



Greening of Federal Facilities

National Renewable Energy Laboratory
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Subcontractor: ENSAR Group, Inc.
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Task # 3 Conduct Environmental Design Charrette
Deliverable #3.4 Charrette Final Summary Report

August 25, 2000

This report is a summary of the *Environmental Design Charrette* conducted at Naval Support Activity Mid-South Base, Millington, Tennessee, on July 17-19, 2000.

Charrette Final Summary Report Task 3.4

Submitted:
August 25, 2000

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GREENING CHARRETTE

Naval Support Activity Mid-South is proud to have hosted the first Department of Defense (DOD) installation "Greening Charrette". In our journey to become the Navy's premier shore installation, we are eager to embrace new ideas, new technology, and new ways of doing business. I am confident that this charrette provided significant and tangible results that will help achieve our goals of energy and environmental protection.

I was especially pleased with the diversity and talent of the participants. The array of industry experts, community members, business leaders, and Navy representatives was impressive and clearly reflects the importance of this effort. We are excited about continuing our education in sustainable design and improving upon the success we have enjoyed to date. We look forward to setting the standard for the national Greening effort for both the Navy and DOD.

A handwritten signature in black ink that reads "D. L. H. Lofink". The signature is written in a cursive style.

D. L. H. LOFINK
Captain, U. S. Navy
Commanding Office

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EXECUTIVE SUMMARY

The Naval Support Activity Mid-South base was the chosen site for a “Greening Federal Facilities Charrette” funded by the National Renewable Energy Labs under a grant from the US Department of Energy (Federal Energy Management Program). The base has been a major Navy Training Facility and airfield located near Memphis, Tennessee. It has been undergoing transformation into an administrative support facility for the Navy. As such, many buildings have been demolished or renovated for new uses. The base has been forming partnerships with local community agencies and other groups during this transition.



Fig. 1 NSA Mid-South Navy Base

The charrette, or intensive brainstorming session, was held in July 2000 at the NSA Mid-South base to focus on environmental excellence and high performance. Approximately 45 individuals participated from diverse backgrounds and fields: the base, the community, the Navy headquarters, and from national federal agencies and private companies. Five distinct areas were addressed in detail during this exercise: site & water, energy, waste & recycling, operations & management, and “big picture” (process, education, and community outreach) issues.

National experts in the five fields were chosen to facilitate the focus groups while experts from the base and community were asked to lead the discussions and become “champions” of the charrette results.

The ultimate goals of this charrette were to:

1. Identify economically viable action items that NSA Mid-South could undertake to incorporate high performance sustainable design principles into the base and the base projects.
2. Suggest strategies to better integrate sustainable design concerns within the existing NSA Mid-South base projects and processes that other bases could learn from and implement.
3. Set the standard for environmental excellence at this premier installation for the Navy, NSA Mid-South, becoming a model for all US military bases.



Fig. 2 Charrette brainstorming

Based on the work of the 5 focus groups, short, mid, and long-term goals and objectives were generated -- ultimately creating a long range outlook of sustainable opportunities and objectives for NSA Mid-South. This long range outlook in an abbreviated form is noted below (more in-depth material may be found in the charrette report). From this outlook, NSA Mid-South

can begin to prioritize overall goals and objectives with respect to the time, personnel, and dollars available and create a long range action plan.

The facilitators also created a “Top 5” list of observations and recommendations to the base command for immediate “next steps”. These are noted before the long range outlook.

The “next steps” are important not only for NSA Mid-South. They will also help other military installations initiate green strategies in order to achieve high performance facilities and overall effective and efficient base operations.



Fig. 3 NEX, Navy Exchange, and NSA Mid-South

“NEXT STEPS”: IMMEDIATE

Observations and Recommendations by National Sustainability Experts

1. Create a Sustainable Steering Group

- Core leaders/participants from the NSA Mid-South greening charrette would be prime candidates – this steering group would prioritize the listed goals and objectives created during the charrette into a realistic long-term action plan.
- Once sustainable steering groups are created at other bases, NSA Mid-South will be the obvious meeting place for the future Navy “Sustainability Board”.
- The Group should determine which Admiral would most likely “champion” this Sustainability Board and make him the prime spokesperson for these endeavors.

2. Benefit from other Green Projects and their “Lessons Learned”

The Base Sustainable Steering Group should:

- Watch the free 28 minute video of “Pennsylvania’s First Green Building”. (Call # 717-787-4190...the Pennsylvania Department of Environmental Protection and ask for the free video called: "The Story of Pennsylvania's First Green Building: DEP South Central Office Building". It usually takes about 3 days to receive the copy once you call.)
- Investigate some of the case studies listed in this charrette report and decide on a site visit to one of them.
- Take a site visit to the chosen green case study and talk with the “champions” for insights and “Lessons Learned”.

3. Commit to a Sustainable “Pilot Project” on the base

- NSA Mid-South would be well advised to undertake a “Pilot Project” to test many of the sustainable issues addressed during the charrette. (i.e. native plantings, energy efficient glazing and lighting, waste reduction and recycling, etc.)
- A possible choice would be Building S-241 with an addition.
- This “Pilot Project” could also be assessed using the LEED green building rating system (and possibly the ARMY’s new green military rating system).

4. Green the existing Requests for Proposals (RFP)

- NSA Mid-South should be as specific and clear in their language for “sustainability”.
- Use this new RFP for the Pilot Project.
- Check other RFPs that have addressed sustainability for the specific language that they have used and their results.

5. Begin Ecological Restoration immediately

- Reduce the amount of “lawn” on the base by choosing one area to transform.
- Document the time, effort, and results of this endeavor as well as any other “lessons learned”.
- Make this an educational endeavor by documenting and sharing the results.

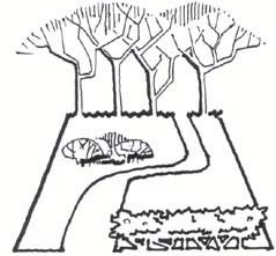
LONG RANGE SUSTAINABILITY OUTLOOK:

Short Term Goals and Objectives (Within one year):

Items are listed in order of participants' preference

- **Site & Water:**

1. Develop a master landscape plan (Assess landscape types immediately around buildings)
2. Establish a native tree relocation program (Use tree spade owned by the golf course)
3. Develop landscape standards (including parking lots/ reforest where buildings have been removed)
4. Build landscape restoration into demolition projects (more than just grass)
5. Stop mowing selected areas (this can happen immediately)
6. Establish green partnerships (landscape architecture schools, boy scouts, etc.)
7. Create a landscaped berm at the west end of the mall with some other features (maybe use construction rubble as fill)
8. Obtain arboretum status
9. Establish environmental project funding



- **Energy:**

1. Green the RFPs (Request for Proposals)
2. Focus on glazing and lighting in the design specifications
3. Hire an energy manager (higher grade level)
4. Establish a green mission for the public works department
5. Conduct cost-benefit studies
6. Establish a command green committee
7. Educate A/Es, Contractors, Designers, and Occupants
8. Identify resources (\$ and people)
9. Conduct analysis of existing operations (i.e. lighting controls)
10. Implement the use of preventative maintenance software
11. Evaluate current demolition contract in regard to energy
12. Develop lighting design guidelines (interior and exterior)
13. Establish metrics for energy measurements
14. Establish marketing to occupants



- **Waste & Recycling:**

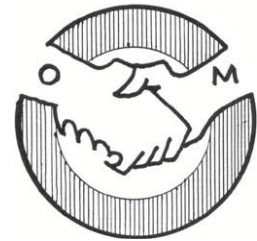
1. “No-brainers”:
 - a) Navy Inns (towels/linens) (i.e., card explaining option to reuse towels and linens and not wash every day).
 - b) NEX/MWR (reduction in packaging)
 - c) Reduction of wet garbage
2. Commit to a Case Study where major components will be recycled (a demolition project) with support from the CO and Major Claimant
 - a) Establish specification & contract language to address this



- b) Establish a measurement & verification system for quantitative metrics
- c) Establish a training/education program for A/Es, Contractors, Bidders, Designers, Occupants/Residents, and Children
- 3. Purchase equipment to improve base recycling efforts
- 4. Increase recycling storage area for trees, building materials, etc. (MWR) to sell and reuse materials
- 5. Establish task forces for the following:
 - a) Local base policies on waste reduction
 - b) Waste Reduction Partners
 - c) Awards Programs (“healthy competition”)

- **Operations & Maintenance:**

- 1. Using the gym project, incorporate green elements and daylighting
- 2. Identify where lower maintenance could be achieved: alternative vegetation, reforestation, etc.
- 3. Establish recommissioning efforts
- 4. Create a forum to look at and review “green issues” and actions over time (6 months, 1 year)
- 5. Energy Management Control System (EMCS)
- 6. Create a “green atta boy” program
- 7. Empower the recycling program manager
- 8. Implement the use of low VOC paints
- 9. Establish green language in the RFPs (Request for Proposals) for activity level projects (glazing, roofing, lighting, awnings, and orientation)
- 10. Begin an education program about recycling
- 11. Investigate alternatives to the use of hay bales for erosion control



- **“Big Picture” (Process, Education, and Community Outreach):**

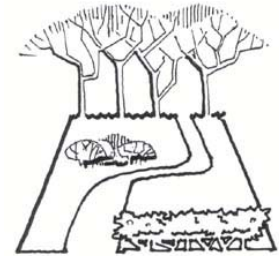
- 1. Plant native plant display/demo plots (at housing referral office)
- 2. Investigate the Joint Land Use Planning (JLUP) process
- 3. Assign responsibility for green education efforts
- 4. Prepare a brochure for the Navy Inn guests that addresses green issues such as waste reduction
- 5. Develop and distribute “greening materials” to developers in the community
- 6. Identify current base and community “good green practices” being implemented now
- 7. Update Navy Corp. Command brochure with green message
- 8. Establish mechanisms for Joint planning (base and community) on specific topics
- 9. Incorporate green issues into base indoctrination course
- 10. Develop/distribute education materials for residents
- 11. Clarify public access and educate the community
- 12. Incorporate the green message into events



Mid Term Goals and Objectives (From 1-5 years):

• **Site & Water:**

1. Develop on on-site nursery
2. Implement sustainable site design for housing (start for future projects and make sure it is not cut from the budget/include bike paths, gathering areas, community gardens within walking distance, and less mowing)
3. Develop a GIS system (include the landscaping in this system)
4. Identify and develop pedestrian spines (define pathways even diagonal paths between buildings and destinations)
5. Establish a bicycle fleet (this is done in many other places, used by anyone who needs one, and there is the added benefit of sustained physical fitness)
6. Develop and implement green parking lots (i.e., planting islands, etc.)
7. Revitalize the mall area (currently this area which has the most opportunity is not being optimized/ encourage people to go to that space)



• **Energy:**

1. Balance and “right-size” HVAC systems (VAVs, economizers, etc.)
2. Encourage research and development in energy efficiency at the base
3. Commit to a case study/prototype facility
4. Encourage A/E and Contractor “buy-in” to energy efficiency and green practices (Demand LEED green building rating system training and certification)
5. Use the base as a test site for acquiring new technologies/ new knowledge
6. Develop plans to surpass current regulations
7. Establish focus committees such as a “Sustainable Development Committee”



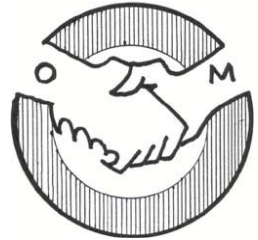
• **Waste & Recycling:**

1. Commit to 10-25% of all base projects (new, demolition, and renovation projects) to be case studies that would be measured for waste reduction.
 - a) Establish consistent data collection and “Measurements of Excellence” and share information through internal and external communication channels
 - b) Continue ongoing training sharing “Lessons Learned” from contractors, occupants, children, etc.
 - c) Use measurement/verification system on all case studies
2. Secure funding and continue equipment procurement for recycling efforts
3. Increase task forces to:
 - a) Address base and community policies on waste reduction and establish a common vision
 - b) Implement waste reduction awards program (i.e. “Recycler of the Month”)



