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NOAA FINAL REPORT

TO: Lisamarie Carrubba and Marlon Hibbert (NOAA), JP Oriol and Bevan Smith (DPNR), and Barry Devine (IGLA)

FROM: Anne Kitchell (HW)

DATE: December 26, 2014

RE: USVI Green Construction Training Summary Report and Recommendations for Continuing Education by DPNR

This report summarizes NOAA's FY12 and FY13 trainings related to green building and construction in the USVI. The purpose of these workshops was to: 1) distribute educational materials previously developed by others under a separate NOAA contract and by the Island Green Living Association (IGLA) that was a partner on the project, 2) encourage discussion and implementation of green building successes and challenges in the USVI amongst local residents, agencies, and building community; and 3) to support local implementation of a long-term Green Building education program. Specifically, this report provides recommendations for the Department of Planning and Natural Resources (DPNR) to take over education and outreach efforts building on the materials and partnerships developed over the past few years with funding from NOAA's Coral Reef Conservation Program.

Workshop Summary

Five workshops were conducted in the USVI to distribute information to 4 target audiences (agencies, designers, implementers, and homeowners) including:

- One-day combined classroom and field training for all audiences at 2 residential construction sites and a green residence on St. John;
- A classroom training for agency staff at the RT Park and a separate field training for implementers on St. Croix that included site visits to the substation/solar array construction projects and the RT Park;
- Classroom and field training for all audiences on St. Thomas with site visits to Springline Architects, the Montessori School, and Smith Bay Beach; and
- A separate session on St. Thomas for realtors/appraisers.

These workshops were coordinated in partnership with NOAA, DPNR, Horsley Witten (HW) and IGLA. The VI Waste Management Authority, Energy Office, DPNR Historic Preservation Office, Springline Architects, Magens Bay Authority, J. Benton Construction, RT Park/Aireko, the Montessori School, and Elissa Runyon were also important contributors to the workshops. Summary reports were prepared for each workshop documenting the agenda, key findings and recommendations, flyers, and workshop evaluations. The reports are provided as attachments

to this report, but are also available on-line along with presentation slideshows from each at www.horsleywitten.com/greenconstructiontraining/.

The educational materials developed prior to and distributed at the workshops included:

- *Our Island Our Future* training modules, field manuals, and checklists for green design and construction practices tailored to 4 different audiences. These modules are available on-line at the Island Green Living Association (IGLA) website at www.igbavi.org/green/resources/training-slideshows/ and at the NOAA CORIS Library http://data.nodc.noaa.gov/coris/library/NOAA/CRCP/project/20724/.
- Four short videos showcasing local practioners and agency representatives discussing various aspects of green building in the USVI including: Jean Pierre Oriol on the programmatic-side of development oversight; Doug White on elements of a residential green building; Gary Ray on native plants and landscaping; and Robert deJongh on commercial green building practices. These videos are downloadable directly from the aforementioned websites.
- Over 100 DVDs containing the modules and videos were distributed to workshop attendees and DPNR. A one-page Users Guide was developed in English and Spanish to accompany the DVD.
- Spanish translations were developed by NOAA for the implementers and designers field guides and checklists.
- Three Public Service Announcements (PSAs) were developed by IGLA concurrent to the workshops on planning, building, and living green. These PSAs were completed in time to be shown during the St. Thomas training and are available on the IGLA website.

Incentive packages were provided by IGLA for non-agency participants attending the workshops. A summary of the awards is provided in Table 1.

Table 1. Summary of IGLA incentives requested

Incentive	Value	# Requested			Total Value
		STJ	STX*	STT	
1-yr professional IGBA membership	$250	11	3	5	$4,750
2-yr green leaf/ family IGBA membership	$100	11	--	3	$1,400
Residential Tropical Green Certification Voucher	$250	1	--	0	$250
2 hours of consultation services	$250	4	1	4	$2,250
**low numbers likely due to predominance of agency staff*		***27***	***4***	***12***	***$8,650***

Continued Green Building Education by DPNR

NOAA's objective in funding the development of Green Building educational materials, contracting with IGLA on PSAs and membership building, and conducting Green Building workshops is to build territorial capacity to implement a long-term education program related to green building techniques and construction practices. A number of recommendations and opportunities for advancing green building in the USVI were suggested during the workshops and are contained in the reports specific to each workshop; however, specific recommendations for DPNR to take over green building training are described below:

1. Add a required Green Building element to the agency's annual education program plan. The program component should include at least 1 activity targeting residents, designers, builders, and/or agency staff each quarter. Examples may include coordinating with IGLA to host an evening lecture series for builders on St. Thomas and St. Croix; facilitating a site visit to a construction site to train permitting and inspection staff on erosion control and other regulatory requirements and the proper installation and function of BMPs; or highlighting local "green" projects in newsletters and on DPNR's website. The education program should be implemented by the DPNR Education Coordinator, with assistance from BP personnel responsible for oversight of the NPS Management Plan and CZM's new Watershed Coordinator staff position. The education coordinator could utilize slideshows, modules, videos, and exercises that have already been developed.

2. Dedicate a portion of federal grant dollars received for implementing non-point source (NPS) management to hire third-party educators. We recommend subcontracting with IGLA, UVI, or the Caribbean Chapter of the US Green Building Council (http://usgbccaribbean.org/) to assist in the facilitation of an industry-wide conference related to advances in green building techniques, construction materials, landscaping, and case studies in the region. The purpose of the conference is to bring designers, builders, and material suppliers together to inspire better building practices for practioners. This could also be done in conjunction with the NPS conference, if this activity is revived in USVI.

3. Provide opportunities to support certification and Professional Development Hours (PDHs) or Continuing Education Units (CEUs). A long-term goal for DPNR should be to have permitting and inspection staff certified in erosion control, LEED building, or other relevant areas. Consider policies to encourage staff certification and require third-party educators to provide accredited professionals (e.g., architects, engineers, electricians) with attendance "credits" for participating in green building education programs. At a minimum, all DPNR staff should complete the Our Islands Our Future- Green Building for Agencies module.

4. Distribute Green Building videos in the Building Permits lobby on St. Croix and outside CZM on St. Thomas. Engage anyone coming in to apply for a building permit to watch the videos or running slideshows, take a DVD, and/or have copies of green building checklists next to permit applications. DPNR could insist that homeowners/applicants sit through permitting presentation (or a shorter version) when they come to DPNR as a requirement to get an introduction to greener options, even if they come in with plans.

5. Post Green Building materials on the DPNR Building Permits website. The website could be a repository of technical information related to green building, including the Our Island Our Future modules, videos, and other materials. Alternatively, DPNR could provide a link to the IGLA or NOAA websites where this material is already posted.

6. Use videos and implementers module as one option in the enforcement toolbox. Require contractors, site operators, and owners responsible for erosion control or other construction violations to come into DPNR and watch videos and review the relevant portion of the implementer's module. This could be a good option when the agency is less inclined to issue monetary fines or for repeat offenders. Some of the educational materials have been

translated into Spanish as well. Short exams could also be prepared based on the materials that those cited for violations could be required to complete after viewing the videos or appropriate sections of the implementer's module.

7. Incorporate relevant Green Building principles into the new stormwater standards. The Environmental Handbook is in the process of being updated to include construction and post-construction stormwater design standards. Some of the key construction practices related to site clearing, natural area preservation, erosion and sediment control, and stormwater management can be incorporated into the new requirements. Requiring discussions and documentation of "green" alternatives during the early stages of the permitting process should be a significant consideration in the administration of the new standards.

8. Partner with the VI Housing and Financing Authority for outreach events and to leverage resources for advancing green building techniques. DPNR should become an official partner of the Housing Expo, which would include conducting workshops and assisting in organizing the event. This year's theme is "going green." The benefit of this partnership would be not only to reach a broader audience with green building messaging, but to build on relationships with VIHFA, an agency with a hand in the design and construction of public development projects.

9. Support VI Waste Management Authority efforts to reduce construction waste. There is an overlap between DPNR's green building education program and VIWMA's objective to promote recycling and reuse of construction materials. DPNR should assist VIWMA by providing contractor lists to VIWMA's networking database, by posting information related to recycling opportunities and appropriate dump permits to all applicants, and by including VIWMA in education program activities related to green building. DPNR should also support VIWMA's efforts to promote reuse and recycling of construction materials on St. Thomas and St. Croix and encourage VIWMA to partner with IGLA on St. John where IGLA has established the ReSource Depot. Consider opportunities to promote creation of a public (or privately-operated) "Resource Depot" on St. Croix similar to those on St. John and St. Thomas.

10. Consider using the regular NPS steering committee meetings to bring agencies together and continue discussions on providing green incentives. This forum could be particularly valuable when coordinating implementation of the energy code and housing design program in the Territory.

11. Establish a recognition/award program for projects and builders that successfully implement green building practices. At a minimum, DPNR should track and acknowledge projects that showcase successful green building techniques on the agency website, in newsletters, or via newspaper articles or announcements. Take advantage of existing programs to identify projects that can be highlighted (i.e., IGLA already administers a green building and green villa certification programs, LEED certifications).

12. Facilitate working sessions between appraisers, realtors, and the green building community to develop methods for valuing "green" properties. DPNR could partner with the Energy Office to work with appraisers, realtors, banks, and insurance representatives to generate checklists and valuation procedures to better account for "green" design features.

