0 Silver
- Affinity Health System Family Practice Clinic – Greenville, Greenville, WI – LEED, NC v.2.0 Certified
- The Angel Harvey Infant Welfare Society of Chicago Community Health Center, Chicago, IL – LEED, NC v. 2.0 Certified
- Duluth Clinic - First Street Building, Duluth, MN – LEED, NC v. 2.0 Gold
- Pearland Pediatrics, Pearland, TX – LEED, NC v.2.0 Certified
- Southeast Regional Treatment Center Building 2, Madison, IN – LEED, NC v. 2.0 Certified
- Southeast Regional Treatment Center Building 13, Madison, IN – LEED, NC v. 2.0 Certified
- Southeast Regional Treatment Center Building 21, Madison, IN – LEED, NC v. 2.0 Certified

6.1.1 DELL CHILDREN'S MEDICAL CENTER OF CENTRAL TEXAS

Location: Austin, TX

Certification: TBD, anticipated LEED-NC Platinum

Set to open in summer of 2007, the Dell Children's Medical Center of Texas is a 455,000 square foot facility that will serve as an emergency center, children's surgery center, and pediatric critical care facility.

The facility is located on a 37-acre site located off Interstate 35, approximately 10 miles north of Austin. The site is planned for up to 1.4 million square feet of development. Phase one includes the hospital, an energy plant, a medical office building, parking facilities, and a Ronald McDonald House.

The design team adopted the goal of LEED Platinum in 2002, while the hospital's program of requirements was being finalized. The design process was then developed around the LEED goals. This allowed an integrated design approach and helped create a sense of ownership and collegiality among the various team members and involved municipal agencies. Inclusion of municipal agencies in the process resulted in expedited design reviews.

Major sustainable initiatives included:

- Cogeneration. Austin Energy funded the design, engineering, and equipment of an on-site combined heating and power plant. This resulted in reduction of capital costs, as well as greater energy efficiency. The CHP can be 75 percent more efficient at primary fuel conversion to useful energy and on-site location brings transmission loss close to zero. This results in a 42 percent savings in primary energy utilization as compared to a typical power delivery model. Steam from the CHP was used for heating, food service, and medical equipment, as well as in absorption chillers. The team calculated a 4.9 year payback for Austin Energy's initial investment.
- Air exchange. The courtyards provided cooler fresh air to the air handlers than if intake air was drawn from the facility's roof. Air handlers were strategically located throughout the facility, and units were "right sized" for their specific zones, thereby reducing the amount of energy required for operation.
- Daylighting. The team developed a modular structural grid and incorporated open air courtyards throughout the building. Daylight is provided to 64 percent of the non-exempted spaces. Although this is not enough to earn a LEED point, the Green Guide for Health Care awarded Dell Children's a point for daylighting.
- Construction Waste Management. 5.7 million pounds of construction debris (97 percent) was recycled or reused.
- Concrete. As the structure of Dell Children's is 90 percent concrete, the team made a concerted effort to incorporate fly-ash into the concrete mix. The final result was 32 percent fly ash, resulting in keeping nearly 5 million pounds of CO2 emissions from the atmosphere.

The business case for sustainable design was critical in the success of the Dell Children's project. After completion of careful cost-benefit studies, the team determined that the overall payback for sustainable design initiatives would be approximately 5.9 years. In energy cost savings alone, the hospital expects to save $6 to 8 million in the first 20 years. Productivity gains are expected to be between 1 and 5 percent of employee costs.

6.1.2 BOULDER COMMUNITY FOOTHILLS HOSPITAL

Location: Boulder, Colorado

Certification: LEED – NC v. 2.0 - Silver

The first hospital in the United States to earn certification from the USGBC, Boulder Community Foothills Hospital (BCFH) is a three-story, 200,000-square-foot facility with 60 beds, as well as a 24-hour emergency department, an intensive care unit, surgery, radiology, and laboratory services.

Air quality and energy efficiency were given high priority when designing and constructing the facility. A highly efficient power plant was built to provide heat, lighting, and hot water. Requiring an initial investment of $1.3 million, this plant is expected to have a 12-year payback through energy savings.