- **Operations & Maintenance:**

1. Investigate how to use EMCS (short term implementation, operational technical systems, etc.)
 - a) Contractual issues
 - b) Computers and computer equipment
2. Investigate other O & M roles (PM I.D.)
3. Implement O & M education/training
4. Improve recycling efforts (long-term markets)
5. Establish documentation requirements to collect data on savings and results
6. Use the clubhouse at the golf course as a case study
7. Establish a bulk relamping program
8. Initiate other energy and lighting projects
9. Establish waste reduction/recycling efforts in demolition projects:
 - a) A two option bid (100% recycling and partial recycling)



- **“Big Picture” (Process, Education, and Community Outreach):**

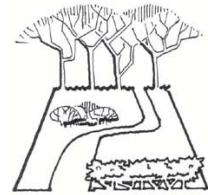
1. Continue to look for and foster joint activities
2. Use JLUP process if appropriate
3. Continue ongoing responsibility for developing and implementing education programs
4. Make Navy Inn into a “green hotel”
5. Put sustainability messages and showcase successes on NSA Web site
6. Expand “Yard of the Month” award to include native plants
7. Retrofit a house as a “green model” for education



Long Term Goals and Objectives (5 years onwards):

• **Site & Water:**

1. Landscape golf course fairways (break up each hole to give it its own character)
2. Implement swale greenbelt restoration (big ditches are hard to mow/this objective would save time and encourage natural vegetation)
3. Implement water efficiency measures (low flow toilets, faucets, and showers)



• **Energy:**

1. Implement renewable energy sources
2. Become self-sufficient



• **Waste & Recycling:**

1. Commit to 100% of all base projects are focused on recycling and waste reduction/waste elimination
2. Maintain ongoing competency (stay “cutting edge”)
3. Increase task forces to address:
 - a) Common vision of waste reduction/elimination goals and measurements by local base and community leaders
 - b) Local , national, and global awards achieved by base/community for recycling/waste efforts
4. Change Navy Policies globally
 - a) Change Navy Guide Spec to address waste reduction and recycling
 - b) Establish and implement Navy Training/Education course on “best practices” for waste reduction and recycling
 - c) Share data collection and “lessons learned” globally (on Whole Building Design Guide Web site:www.wbdg.org)
 - d) Successful funding approval will be based on the excellence demonstrated at NSA Mid-South



• **Operations & Maintenance:**

1. Establish and implement long range maintenance plan
2. Establish base-wide water conservation strategies
3. Continue metering and use data to improve performance
4. Implement plan with focus on reducing maintenance (reforestation, keep trails established, use pedestrian walkways on base)



• **“Big Picture” (Process, Education, and Community Outreach):**

1. Identify and showcase successes
2. Continue programs and continually re-evaluate and update



SUSTAINABLE DESIGN CHARRETTE PROCESS



Fig. 4 The Helmsman Club was the charrette location.

The Department of Defense, with military installations worldwide and obvious related high impact potential, was targeted by the Department of Energy for a “Greening of Federal Facilities” endeavor. Naval Support Activity Mid-South in Millington, Tennessee, near Memphis, was chosen as the site of a “Greening of Federal Facilities” Charrette. Funding from the Department of Energy through NREL (National Renewable Energy Lab) was dedicated to this process to help catalyze sustainable initiatives in the military.

Approximately 45 participants from various backgrounds assembled at the NSA Mid-South base for the two-day charrette. (A charrette is a sustained, intensive brainstorming session in consideration of a single topic or problem.) In this case, the charrette participants worked both as a large group and as focused work groups to identify realistic and long-range sustainable opportunities and objectives for the NSA Mid-South base.

The night before the charrette, a reception at the base attracted many of the participants and allowed them to get acquainted before the start of the event. For the next two days, using a format that combined presentations with breakout work sessions, the participants reviewed current baseline conditions and worked toward the formulation of specific sustainability opportunities and recommendations for NSA Mid-South.

MONDAY (July 17, 2000)

Monday afternoon, the charrette speakers and facilitators were given a tour of the base by Rodger Aitken, the NSA Mid-South Facilities Planner Director, who has been at the base since the late 1960s.

Monday evening, a reception was held at the Base Club building which was the site for the two-day charrette. Drawings and maps of the base were displayed; not only current base drawings and maps, but historic and future maps as well. Many of the charrette participants became engaged in discussions at the reception that later formed the basis of several charrette ideas.

TUESDAY (July 18, 2000)

Captain Diane Lofink, Commanding Officer of NSA Mid-South, opened the charrette early on Tuesday morning with a welcome and introduction to the base as well as a declaration of her personal support for sustainable initiatives. Commander Bob McLean, the Public Works Officer for the base, added a critical statement, reminding the participants that the sustainable initiatives developed during this charrette should also make good overall business sense.

Mike Chapman of Naval Facilities Engineering Command spoke next. Mike, who works in the new “sustainable” Navy Headquarters Building in Washington, DC, expressed the need to implement sustainable design principles and gave some compelling reasons and “hands-on” examples. Following Mike, Anne Sprunt Crawley of the Federal Energy Management Program (DOE) introduced everyone to the concept of a “charrette” and



Fig. 5 Charrette Presentation

spoke briefly about past initiatives to green federal facilities, such as the “Greening of the White House”, that preceded and eventually led to this NSA Mid-South charrette.

Introductions of all the participants and logistics followed the morning speakers. Next came a viewing of the Department of Defense (DOD) video, “The “The Greening of the Red, White, and Blue”. The video set the stage for the charrette – showcasing sustainable initiatives in the DOD and challenging the group to commit to sustainability and its implementation. After the video, Andy Walker and Anne Sprunt Crawley spoke about past charrettes in more depth, and also about the expectations for this NSA Mid-South charrette. They voiced the desire to have tangible benchmarks and goals as well as to format the charrette in a manner that others could easily learn from this experience.

Rodger Aitken, Facilities Planning Director for NSA Mid-South and a main charrette steering committee member gave an overview of the planning issues that the base has undertaken in the past few years, notably its change in mission from a training base to an administrative base. This critical overview of the base and its current operations provided essential information for the charrette participants.

Following a lunch break, the large group listened to national sustainability experts give quick overviews of the individual topic assignments for the five focused work groups: Site And Water, Energy, Waste And Recycling, Operations And Maintenance, and “Big Picture” Issues (process, education, and community outreach). After each topic presentation, question-and-answer sessions brought insights and highlighted key concerns that would need to be addressed by the charrette participants in their focused work groups.

Near the end of the first day, the large group split into the five focused work groups. The group sizes ranged from five participants to approximately fourteen. The groups determined how they would address the following issues in their assigned topic areas during the next full day of work:

- Baseline Conditions
- Sustainability Efforts
- Opportunities and Barriers
- Case Studies/Exemplary Projects
- Short, Mid, and Long-term Goals

WEDNESDAY (July 19, 2000)

For this second full day, the large group room was transformed into five distinct work areas. Work groups were asked to continue and to assign a spokesperson for the group. The spokespersons are noted below:

- **Site and Water:**
Spokesperson: LCDR Beth Lin
- **Energy:**
Spokesperson: Tom Beck
- **Waste & Recycling:**
Spokesperson: Tonya Barker
- **Operations & Maintenance:**
Spokesperson: Commander Bob McLean
- **“Big Picture”:**
Spokesperson: Val Chapman

About an hour before lunch, all but 2 or 3 people from each group were asked to go around the room and check out what the other groups were doing. Those left at their work area stayed behind to explain their group’s ideas to the visiting group members. This was a tremendous opportunity for cross-pollination of ideas. All groups benefited from this exchange; with new ideas quickly generated while the other ideas were challenged, praised, and even “stolen”!

Beth Shearer, Director of the Federal Energy Management Program of the Department of Energy, joined in the second day of the charrette and enthusiastically participated in the cross-pollination of ideas. During the lunch session she gave an impressive presentation of what dramatic positive environmental impacts could be achieved through energy efficiency and other sustainable initiatives such as this charrette. She raised several of the ideas and discussions that she had just witnessed or had been involved with in the focused work groups. This was a powerful motivator for the rest of the day.

After the lunch presentation, the five work groups refocused on short, mid, and long-term goals and were given 3 overhead sheets to record their goals so that they could be shared with the larger group at the end of the day. As final presentations, each spokesperson was asked to present the group’s short, mid, and long-term lists. Jim Franklin, as the large group facilitator, asked that the large group vote on the priorities of the listed items following each focused work group’s short-term goals presentation. In this way each work group presented a clear listing of their short, mid, and long-term findings. (Note: The short-term priority listings as well as the mid and long, for each of the work groups, are shown in the executive summary.)

Closing remarks were given by Commander Bob McLean on behalf of the base and Captain Lofink. McLean stated that he hadn’t been sure what to expect when he first heard of this

charrette opportunity, but was now pleased with the results. He stated that what transpired during the charrette was close to his best case scenario; he felt the charrette identified opportunities that were doable, attainable, made good business sense AND could be integral to a long range action plan for the base. Commander McLean noted that no one should be intimidated by the big picture and the long-term agenda since many “low hanging” fruit could be easily picked in the short term. He ended by encouraging continued teamwork, dialogue, and true partnerships between the base and the outside contractors, the community, and others.

CHARRETTE PLANNERS AND PARTICIPANTS

The Steering Committee:

Rodger Aitken, NSA Mid-South, Facilities Planning Director, Base Charrette Leader
CDR Bob McLean, NSA Mid-South, Public Works Officer, Base Charrette Liaison
Jerry Harris, Southern Division, Naval Facilities Engineering Command, Business Liaison
Mark Whitson, Field Support Activity (CNO Code 09B), General Engineer
Ronnie Bostain, Southern Division, Naval Facilities Engineering Command, Navy Green Team Liaison
Andy Walker, NREL, Project Manager and Energy (HVAC) Facilitator
Greg Franta, FAIA, ENSAR Group, Inc., Project Leader and Energy Facilitator
Gail Lindsey, AIA, Design Harmony, Inc., Charrette Leader and Waste & Recycling Facilitator

Guest Speakers and Facilitators:

Mike Chapman, Naval Facilities Engineering Command, Guest speaker
Captain Diane Lofink, Commanding Officer of NSA Mid-South, Guest Speaker
Beth Shearer, Department of Energy - Director of FEMP, Guest speaker
Anne Sprunt-Crawley, Department of Energy FEMP, Guest speaker and O&M Facilitator
Jim Franklin, FAIA, Jim Franklin Consultant, Large Group Facilitator
Joe Cloud, ASLA, EDAW Inc., Site Facilitator
Michael Laurie, NREL, Water Facilitator
Joel Todd, Scientific Consulting Group, Inc., "Big Picture" Facilitator
Nancy Clanton, Clanton & Associates, Energy (Lighting) Facilitator
Jason Hainline, ENSAR Group Inc., Energy Facilitator

Military Stakeholders:

Dale Sanders, NSA Mid-South, MWR Administrative Officer
Tom Beck, NSA Mid-South, Engineering Director
Carey Ragan, NSA Mid-South, Architect
Lou Ayala, NSA Mid-South, Architect
Tonya Barker, NSA Mid-South, Environmental Director
Jim Heide, NSA Mid-South, Environmental Engineer
Dave Wainwright, NSA Mid-South, Facilities Planning Technician
Diane Baum, NSA Mid-South, Housing Director
Jerry Goin, NSA Mid-South, Contract Surveillance Representative
Bill Neville, SouthDiv, Naval Facilities Eng. Command, Real Estate Specialist/Planner
Steve Shoaf, SouthDiv, Naval Facilities Eng. Command, Project Design Manager
Dave Ranson, Navy Personnel Command, NPC-65
LCDR Beth Lin, Resident Officer in Charge of Construction, Assistant Resident Officer in Charge of Construction
Frank Novitzki Resident Officer in Charge of Construction, Project Manager
LTCOL Jim Currey, Tennessee Air National Guard, Director of Environment, Staff Civil Engineer
Jerry Garza, J.A. Jones (BOSS Contractor), Project Manager
Virginia Taylor, J.A. Jones (BOSS Contractor), Quality Control