Attachments

St. John July 16, 2013 Workshop Summary

St. Croix March 18-19, 2014 Workshop Summary

St. Thomas June 10-11, 2014 Workshop Summary

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WORKSHOP SUMMARY

TO:	Lisamarie Carrubba, Marlon Hibbert, Glenis Padilla (NOAA), JP Oriol, Dave Rosa, and Jonathan Small (DPNR); Barry Devine, Doug White, Gary Ray, and Bill Willigerod (IGBA)
FROM:	Anne Kitchell (HW)
DATE:	July 30, 2013
RE:	Summary of USVI Green Construction Training, St John

This memorandum provides a brief summary of the July 16, 2013 USVI Green Construction Training at the UVI St. John Academic Center in Cruz Bay. The purpose of the clinic was to: 1) kickoff a series of workshops on green design and construction in the USVI sponsored by NOAA and DPNR; 2) increase exposure and build membership for the Island Green Building Association (IGBA); and 3) distribute DVDs with newly compiled training materials related to building green in the USVI. The training on St. John is to be followed by trainings on St. Croix and St. Thomas over the next year targeting designers, implementers, agencies, and homeowners.

The one-day training on St. John involved classroom sessions by local architect Doug White and native plant specialist Gary Ray, with a facilitated discussion (**Figure 1**). Lisamarie Carrubba and Bill Willigerod introduced the training and provided background on the IGBA. A field trip to three residential sites (one completed, one partially completed, and one just recently cleared) was led by Dave Rosa, Tim Coyle, and Doug White in the afternoon. Thirty-seven people were in attendance, which includes ten workshop organizers from NOAA, DPNR, IGBA, and Horsley Witten. Participants included agency representatives from Building and Permits and the VI Energy Office; private sector designers, landscapers, builders, and realtors/assessors; as well as community groups.

Figure 1. Classroom portion of training at UVI St. John Academic Center

Each participant was provided a workshop folder with an agenda, participants list, evaluation form, session handouts, IGBA flyer, and a DVD (with instructions) of NOAA's Green Construction training materials. **Attachment A** includes a digital copy of the workshop packet materials, excluding the DVD. The DVD materials include modules (slideshows), videos, and field guides that are also available for download from the IGBA website at www.igbavi.org/green/?page_id=897 and www.igbavi.org/green/?page_id=51. Attendees were asked to sign a liability waiver for participation in the field trip that included a video release statement. **Attachment B** includes results of the workshop evaluation, a copy of the sign in sheet, and a final contact list.

At the end of the training, remaining participants were given a certificate from IGBA to claim one of four incentive awards ranging from a value of $100-$250. Table 1 summarizes the numbers of incentives claimed to date. According to IGBA, this represents 19 new memberships.

Table 1. Summary of Incentives Claimed

Incentive	Value	Number Claimed to date	Total Incentive Value
1-yr professional IGBA membership	$250	11	$2,750
2-yr green leaf/ family IGBA membership	$100	11	$1,100
Residential Tropical Green Certification Voucher	$250	1	$250
2 hours of consultation services	$250	4	$1,000
		27	***$4,100***

Classroom Discussion

During the classroom session, Doug discussed the key elements of the Green Certification Design Program, using the program checklist booklet as a session handout. Doug introduced the 8 key checklist elements below, briefly discussing the rationale of major items under each:

1. Site planning and design
2. Building Structure
3. Water Management
4. Energy Conservation and Management
5. Waste Minimization and Recycling
6. Light pollution
7. Visual impacts
8. Landscaping, Green Belts, and Native/Natural Vegetation

Gary focused on the last check list item related to landscaping and vegetation. His emphasis was on protecting and replicating native landscapes, species selection, and the future of commercially available plant stock.

A group discussion was facilitated on how to advance green design techniques in the USVI during these sessions are summarized in **Table 2**.

Table 2. Summary of Discussion Topics

Topic	Comments
How does agency permitting hinder or promote green building?	• Alexis, DBP – question about photovoltaic, he explained information needs for permit applications, now promoting use of alternate energy; can't obstruct ghuts or divert flows, can come to DBP for orientation regarding water extraction for irrigation (based on question from Turnbull about person who was given notice of violation for doing work in a ghut) • Alexis – ICC requirement for electrical compliance October 1, will require motion sensors in residential and commercial or retrofitting if project needs a permit
What incentives are available?	• Joseph Daniel, VI Energy Office – promotes use of green building in terms of alternate energy; have had incentives such as one for solar water heater or rebate program with federal funds for solar panels or loan for water heater, have also done rebates for energy efficient appliances (and encourage people to get rid of the old appliance as well because before when they did this type of thing they found that people kept both)
Can improved enforcement improve compliance with green building practices?	• Rick – knows there are challenges with enforcement, get a lot of bashing of DPNR but a lot of times it's by people who are doing something they're not supposed to. • Alexis and Ellerton - DBP's responsibility is to protect environment and citizens from things like structures getting undermined; need community organizations to help with documentation because often by the time DPNR gets to site, damage is done or activity is over; DPNR wants to have community orientations on each island and is planning to kick those off next FY about what DPNR does and doesn't do; trying to get process with heavy equipment operators so they get fined rather than or in addition to homeowners and contractors and equipment gets confiscated; issues in enforcing – need to hit person in pocket – sometimes hard for DPNR to find owners because deeds not filed • Alexis- Lack of restrictions on steep slope development, leads to DPNR having to allow projects that are ultimately going to become enforcement issues
What are some examples of Green Construction Projects and do you have any advice?	• Erin and Leonardo – small footprint, consider what you need in terms of size, keep natural ventilation and shading, often don't need expensive systems to do the same things, a lot is client input and engaging them on property • Winston – sister is LEEDS AP and led design team (US Green Building Assn qualification for practitioners to achieve certain level in energy efficiency) – promotes green building in energy use, building materials, site clearing in responsible way, reuse of waste from site; project was in states, rainwater collection and reuse, pavers, going for LEEDS silver; client enthusiastic initially but as costs went up needed more convincing; more up front expenses with this type of project but pays off later, about 25% more expensive than conventional projects up front
How can we incorporate the value of green building in appraisals?	• Alissa, Appraisal Board Chair – as people start to build more green, costs are higher but costs do not equal market value, a gentleman just built a LEEDS platinum but appraisal value is nowhere near because there were no projects to compare to especially because cost of components may decrease and that will affect value; appraisal board is federally regulated, audited every 2 yrs, all requirements come from DC, lenders are in control and don't care; how do you measure the value of a property and have that translate into appraisal value. • Erin - need to incorporate long-term maintenance cost reduction due to efficiency of green materials, better quality of materials • Sharon, Coral Bay – people are buying view, no one wants to remind people of cost of running some of these houses • Gary – need to move from monetary to resource economy; need to incorporate penalties in valuation; what's starting to be left are extremely steep areas; lurching into future that will require restrictions such as slopes • Alissa – now have appraisal management companies with people going down checklist and appraisers don't see lenders any more • Winston – cap and trade idea for resources, especially in appraising house based on

Topic	Comments
	carbon values/footprint which is a concept accepted worldwide; add category for consumption to home values • Marlon – coupled with view, do clients ever ask if water is clean? • Alissa – no and broker won't mention this • Marlon – is there a way to tell people why water is clean and why view is so pretty, economic valuation study was done in VI that also looked at real estate value, can we get this incorporated in sales? Can make study available for everyone and possibly have IGBA post it or link to it. • Alexis - Role of coral reef in our economy, calculate impact of runoff on corals and impact on economy • Leonardo and Erin – relating with nature, constructing studio and workspace in Bordeaux, constructing from steel and hardwood, no driveway just carry things up, keeping footprint very small and doing all work themselves, starting small but planning for expansion areas for future construction • Bill – education and energy cost will drive this; started designing solar, earth-sheltered, etc. in 1970s and, as energy costs went up, clients wanted operating costs to go down so were interested in building green. Then, when costs did go down, people weren't interested again. Passive solar doesn't cost anything; has found that most clients demand efficiency; one board member is in real estate and is finding clients ask about energy cost this will begin to drive market and appraisal market • Gary – should have cost per square foot information for buildings, problem with residential is that it varies with lifestyle • Sharon – WAPA has information on website and is on your bill regarding average energy costs, would be harder to do cost estimates with rental property
Regulatory or policy issues?	• Issue with subdivision roads because contractor/developer builds to size to meet federal highway standards in order to transfer road to local government rather than make it smaller which leaves it under homeowners association/property owners • Importance of forest communities for migratory bird species that use them during migrations in Caribbean, need to market this and not just reefs • Phytosanitary permit trying to minimize pests from Florida; no APHIS station here and it is essential that we establish facilities including for fumigating entire shipments

Subsequent to the workshop, Alissa Runyon sent a link to a draft document from the Appraisal Foundation addressing the key issues with, and recommendations for, incorporating of green design into the valuation process (download available at the following URL: https://appraisalfoundation.sharefile.com/download.aspx?id=s319e3972cbd4fe7a).

Field Trip

A safari was rented to transport participants to three separate field sites, one in Chocolate Hole/Pillsbury Bay area and two sites in Peter Bay. The first site, Tim Coyle's Residence, is an active construction site where the owner is adding onto an existing home voluntarily applying green design techniques that go beyond the requirements of USVI building code (**Figure 2**). The owner was there and led the discussion; he highlighted the following green design features of the site:

- Use of plastic grid pavers on the road right of way and in the proposed boat trailer storage area; he is watering to help establish Bermuda grass;

- Underground stormwater collection system for reuse of driveway runoff in landscape irrigation system; currently receiving muddy runoff from un-stabilized area; will want to clean out prior to hooking up to irrigation system;
- Relocation of plants on the property from construction area to newly constructed landscaped areas in the front;
- Installation of retaining wall graded to drain back towards property instead of down cliff-face; silt fence used to trap sediment and rock sloughing during wall construction; and
- Wastewater system with aeration chamber and chlorination system; includes an alarm notification system in case of pump failure.