Numerous additional energy-efficiency measures were employed throughout Boulder Community Foothills Hospital, including variable speed high-efficiency chillers, high-efficiency fans, and fan motors, Energy modeling shows BCFH operating at a 27.6 percent savings above ASHRAE 90.1-1999.

In addition to energy savings, BCFH also focused on providing a sustainable environment around the hospital. Outdoor lighting was carefully designed to reduce light pollution in the night sky. To conserve water, drought tolerant plantings and other xeriscaping surround the area. Additionally, the hospital left 31 acres of the campus undeveloped. The northern section of this area is part of a wildlife corridor and includes a wetlands area.

6.1.3 PROVIDENCE NEWBERG MEDICAL CENTER

Location: Newberg, OR

Certification: LEED – NC v. 2.0 - Gold

In 2006, Providence Newberg Medical Center (PNMC) became the first LEED-NC Gold certified hospital. The 56-acre campus houses an interconnected hospital, administration center, and medical office building.

In just 14 months, the facility will have repaid its initial investment and is expected to save nearly 26 percent in annual energy costs by the end of its first year. PNMC is also expected to use 40 percent less water than a facility constructed to code standards.

Energy savings measures include:

- 100 percent outdoor air
- Occupancy sensors, daylight controls and centralized lighting control systems
- Sunscreens over windows
- Occupancy sensors control HVAC systems
- Natural light in all public spaces and waiting areas

Providence Newberg Medical Center meets 100 percent of all electrical needs by purchasing green power (50 percent wind, 25 percent geothermal, 25 percent low impact hydro).

PNMC also participates in the Dispatchable Standby Generation program through Portland General Electric (PGE), which allows PNMC to sell power produced by the medical facility's two 750 kilowatt emergency generators to PGE in times of peak demand for the utility.

Challenges experienced in the design of PNMC included balancing sustainable goals with programmatic needs. For example, while lots of windows provide natural daylighting and reduce lighting energy costs, they can pose privacy issues for a hospital.

6.1.4 PETER LOUGHEED CENTRE

Location: Calgary, Alberta, Canada

Certification: LEED – NC Registered

One of four acute care hospitals in the Calgary area, the Peter Lougheed Centre lies in the northeast section of the city. With Calgary's changing demographics and large population influx, programming dictated that a new wing as well as extensive internal renovations were required. The shift to outpatient care has also driven extensive changes to program and facilities.

The 32,000 square meter new East Tower will contain a new Intensive Care Unit, Cardiac Care Unit, and five Inpatient Units. Outpatient facilities will include a Hemodialysis unit, Mental Health Short Stay unit, and Emergency Department handling up to 75,000 visits per year.

The Peter Lougheed Centre is pursuing LEED certification, with highly efficient mechanical systems, benign materials, and increased natural daylighting. This project, under construction at the time of this manual's publication, uses "off the shelf" technologies to reduce energy consumption at little to no additional cost.

Sustainable strategies used in this facility include but are not limited to:

- Advanced envelope design
- 100 percent natural air with no remixing
- 80 percent efficient heat exchangers
- Condensing boilers exceeding 70 percent efficiency
- Natural daylighting
- Operable windows and advanced balancing system to maintain appropriate pressures
- Radiant heating at perimeter to limit heat loss
- Green roof over one quarter of surface area; remainder of roof is high albedo
- Rainwater retention and reuse for system water and irrigation
- Use of recycled materials

Designers believe that much of the project's success can be attributed to the involvement of the entire team from the beginning of the project. This includes an experienced and involved engineer, as well as a consultative group of operations staff.

6.1.5 OREGON HEALTH AND SCIENCE UNIVERSITY

Location: Portland, Oregon

Certification: LEED – NC Platinum

The first medical and research facility to achieve LEED-NC Platinum, Oregon Health and Science University is a 16-story, 400,000 square foot building housing clinical offices, ambulatory surgery suites, a rehabilitation center, research laboratories, educational facilities, a conference center, and a wellness and fitness center. The ground floor of the facility houses a pharmacy, an optical shop, and a café.