Celia Jones Chastain, MDI Subcontractor of J.A. Jones (BOSS Contractor), Horticulturist
Darryl Matsui, Naval Facilities Engineering Service Center, HVAC and Energy Projects
Engineer

Community Stakeholders:

Jim Ferguson, City of Millington, Director of Planning

Val Chapman, Millington Planning Commission and City Beautiful, Director of Planning

Cliff Norville, Memphis/Shelby County Planning Commission, Manager of Energy
Management

Charles Pickel, MLG&W, Manager, Gas and Water Engineering

Dick Prosser, Prosser Hallock, Planner

Stan Klenk, Allen and Hoshal, Civil Engineer

Charles Goforth, Allen and Hoshal, Planner

SITE AND WATER TEAM ACTION PLAN

Facilitators: Joe Cloud, ASLA and Michael Laurie

Spokesperson: LCDR Beth Lin

Team members: CDR Bob McLean, NSA Mid-South, Public Works Officer, Celia Chastain, MDI, Horticulturalist Charles Pickel, MGL&W Charles Goforth, Allen and Hoshel, Dale Sanders, Navy, Local MWR

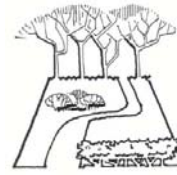


Fig. 6 Site and Water group

1. Baseline Conditions:

What is currently being done at the base regarding this topic area?

The current major site issue on base is building demolition and an extraordinary amount is taking place. One overall effect is a dramatic reduction in building density, leaving a wide-open landscape with its urban fabric rather tattered. The enormity of the spaces between buildings eliminates the sense of pedestrian scale. Another result is an excess of parking in most areas.

A major project for housing rehabilitation is scheduled to begin in the next 12 months. The results of the greening charrette may be able to provide a positive influence on design work for this upcoming effort.

A major outdoor space was recently completed on base. Known as ‘The Helm’, by all accounts this is a less than successful space. Functionally, it is somewhat confused – the central ceremonial space is too large to allow for proper intimacy, placement of lighting and guy ropes interferes with audience visibility, and the main axis leading up to the ceremonial space terminates in a wall that prevents access to the space. Poor soil conditions have prevented plant materials from establishing themselves well, although some corrective measures are being taken. More could be done. However, this is a relatively under-utilized space.

As part of the base realignment, the base is working with the local community to finalize a land ownership and easement pattern that works out well for everyone, particularly with regards to open space initiatives in the vicinity of the airport.

The golf course recently underwent a major renovation, mostly related to improving operational conditions. It should be investigated for sustainability opportunities.

2. Sustainability Efforts:

What activities are currently underway in this topic area that enhance base sustainability?

The buildings and pavements demolition projects have made significant efforts to increase permeable surfaces. However, the reduction in stormwater runoff due to the removal of these

impermeable surfaces may be less than perceived. Much of the annual rainfall occurs during the summer months when the clay soil is baked hard. With only close-mowed bermuda grass as a ground cover, this hard clay soil will shed water quite rapidly. Restoring former building sites using alternative landscape types should be explored as a part of the building demolition project. Proper restoration of site soil conditions to those capable of sustaining good plant growth should also be an integral part of these projects.

NSA Mid-South has planted over 2,000 trees in the past several years in an effort to minimize the expansiveness of the lawn area and increase shade availability. Many of the trees have been native willow oaks, which are an excellent choice. This is an excellent beginning, with more to be done.

3. Opportunities and Barriers:

**What opportunities can be identified in this topic area to enhance base sustainability?
What are the potential barriers to these opportunities?**

A number of immediate opportunities exist. As is typically true, there are barriers to realizing most of these opportunities, and the majority of them are either financial or cultural.



Fig. 7 Site landscape

Including the golf course, the base appears to be maintaining over 1,000 acres in mown lawn, which is a large drain on maintenance resources. There is an environmental cost as well, as these mown areas cause increased runoff and decreased habitat. The major barrier to reducing the area of lawn is cultural – upper echelon officers equate lawn with tidiness, efficiency, and industriousness. The challenge may be to find the middle ground – maintain adequate areas of lawn to leave the desired positive impression, while nibbling away at the edges and wherever it won't be missed. Implementing a landscape that includes only minimal lawn area as part of the demolition work is one way to change the lawn dominated landscape without the cost of changing the existing lawn areas. Working to change the cultural perception of what is a quality landscape will also help in the long run. There are many college campuses in America that follow sustainable principles, yet are seen as being very attractive.

All stormwater is conveyed through open ditches directly into the Big Creek watershed. Many of these ditches show signs of erosion. There are no retention ponds on base to slow runoff or improve water quality. It would not be possible to develop the site with such a drainage system today, due to concerns for runoff and water quality. Thought should be given to restoring this system to a more natural system, or at least introducing natural elements. The good news is that the system is open, rather than underground in pipes. Much of this system could be adapted to more closely resemble natural hydrologic systems, including such elements as wetlands, open ponds, and bottomland hardwood forests. One major barrier is the capital cost associated with this type of conversion. Another barrier is cultural – as with lawns, the ditches are perceived as being neat and efficient, whereas more

natural systems may be seen as unkempt and possibly harboring undesirable wildlife such as snakes or rats. As the ditches are associated with roadways, they will be highly visible – any changes will be immediately noticeable. Still another barrier is knowledge – it will require some study to know where to start with ditch restoration. Care must be taken to cause no harm, such as increasing downstream flows, or on-base flooding. However, as a federal facility, NSA Mid-South can assume it remain in its current use long enough to ensure that gradual change will pay dividends.

Another potential opportunity is to make the base more pedestrian friendly. Right now, everyone drives everywhere – even to the gym to exercise! The summer climate is very hot and humid, not an environment conducive to walking. The scarcity of shade, excess of large hot parking lots, lack of visual clues indicating where the major walkways and destinations are, and enormous spaces between facilities all conspire to keep people in their cars and off their feet.

Many base users are visitors on Navy business, particularly annual review boards, and not familiar with where to go. Walking would be encouraged by the creation of clear pedestrian routes for them to follow, with adequate lighting and landscaping to make walking an attractive option. Obstacles to this are largely monetary – it is hard to fund these types of non-facility related projects. The landscape needs to be looked at as a quality of life situation – the state of the work environment affects people’s satisfaction with their circumstances – and funded appropriately.

One obstacle to obtaining greater efficiencies in material use and reduction of waste is the current low cost of water. The base produces its own water at very low cost, so there is little incentive to reduce wasteful use of this plentiful resource, and the payback period for installation of water saving measures would be very long. The only real cost to the base is for collection and treatment by the local sewer utility, at a rate of \$.60 per 1,000 gallons. Should the water supply system be taken over by the same utility, a measure that is currently under consideration, the cost of water may double, but the new total water cost of \$1.20 per 1,000 gallons would still be very low by national standards. It is the understanding of the site team that there is a water infiltration problem into the sewage collection system that is costing the base some money. This infiltration problem should be studied and solutions proposed. The water system is currently operating at only 30% capacity and produces water of high quality, although there are some clarity issues with the deepest wells. More discussion on these issues should take place to refine accuracy.

4. Case Studies/Exemplary Projects:

What other military or civilian projects can help promote certain strategies/opportunities in this topic area?

SUBASE Bangor, Washington, is one of the most attractive installations in the Navy, and it has very little mown lawn. Most of the landscape consists of a very sustainable native forest with native shrub understory. The native landscape is productive enough to maintain a regular fall deer-hunting season. The same is true of Fort Belvoir, Virginia, which maintains an open base, including a 700 acre nature preserve open to the public, protecting the

watershed of the Potomac River. There are many lessons here for NSA Mid-South and its watershed of Big Creek.

The Naval Air Station, Joint Reserve Base, Fort Worth Environmental Department, has begun an intensive soil erosion project to counter years of harmful site practices. This project will ultimately restore a 25-acre tract of land on the base. Native grasses and wildflowers have been introduced to provide ground cover and stabilize the soil. The realized benefits of this project are restoration and conservation of soil, and an increased aesthetic appeal of the station at a cost savings of \$18,000 each year by reducing the mowing requirement by at least 6 months each year.

(Check out this project at: <http://206.5.146.100/n45/doc/sstories/html/ftwrth3a.html>)

ATT Corporation recently converted approximately 50 acres of lawn in Naperville IL from lawn to attractive native prairie. The maintenance costs dropped from \$2,000/acre to only \$500/acre for prairie, yielding a payback period for the investment of just over a year.

5. Short, Mid, and Long-term Sustainability Goals:

SHORT TERM GOALS (WITHIN YEAR 1)

1. **Develop a Master Landscape Plan:** This plan would guide development and management of the overall base landscape.

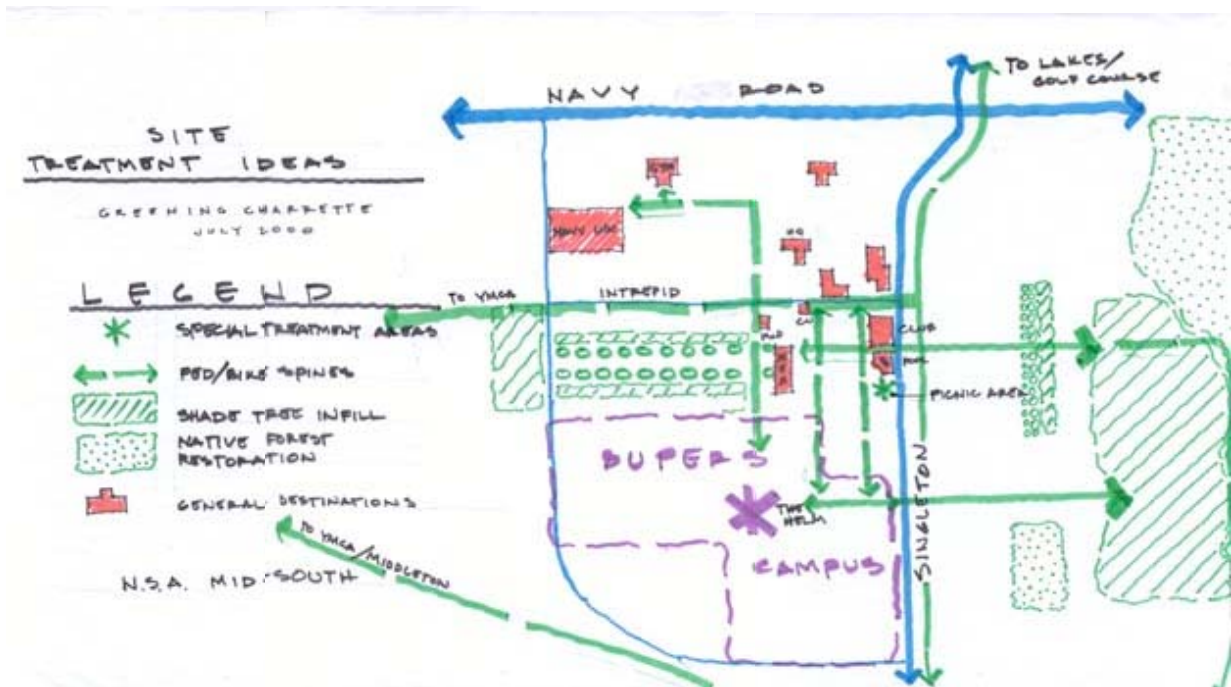


Fig. 8 Site Plan Concepts

It has the potential to significantly reduce maintenance costs by identifying areas where alternatives to mowing can be implemented, including restoration of native forest cover,

wildflower meadows, groundcovers, and other alternative and attractive landscape solutions. This plan can also aid sustainability through reducing storm-water runoff and enhancing wildlife and songbird habitat. See also items 2, 3 and 5. A number of items were identified that can be addressed in such a plan. Many of them are considered important enough to be addressed as individual items elsewhere in this action plan:

- Identify areas for natural reforestation
 - Create people-scale places using landscaping, especially along pedestrian corridors
 - Reduce lawn areas by substituting meadows, groundcovers, shrub beds, or tree groves
 - Relocate natural tree saplings from elsewhere on base to central campus
 - Landscape the golf course fairways
 - Develop an on-site nursery
 - Identify opportunities to return swales to more natural conditions
 - Develop parking lot landscaping standards
 - Develop landscaping standards for visually acceptable reforestation of large areas of the central campus.
 - Develop a strategy for the use of compost and green waste.
2. **Establish a Native Tree Relocation Program:** Maintain efforts to increase the number of shade trees on base by using the Vermeer tree spade (owned by MWR and located at the Golf Course) to relocate existing native tree saplings that have “volunteered” on Navy property north of the golf Course and south of the runway. This could be done very cost effectively using CB labor or the BOSS contractor. This relocation should be part of a focused, planned strategy, and involve only high-quality, long-lived shade trees such as oaks and sweetgums.
 3. **Develop Landscape Standards:** Identify a number of different attractive landscape solutions that are acceptable to the base management, and specify the conditions under which they may be used. With the standards resolved, NSA Mid-South can strategize alternatives to mowed lawns and consider attractive ways to deal with perimeter lawn areas and areas that formerly contained large buildings, along with plans for a richer pedestrian environment to encourage walking in certain areas of the base. This item works hand-in-hand with items 1, 2, and 5.
 4. **Build Landscape Restoration Standards into Demolition Projects:** When buildings are demolished, construction specifications should contain rigorous criteria for site restoration. The priority must be to establish viable long-term vegetation on the site. This criteria should include remediation of all soil contamination, removal of all objects in the top layers of soil to a specified depth (at least 36” recommended), and placement of quality topsoil to a specified minimum depth (12” –18” recommended). As an alternative, sufficient soil amendments can be added on-site to produce an adequate root zone environment. The site should also be graded to produce positive off-site drainage.
 5. **Stop Mowing Selected Areas:** Extensive mowed lawns constitute a non-sustainable landscape, requiring a continuous input of water, fertilizer, toxic pesticides, and labor. Lawns are inordinately expensive to maintain (estimated at \$800-1,1000/acre at NSA Mid-South), and the required use of mowers contributes to air pollution. Other often overlooked, environmental costs include excessive storm-water run-off, lost habitat, and the lost summer cooling provided by shade trees. There are many areas outside of the core campus area that can be converted to other landscape types with no loss in perceived

quality to the base landscape, with benefit of substantial maintenance savings. See also items 1, 2 and 3.

6. **Establish Green Partnerships:** Identify non-profit groups that can help implement landscape solutions on-base at no or low cost through partnerships. These include groups such the Master Gardeners, the Boy Scouts, the Nature Conservancy or Audubon Society; job training programs such as the Youth Conservation Corps or other groups who do employment training centered around the landscape industry, and others. Some of these groups, such as the Master Gardeners, are actively looking for projects to fulfill practice requirements. Others, such as the Boy Scouts, would welcome opportunities for their members to earn green merit badges.
7. **Create a landscaped berm at the end of the Mall:** As part of demolition of the former HQ building, consider placing an earth berm at the end of the mall to create a sense of containment for the mall area. If possible, use construction rubble as fill.
8. **Obtain Arboretum Status:** By gaining recognition by the State of Tennessee as a certified arboretum, NSA Mid-South would become eligible to receive free trees from Pinson Mounds State Tree Farm. In return for adhering to established arboreta criteria, the ongoing reforestation program could maintain momentum at a reduced cost to the base.
9. **Establish Environmental Project Funding:** NSA Mid-South may be eligible for state and Federal grant programs oriented toward environmental restoration that can help fund environmentally sustainable projects. In particular, projects related to wetland restoration, storm-water runoff reduction, and water quality improvement have a high chance of finding funding. As the emphasis on watershed protection measures gain momentum, more funding is becoming available. Programs emphasizing protection of the Mississippi watershed are a good place to start.

MID-TERM GOALS (1 – 5 YEARS)

1. **Develop an On-site Nursery:** Develop a tree and plant nursery at NSA Mid-South in support of the landscape maintenance and restoration efforts. The BOSS contractor as part of their on-going maintenance efforts can operate this nursery. During the charrette, a possible suitable location was identified with water already available is the former community gardens area north of the housing area adjacent to the golf course, behind the Public Works Officer's residence. However, it was subsequently noted the Navy no longer owns this and another location needs to be identified. This area could serve double-duty by being managed for sod production, and converted to a nursery gradually as the sod is stripped off. This will require proper turf management actions for a specified time period prior to sod production to ensure high quality sod.
2. **Implement Sustainable Site Design for Housing:** Consider more than the structures when upgrading housing areas. Site improvements that go along way to increasing residents quality of life along with increasing sustainability include actions such as:
 - Plant more deciduous shade trees to minimize solar gain on the houses and yards during the summer (Do not plant evergreens,– they will block sunlight during winter months when it is desired).
 - Install community gardens within a very short walking distance to the residences, complete with water hookups and the use of base-owned machinery for spring tilling, to allow residents to grow their own food.

- Installation of bicycle paths connecting to the rest of the base, including other housing areas, separated from the road system.
 - Access to inexpensive landscape plants for residents who so desire (see # 16 – perhaps the base could make ornamentals available for a very low cost).
- 3. Develop a GIS System as a Site Management Tool:** NSA Mid-South now has a Geographic Information System up and running. Not only is this a valuable tool for facility management, it can be made a highly productive tool for landscape management. This will require the development of individual landscape related ‘coverages’, or thematic maps. Examples of the sorts of elements that could be usefully mapped include landscape cover types; the complete base hydrologic system; a complete tree inventory; wildlife habitat; the complete irrigation system, including valves and head type and location; site lighting, including element type and maintenance schedule, soil conditions, potential building sites, and many others. For example, the amount of turf grass being maintained and mowed could be tracked, and savings easily calculated if certain areas are converted to other cover types. The GIS can very quickly and easily do area takeoffs for rapid planning scenarios. This is perhaps the best landscape maintenance tool available to the base if properly constructed, maintained, and used.
- 4. Identify and Develop Pedestrian Spines:** There are a few desirable pedestrian paths between the BUPERS campus to places like the Navy Inn, the gym, the Officer’s Club, the NEX, McDonalds, etc. These are the natural areas for base personnel to use when going between the BUPERS area and these other functional areas by means other than the automobile. By identifying these areas, and developing them as ‘pedestrian spines’, the base will encourage walking and bicycling, and reduce the use of the automobile. Among the means that can be employed to make these areas more attractive and pleasant to pedestrians include proper signage; distinctive pavement types that make them stand out, adequate lighting, and above all- attractive landscaping. In particular, continuous deciduous shade trees should be employed along the south side of these pedestrian spines to maintain a shady cool area for walking. Continuous bands of shrubbery and groundcovers will also make these areas more attractive for walking, and also reduce mowing requirements and create more habitat for songbirds. This non-motorized transportation network could also be extended to include some regional connections, such as a bike trail along Singleton Avenue, and a trail along Big Creek that could provide better access to the future YMCA, and perhaps eventually to Millington. For the core area pedestrian spines, however, walking distances should be respected. A standard rule-of-thumb for pedestrian access used in retail and stadium design is to assume any distance greater than ¼ mile will be perceived as an obstacle to walking.
- 5. Establish a Bicycle Fleet:** Increasing bicycle use on base would be a significant sustainability enhancement. It would reduce reliance on the automobile, reduce related air pollution, encourage troop fitness, and minimize the need for automobile related infrastructure, such as parking lots. One method is the creation of a fleet of inexpensive bicycles owned and maintained by NSA Mid-South. They would be sprinkled around the base, and anyone wanting to use one would simply take a bike and leave it at a specified convenient rack when arriving at their destination. Bikes could be painted a distinctive color to maximize visibility and discourage theft. Programs (such as contests among divisions) could be developed to encourage their use.

6. **Develop and Implement Green Parking Lots:** NSA Mid-South has extensive areas of asphalt-paved parking areas, many of which are not used to their full capacity. These areas of asphalt are environmentally unfriendly in a number of ways. They absorb the solar radiation, creating heat islands that can be significantly hotter than the surrounding landscape, and also raise the temperature of that landscape. They raise the rate of runoff and contribute a number of environmentally unfriendly substances to the hydrologic system through runoff. A number of possible solutions exist, including the use of shade trees, perimeter bioswales, infiltration basins, integration with pedestrian walkways, and others. Existing parking lots can gradually be retrofitted to a ‘greener’ design, while still maintaining adequate supplies of surface parking.
7. **Revitalize the Mall area:** With the removal of so many buildings from the central core campus area, the great lawn in its heart, flanked by magnificent willow oaks, has become an overlooked and under-utilized feature (Fig. 9). Certain measures could be undertaken to revitalize this space. Initial suggestions include addition of more even modern lighting, and planting additional parallel rows of oaks outside of the existing rows. This would eventually result in a wider shade canopy on either side, reminiscent of the mall in Washington, DC with its triple row of elms. Future siting efforts may consider making the building locations along the mall in the center of the base the highest priority, provided the buildings are the appropriate types. This strategy will help create a more compact and pedestrian-friendly central campus core, while gradually adding improvements related to infill projects. The creation of an attractive shady picnic area adjacent the swimming pool would serve families on base and serve the dual function of making the NEX area more attractive by restoring the old building pad between the pool and the NEX to a landscape condition. Perhaps this project could be coupled with the demolition of the old Bowling Alley.



Fig. 9 Mall Area

LONG TERM GOALS (5 YEARS +)

1. **Landscape Between the Golf Course Fairways:** The current golf course configuration, while probably highly functional and efficient, resembles most of the rest of NSA Mid-South in that its surface consists largely of mown turf grass. Not only is this expensive to maintain and ineffective in terms of storm-water retention and cleansing, it also makes for a certain bland sameness to the actual experience of playing golf. Most holes can be seen from any other hole, with the result that the individual fairways lack character. It is

also a lost opportunity to create songbird and wildlife habitat, as there is no understory or mid-story to the existing tree cover. By landscaping the areas between the fairways, a greater diversity of habitat will be created, maintenance costs greatly reduced, and perhaps best of all, the golfing experience would be enhanced by creating a unique character to each of the fairways.

2. **Restore Drainage Swales As A Natural Greenbelt System:** Among the most prominent landscape features at NSA Mid-South are the large drainage swales that line the roads and carry storm-water runoff quickly and efficiently down to Big Creek. These swales probably date back to the time of the original road development. They present an excellent opportunity to apply sustainability principles by allowing nature to creep back into the developed central part of the base, through selective restoration of natural hydrologic systems.

Among the benefits are:

- Increased detention of stormwater runoff, minimizing downstream runoff impacts
- Increased water quality of the runoff, through the filtration, nutrient uptake, and settling which occurs in more natural systems
- Increased habitat quality and diversity, by allowing wetland vegetation patterns to develop.