The second site, #1 Peter Bay, is an occupied residence featuring a number of green design elements (**Figure 3**). Doug White was the architect for the home and led the field trip. He covered the following key points:

- Constructed wetland for wastewater treatment; aesthetically pleasing and provides better treatment than a conventional septic system;
- Green roof over carport;
- Replanting of beach species to enhance impacted vegetative buffer;
- Underground stormwater system collects driveway runoff for reuse in landscaping; trench drain, drain inlet with screen for organics, and overflow orifice with paved flume are included; and
- Diversion of stormwater runoff from upper watershed down beach access trail into a swale and sediment basin.

The third site was in upper Peter Bay and had been cleared within the last three weeks (**Figures 4A and 4B**). Dave Rosa led the field trip, which focused primarily on erosion and sediment control, construction sequencing, clearing and loss of valuable topsoil, and understanding the permitting and enforcement process.

In small groups, participants were asked to brainstorm suggestions for stormwater management at the site (**Table 3**).

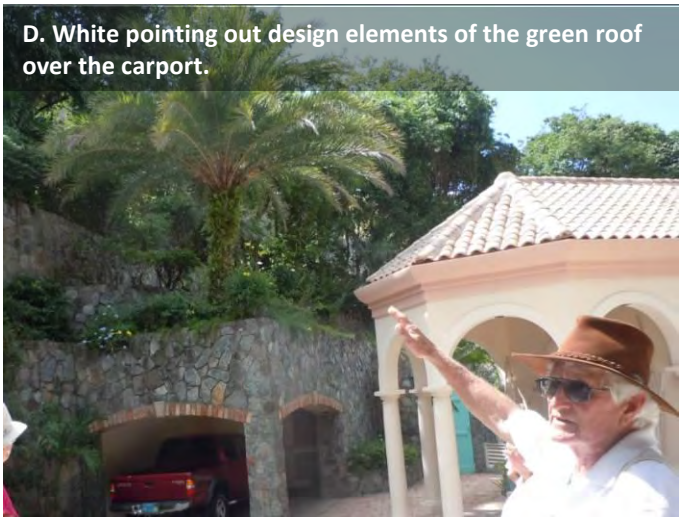
Next Steps

Workshop follow-up items include:

- Processing of training incentive certificates by IGBA;
- DPNR following up with upper Peter Bay construction site on alternatives to address stormwater runoff problems on site.
- Review and editing of video footage taken during the training for potential usage by IGBA in subsequent training or educational messaging.
- HW, NOAA, DPNR and IGBA to continue planning for additional trainings for agency staff, practioners, and homeowners on St. Thomas and St. Croix.

Figure 2. Field Trip to Tim Coyle's Residential Construction Site

Figure 3. Field Trip to #1 Peter Bay Residential Property



D. White pointing out design elements of the green roof over the carport.

Stormwater runoff from driveway is collected via trench drain and stored in underground tanks for reuse in irrigation system.

Participants observing the constructed wetland system used to treat wastewater. Traditional septic systems are no longer allowed in the coastal zone in the USVI.

Diversion berm installed on beach access trail to direct stormwater into vegetated swale/basin rather than direct discharge to the beach.

D. White explaining the importance of protective beach vegetation and describing additional plantings installed by homeowners.

Table 3. Summary of Stormwater Suggestions at Upper Peter Bay

Topic	Comments
Enforcement /Plan modification	• Suggested DPNR stop job until owners initiate mitigation plan. Measure actual and proposed disturbed area; if over 1-acre, site should have SWPPP. • Need to get rid of what was old septic tank after pumping. • Keep cut already made for access rather than cut another driveway and expand boulder wall near pool for turnaround, use area where excavator goes up as rest of road; • Should have saved topsoil during excavation; municipal compost/soil topper would be great to have because right now won't be able to plant as they eliminated all topsoil and are at bare rock (will be extremely costly to restore area to grade and vegetate).
Temporary management of runoff during construction	• Excavate sediment traps or employ other detention device, such as storage tanks, or dewatering bags, to collect runoff and allow for settling of particulates (**Figure 5A/B**). Consider using septic tank (cleaned) as a settling chamber for forebay of two-celled sediment trap at base of construction entrance. Consider terraced detention option with gabion baskets in flat area below retaining wall where old structure was located; • Provide stabilized ditch system along construction road to convey runoff non-erosively to sediment detention areas (**Figure 6**). Pitch road surface accordingly. Consider concrete swales or excavating infiltration swale along one-side of entrance road (filling with riprap); • If necessary, use waterbars or cross-drains across road surface to outlets where water can be piped down the slope into detention practices. It may be possible to use gravel cross-drains that can be driven over. • Pave the construction road and abandon proposed driveway. • Need stabilization of entrance, but difficult given grade. Perhaps use geoweb system to hold gravel, which could function as a construction entrance (**Figure 7**). • Include a concrete berm at bottom of entrance to further prevent sediment on road; daily sweeping/ shoveling where tracking is evident on road • Stabilize all erodible slopes with geotextile fabric and/or hydroseeding (**Figure 8**);
Long-term stormwater management	• Use pervious concrete pavers on road with at least 5 culverts incorporated in it • Use site on hill to make treatment wetlands in terraced area as a permanent post-construction solution to handle stormwater; could have terraces now but as troughs with small bridges as crossings, line troughs with rocks, place switchbacks with rock troughs at each bend with drop boxes for sediment; requires maintenance to clean sediment • Gabion baskets and gravel to slow down water and filter stormwater

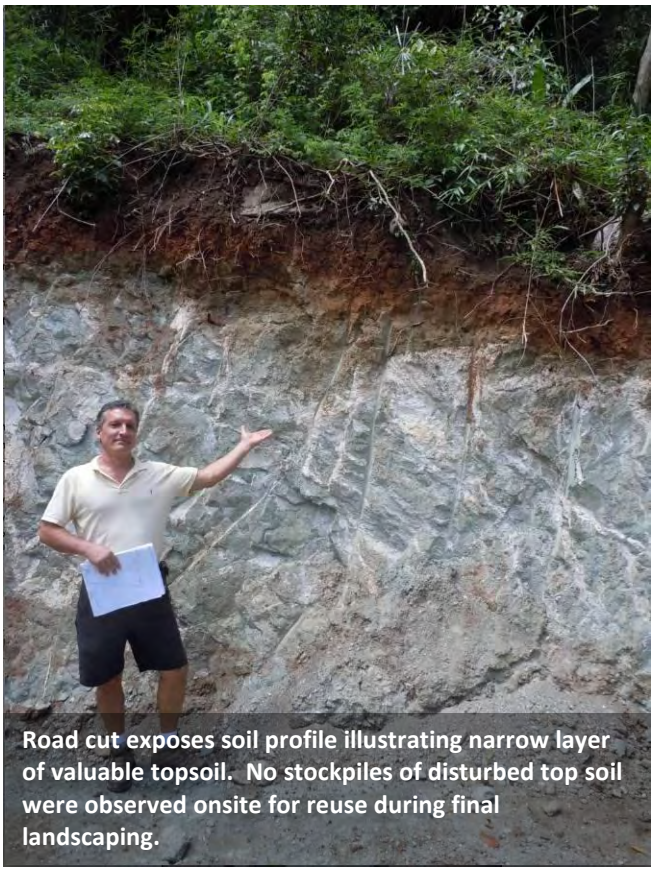
Figure 4A. Field Trip to Upper Peter Bay Construction Site

Clearing of the site and grading portion where retaining wall. This will be back filled with stockpile material.

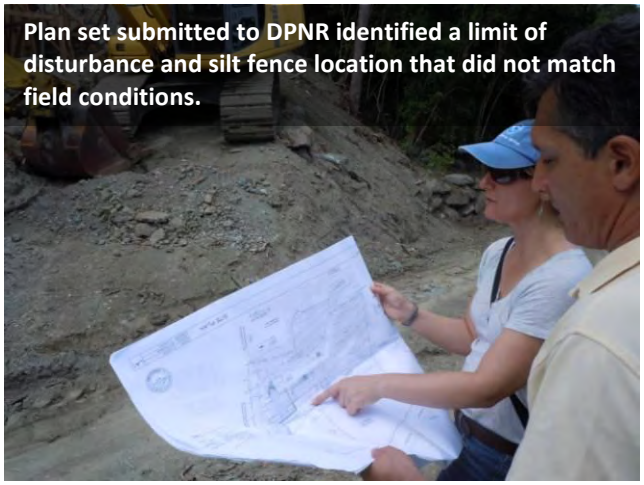
Steep access road exposes erodible soils with no measures in place to prevent erosion. This road is not intended to be the main driveway to the house.

Lower portion of entrance road is concrete. Sediment has accumulated on public roadway at base and downhill from entrance. Tracking of sediment evident along road.

Figure 4B. Field Trip to Upper Peter Bay Construction Site



Road cut exposes soil profile illustrating narrow layer of valuable topsoil. No stockpiles of disturbed top soil were observed onsite for reuse during final landscaping.



Plan set submitted to DPNR identified a limit of disturbance and silt fence location that did not match field conditions.

Exposed septic tank was found beneath contractor/worker vehicle parked on access road near entrance.

In small groups, workshop participants brainstormed options for managing stormwater runoff.

Unconsolidated material pushed down slope without protective sediment barriers called for on site plan.

Figure 5A. Examples of sediment traps and dewatering basin.