The project team set up "Big Hairy Audacious Goals" for the building, including:

- 60 percent energy savings below Oregon Energy Code
- Reduce initial MEP budget by 25 percent

The project began with a two-day charrette that enabled the team to identify integrated design goals. From the charrette, the team decided to further study several ideas, including rainwater reuse, a microturbine system for the central utility plant, and photovoltaic panels on the building's south elevation. Roof-mounted turbines were also investigated, but were ultimately excluded from the design.

Located just south of downtown Portland, the Oregon Health and Science University is the state's main teaching hospital. Its expanded facility uses building orientation, as well as other measures, to reduce the building's energy consumption. The building's long east-west axis, dictated by the local street layout, takes advantage of passive solar heating in winter, as well as providing daylighting to the interior.

Sustainable strategies integrated into the design of Oregon Health and Science University include, among others:

- 100 percent of the sewage generated in the building treated in a membrane bioreactor on site
- Integrated daylighting system
- Naturally ventilated stair towers
- Radiant heating and cooling
- Eco-roofs
- Rainwater and wastewater harvest and reuse for landscaping
- The south façade of the building on the 15th and 16th floors serves as a giant solar air heater by the creation of a 6,000 square foot trombe wall consisting of two glass skins
- Sunshades on the south side that double as solar electricity generators
- Occupancy sensors for lighting
- Reduced lighting in lobbies and other pass-through areas
- A gas-fueled cogeneration system powered by five 60-kilowatt microturbines

- Chilled beams that combine convective cooling systems with displacement ventilation
- Use of sustainable and lower toxicity materials in interior finishes and furnishings

The building is 61 percent more energy-efficient than required by Oregon code. It uses 56 percent less potable water than a similar conventional building does.

Key to the design of this facility was cost savings. Overall, the net mechanical and electrical systems costs are 10 percent under the $30 million allotted based on a conventional design. The designers attribute cost savings to integrating the design team and sustainable goals early in the building's design process.

In the planning process, the team identified the financial advantages of building green:

- High-performance green buildings may have reduced capital costs due to using an integrated design process.
- Reduced operating costs for energy and water.
- Increased worker productivity.
- Better employee attraction and retention.
- Reduced liability for future issues related to sick buildings.
- Opportunities for positive marketing and public relations.
- Increased real estate value.
- Opportunities for financial and tax incentives.

Key challenges encountered by the design team included:

- Providing for the comfort, productivity and health of the building's occupants while still meeting aggressive sustainable design goals.
- Achieving LEED platinum required "thinking outside the box."
- Meeting the goal of energy savings 60 percent greater than code required the team to use energy modeling as a design tool to determine the most effective energy-efficiency measures. In the final building design, 42 specific measures were included. Key design points for energy efficiency include:
  - Right-size the HVAC system
  - Use free energy such as sun, wind, water, or geothermal
  - Reduce demand
  - Shift loads from peak to off-peak periods
  - Use radiant heating and cooling instead of convective heat transfer
  - Challenge restrictive codes
  - Embrace every opportunity, no matter how small
- The three-story atrium made smoke control challenging. This was solved by integrating the garage exhaust with the smoke evacuation system. Typically, the garage exhaust runs; however, in the case of a fire emergency, a damper closes the garage exhaust and opens the atrium exhaust ducts.

- Building height and profile limitations made including a standard mechanical penthouse on the roof challenging. This was solved by grouping smaller fans into a fan-wall array which is not only smaller, but also more energy efficient.
- The use of captured rainwater accounts for only 10 percent of the building's needs, so the designers had to look for other water efficiency opportunities. Solutions included low-flow fixtures for sinks, urinals and showers, an on-site bioreactor which is used to treat sewage. Non-potable water is only used for landscaping, in core water closets and urinals, not in the clinics or exam rooms.

6.1.6 EMORY UNIVERSITY WHITEHEAD BIOMEDICAL RESEARCH BUILDING

Location: Atlanta, GA

Certification: LEED – NC v.2.0 Silver

An eight story, 325,000 square foot laboratory building, housing 148,000 square feet of research laboratories, an extensive vivarium, and a central Environmental Health and Safety facility, the Emory University Whitehead Biomedical Research Building is the largest of its kind in the southeastern United States.

Major sustainable goals included the desire to save energy and water. Achieving LEED certification was not required until the project was already underway.