Potential restoration actions could include removal of concrete bottoms to encourage infiltration and filtering, placement of low check dams to create ponding to allow settling of suspended particulates, selective swale widening to allow construction of new wetland habitat and increase stormwater storage capacity, selective removal of culverts and replacement with bridge structures, and restoration of native vegetation. This last action could be as simple as halting mowing in the very ditch bottoms, allowing certain wetland plants to naturally reestablish themselves. Or it could be allowing the infill of native bottomland forest along certain drainage ways, such as the Big Creek tributary marking the eastern edge of the base, thus stabilizing the banks and minimizing erosion. This is identified as a long-term action, as it should only be done after some study in a deliberate and thoughtful manner. Care needs to be taken to ensure that adequate drainage is maintained throughout the base, and that downstream flooding will not be promoted. It should be noted that, were the base developed today, these swales would not be an acceptable engineering solution to site drainage, but that retention ponds, detention ponds, bioswales, and wetlands retention would all be required as a part of good site development practices to protect the Mississippi watershed.

3. **Implement Water Efficiency Measures:** A number of fairly simple measures can be considered that would decrease water consumption. These can be implemented over time, as new building and irrigation systems come on line, or they can be implemented as individual discrete programs, at the discretion of individual program managers. These measures include the following:

- Installation of leak detection systems.
- Installation of faucet aerators.
- Installation of low-flow shower heads.
- Installation of waterless urinals.
- Installation of better irrigation controls, emphasizing feedback sensors that detect actual soil moisture content, rather than setting controls one time for maximum-demand scenarios.

- Better maintenance of irrigation systems, ensuring that irrigation heads are in good condition and not wasting water. This would be a very good application of the base GIS system; to track and monitor system maintenance.
- Study the sewer system infiltration rates, and propose cost-effective solutions.

ENERGY TEAM ACTION PLAN



Facilitators: (Building Envelope Group) Greg Franta, FAIA, Jason Hainline, and Nancy Clanton

Facilitator: (Mechanical Systems) Andy Walker

Spokesperson: Frank Novitzki

Team members: (Building Envelope Group) Carey Ragan, Jerry Goin, and Steve Shoaf

Team members: (Mechanical Systems) Tom Beck, Darryl Matsui, Jim Ferguson



Fig. 10 Energy Team

1. Baseline Conditions:

What is currently being done at the base regarding this topic area?

Basic energy efficiency and code compliance measures during building renovation.

2. Sustainability Efforts:

What activities are currently underway in this topic area that enhance base sustainability?

Practical and code compliance measures

3. Opportunities and Barriers: What opportunities can be identified in this topic area to enhance base sustainability? What are the potential barriers to these opportunities?



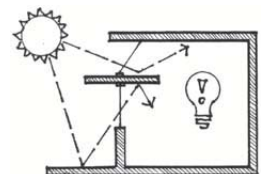
Fig. 12 Building 241 interior provides great daylighting and sun control opportunities with high ceilings and north and south windows.



Fig. 11 Building 241 has excellent opportunities for energy efficiency with its ideal orientation and apperatures.

Using Building 241 (Fig. 11 and 12) as a retrofit example, several energy efficient opportunities were identified as follows to explore and implement:

- The possibility of a greening charrette
- Daylighting strategies such as light shelves and glazing replacements
- Lighting upgrades
- Window upgrades
- New insulation with higher R value



- New HVAC system (lower peak loads to reduce chiller size by 50-70%) Combine other techniques with a chiller replacement
- Energy modeling as part of the design process
- Water saving devices in the restrooms
- Green design issues in the project RFP
- Design Build Approach
- Maintenance based priorities changed to be green based priorities

On the other side, barriers were identified and noted below:

- Local companies may not have greening expertise
- Budget constraints
- Changes are difficult to make once the contract has been awarded
- The base has not had good experiences with Design Build or Turn-key operations (Their experience has been that Design Build is successful only with an excellent set of specifications)
- Documents used to procure project funding may be outdated and therefore construction budget is inappropriate

Other general opportunities were noted for energy improvements. Several are listed below:

- Develop exterior lighting guidelines (An opportunity to change the high levels of gas station lighting on the base.)
- Build in green issues into the Construction Specifications
- Green the Requests for Proposals
- Train and Educate A/Es, Contractors, and others on base about building envelop concerns regarding energy efficiency – i.e. glazing, insulation, lighting, roofing, controls, and HVAC systems



Fig. 13 Newer building with shading and good orientation



Fig. 14 Newer base building interior illustrating poor quality lighting with high brightness differences and dark furnishings

- Log maintenance on the Energy Management Control Systems (EMCS) /Also tie life safety system to EMCS
- Monitor electric use of buildings and manage demand
- Change lighting to occupancy control instead of lighting on a schedule/ Also have HVAC on occupancy control

- Award house or neighborhood that uses the least amount of energy; offer incentives to building occupants
- Some bases have contracted with the local utility to cover an energy manager position; look for such opportunities

Longer term opportunities for energy efficiency were also discussed; they are:

- Maintenance free roofs that could last 30-50 years which would also be heat reflective and serve multi-purpose uses such as garden, water recovery, and energy producer. (Also, earth roofs and roofs with reflective exterior surface)
- Gray water irrigation systems
- Maintenance free or low maintenance building envelopes with low maintenance selective glazing
- Local material use as well as salvage material use
- Consolidation of buildings
- Less mowed grass, more native vegetation
- 100% Daylighting in all buildings and individual control of electric lighting by voice command
- Use of fuel cells, photovoltaics, solar, geothermal, thermal storage, hot water solar panels, etc.
- Integrated systems
- Insulation that would be thin yet have a high R value to optimize performance and would be made of natural materials
- Buildings that would last 100 years or more and would be easily remodeled and flexible
- Meters on buildings for billing and monitoring
- Buildings would feed the energy grid as opposed to continuously drawing from it
- Set targets for energy efficiency to achieve greatest effectiveness
- Natural ventilation

4. Case Studies/Exemplary Projects:

What other military or civilian projects can help promote certain strategies/opportunities in this topic area?

Pentagon, White House, Navy Building 33, and Way Station as presented by Greg Franta (see presentation section on energy).

5. Short, Mid, and Long-term Sustainability Goals:

SHORT TERM GOALS (WITHIN YEAR 1)

1. **Green the Request for Proposals (RFPs):** Incorporate clear green language into the Request for Proposals. Describe all the services desired and determine the greening approach at the front end and also in regard to overall facility performance. (Champions: Engineering Group)
2. **Focus on glazing and lighting in the design specifications:** Focus on quality lighting and windows. Study lighting controls for better occupant acceptance. Tone down gas station lights. (Champions: Engineering Group)

3. **Hire an energy manager (higher grade level):** A qualified energy manager should be hired that has sustainable design experience. (Champion: Command)
4. **Establish a green mission for the public works department:** The Public Works Department should have a green function and focus. (Champions: Command, Engineering, and Planning)
5. **Conduct cost-benefit studies:** Conduct a cost benefit study to review energy retrofits (Buildings 768,769,791,784,785,and 787) and identify the most effective methods. Identify existing government contracts to help with studies. (Champions: Engineering and Planning Groups)
6. **Establish a command green committee:** Command interest is needed for a sustainable support group. Energy financial incentives as well as quality of life issues would be worthy topics to discuss. (Champion: Command)
7. **Educate A/Es, Contractors, Designers, and Occupants:** Educate the various building industry sectors on design integration especially in terms of energy efficiency strategies. Stress the need to design the facility's envelope for 50-100 year span while lighting, HVAC, and other systems for 10-20 years Document occupant behavior before and after education. (Champions: Planning Group and Energy Manager)
8. **Identify resources (\$ and people):** Review financial opportunities and determine how best to finance sustainable strategies. Identify potential funding opportunities through energy saving performance contracts focused on lighting, windows, insulation, and HVAC. Identify people resources. (Champions: Engineering and Planning Groups)
9. **Conduct analysis of existing operations (i.e. lighting controls):** Check findings of analysis. A lighting control evaluation may point to increase usage of EMCS for energy efficiency. (Champions: Engineering Group)
10. **Implement the use of preventative maintenance software:** Use software for HVAC preventative maintenance. (Champions: Engineering Group)
11. **Evaluate current demolition contracts in regard to energy:** Check to see if current disposals can be recycled (Champions: Engineering Group)
12. **Develop lighting design guidelines:** Establish interior and exterior lighting standards. (Champions: Engineering Group)
13. **Establish metrics for energy measurements:** Energy performance should be quantifiable and measured according to established metrics. (Champion: Energy Manager)
14. **Establish marketing to occupants:** Market energy efficiency to occupants. (Champions: Engineering Group)



Fig. 15 Skylights in the Helmsman with ample daylight and electric lights turned on, emphasizing the need for controls.

MID-TERM GOALS (1 – 5 YEARS)

1. **Balance and “right-size” HVAC systems (VAVs, economizers, etc.):** Right sizing HVAC systems should be addressed not only in new design but also in retrofits and renovations.
2. **Encourage research and development in energy efficiency at the base:** Support champions and projects that demonstrate energy efficiency initiatives.
3. **Commit to a case study/prototype facility:** Do a prototype implementation to witness “hands-on” sustainable strategies. Document results.

4. **Encourage A/E and Contractor “buy-in” to energy efficiency and green practices:** Educate A/Es and contractors on green practices and encourage them to implement greening in their work. Demand that the LEED green building rating system be used on the project. Require project designers to be certified LEED designers.
5. **Use the base as a test site for acquiring new technologies and new knowledge:** Constantly review and use new technologies on the base.
6. **Develop plans to surpass current regulations:** Meet and exceed current green Executive Orders.
7. **Establish focus committees such as a “Sustainable Design Committee”:** Establish a base-wide committee on sustainable design that meets regularly to review overall goals and objectives of the base in terms of sustainability.

LONG TERM GOALS (5 YEARS +)

1. **Implement renewable energy sources:** The base should utilize renewable energy sources such as fuel cells, photovoltaics, solar, geothermal, thermal storage, hot water solar panels, etc.
2. **Become self-sufficient:** NSA Mid-South should research, explore, and implement technologies that allow the base to become less reliant on outside sources for base energy needs.

WASTE & RECYCLING ACTION PLAN

Facilitator: Gail A. Lindsey, AIA

Spokesperson: Tonya Barker

Team members: Jim Heide, Gina Taylor, and LTCOL Jim Currey

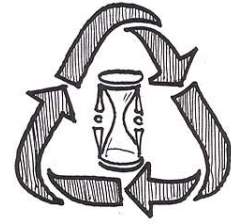


Fig. 16 Waste and Recycling Team

1. Baseline Conditions:

What is currently being done at the base regarding this topic area?

Two of the current major waste and recycling issues on base are building demolition and “adaptive reuse”. There is a large waste stream generated by demolition projects, and the full potential for reuse of the materials is yet to be tapped. Several adaptive reuse projects have been successfully undertaken and this reuse of existing structures is to be commended.

Partnerships with community and other military entities for use of existing vacant base structures have proven effective. Some shared use of facilities with community and military groups is also underway.

NSA Mid-South has been studying its waste stream for years and has significantly reduced the hazardous portion, especially in regard to paint and woodworking materials. Hazardous wastes have been segregated in the past and this effort continues (i.e. asbestos, light bulbs, ballasts, etc.).

In addition to the reduction of their solid and hazardous waste stream, NSA Mid-South has also focused on and addressed pollution prevention, air emissions, stormwater, and wastewater.

2. Sustainability Efforts:

What activities are currently underway in this topic area that enhance base sustainability?

NSA Mid-South just released their new Solid Waste Management Plan 5 months ago at the start of 2000. Recommendations are very current.

In terms of Pollution Prevention, NSA Mid-South has an Environmental Protection Plan as well as an affirmative procurement program in place. The base reviews materials by checking both the MSDS (Material Safety Data Sheets) and the DLIS (Defense Logistic Information Service) listings of Environmentally Preferred Products.

NSA Mid-South has sought to improve base operations with “greener” systems such as the green machine parts washer.