Example of a sediment trap from Whispering Hills residential construction site on St. Thomas used to capture runoff from construction access road.

Small sediment trap at base of steep construction road in Coral Bay, St. John.

Sediment basin with overflow pipe at construction site in Coral Bay, St. John.

Example of pipe slope drain to convey runoff down a steep slope into a sediment trap with rock reinforced overflow spillway.

Example of design with dewatering pipe and gravel stone base.

Figure 5B. Potential options for sediment trapping devices and conveyance structures (not all are needed).

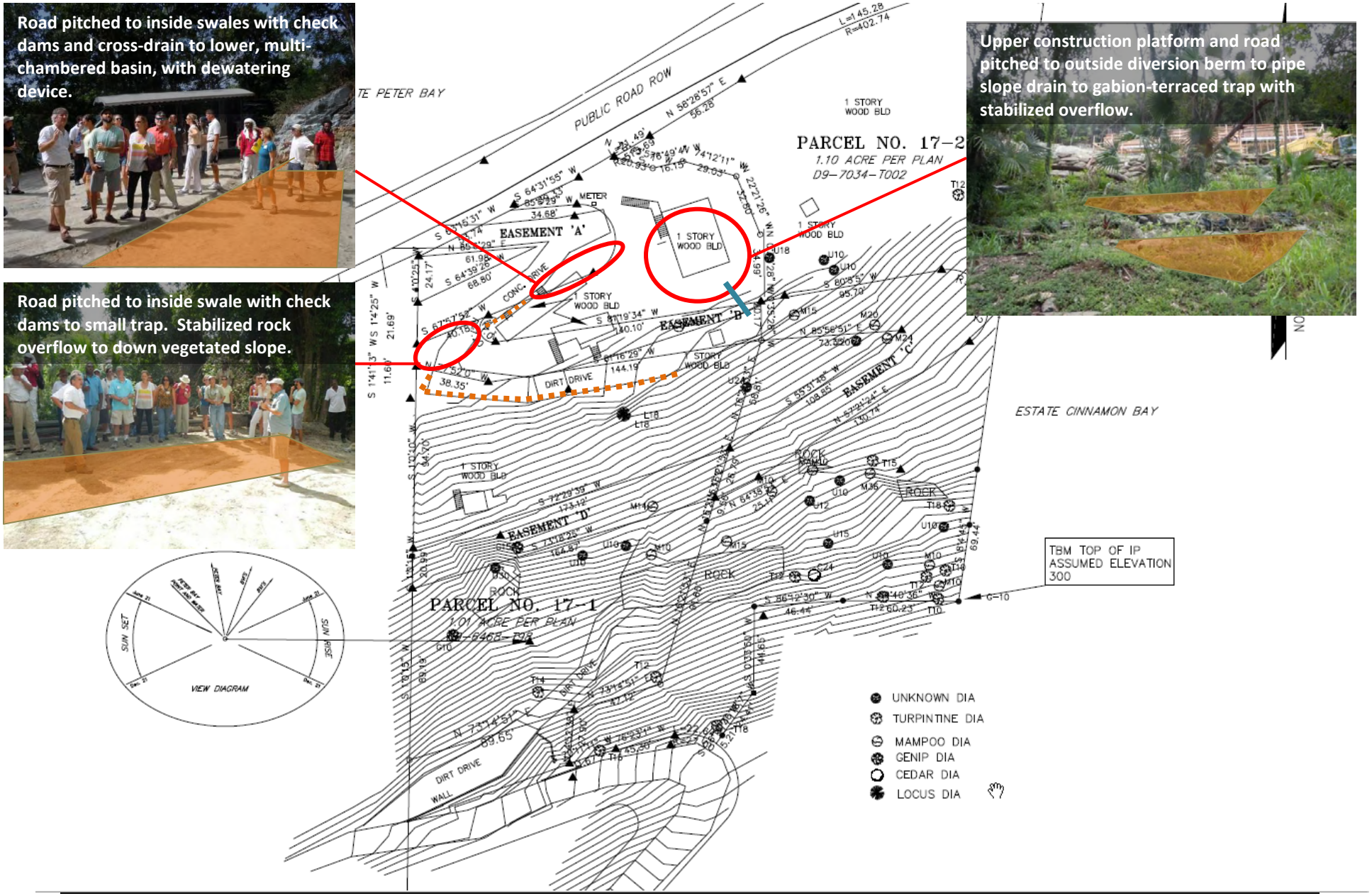


Figure 6. Examples of road-side conveyance systems.

Figure 7. Example of stabilized construction entrance and Geoweb® application for unpaved roads in St. John.

Figure 8. Example of materials that can be used to stabilize slopes.

Synthetic erosion control matting used to stabilize a channel bottom in Coral Bay.

Coir fiber erosion control blanket used to stabilize slopes and exposed soils at the Grandview construction site on St. Thomas.

Attachment A:

Workshop Packet Materials

Agenda
Evaluation Form
Participants List
IGBA Flyer
Green Certification Checklist (non-brochure format)
Native Landscaping Handout
DVD Users Guide

Green Construction Training

Tuesday, July 16, 2013
Cruz Bay, St. John, USVI

Agenda

Tuesday, July 16, 2013

8:30 **Registration/Sign In**

9:00-9:30 **Welcome** *(Lisamarie Carrubba, NOAA Fisheries/Bill Willigerod, IGBA)*
What is "green building" and the USVI Green Construction Training project? What resources are available and how do we access them? What does IGBA have to offer local practitioners?

9:30-10:15 **Building Green in the USVI** *(Doug White, Architect)*
What are the key tenets of building design that can reduce energy costs, utilize more sustainable construction materials, and minimize impacts on the environment. How can this be accomplished in the USVI?

10:15-10:30 **Break**

10:30-11:15 **The Reality of Going Green** *(Jonathan Smalls, DPNR/Anne Kitchell, HW)*
Ask the experts during a facilitated group discussion about the feasibility of implementation. Who are the professionals that can design and build green? What are the sources and cost of green construction materials from solar panels to sustainably harvested or recycled products? Are there permitting issues? What are available incentive programs?

11:15-12:00 **Landscaping for the Landscape** *(Gary Ray, Virgin Forest Nursery)*
Plant protection, selection, and layout tips to maximize the benefit and aesthetics of your vegetation, minimize maintenance, and discourage the spread of invasive species.

12:00-1:00 **Lunch**

1:00-4:00 **Green Construction Practices Field Trip** *(Dave Rosa, DPNR and others)*
Travel by safari to local construction sites to evaluate the application of green construction practices on site, inspect BMP implementation and maintenance, and discuss permitting and regulatory requirements.

Please wear clothing and safety equipment appropriate for being on construction sites!!

Green Construction Training
July 16, 2013
EVALUATION FORM

1. Please rate your agreement with the following statements. Circle your response.

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree, NA = does not apply.

I understand the basic principles of green building design.	1	2	3	4	5	NA
I have a better understanding of how to implement green design principles.	1	2	3	4	5	NA
I know the basic steps for protecting and creating a "green" landscape.	1	2	3	4	5	NA
I could evaluate a site to determine if "green" construction practices are applied.	1	2	3	4	5	NA
I am likely to join IGBA or use some of their services or other resources.	1	2	3	4	5	NA

2. Strengths and Weaknesses:

Which aspects of the workshop did you consider most beneficial?

_____

Which aspects of the workshop did you consider least beneficial?

_____

3. Did this workshop meet your expectations? O Yes O No

4. Overall rating of the entire workshop:

Poor		Good		Excellent
1	2	3	4	5

5. What future training topics related to Green Building would you recommend:

_____

_____

Other comments:

THANK YOU FOR COMPLETING THIS FORM!

USVI Green Construction Training
Cruz Bay, St. John
July 16, 2013

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1.5 Waste Minimization & Recycling –

Develop a process to minimize waste during the construction phase and on-going building operations.

- Design for efficient use of materials during construction.
- Reuse onsite fill material and stone for landscaping.
- Salvage and reuse construction materials when remodeling.
- Design space for onsite composting of kitchen and garden waste.

1.6 Light Pollution –

Design an exterior lighting system that minimizes the amount of ambient light visible from outside the property.

- Eliminate outwardly shining lights on buildings, patios and decks.
- Use downward facing light fixtures on decks, pools and patios.
- Use ground level fixtures for driveways, paths and landscape lighting.

1.7 Visual Pollution –

Ensure that the visual impact of the building is in harmony with the surrounding community.

- Design structures in harmony and balance with the natural environment.
- Retain vistas on owner's property and respect adjacent property vistas.
- Preserve the visual privacy of the property, adjacent properties and those across a valley.
- Create landscaped screens to hide onsite parking areas for structures and roads.

1.8 Landscaping, Green Belts & Native/Natural Vegetation –

The preservation of the existing natural vegetation of a site is the simplest and most cost effective form of landscaping. This vegetation is already well-established onsite and will survive in our extreme environment without constant irrigation.

- Use native xeriscopic landscaping (plants that will survive in a dry climate) wherever practical.
- Carefully consider and plan for the effective use of imported exotic tropical vegetation which is not self sustaining (requiring continuous watering). It may be invasive, crowd out native species and carry diseases and pests which kill native vegetation. The native century plant, *agave missionium*, is currently being devastated on St. John by a non-native beetle, probably imported in an exotic agave.
- If imported tropicals are used in landscaping, it is suggested that their use be concentrated around buildings where the most environmental disruption has taken place during construction. In this way, the perimeter greenbelt around the property can remain undisturbed natural/native vegetation.
- Owners are encouraged to try to minimize the use of chemical fertilizers, herbicides and pesticides that will leach into the substrata and eventually into the ocean. Natural and organic remedies are recommended.