The Whitehead Biomedical Research Building employs the following sustainable strategies:

- Low irrigation landscaping
- Stormwater harvesting for site irrigation
- Condensate recovery for cooling towers
- Automated cage-washing system for vivarium
- Energy recovery via four enthalpy wheels, which reduces the building's cooling load by approximately 20 percent.
- Mixing return air (75 percent outside air to all zones)
- Building glazing to reduce ultraviolet transmittance
- Photo sensor and motion detector control of lighting
- Recycled and local materials
- Flexible modular design
- Construction recycling – a program which saved approximately $20,000

The primary post-occupancy issues relate to inadequate free area for the volume of exhaust air flow, which results in high static energy and thus additional fan energy use. Additionally, the exhaust from the facility's vivarium did not mix well.

The building was completed for a total construction cost of $65 million. The additional cost incurred to achieve a LEED Silver rating was estimated to be approximately $990,000, or 1.5 percent of the building's total construction cost. Significant long-term reductions in operations

and maintenance offset this investment. Savings in energy cost alone over the first ten years are estimated to offset the additional first cost.

6.1.7 WASHINGTON VETERANS HOME

Location: Retsil, WA

Certification: LEED-NC v. 2.0 - Gold

A 240 bed long-term care facility for veterans, Washington Veterans Home includes a 160,000 square foot residential and administration building and a 10,000 square foot kitchen and dining facility. The facility was designed to focus on patient care, reduce overall expenses, and offer residents the health benefits of a sustainable facility.

Washington Veterans Home was designed to use exclusively natural ventilation for cooling. For the facility's naturally ventilated spaces, the design provides effective ventilation in at least 90 percent of each room or zone in the direction of airflow for 95 percent of the hours of occupancy.

Aided by a mild microclimate and sea breezes from the nearby Sinclair Inlet, the carefully engineered natural cooling system includes 240 operable windows. To better serve the Home's elderly residents, windows were specially manufactured to be lighter than normal. The project was required to request a code exemption to allow natural ventilation.

Additionally, the Washington Veterans Home utilizes an improved thermal envelope to reduce the facility's energy load.

Among others, the key lessons learned include:

- Involve stakeholders from the beginning to gain momentum
- Involve a fully integrated design team from the beginning

6.1.8 MONTEFIORE MEDICAL CENTER

Location: Bronx, NY

Certification: None

A Solar Turbines Taurus 60 generator set drives Montefiore Medical Center's combined heat and power system. Montefiore operates its own 14-megawatt cogeneration plant, and all its critical loads are backed up by emergency power generators. This system enabled Montefiore Medical Center to be the only hospital in New York City to continue to operate with full power during the first night of the 2003 regional blackout.

6.2 COMMERCIAL INTERIORS CASE STUDIES

6.2.1 RANCHO CORDOVA CITY HALL

Location: Rancho Cordova, CA

Certification: LEED-CI – Certified

The City of Rancho Cordova's 40,000 square foot build-out of the City Hall facility took eight months from start to finish and incorporated sustainable design elements with little or no costs to earn a total of 24 LEED-CI credits. Some of the elements included in this facility are:

- Installation of a new white, single-ply roof directly over the top of the existing roof, lessening the need for cooling in the summer.
- Installation of high efficiency HVAC units.
- Selection of water conserving plumbing fixtures, resulting in more than 43 percent water savings.
- Recycling of more than 77 percent of the project's construction waste resulted in donations of more than 30 tons of materials to Habitat for Humanity.
- Retention of existing trees resulted in more than 53 percent shading.
- Use of low-emitting materials.
- Use of recycled and renewable materials.
- Creation of educational materials including building signage and development of a building tour.
- Participation in SMUD's 50 percent Greenergy program.
- Use of green cleaning practices and products.

6.2.2 VANCOUVER PORT AUTHORITY - CORPORATE HEADQUARTERS

Location: Vancouver, BC

Certification: LEED-CI – Gold

At 55,000-square-feet, the Vancouver Port Authority building is the largest LEED-CI project in Canada.