An Environmental Spec has been written which is very tight and restrictive to control the types of waste on the base.

3. Opportunities and Barriers:

**What opportunities can be identified in this topic area to enhance base sustainability?
What are the potential barriers to these opportunities?**

Several opportunities for improvement in the area of waste and recycling exist.

The first opportunity noted was the potential for improved collection of waste material that could be recycled, such as paper and aluminum cans. This collection could be accomplished more readily if there were more receptacles around the base at appropriate locations. Increased waste receptacle availability means a greater percentage of the recyclable waste will be collected. The barriers to realizing this opportunity are the initial cost of more waste receptacles, and the long-term labor costs to maintain them.

Another barrier noted was the market limitations for recycling in the Millington area. Inconsistent recycling markets, especially for glass and aluminum, make the recycling of certain materials more difficult in the near-term. A possible opportunity to improve recycling markets over the long-term might be a base partnership and exchange with the Tennessee Recycling Association (TRA) to identify emerging recycling markets and help them grow.

Increased waste reduction and recycling on job sites is another sustainability opportunity. An instructional video shown at the construction site to the contractors and subcontractors might prove to be beneficial. Currently there is a low receptivity to waste reduction and recycling from the contractors and subcontractors (no doubt due to the low landfill costs, approximately \$15/ton, and close proximity and easy access to the BFI landfill).

More efficient dumpster pick-ups are a potential opportunity at the base to reduce transportation and labor costs. A study is currently underway studying the frequency of pick-ups, with an aim to yielding full capacity loads.

Cutting the amount of wet garbage sent to the landfill from the base would be a significant waste reduction (especially at the Food Court). This wet garbage could possibly be used for pig fodder by partnering with the hog farm that is about a quarter-mile from the Singleton Gate. Legal issues of segregation and separation would need to be addressed. In order for this idea to be cost effective for the base, the partnership agreement would require that the farmers come to the base to collect the wet garbage.

A significant waste reduction could result from a change in a current landscape practice of throwing out grass clippings. The clippings could be composted or used for mulch. Two known barriers, weed growth and fungus growth, are associated with the use of too much grass clippings as mulch. Different ways to tackle this waste problem could be the use of taller grasses (as used in France to reduce maintenance labor and costs) or native plantings. However, this change in vegetation would need to be connected with training and education

of the base personnel as well as contractors. (See the Site and Water Report for further insights on this issue.)

Another waste reduction opportunity is the increased use of recycled products. This opportunity is shaky due to quality issues. For example, Dove Data Products recycles printer/copier toner and is listed by GSA. However, NSA Mid-South personnel have noted a problem in the quality of this toner. Most helpful would be a web site with user feedback and an updated list of what works and what doesn't.

Despite the current efforts in this arena, a further reduction in NSA Mid-South's hazardous waste was noted as a significant opportunity. Establishment of a better paint (and similar materials) inventory system would prevent the premature expiration of significant amount of these materials. The full use of these materials saves procurement costs while reducing the hazardous waste stream. Base experts noted that Contractors should be routed through the Hazardous Waste Minimization Center (Haz Min Center) before new materials are purchased for a quick education about hazardous materials and the associated waste. Due to the current use of IMPAC government credit cards, there is less control of what hazardous materials are purchased and brought on to the base. (The countervailing advantages of the IMPAC cards are that smaller quantities can be purchased and administration is at the user level.) A possible solution to rectify the potential disadvantage of the IMPAC cards, without removing the advantages, would be to have the Comptroller review purchase lists. The Comptroller could check the line items and alert IMPAC card users of unauthorized or ill-advised hazardous materials. Contractors purchasing unauthorized hazardous materials could have their IMPAC cards revoked.

Base membership in the Tennessee and Kentucky EPA/ DOD Organization and attendance at their conferences would be advisable to further increase the future opportunities for hazardous waste reduction.

**4. Case Studies/Exemplary Projects:
What other military or civilian projects can help promote certain strategies/opportunities in this topic area?**

A New Operations Facility at Seymour Johnson AFB in Goldsboro, North Carolina requires the primary contractor to divert at least 75% of the construction waste generated at the site from municipal landfills, sending it instead into recycling markets. In addition, the contractor must separate, store, and protect identifiable recyclable materials and salvageable waste products. As part of the progress payment application, the contractor must provide a waste management plan that outlines the collection, transportation, disposal costs, and quantities of waste generated as proof of waste reduction efforts. All this is written into the project specifications. Since the start of construction on the \$3 million dollar facility, over 2,673 tons of construction waste material has been diverted into recycling markets. This effort decreased the use of new materials, saved landfill space, and also provided a cost avoidance of almost \$100,000.

(Check out the project at:

http://www.afcee.brooks.af.mil/pro_act/success/SeymourJohnson.htm)

Fort Sam Houston's Directorate of Public Works attempts to recycle materials from buildings scheduled for demolition or renovation. Construction contracts call for the reuse of specific materials. Everything from foundations to plumbing fixtures may find new uses at the installation. The reuse of materials saves the base on landfill requirements as well as money. (Check out the project at: <http://aec.army.mil/prod/usaec/op/update/fall98/samhouston.htm>)

The EPA Research Facility in Research Triangle Park, North Carolina has been acknowledged for its waste reduction efforts as well as its other environmentally friendly features.

(Check out the project at: <http://www.epa.gov/rtp/new-bldg/status/status.htm>)

Aberdeen Proving Ground has implemented four affirmative procurement programs in the last few years. APG worked with Green Seal, a non-profit testing service to identify 73 paints that are environmentally preferable. A training program was implemented to inform personnel about purchasing environmentally preferable products. To help shoppers make informed purchases at the installation, environmentally preferable labels were created and affixed to products that met one of six environmental criteria.

At Fort Riley, Kansas a comprehensive recycling program that is cost-effective was developed and now recognized as one of the premier recycling efforts in Kansas.

(Check out more information on this program at:

http://aec-www.apgea.army.mil/prod/usaec/eq/programs/army/popup/97r_nii.htm#introduction)

5. Short, Mid, and Long-term Sustainability Goals:

SHORT TERM GOALS (WITHIN YEAR 1)

1. **“No-brainers”:** Certain waste reduction efforts are considered “no brainers” because they can be immediately effective in reducing waste at NSA Mid-South and at simultaneously begin to lower base operating costs. Three “no brainers” were identified: (Champion: Tonya Barker)
 - **Navy Inns (towels/linens)**
Similar to private hotel chains that are currently saving money and the environment by asking their customers to use towels and linens more than one time, the Navy Inns could simply request the same from their customers and begin to conserve water, energy, and money.
 - **NEX/MWR (reduction in packaging)**
To help reduce waste on the base, it would be advisable to work with both the NEX and the MWR to promote the purchase and resale of goods that have minimal packaging. A large percentage of the waste stream is packaging from purchased goods. Perhaps an environmentally preferable label could be created at these facilities to help shoppers make informed purchases (See APG case study listed above.)
 - **Reduction in wet garbage**

Wet garbage is currently part of the base waste stream. Alternative approaches to this waste seem imperative. Composting and/or use for pig fodder at the near-by pig farm were two alternative approaches generated. Issues of reuse, sanitation, and delivery for the pig fodder approach would need to be addressed.

- 2. Commit to a Case Study where major components will be recycled:** Due to the fact that a major issue in waste reduction at the base is demolition projects, it would be advisable to commit to a demolition project as a first case study to reduce waste. Support for this project needs to be garnered from the Commanding Officer and the Major Claimant. The case study should be identified in the immediate next round of projects. Several ideas were generated in terms of this case study approach, they are noted below: (Champion: Tonya Barker with Engineering Staff)

- **Establish specification and contract language to address waste reduction and recycling**

Specification language in regard to job site recycling and waste reduction must be clear and specific. A good resource is the Waste Spec by Triangle J Council of Governments (<http://www.tjcog.org/waste>) (Champion: Danny)

- **Establish a measurement and verification system for quantitative metrics**

The LEED rating system would be a good resource in creating quantitative metrics for waste reduction; there is a LEED credit that addresses the issue of a water management plan. Also, the Seymour Johnston AFB project in North Carolina noted above in the exemplary projects could be a good resource. (Champion: Danny)

- **Establish a training/education program for A/Es, Contractors, Bidders, Designers, Occupants/Residents, and Children**

Different courses and course materials could be created for the different audiences to engage them in a base-wide effort to reduce waste. (Champion: Danny)

- 3. Purchase equipment to improve base recycling efforts:** Efficient and effective equipment is needed by the base for its collection and recycling efforts of waste materials. All base equipment should be well maintained to operate at the highest performance levels. (Champion: Jim Heide)
- 4. Increase recycling storage area for trees, building materials, etc. (MWR):** The increase of storage area on base would allow for a larger volume of materials to be sold and reused. Not only could building materials be stored and sold, but also trees that have been cut down from a site could be stored for resale (either whole or, if appropriate, cut for firewood.) (Champion: Jim Heide)
- 5. Reuse more buildings (Fig. 33) and minimize demolition.**
- 6. Establish task forces for the following:** It would be beneficial for a group of individuals interested in the case study issues as well as local base policies to meet regularly to consider base policies on waste and recycling and identify opportunities for enhanced performance. A great opportunity would be to learn from other bases



Fig. 17 Building 241 is being considered as a demolition site, but provided the potential as a tremendous renovation opportunity, especially responding to energy and daylighting.

and begin to establish a dialog with the community and outside contractors. (Champions: Tonya Barker, Jim Heide, and Gina Taylor)

- **Local base policies on waste reduction and recycling**
An initial step of the task force could be the investigation of current policies and how they apply to waste reduction and recycling and to propose ways that they could be improved.
- **Waste Reduction Partners**
Identify potential partners, such as the Tennessee Recycling Association, to engage in dialogue about opportunities and barriers to waste reduction and recycling. Begin to look at long-term strategies together.
- **Awards Programs**
An awards program could provide incentive for contractors to implement recycling efforts into their projects and for occupants and residents to engage in waste reduction at home and at work. Within the first year, defining the scope and organization of the program along with locating sponsorship would be appropriate.

MID-TERM GOALS (1 – 5 YEARS)

1. **Commit to making case studies (that would be measured for waste reduction) out of 10-25% of all base projects (new, demolition, and renovation projects):** After the demolition case study in the short term goals, the base should broaden the project types to include new and renovation project, specifically focusing on recycling and waste reduction. A larger percentage of the facility projects on the base should be contracted to address job site recycling and waste reduction issues.
 - **Establish consistent data collection and “Measures of Excellence”**
After establishing metrics and quantifiable waste management plans, the base can collect consistent data and establish “Measurements of Excellence”.
 - **Continue ongoing training sharing “Lessons Learned” from contractors, occupants, children, etc.**
As more and more case studies are undertaken and data collected, training using the documented case study information can be shared with others in terms of “Lessons Learned” sessions or documentation.
 - **Use measurement/verification system on all case studies**
A specific and consistent measurement/verification system throughout the base is critical to the creation of a useful database over the long term. Similar to documenting the existing hazardous waste stream and its reduction, the documenting of current standards of waste, in terms of job site recycling, generated waste, landfill disposal rates, and reuse/recycling rates, is essential to improvement.
2. **Secure funding and continue equipment procurement for recycling efforts**
Continued procurement of waste reduction and recycling equipment that will reduce the waste stream on the base effectively and efficiently should be a top priority. Again, consistently scheduled maintenance on all waste reduction equipment is mandatory to keep it running smoothly for the long term.
3. **Increase task forces to:**
After the first year of initial task group meetings to gather information on base policies and procedures regarding waste reduction and how to improve them, a larger discussion with the community should be sought.