ISLAND GREEN BUILDING ASSOCIATION

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U.S. Geological Survey, Water Resources Institute

Island Green Building Association

IGBA

www.igba-stjohn.org

St. John, U.S. Virgin Islands

Promoting Responsible and Sustainable Development on St. John, USVI

Island Green Building Association

The Island Green Building Association (IGBA) was established in 2004, by a group of concerned construction industry professionals and island residents. Our organization, with a perspective on the fragile nature of our environment, is concerned that road and building construction have adversely affected our island's natural ecological resources. We believe this environmental degradation is worsening and places the quality of life and the economic well-being of the island at great risk.

Growth is inevitable. Members of IGBA believe that the loss and compromise of our environmental and cultural resources are not. When planned and completed in a sustainable and environmentally responsible way, residential, commercial and infrastructure development can help preserve and protect the spectacular beauty and natural diversity that provide ecological health, sense of community and the unique quality of life found on St. John.

Environment, Culture, and Community

The quality of our lives is dependent on the quality of our surroundings, our culture and our community. When we embrace and celebrate our relationship to the natural world and our neighbors, we create a sustainable and thriving community.

Like other small mountainous Islands of the Caribbean region, St. John is endowed with an **environment** of natural beauty, great weather and priceless biological diversity from ridge top to coral reef. However, the lush cover of our island masks many intrinsic challenges to responsible development. Steep slopes, shallow, erodable soils and drenching rainfall combine to create site conditions requiring special considerations in order to reduce erosion, pollution and destruction of marine and terrestrial communities. With only 5% of the island developed and more than three-quarters with slopes greater than 35%, special care must be used in planning and constructing buildings and roads. IGBA's intent is to promote the use of development practices that reduce or eliminate these negative impacts on our land and sea resources.

IGBA MISSION STATEMENT

IGBA members provide leadership by example, advice, and counsel on sustainable and environmentally responsible development and are committed to practicing these ***Guiding Principles***.

- TO PROMOTE the construction of roads, buildings and other structures in harmony and balance with the fragile ecosystems and priceless natural beauty of St. John by providing practical recommendations to owners and builders on environmentally appropriate design, materials and site development practices.
- TO HELP preserve the native vegetation, traditional cultures and lifestyles of St. John by placing environmental and social sustainability at the core of practices and professional responsibilities.
- TO DEVELOP and continually improve practices, procedures, products, services and standards for tropical green building design and construction to create healthy environments.
- TO EDUCATE the building industry, clients and the general public about the importance of sustainable green building design and construction.
- TO WORK to change policies, regulations and standards in government and commerce so that sustainable green building design and construction become fully supported standard practices.
- TO BRING the existing built environment up to green building standards.
- TO ACHIEVE definable, measurable green building results within each project undertaken.

The people, social customs, traditions and activities of daily life form a **culture** unique to each geographical place. The Caribbean, a blend of many cultures, is teeming with music, literature, art, architecture, flavors, dress and language. This culture is reflected in the style, structure and layout of Caribbean homes and Community buildings. These vernacular design elements are both pleasing and practical in our tropical environment. IGBA's intent is to promote the use of these design elements wherever practical.

Those who call St. John home, have a special feeling of place, **community** and a pace of life slower, more respectful and polite than the bustling mainland. While St. John's landscape is changing, its cultural foundation is solid and diverse. IGBA's intent is to help preserve this cultural foundation by respecting our neighbors, our heritage and the way of life of our many different communities.

The Green Building Guidelines that follow are presented to help reduce the negative impacts of building construction practices on our natural environment, especially the impacts due to loss of natural vegetation cover and sedimentation.

If you are a builder or property owner and are planning to have a building, driveway or roadway constructed, you can help by making certain that you and all of the contractors that you hire agree to follow these guidelines. With your help, we can make a difference, a huge difference in protecting our resources and our quality of life.

GUIDELINES of SUSTAINABLE GREEN BUILDING DESIGN & CONSTRUCTION:

– BUILDING CONSTRUCTION –

1.1 Site Planning and Design –

Design the site to achieve the functional requirements of the development with minimum site disturbance and maximum environmental protection.

- Make every effort to retain native/natural vegetation on the site by clearly delineating the areas of the property to be left undisturbed.
- Utilize building setbacks as green belt areas along roads and property lines.
- Develop surfaced onsite parking areas to minimize runoff and eliminate on road parking.
- Develop an excavation, storm water drainage and erosion control plan to minimize site run off and pollution of the environment. Maximize collection and retention of storm water on the property through the use of berms, swales, settlement terraces and landscape irrigation. Systems should be designed to handle very heavy rainfall.
- Use cleared brush for down slope diversion berms. Compost on site, rather than burn the remaining cleared brush.

1.2 Building Structure –

Design the building to be responsive to and reflective of tropical architectural design considerations, including trade winds and sun paths.

- Developments within low density development areas (such as the National Park) should be respectful of the areas' rural character and construct low-profile structures that blend into the extent possible.
- Use renewable, recyclable, local, sustainably produced, non-toxic materials.
- Design for protection against hurricanes and earthquakes.
- Use Caribbean (vernacular) architectural design elements.
- Design for lifecycle cost considerations with quality, low maintenance materials and systems.

1.3 Water Management –

Develop a water management and conservation plan for each building or structure.

- Use an ecologically balanced onsite sewage disposal system (where not connected to a municipal sewer system).
- Develop rain water and gray water collection systems to maximize retention on site and minimize runoff.
- Use non-potable (gray) water for landscape irrigation.

1.4 Energy Conservation & Management –

Design an energy system that maximizes the use of renewable energy.

- Use solar hot water heating.
- Include photovoltaic (solar) and wind energy systems for auxiliary electric power where practical.
- Minimize the need for air conditioning by using a building orientation that takes maximum advantage of trade winds and minimizes heat gain within the structure from solar radiation.
- Design energy efficient, sealed, insulated building envelopes for climate-controlled spaces, when air conditioning is required.

The Island Green Building Association:

Become a member of IGBA today and learn more about our organization at **www.igbavi.org**

- *Hosts Green Thursdays seminars on topics like recycling and renewable energy*
- *Encourages green development with various programs, including educational outreach and green building certifications*

ReSource Depot

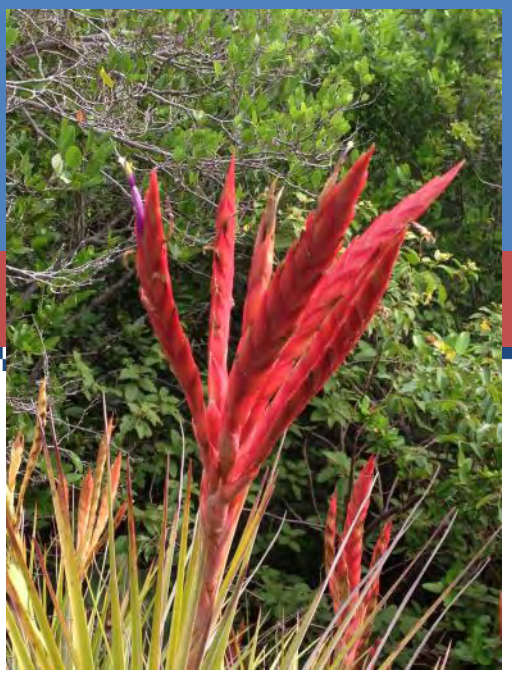
Open Sat. 8 a.m. to noon / Mon. & Thurs. 7:30 a.m. to noon
Located at Gifft Hill & Centerline, across from the Transfer Station

- *Buy new and gently used building materials, home decor and furnishings at a fraction of the cost*
- *Donate goods for a tax write-off*
- *Help us continue to divert thousands of pounds of waste from local landfills!*

Keep up with sales and events at www.facebook.com/IslandGreenBuildingAssociation

Natural Communities as Landscaping

Training Workshop on Sustainable Building and Landscaping



Native Plants are Replacing Imports

Principles of Native Landscaping

1. Contact a local botanist to conduct a pre-shovel vegetation inventory of site to search for rare & valuable plant species and get siting advice to protect valued natives and natural habitats

2. Minimize natural vegetation removal when excavating

3. Barricade important plants to protect priceless specimens

4. Remove carefully important plants within building footprints (with minimal root damage) for rescue propagation and re-use in landscaping

5. Find a propagator for *locally produced* natives for final landscaping

Native bromeliad “blood sword” (*Tillandsia fasciculata*) is hardy and charismatic

Integrating natural plant communities into the residential design adds priceless passive landscaping

Protect our natural heritage by selecting locally produced native plants for landscaping.

Keys to a Natural and Sustainable Landscape

- Preserving existing natural vegetation of a site is the simplest and most cost effective form of landscaping – saving water, minimizing erosion and weed infestations.
- Natural vegetation, if not severely disturbed, is gorgeous and it will survive in our droughty environment without irrigation.
- Native trees and shrubs should be used to re-vegetate and stabilize slopes and cut banks; native plants can work with biodegradable geo-fabrics.
- Bare soils should be mulched or re-seeded as soon as possible.
- If exotic ornamentals are used, selecting species that are **non-invasive** is ecologically and economically crucial in the long run.
- International shipping of nursery plants has added

Our Islands Our Future

USVI Green Building Training

In response to the growing recognition that conventional development practices in the USVI have led to natural resource impacts and water quality impairments, NOAA, DPNR and the Island Green Building Association (IGBA) have teamed up to provide:

- Guidance on practical siting, design, and construction practices to improve energy efficiency, conserve valuable soils and vegetation, and reduce impacts of erosion and stormwater runoff;
- Technical materials directed towards engineers, architects, builders, heavy equipment operators, agencies, and homeowners;
- Hands-on training planned for St. John, St. Thomas, and St. Croix; and
- Free memberships and other incentive packages from IGBA.