Green highlights include recycled materials, energy savings, and water efficiency. When compared to standard building requirements, VPA uses 20 percent less energy for lighting, 36 percent less power for heating, ventilation, and air conditioning, and 39 percent less fresh water than comparable buildings.

Additionally, this building eliminates the use of fossil fuels for heating.

This $8 million investment has resulted in the Port's achievement of "Top 100 Employers."

6.2.3 HOK SAN FRANCISCO OFFICE

Location: San Francisco, CA

Certification: LEED-CI – Certified

The intent of this project was to create a great workplace by being smarter and creating real value, while being practical stewards of the environment and meeting a tight construction budget and schedule.

The 34,000 square foot studio is spacious, light-filled and highly flexible. Environmentally-friendly materials were carefully selected. The entrance lobby, which is awash with daylight, welcomes staff and guests and provides display space for current work.

Architects, urban designers, landscape architects, interior designers and engineers occupy this highly collaborative environment.

Site

The office is situated in a prominent building in downtown San Francisco; downtown city densities minimize urban sprawl and related impacts on undeveloped open spaces.

The building is located near excellent public transportation, and has bicycle storage and shower facilities.

HOK decided not to lease any parking spaces for personal vehicles in order to encourage employees to try alternative modes of traveling to work.

Energy

Fundamental commissioning was performed on all tenant-installed systems.

The tenant space exceeds the energy efficiency requirements of Title 24, even though the building is a San Francisco historical landmark and is exempt from Title 24.

The energy-efficient lighting system has a low lighting power density and was designed to utilize an advanced Digital Addressable Lighting Interface (DALI) lighting control system.

Materials

Materials were specified from manufacturers that are sustainable design leaders. Recycled-content materials include carpeting, metals, drywall, insulation, and ceiling tiles. Rapidly renewable materials include linoleum and bamboo. In addition, many materials were manufactured locally, including metals, drywall and wall panels. Eco-Panels, FSC MDF with Flat-line finish, were used for all wall accent panels.

Waste materials were recycled during construction. Paper, glass, metal and plastic recycling is integrated into the design.

Indoor Environmental Quality

The building is non-smoking. Additionally, care was taken during construction to avoid affecting other tenants in the building with dust, odors, etc.

Low-VOC adhesives and sealants were used throughout, also low-VOC paints, and low-emission carpeting. Engineered wood products have no added formaldehyde.

The HOK office was designed to provide natural daylight and views. Staff workstations are never further than 25 feet from the floor-to-ceiling exterior glazing.

6.2.4 INTERFACE ENGINEERING

Location: Portland, OR

Certification: LEED-CI – Gold

For its new 20,000 square foot headquarters facility, Interface focused on indoor environmental quality and energy efficiency.

To achieve maximum energy efficiency, Interface used energy-efficient "direct/indirect" lighting fixtures, occupancy sensors and lighting timers. Additionally, the company's in-house expert commissioning technicians tested and balanced the firm's two floors for continued energy savings.

To maximize indoor environmental quality, more then 50 percent of the work spaces have daylighting for critical visual tasks, and more than 90 percent of the work spaces have a direct line-of-sight to vision glazing.

Site selection for the new facility was driven in part by the desire to locate the space close to public transportation. The site selected is flanked by two light rail lines and is two blocks from Portland's downtown bus mall.

Total cost for participating in the LEED-CI pilot was covered by a small tenant improvement allowance and a modest rent concession.

6.2.5 PUGET SOUND ENERGY CORPORATE HEADQUARTERS

Location: Bellevue, WA

Certification: LEED-CI – Certified

Puget Sound Energy's sustainable goals for their new corporate headquarters focused on energy efficiency and improving employee satisfaction, without increasing costs.

Strategies used to improve energy efficiency included:

- Use of software to monitor and manage energy consumption of the computer network
- Use of lighting controls and sensors
- Installation of energy-efficient appliances

The additional cost of the energy measures totaled approximately $59,000, but Puget Sound Energy was able to offset 43 percent of this cost through rebates.

Puget Sound Energy found that their new facility not only saved 199,431 kWh annually (approximately $10,000 in annual energy cost savings), but it also improved employee satisfaction and provided an opportunity for excellent public relations.