- **Address base and community policies on waste reduction and establish a common vision**
A collaborative task group involving base leaders and community leaders could establish a common vision for recycling and waste reduction initiatives in the region.
- **Implement a waste reduction awards program**
By establishing “Measures of Excellence” through consistent data gathering on case studies, the base could implement an awards program for contractors who have achieved top “Measures of Excellence” in their projects. Other waste reduction awards programs could be implemented during this time for other user groups and a waste reduction ceremony (at the base reuse/recycling center?) could be held to honor the recipients.

LONG TERM GOALS (5 YEARS +)

4. **Commit to having 100% of all base projects focused on recycling and waste reduction/elimination:** After five years of case studies focusing on waste reduction and recycling, these practices should be standard for all base projects. Data collection should be refined over time and updated from new information.
5. **Maintain ongoing competency to stay on the “cutting edge”:** Support should be given by the base to keep base personnel on the “cutting edge” of waste reduction initiatives. Base personnel could attend conferences both as speakers to share waste reduction information and also as participants to gather new information. Ongoing internal and external information exchange is critical to an increased knowledge base.
6. **Increase task forces to address community concerns and cooperation:** The exchange between the base and community leaders in terms of waste reduction should be ongoing and reflect refinements and updates.
 - **Common vision**
The common vision of waste reduction by base and community leaders should reduce duplication of efforts and prove to be the most efficient use of the area resources.
7. **Change Navy Policies globally in respect to waste and recycling:** Implementing waste reduction initiatives at NSA Mid-South with consistent data collection and metrics will provide a useful knowledge base for the entire Navy listing what works and what doesn't. This knowledge base, through long-term tracking and feedback, could be used to set high-performance Navy policy and standards for waste reduction.
 - **Change the Navy Guide Spec to address waste and recycling**
NSA Mid-South's case study database and history of waste reduction specifications could inform the Navy Guide Spec of appropriate spec language for optimal waste reduction results.
 - **Establish and implement Navy Training/Education course on “best practices” for waste reduction and recycling**
Gathering of case study “best practices” in waste reduction over several years could easily form the basis of an excellent training course for the Navy. Case study documentation would be essential to this shared learning.
 - **Share data collection and “Lessons Learned” globally**
Not only could the data collected over the years from NSA Mid-South case studies be shared in training/education courses but it could also be shared over **the World Wide**

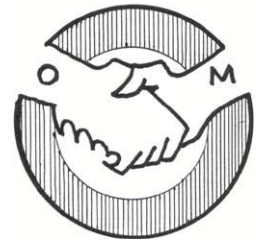
Web. An initial place to post the waste reduction case studies could be the Whole Building Design Guide web site. (<http://www.wbdg.org>)

- **Successful funding approval will be based on the excellence demonstrated at NSA Mid-South**

It would be prudent for NSA Mid-South to begin their waste reduction efforts through case studies that are required to document certain data and meet specific metrics.

Over time this will be an invaluable knowledge base that can influence base decisions and inform overall Navy operations. It will also be essential in securing future funding for further investigations to reduce waste and establish NSA Mid-South as an installation known for excellence.

OPERATIONS AND MAINTENANCE TEAM ACTION PLAN



Facilitator: Anne Sprunt-Crawley

Spokesperson: Commander Bob McLean

Team members: Dave Ranson, Dale Sanders, Jerry Garza, and Mike Chapman



Fig. 18 Operations and Maintenance Team

1. Baseline Conditions:

What is currently being done at the base regarding this topic area?

Many substantial activities are underway at NSA Mid-South that address good operations and maintenance practices.

2. Sustainability Efforts:

What activities are currently underway in this topic area that enhance base sustainability?

Erosion control is being addressed at the base.

MWR stopped mowing certain fields on the base and now cuts them for hay. The hay is used in stables and is also sold to J.A. Jones (BOSS Contractor) for construction runoff control.

Energy efficiency upgrades are underway at the base in the following areas:

- Energy Management Systems
- Lighting
- Steam to Boilers
- Current window and door replacements on housing units
- Reflective roofs

There are currently restrictions on hazardous materials (i.e. lead, asbestos, etc.) entering the base.

Environmentally safe refrigerants are being used at NSA Mid-South. (Currently all unsafe refrigerants are gone except some R-12 in two Army buildings.)

Some recycling is currently underway at the base.

“Environmental tickets” are currently given to contractors who do not meet environmental base standards.

3. Opportunities and Barriers:

**What opportunities can be identified in this topic area to enhance base sustainability?
What are the potential barriers to these opportunities?**

Numerous opportunities exist on base, especially in the following areas, to improve operations and maintenance while increasing base sustainability:

- Training and Education on O & M (During the Planning Process and at the Activity Level)
- Communications regarding O & M (Internal and External)
- Commissioning (For both new and renovation projects)
- Sustainable/ low maintenance landscapes (reforestation, alternative vegetation, etc.)
- Long term water conservation (golf course)
- Energy efficiency measures
- Waste reduction and recycling (education, recycling containers, etc.)
- Indoor Air Quality
- Cleaning Products and Systems
- Scheduling of audits and feedback
- O & M Contracts



Fig. 19 Residential operation and maintenance are sound, but still offer many opportunities

An excellent opportunity to increase awareness of O & M issues and their direct connection to base sustainability would be to use case studies as demonstration projects. Two potential demonstration projects are the gym and the golf course clubhouse.

Group relamping vs. individual calls is an opportunity for energy efficiency as is the use of more reflective roofing.

In regard to hazardous materials reduction in O & M practices, the base could look into the following opportunities:

- Use of low Volatile Organic Compound (VOC) materials such as paints and sealers
- Education of IMPACT users so that they will not purchase aerosol materials
- Establishment of a central site where contractors could check out alternatives to commonly used hazardous materials

An opportunity is available to give not only negative “environmental tickets” to contractors but also positive “environmental tickets” which could be identified as “Green Atta-Boy (kudo) tickets”.

There are opportunities on the base to do more with recycling and waste reduction efforts than is currently being done. (Especially with more personnel coming to the base from locations where recycling is a way of life and is expected – recycling initiatives may be easily introduced and successful.) Waste management plans should be sought from all contractors.

An opportunity that should be explored is the review and updating of the current Annual Inspection Survey. (Should this include HVAC, recycling, water conservation, air quality checks, etc.?) Opportunities to improve current maintenance activities should be explored

and addressed in an Annual Inspection Survey as well as the Capital Improvement Plan and the Long Range Maintenance Plan (LRMP)

The base should investigate the opportunity to use and reuse hay bales and at the same time seek alternatives to the hay bales currently used for horses and soil control.

The major barriers to the opportunities listed above are time, effort and cost.

**4. Case Studies/Exemplary Projects:
What other military or civilian projects can help promote certain strategies/opportunities in this topic area?**

The lighting relamping program at Wright-Patterson AFB was an aggressive program to systematically phase out all 40 watt fluorescent tubes and replace them with 34 watt tubes by the end of FY 1998. This base-wide approach significantly reduced energy consumption and out-of pocket energy costs, which are directly related to operation and maintenance budgets. The tubes can be purchased through Base Supply. The anticipated base-wide annual energy cost savings is \$215,000.

The recycling program at the Tobyhanna Army Depot in Pennsylvania has posted numbers as high as a 79% reduction in solid waste (a huge leap from the original 10% reduction in 1990). It has maintained a greater than 70% reduction in the amount of solid waste disposed in landfills over the last 5 years. As the recycling program grows, the installation seeks new, innovative ways to recycle or replace materials that are major contributors to its waste stream.

(Check it out

at:http://aecwww.apgea.army.mil/prod/usaec/eq/programs/army/popup/97r_ii.htm)

5. Short, Mid, and Long-term Sustainability Goals:

SHORT TERM GOALS (WITHIN YEAR 1)

- 1. Using the gym project, incorporate green elements and daylighting:** Use this project as a case study to test specific operations and maintenance strategies as well as daylighting and other green strategies. Expand greening considerations into project planning. Document and verify project costs, savings, and other results.(Champions: Engineering Group)
- 2. Identify areas where lower maintenance costs could be achieved: alternative vegetation, reforestation, etc.:** Identify areas with lower maintenance cost potential and determine what should be installed or changed. (Champions: PWO, JAJMS, and other)
- 3. Establish recommissioning efforts:** Determine the specific requirements of recommissioning. Check into post occupancy surveys, monitoring, metering, and other commissioning strategies. (Champions: Engineering Group)
- 4. Create a forum to review “green issues” and actions over time:** Establish a “Green Actions Progress” Report every 6 months. Evaluate what has been accomplished and revisit future action items. (Champion: PWO)

5. **Energy Management Control Systems (EMCS):** Implement EMCS to enhance energy efficiency at base facilities. Use this technology to improve operations and maintenance functions. (Champions: Engineering Group)
6. **Create a “green atta boy” program:** In addition to the existing “environmental tickets” given to contractors for non-compliance with base environmental standards, implement positive incentives for contractors who do follow or exceed base environmental standards. One positive incentive could be green “Atta Boy” awards or tickets. (Champions: Environmental Group)
7. **Empower the recycling program manager:** Support a recycling program manager to undertake more extensive recycling measures on the base. Promote the use of high-quality, long-lasting recycling containers. (Champion: PWO)
8. **Implement the use of low Volatile Organic Compound (VOC) paints:** Reduce the amount of hazardous waste on base by the use of low VOC paints, sealers, and adhesives.(Champions: Environmental Group)
9. **Establish green language in the base Requests for Proposals (RFPs) for activity level projects (glazing, roofing, lighting, awnings, and orientation):** Introduce and maintain green concepts at the activity level through green RFP language. Conservation of energy and water, recycling, sustainable landscaping, ongoing maintenance and repair, and commissioning should be standard project considerations.
10. **Begin an education program about recycling:** Currently markets are a hindrance to optimal recycling. Initiate education programs to inform various populations on the base about recycling and waste reduction. (Champions: Environmental Group)
11. **Investigate alternatives to hay bales for erosion control:** Research is needed on hay bales and their alternatives. If hay bales are to be used, a use for old erosion control hay bales should be sought. One possibility might be the use of the old hay bales for filling in gullies. This should be explored and feedback given. (Champions: Environmental Group)

MID-TERM GOALS (1 – 5 YEARS)

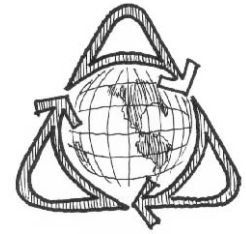
1. **Investigate how to use the Energy Management Control Systems:** Explore the issues of contracts, short-term implementation, and technical operations associated with EMCS. Check on computers and computer equipment associated with the systems. Tie the EMCS to a preventative maintenance program. In order to incorporate EMCS in the next O & M contract, requirements need to be identified before the next O & M contract (1-½ years).
2. **Investigate other O & M roles (PMID):** Define cycles and implement integrated building assessments.
3. **Implement O & M education and training:** Education should address all green issues in tandem with O & M considerations. It should be noted that the base population and the base residents are transient, a majority moving off base every 3 years. Ongoing education and training is therefore critical.
4. **Improve recycling efforts:** Look at recycling markets long term. Continue to improve recycling efforts on base.
5. **Establish documentation requirements to collect data regarding savings and results:** Set up a template for documentation in order to compare results across the board. Documentation should be specific and quantifiable. Determine best metrics and use them base-wide.

6. **Use the clubhouse at the golf course as a case study:** Use the clubhouse as a case study to factor in O & M considerations into programming, planning, design, and construction. Establish preventative maintenance cycles. (i.e. roof, paint, carpet, AC, etc.) Design for low maintenance. Document and verify project costs, savings, successes, and other results.
7. **Establish a bulk relamping program:** Instead of individual replacements of lamps, which can be costly in terms of labor, establish a relamping program on base. See the example above of the Wright-Patterson AFB relamping program.
8. **Initiate other energy and lighting projects:** Continue to identify potential projects in which to implement energy efficient measures. Use daylighting and efficient lighting as high performance energy efficient strategies. Document results.
9. **Establish waste reduction and recycling efforts in demolition projects:** For the next demolition project, request 2 option bids; one for full 100% job site recycling and one for partial job site recycling.