For more information on green building practices in the USVI and upcoming training workshops, go to: **www.igbavi.org**

Or Contact:

Lisamarie Carrubba, NOAA Fisheries
lisamarie.carrubba@noaa.gov (p) 787-851-3700

Anne Kitchell, Horsley Witten Group
akitchell@horsleywitten.com (p) 508-833-6600

How do I Use Available Training Materials?

NOAA and other local partners have prepared educational materials that you can access to learn more about green building design and construction techniques or use to provide instruction to others. Specifically, these materials include slideshows and videos that can be used in a classroom setting, or viewed on your personal computer. Supplemental field manuals are also provided that can be used to guide hands-on learning activities.

Step 1. Verify that your computer software is compatible. These materials are currently in .ppsx format and require Microsoft Powerpoint 2007 or a more recent version. Free universal file viewers are available for download on the internet. Note that the slideshows contain embedded videos. The videos are in Quicktime (.mov file extension) and can be viewed with most media players.

Each slideshow is organized by Lessons and can be viewed at your own pace.

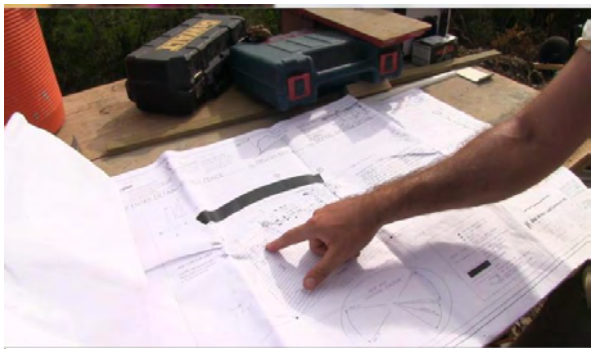
Step 2. Materials are divided by user category: designers, implementers (contractors, heavy equipment operators), agency personnel, and homeowners and others. Determine which interests you and select the appropriate slideshow or field manual from the DVD provided, or by going to IGBA's website (click on the Resources tab from the homepage and select "training slideshows" from the drop down menu) at http://www.igbavi.org.

Note that some of the information is the same in each set of modules while some is more detailed based on the intended audience.

Five videos are available starring local architects, native plant specialists, and government employees.

Step 3. If you are self-educating, each slideshow begins with an introduction that explains the goals and learning objectives of the material that will be presented. Go through the slideshows at your own pace. Each slideshow is divided into the following lessons:

Lesson 1: Guide to Green Design
Lesson 2: Guide to Site Assessment & BMP Selection
OR
Homeowners Guide to Choosing the Best Site
Lesson 3: Guide to Managing the Construction Process
Lesson 4: Guide to Green Landscaping



Field manuals give instruction for hands-on activities that can be used to reinforce classroom lessons.

Step 4. If you are looking for someone to provide training, contact IGBA or Jonathan Small at DPNR CZM 302-773-1082 Ext. 2229 or jonathan.small@dpnr.vi.gov.

Attachment B:

Sign in sheet
Final Participants List
Evaluation Form Summary

Green Construction Training
July 16, 2013
EVALUATION FORM

N=12

1. Please rate your agreement with the following statements. Circle your response.

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree, NA = does not apply.

	1	2	3	4	5	NA	AVG
I understand the basic principles of green building design.	8%			50%	42%		**4.2**
I have a better understanding of how to implement green design principles.	8%			67%	25%		**4.0**
I know the basic steps for protecting and creating a "green" landscape.	8%			67%	25%		**4.0**
I could evaluate a site to determine if "green" construction practices are applied.		8%	18%	33%	33%	8%	**4.0**
I am likely to join IGBA or use some of their services or other resources.	8%	8%		25%	50%	8%	**4.1**

2. Strengths and Weaknesses:

Which aspects of the workshop did you consider <u>most</u> beneficial?

- Lectures (2)
- Presentations and tour
- All excellent (3)
- Design and construction (2)
- Field trip (2)
- Group discussion

Which aspects of the workshop did you consider <u>least</u> beneficial?

- Last house at Peter Bay
- Group discussion in the classroom
- Nothing (2)
- permitting
- would like an outline or brief handout; include a list of contacts
- First house on field trip
- Lengthy presentations

3. Did this workshop meet your expectations? ○ Yes ○ No

100% 0%

4. Overall rating of the entire workshop:

Poor		Good		Excellent	**AVG**
1	2	3	4	5	
		8%		92%	**4.8**

5. What future training topics related to Green Building would you recommend:

- Hands-on landscaping (2)
- Sewage treatment planning
- DPNR requirements and Army Corps regulations
- Constructed wetlands
- Runoff natural and manmade
- Structural, finishes, alternative energy
- Composting
- Recycling
- Pass sustainable design strategies
- Site prep and mitigation

Other comments:

- Thanks! excellently managed
- Thank you
- Keep up the good work
- Thank you for lunch
- Very well planned, great speakers and slideshows

USVI Green Construction Training
Cruz Bay, St. John
July 16, 2013

FIELDTRIP WAIVER

Last Name	First Name	Agency	Sign In	Sign Out	Lunch Choice
Barksdale	Rick	The Summer's End Group, LLC		✓	STJ CUBAN #28
Bernstein	Gregg	Asolare			
Boulon	Rafe H	Retired DPNR/NPS - Consultant		✓	— #28
Brooker	Colleen R	Passiflora Designs	Colleen Brooker	✓	#2
Carlsen	Dan	IGBA	Dan Carlsen	✓	#12
Carrubba	Lisamarie	NOAA Fisheries Service		✓	tuna melt with cheddar #16
Castle	Sabrina J			✓	#12
Curtright	Kevin	Passiflora Designs	Kevin Curtright	✓	#7
~~Doug~~	~~White~~	PEND			
Gallagher	Mary	IGBA			#14
Garcia	Edgar W	US Army Corps of Engineers		✓	
Gary	Ray			✓	#2
Jayson	Parrilla	VIWMA			
Kitchell	Anne	Horsley Witten	Anne Kitchell	✓	tuna melt #16
~~Martin~~ CELAIRE	~~Benita~~ Bowchi	We grow food	Bolaw	✓	
Moon	Erin	design per square inch	Erin Moon	✓	
Neb Ka RA	Herishetapaheru P	NBQD, LLC & PAI, INC	HERE	✓	
Padilla Plaza	Glenis M	CRCP NOAA	GlenisPP	✓	#12 Smoked turkey
Patton	Irene S	Friends of the VI National Park	Irene Patton	✓	OK
Perez	Leonardo	design per square inch		✓	
Perry	Clemenceau				

Greek Salad ✓

#2 ✓
#3 ✓

#4 ✓

Last Name	First Name	Agency	Sign In	Sign Out	Lunch Choice
Reed	Patricia C	Coral Bay Community Council	HERE	✓	
Rosa	David S	DPNR - CZM	DS Rosa	✓	#12 ✓
Runyon	Elissa R			✓	#3 hummus & veggies (not sourdough pita) ✓
X Schenider	Allison	Guinea Grass Ventures, Trust			
X Simmonds	Emmaline	Virgin Islands Waste Management Authority			
Small	Jonathan	DPNR CZM	HERE		
Stout	Heidi			✓	#12 ✓
Summers	Chaliese	The Summer's End Group, LLC		✓	#13 ✓
Turnbull	David	CAC member of the VIWMA		✓	#16 ✓
X Walwyn	Adson				
X Williams	Laurie L	Virgin Islands Waste management Authority			
Willigerod	William	William Willigerod, P.C.		✓	#13 ✓
Wilson	Winston C	INDIGO ENGINEERING GROUP CARIBBEAN LTD.		✓	#14 ✓
Hibbert	Marlon	NOAA CRCP		✓	11 #29. ✓
Mulder	Cherie			✓	
WHITE	DOUG	(6B)7		✓	#2. ✓
STELZER	WILLIAM	VIDEO		✓	#12. ✓
Nelson	Gabrielle	Dr. Cool		✓	
Downing	Alexis	DPNR-Parks		✓	
Ellenton	Maynard	" "		✓	#12 ✓
HANK	KRISTIN	—		✓	#12 ✓
COLDREN	SHARON	Coral Bay Com Council		✓	#12 ✓
VAHLING	KAREN	Friends of VINP		✓	#3 ✓ #13 ✓
Joseph	Daniel	Energy Office			