Additionally, this facility used low-VOC paints and adhesives and doors, paneling and cabinets were built with formaldehyde-free core materials. 95 percent of all construction debris was recycled.

6.2.6 HARVARD SCHOOL OF PUBLIC HEALTH

Location: Boston, MA

Certification: LEED-CI – Certified

The design of the 40,000 square foot Harvard School of Public Health focused on conserving energy and water. The building's cutting-edge features were designed not only to increase energy efficiency, but also to promote the health, comfort, and productivity of the staff and students. Specific strategies included:

- Use of standard low-flow technologies resulting in reduction in total water use by 20 percent.
- Use of T5 lights, occupancy programming and sensors resulting in reduction in the total energy used for lighting by 40 percent.
- Use of under-floor ventilation systems resulting in increase in performance of HVAC by 15 percent.
- Purchase of renewable energy certificates to offset 50 percent of the electricity for the space.
- Provide daylight to 75 percent of the space within the building.

Additionally, the space includes bicycle storage and changing rooms to accommodate people using alternative transportation.

Total costs for the space were $6.1 million. Of that, $77,000 (1.3 percent) was attributed to "green" costs. The annual savings for energy and productivity gains were estimated conservatively at $82,000, resulting in a 0.9 year simple payback.

6.2.7 SCA AMERICAS

Location: Philadelphia, PA

Certification: LEED-CI – Gold

SCA's design priorities for its 81,200 square foot space included natural elements (water, earth and light), employee inclusiveness, and sustainability.

Unique features of the design include:

- Optimization of the HVAC system to minimize air stratification.
- Installation of more than 90 percent EPA Energy-Star rated office equipment, including computers, copiers, and other office technologies.
- Installation of submeters on each floor to identify inefficiencies and hasten their repair.

- Use of aerators on all faucets to reduce water use by 20 percent. The building owner later installed this technology throughout the entire building after conducting an analysis of the return on investment.
- Recycling of 81 percent of construction-related waste
- Use of more than 50 percent local materials and more than 32 percent recycled materials in construction
- Purchase of wind power certificates to offset 100 percent of energy use.

Large building floor plates made achieving the credit for daylight and views difficult. SCA was able to provide daylighting to 75 percent of the occupants by moving open work stations to the exterior and using interior glazing systems. Additionally, all interior offices have glass. SCA focused efforts on daylighting because of the multiple benefits of the strategy: reduced lighting loads, saving energy, and improved overall work environment.

6.3 CEMETERY CASE STUDIES

The following projects demonstrate the use of sustainable design strategies that may be applied to NCA cemeteries.

6.3.1 GOLDEN CEMETERY

Location: Golden, CO

Certification: None

The city of Golden, Colorado has begun a rigorous city-wide sustainability effort. The following are some of the sustainable measures taken on the grounds of Golden Cemetery.

- Conversion of automatic gates at the Golden Cemetery to solar power
- Installation of permanent gas and diesel tanks at Golden Cemetery, eliminating trips to transport in 5-gallon containers
- Replacement of a pickup truck with a small utility vehicle, a tractor with a small utility vehicle, and purchased an electric cart to transport families, visitors and etc. around the cemetery grounds
- Installation of a computer-programmed automatic sprinkler system that waters at night, saving millions of gallons of water annually (system is also automatically shut off upon one quarter inch of rainfall)
- Use of non-potable water for irrigation

6.3.2 WOODLAWN CEMETERY

Location: Santa Monica, CA

Certification: None

Recycled urban runoff is being used for irrigation at the City's cemetery. The treated water meets all of California's Title 22 requirements

6.3.3 RIVERSIDE NATIONAL CEMETERY

Location: Riverside, CA

Certification: None

Vehicles/equipment at VA's Riverside National Cemetery require washing prior to maintenance and to maintain an acceptable appearance. The wash water previously contained grease, oil, and grass clippings, and drained into a grassed swale or storm water drain. This procedure used approximately 400,000 gallons of potable water per year.

The redesigned wash rack, with the WaterStax Wash Water Treatment System, collects the wash water for reuse. This resulted in100 percent reduction in potentially grease and oil-containing wash water run off and 99 percent reduction in potable water use, saving an estimated $11,400 per year.

Department of
Veterans Affairs