LONG TERM GOALS (5 YEARS +)

8. **Establish and implement a long-range maintenance plan:** Establish a long-range maintenance plan and in tandem explore the issues of preventative maintenance programs.
9. **Establish base-wide water conservation strategies:** Identify all water usage areas and check on economic incentives for water conservation. (Note: water conservation at the golf course may be the first place to explore.)
10. **Continue metering and use data to improve performance:** Establish a feedback loop, using metering results (i.e. electricity and water) and other collected data, to successfully to improve performance.
11. **Implement a site plan with a focus on reducing maintenance (reforestation, trails established and maintained, and useful pedestrian walkways on base):** Make the site appealing to pedestrians. (i.e. covered shaded walkways and diversity of vegetation) Document the establishment times, maintenance requirements, costs, and savings of these elements.

“BIG PICTURE” TEAM ACTION PLAN (PROCESS, EDUCATION, & COMMUNITY OUTREACH)



Facilitator: Joel Todd

Spokesperson: Val Chapman

Team members: Diane Baum, Mark Whitson, Rodger Aitken, Tim Campbell, and Jim Ferguson

1. Baseline Conditions:

What is currently being done at the base regarding this topic area?

Process

NSA Mid-South leaders and community leaders have begun a shared “visioning” process for land use and facilities.

Representatives of the base participate in several community boards and councils to ensure communication.

Education

No formal education initiatives regarding sustainability are currently underway.

Community Outreach

The base and community are moving beyond potential conflicts over land transfer and are currently ready to move forward in a joint manner. (The “community” is defined as Millington, Shelby County, Tipton County, Bartlett, and West Memphis; as noted in the Regional Shore Plan)

Fences that used to surround the base have been taken down in an effort to “remove barriers” between the base and the community. However, it may take people some time to overcome these long held perceptions that the base is restricted and not open to the outside community.

The last two Commanding Officers of the base have done a good job getting the message out regarding a collaborative approach between the base and the community.

The airport transfer from the base to the community involves lots of groups. The Navy has been previously viewed as being on the “other side of the fence”, and this transfer has helped shift perceptions.

2. Sustainability Efforts:

What activities are currently underway in this topic area that enhance base sustainability?

Collaborative land planning and shared facilities.

3. Opportunities and Barriers:

**What opportunities can be identified in this topic area to enhance base sustainability?
What are the potential barriers to these opportunities?**

Sustainability actions taken as a result of this charette or other processes are opportunities for education and involvement – the champions established for various activities should look at these opportunities and take advantage of them.

Opportunities are apparent for sustainability training and education both on base and in the community. Several audiences were identified for educational/training programs:

- Senior officers that are visitors to NSA Mid-South
- Senior officers that are stationed on base
- Local and regional community
- Facility managers on the base
- Project managers (MWR)
- Tenant Commands
- Contractors: A/Es, maintenance, construction, and service industry
- Southern Division Naval Facilities Command
- Larger DOD and Navy audiences
- Department Heads
- KIDS (as a way to influence base and community interaction and cross over at early ages)
- Enlisted folks in base housing

The opportunity to use sustainability as a way to change the image of the base and to gain positive attention is promising.

Opportunities to share facilities and land between base and community folks and reduce the duplication of functions and services would make an optimal use of resources. Some initial areas of sharing could be:

- Youth sports
- Open space
- Utilities
- Planned Developments
- Land Transfers

City planners and base planners could continue to look for opportunities to optimize land and facilities.

The opportunity to have a strong collaborative exchange between the Navy base and the community regarding the airport is a good step towards other joint endeavors. The Navy should participate with the Mayor and interested parties (airport authority, industrial redevelopment board, and aldermen) in the in the planning deliberations and progress issues. Perhaps the CO could participate as an ex officio.

Joint land planning is an excellent opportunity for base and community collaboration. Planning meetings could be established for periodic information sharing (e.g. maps of proposed changes could be discussed and reviewed jointly). The Department of Defense has a forum in place called the JLUPC (Joint Land Use Planning Commission). This format should be researched for NSA Mid-South base. Instead of the community being presented with a “fait accompli” plan, the JLUPC could establish a new model for true shared land planning.

The opportunity for the community to reuse existing Navy utility lines was raised. Sewer lines north of Navy Road could be turned over to the city since they are expensive for the Navy to maintain with few Navy users and a large number of lines. This would give the city access to land and sewer lines for development and would provide immediate infrastructure in the area.

Sewer lines would make it possible for the city to look into the possibility of higher-end rental housing developments to meet the needs of the changing workforce on the base. This concept requires prior market research. However, on first look, this seems viable since there are no quality rentals in the area and people usually go to Bartlett, Raleigh, or other cities for quality rentals. Currently, good rentals in Millington don’t go on the market. Approximately 60%+ of the housing in Millington is rental, though most is not quality rental. The new quality rental developments could court military tenants.

The opportunity for the NSA Mid-South base and the surrounding community to grow “synergistically” makes sustainable sense. Consistent ordinances, efficient, shared use of land and facilities, and non-duplication of local functions both save money and contribute to a view of the base and the surrounding areas being “one sustainable community”.

At least three strong barriers must be overcome in order to achieve this goal of “one sustainable community” working together on joint endeavors. They are:

- Not all facilities on the base are open to the public and there is some confusion in the community about which are, and are not, publicly available. The common perception of the base as “off limits” or restrictive to the community.
- The perception among some is that the community lags behind the base. New base residents are administrative personnel, often more senior in their careers than the previous group of trainees who made up the majority of the base residents. These new people have different interests, look for different types of housing, and expect different types of services (such as stores, restaurants, etc.). Resources in the community that grew up to support the trainees are not necessarily able to meet these evolving needs.
- The real existing prohibitions on cooperation. Currently waivers are needed to overcome legal barriers. There is an opportunity to investigate these barriers and offer alternatives to current prohibitions.

4. Case Studies/Exemplary Projects:

What other military or civilian projects can help promote certain strategies/opportunities in this topic area?

Bayscapes, a program sponsored by the US Fish and Wildlife Service and Alliance for Chesapeake Bay promotes the use of native vegetation for landscaping to reduce maintenance, pollution, and encroachment by non-native species. The garden, designed as a model for the area, includes 2,800 native grasses, plants, shrubs, and trees representing 35 species. It will improve water quality while reducing land maintenance costs and providing wildlife habitat.

(Check out this project at <http://aec.army.mil/prod/usaec/op/update/fall98>)

5. Short, Mid, and Long-term Sustainability Goals:

SHORT TERM GOALS (WITHIN YEAR 1)

- 1. Plant native plant display/demo plots:** Undertake demonstration projects both at the base (possibly at the housing referral office) and in the community to display native plants. Investigate cooperative funding from local nurseries, such as the Ridgecrest Nursery. (Champions: Diane Baum with a contractor)
- 2. Investigate the JLUPC Process:** Investigate the possibility and benefits of using the Joint Land Use Planning Commission process to support “real” joint planning efforts in the next year or onwards. (Champion: Mark Whitson)
- 3. Assign responsibility for green education efforts:** Identify and assign responsibility for developing and maintaining educational programs on sustainability both on the base and in the community. Find champions for these programs. (Champions: CO and Rodger Aitken as staff)
- 4. Prepare a brochure for the Navy Inn guests that addresses green issues such as waste reduction:** Create a brochure or flyer for Navy Inn rooms to reach transients. Make it a two-way process; inform readers what the base is doing for sustainability and ask them for feedback. (Champions: Rodger Aitken and Diane Baum)
- 5. Develop and distribute “greening materials” to developers in the community:** Develop “green” or “sustainability” messages for community developers. Also, improve appearance of signage, landscaping, etc. (Champion: Jim Ferguson)
- 6. Identify current base and community “good green practices” being implemented now:** Identify what the base and the community are already doing to provide the basis for other tasks. (e.g. how much money is currently going to small businesses in Millington?) Begin to identify opportunities for base and community education. Establish a committee compiled of base and community leaders to address these issues.
- 7. Update the Navy Corporate Command brochure with a green message:** A sustainability message in the Navy Corporate Command brochure would send a clear message that this is a priority issue. (Champions: The CO and PAO.)
- 8. Establish mechanisms for joint planning (base and community) on specific topics:** Identify areas where joint planning is needed, particularly for larger areas that might not be addressed in current commission and council meetings. (e.g. greenways, infrastructure, housing, circulation, implementation planning, etc.) Planning together should go beyond simply sharing information. (Champions: CO and Mayor initiate)
- 9. Incorporate green issues into base indoctrination course:** Incorporate the sustainability message into the base indoctrination course for all new people assigned to NSA Mid-South.

Also, include the message of sustainability in any spouse indoctrinations. (Champions: Rodger Aitken and Diane Baum)

10. **Develop/distribute educational materials for residents:** Develop educational materials and programs for residents. Examine the Pacific Northwest Labs Study as a starting point. Incorporate the sustainability message into a manual and newsletter for residents. Consider competitions, getting materials from Memphis Light, Gas, and Water, and developing materials and programs for the Child Development Center and Youth Center. (Champion: Diane Baum)
11. **Clarify public access and educate the community:** Identify ways to clarify which facilities on base are open to the community. Several ideas to clarify public use facilities on base:
 - Write an article for the local paper describing the assets on the base that members of the community are welcome to use.
 - Place brochures in the Chamber of Commerce as well as in community hotels or motels. The brochures should list public use facilities on the base as well as a calendar of special events that will take place on the base and are open to the public. (Note: MWR can take the lead and coordinate with others for special events, balancing security and public access.)(Champions: Jim Ferguson and PAO)
12. **Incorporate the green message into events:** Incorporate the green message into events such as Earth Day, America Recycles Day, and Family Appreciation Day. These are great opportunities to get the message out and educate the base and community about sustainability. (Champion: Val Chapman)

MID-TERM GOALS (1 – 5 YEARS)

8. **Continue to look for and foster joint activities:** Continue ongoing dialogues, activities of collaboration, and the sharing of resources.
9. **Use JLUPC process if appropriate:** Depending on the research into the Joint Land Use Planning Commission process either use this forum or another to foster joint planning for long-term land use.
10. **Continue ongoing responsibility for developing and implementing education programs:** Continue educational materials and programs for as many sectors on base and in the community as possible. Update and refine over time.
11. **Convert the Navy Inns into a “green hotel”:** The reuse of towels and sheets could be coupled with staff training and education on other sustainable initiatives that are becoming mainstream in private hotels. Signage on compact fluorescents could also educate consumers.
12. **Put information on sustainability and showcase successes on NSA Web site:** Base information and sustainable case studies undertaken at NSA Mid-South could be showcased on this web site.
13. **Expand “Yard of the Month” award to include native plants:** This would be educational as well as sustainable. More natural and native plantings would use less energy, water, and harmful pesticides.
14. **Retrofit a house as a “green model” for education:** Consider building a model home or retrofitting an existing one in order to showcase energy efficiency, water conservation, and sustainable landscaping. 6402 Coronado could be a good case study for this retrofit.

LONG TERM GOALS (5 YEARS +)

- 12. Identify and showcase successes:** Showcase successes on all the venues previously mentioned (meetings, brochures, newspapers, web site, etc.) and foster a feedback loop for continued improvement.
- 13. Continue programs and continually re-evaluate and update:** It is essential to keep pace with new findings and to share the most up-to-date information relating to sustainable living with both the base and the community.

APPENDIX

Site Map

Charrette Agenda

Participant List

Presentation Handouts

LEED Version 2.0

Sustainable Websites

“The Bluejacket” Article on the Charrette

Charrette evaluations