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Bowchi	Celaire	We grow food	Po box 307225	STT	Vi	00803	(340) 344-9118	other	Wgfi_vi@yahoo.com			X			
Boulon	Rafe H	Retired DPNR/NPS - Consultant	5000 Estate Enighed, PMB#68	St. John	VI	00830	(340) 693-8524	other	rboulon@gmail.com				X		
Brooker	Colleen R	Passiflora Designs	16213 Spring Garden	St John	VI	00830	(340) 513-1416	Landscaper	storytellervi@hotmail.com			X			
Carlsen	Dan	IGBA	5511 Upper Carolina	St John	VI	00830	(340) 201-6660	other	dac1943@hotmail.com	X	X		X		
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Hawk	Kristin		9901 Emmaus	St John	VI	00830	(910) 547-8688		kristin.elaine.hawk@gmail.com				X		
Hibbert	Marlon	NOAA CRCP	Almeric Christian Federal Building 3	Christiansted, St Croix,	VI	00820-42	340-244-2339	Agency	marlon.hibbert@noaa.gov						
Jayson	Parrilla	VIWMA	941-946 Williams Delight	Fredriksted	VI	00840	(954) 243-6596	Engineer	jparrilla@viwma.org			X			
Kitchell	Anne	Horsley Witten	90 Route 6A	Sandwich	MA	02563	(508) 833-6600	other	akitchell@horsleywitten.com						
Maynard	Ellerton	DPNR-Building Permits	#45 Mars Hill	FREDERIKSTED, ST. CROIX	VI	00840		Agency	ellerton.maynard@dpnr.vi.gov						
Moon	Erin	design per square inch	7015 Bordeaux	St. John	VI	00831	(407) 417-7945	Architect	moon.ec@gmail.com		X				X
Mulder	Cherie		1401 McLean Mews Ct.	McLean	VA	22101	(703) 618-4300	other	cmulder26@cox.net				X		
Neb Ka RA	Herishetapaheru P	NBQD, LLC & PAI, INC	176-C WHIM ESTATES	FREDERIKSTED, ST. CROIX	US	00851	(340) 643-6273	Contractor	nbkara@gmail,com			X			
Nelson	Gabrielle	Dr. Cool A/C & Appliances	5000 Estate Enighed PMB #31	St. John	VI	00830-10	(340) 693-9071	Design	gabrielle@drcool.com			X			
Padilla Plaza	Glenis M	CRCP NOAA	Carr 301 Km 5.1	Boqueron	PR	00622	(787) 851-3700	other	glenis.padilla@noaa.gov						
Patton	Irene S	Friends of the VI National Park	509 Mongoose Junction	St. John	VI	00830	(340) 779-4816	other	i@pattongold.com	X	X				X
Perez	Leonardo	design per square inch	7015 Bordeaux	St. John	Vi	00831	(407) 417-7944	Architect	ldpereza@gmail.com		X				X
Perry	Clemenceau						(340) 771-1995		dalisnet@gmail.com						
Ray	Gary	Virgin Forest Restorations	9901 Emmaus	St. John	VI	830	(340) 514-0457	Landscape	virginforestvi@gmail.com	X	X				
Reed	Patricia C	Coral Bay Community Council	9901 Emmaus	St John	VI	00830	(340) 776-2099	other	triciareed@coralbaycommunitycouncil.org		X		X		
Rosa	David S	DPNR - CZM	DPNR Office	St. John	VI	00830	(340) 693-8735	other	david.rosa@dpnr.vi.gov		X				
Runyon	Elissa R		Mail 5000 Estate Enighed #116,	St. John	VI	00830	(340) 693-7488	other	bushwacker@viaccess.net		X	X			
Schenider	Allison	Guinea Grass Ventures, Trust	Estate Adrian	St. John	VI	00820	(340) 774-6683	other	calbrowne@aol.com				X		
Seltzer	Bill	Videographer	pobox 354	St. John	VI	00831		other							
Simmonds	Emmaline	Virgin Islands Waste Management Authority	941-946 Est. Williams Delight	Frederiksted, St. Croix Virgi	US	00840	(324) 071-2498	Landscaper	esimmonds@viwma.org			X			
Small	Jonathan	DPNR CZM	#45 Mars Hill	Frederiksted, St. Croix Virgi	US	00840	(340) 773-1082	agency	jonathan.small@dpnr.vi.gov						
Stout	Heidi		6513 susanaberg	St. John	Vi	00830	(340) 344-4056	other	Hstoutvi@gmail.com		X		X		
Summers	Chaliese	The Summer's End Group, LLC	5000 Estate Enighed #63	St. John	VI	00830	(340) 777-9075	other	chaliesesummers@gmail.com	X		X			
Turnbull	David	CAC member of the VIWMA	po box 10379	St. Thomas	VI	00801	(340) 513-7295	Contractor	tbullbam@gmail.com				X		
Vahling	Karen	Friends of the VI National Park	16805 Freemans Ground	St. John	VI	00830		other							
Walwyn	Adson						(340) 771-1995		dalisnet@gmail.com				X		
White	Doug	Doug White Architect	11317 Hansen Bay	St. John	VI	00830	340-690-0217	Architect	dougkwhite@gmail.com	X	X				
Williams	Laurie L	Virgin Islands Waste management Authority	941-946 Williams Delight	Frederiksted	VI	00840	(340) 690-4216	Engineer	lwilliams@viwma.org			X			
Willigerod	William	William Willigerod, P.C.	16213 Spring Garden	St John	VI	00830	(340) 643-5313	Architect	william@willigerod.com	X	X				
Wilson	Winston C	INDIGO ENGINEERING GROUP CARIBBEAN L	LUMBERYARD ST. JOHNS	CRUZ BAY	FL	33411	(561) 906-6542	Engineer	NOSLIW1@GMAIL.COM	X	X	X			
											Total	11	11	1	4
organizers															
did not sign in/sign release form															

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WORKSHOP SUMMARY

TO:	Lisamarie Carrubba and Marlon Hibbert (NOAA); Bevan Smith, Emanuel Liburd, Carmelita Benta, Ellerton Maynard, Alexis Doward, Amanda Acosta-Jackson (BP); Ben Kuelarts (DEP); JP Oriol and Jonathan Small (CZM); Karl Knight (Energy Office); Nadine Noorhasan (VIWMA); Sean Krigger (VISHPO); Barry Devine, Doug White (IGLA); Denise Kurg, David Zumwalt, Orlando Santiago, and Greg Miller (RTPark and associates)
FROM:	Anne Kitchell (HW)
DATE:	April 3, 2014
RE:	Summary of USVI Green Building Trainings, St. Croix

This memorandum provides a brief summary of the March 18 and 19, 2014, USVI Green Construction Trainings at the University of the Virgin Islands (UVI) Research and Technology Park (RTPark), 64 West Center on St. Croix.

The purpose of the trainings was to: 1) continue a series of workshops on green design and construction in the USVI sponsored by NOAA and DPNR; 2) increase exposure for the Island Green Building Association (IGLA); and 3) distribute educational materials related to building green in the USVI. There were two separate clinics. The first was a half-day field course targeting builders and the construction industry. The second was a one-day classroom training targeting agency staff. **Attachment A** includes evaluation form summaries and sign in lists.

These trainings on St. Croix will be followed by a comparable workshop on St. Thomas this summer targeting designers, implementers, agencies, and homeowners; thereafter, DPNR will be responsible for providing continued training under this program.

Participants in the two workshops visited construction sites, toured a LEED-certified building, and participated in classroom activities.

March 18th Builders Workshop

This half-day field course involved evaluating construction practices and green building features at three sites—a completed substation construction project, an adjacent property cleared for a future solar array installation, and the recently completed RTPark facility at UVI campus. There were approximately 28 attendees (including instructors); however, most of participants were from the public sector (e.g. Department of Planning and Natural Resources (DPNR), Virgin Islands Waste Management (VIWMA), UVI, and Port Authority) rather than from the primary target audience of implementers from the building industry.

Efforts to make the building community aware of the workshop included:

- Emails, phone, or fax messages sent to over 50 builders on official 2013 DBA list for St. Croix (many of these contacts were invalid), as well as an additional 40+ builders identified in the local phone book and from previous NOAA work sessions on green building;
- Notification to engineers and designers on St. Croix to help distribute to their clients and contractors;
- Email blasts from IGLA to membership and additional contacts on STX;
- Advertisement in Avis (a local newspaper) posted by IGLA;
- Circulation and posting of flyers by DPNR Building Permits, St. Croix Environmental Association, and USDA office, plus posting of notification in Love & Light bookstore in Christiansted; and
- Flyers distributed to two radio show hosts.

Field Sites

Participants were first taken to the substation/solar array site (**Figure 1**) where Mr. Ian Bass of J. Benton Construction described the purpose of the substation project and the sequence of construction to participants. We walked around the perimeter of the substation to observe and discuss design, implementation, and maintenance of erosion control measures throughout the course of the project. The site offered a number of teaching points because some measures had been implemented to meet earth change permit requirements, but there were still opportunities for improvement. The substation was reported to be at 90% completion.

Table 1 summarizes some of the key features and recommendations discussed for the Substation, specifically.

Figure 2 includes photos taken around the substation site and **Figures 3** and **4** illustrate suggested practices to address some of the recommendations for improved erosion and sediment control discussed by participants.

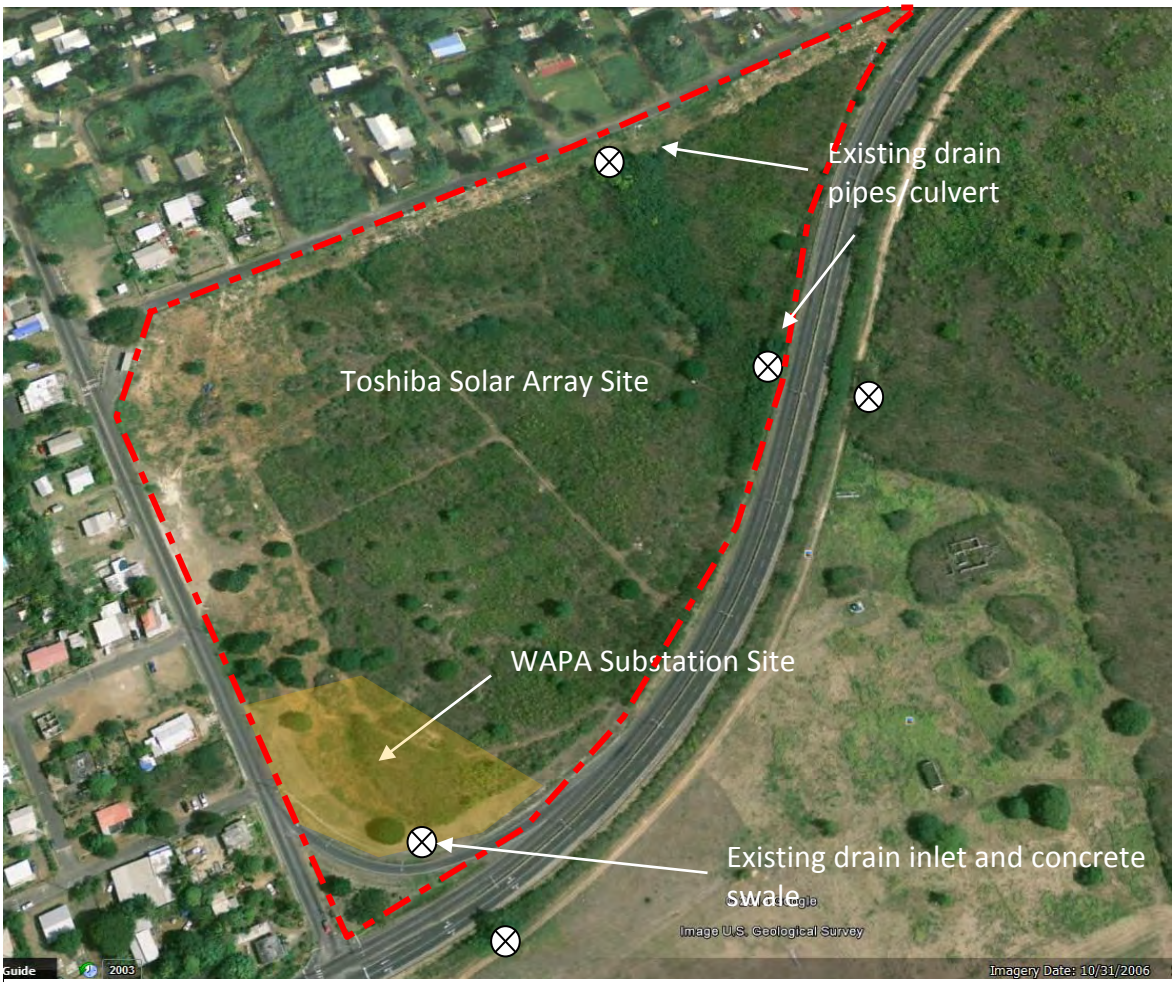


Figure 1. 2006 Google Earth image of Substation/Solar Array project site on St. Croix. The substation was nearing project completion and the vegetation had been cleared across the proposed solar array site at the time of our training visit.

Participants were then divided into groups to explore the adjacent site —a 15+ acre parcel recently cleared for a future solar panel installation. Each group was given a conceptual erosion control plan (not final) for the site, which identified silt fences, sediment basins, construction entrance, areas of natural vegetation, and a proposed layout of the panel arrays (**Figure 5**). Groups were tasked with exploring the site and reporting back to the full group with ideas for an alternative erosion control plan.

Recommendations included:

- Phased clearing and site fingerprinting. It was unclear why site clearing had proceeded without DPNR permit approval or why the far hillside area was cleared when the conceptual plan did not show panels being installed in that location. Trees and vegetation were also cleared along the major drainage path between two pipe/culverts where a gap in panel installation was proposed. This existing vegetation helped slow and absorb runoff through the site. It was mentioned that mulched sites where soils are not upturned may follow a different permitting process than sites cleared by other

mechanisms. Acknowledging that we didn't know anything about the ultimate grading plan for the site, a preferred approach suggested was to clear as you go and only as needed – one of the people who works on solar projects noted that the site will require cut and fill to get the best light conditions for the array, which means minimum site disturbance is likely needed for the solar array project. It was also suggested that, if a project will be built in phases, then clearing should be done prior to the construction of each phase only. In addition, site clearing should only be done for vegetation that will fall within the construction footprint rather than the entire site.

- Spreading of mulch. There was a lot of mulch located at the low points of the property, which will probably create a significant sediment barrier as long as runoff doesn't concentrate and flow erosively through those locations. Ideally, mulch should be spread evenly across an entire site to stabilize exposed spoils and help establish vegetative cover. DPNR should consider providing some kind of performance standard for stabilizing a site with mulch, as well as for maintaining vegetation on site rather than clear cutting. Some of the mulch on this site could have been used to help establish vegetation on the bare soil areas around the west/southern portion of the Substation.
- Installation of perimeter controls prior to clearing. All perimeter controls should be installed before clearing activities begin. For example, a stabilized construction entrance for equipment accessing the site should have been installed, as well as silt fencing or berms on the low side of the property, etc. Need good dust management related to exposed soil stabilization measures.
- Sediment basin. The concept plan shows a small sediment basin proposed on the southeast low point. Consider installing a second basin at the northern low point within the flow path between two existing drainage pipes/culverts and make sure sizing of basin is adequate for site. May need to consider an additional basin near existing culvert drainage south of Substation.
- Breakup flow into smaller volumes. Consider using berms or other diversions such as transverse channels installed parallel to slopes as a means of breaking up the flows on site into smaller, more manageable units (i.e., think agricultural practices). Widen swale along highway to improve water conveyance and put in weir before low point. Make swales take water east and west and use vegetated swales where possible and where the property owner can be responsible for maintenance because this is often not possible when swales are responsibility of the Department of Public Works (DPW). May need to install a retaining wall around the Substation based on runoff volume.
- Know the full drainage area. This site accepts runoff from the uphill neighborhood and roads (see drainage pipe) and generates runoff across the substation site. Any erosion control and stormwater pollution prevention plan (SWPP) must address these areas that are beyond the site boundaries. Sizing of the sediment basin, for example, must include the full area draining to it. Suggest doing a hydrology study to have a better idea of water flow and be able to better design the location and type of erosion control and runoff management measures for the site.

Table 1. Summary of Key Discussion Points at Substation Site

Feature	Observation	Recommendation
Perimeter controls	Silt fences were installed at low point of property prior to clearing and land disturbance. Wooden stakes were replaced with rebar posts. Photos show that the fencing did trap sediment, though muddy overflows did occur and multiple rows of fencing were installed. Sediment accumulated behind fencing was removed and spread across site. Silt fences were removed prior to our visit despite much of the earth at the site being exposed and subject to erosion and sediment transport.	Reinstall silt fences, proper inlet protection device, and/or vegetative filter strip to minimize sediment entering existing storm drain until site is adequately stabilized. Try not to buy the silt fence with pre-installed stakes to give yourself more flexibility in your installation.
	Stabilized, gravel construction entrance was installed at project initiation. The main entrance was recently paved, but vehicles were observed actively accessing the site through an unpaved entrance.	Install and maintain stabilized construction entrance at all unpaved access points.
Conveyance	Channels were installed along the perimeter of the substation to collect and direct runoff to the concrete drainage channel along the highway. Straw/plastic mesh erosion control blankets were used to stabilize slopes of the conveyance channels. The blankets were not properly anchored along the leading edge, which may reduce their effectiveness as runoff undercuts matting. The blankets were not properly installed for either slope or channel applications (see vertical vs horizontal installation procedures in Figure 5). In addition, the bottoms of the channel were not stabilized and are subject to erosion.	Properly anchor erosion mats at the top of slope (see USVI Erosion Control Guide) and according to installation instructions of the manufacturer. The bottom of the channel should be stabilized with matting, rock, or vegetation. If using matting, be sure to use type that can handle flowing water. Consider use of check dams to slow erosive velocities.
Site stabilization	Despite the project being 90% complete, there is still a large amount of exposed soil on site (and in off-site contributing drainage area). Vegetative stabilization will be a challenge given the loss of topsoil and extensive surface compaction (required for underground installations). Special attention should be paid to seed mix, time of year, birds, and initial watering to promote plant establishment.	Ideas discussed included hydroseeding, bringing mulch over from adjacent site, top soil and planting, widespread application of erosion control matting, etc. DPNR-BP to establish performance criteria for what constitutes “stabilization” required before temporary erosion control measures can be safely removed from a site.
Run-on from off-site	While the Toshiba construction job is separate, a portion of that project site drains through the substation site. Much of the off-site drainage area consists of exposed sediment due to land clearing for the solar array project, which contributes muddy runoff to the now unprotected drain inlet near road.	Toshiba site will need to work with J. Benton to address this issue by immediately stabilizing the area, diverting runoff to a sediment basin or other approved practice, and/or preventing muddy runoff from entering existing catch basins.
Other	During construction, a designated concrete wash containment area was used. We did not discuss any dewatering practices likely used at the site given the extensive amount of underground excavation activity.	DPNR-BP to evaluate if de-watering activities were adequately managed and to apply any lessons learned on future projects.
	Erosion and sediment control measures need to be on the plan or else contractors will not account for them. DPNR should reject plans if they think there will be an issue with erosion and sedimentation.	DPNR-BP should not tell the engineer/designer what specific practices must be used, but could provide a list of options to consider and establish performance standards that must be met.

Figure 2. Photos from Substation Construction Site

Uphill of the substation construction site. Extensive exposed soils present at the site must be stabilized before erosion control measures are removed.

Conveyance channels along the substation perimeter direct runoff around the installation. Straw-based erosion control matting is only a first step in stabilizing this channel from erosion.

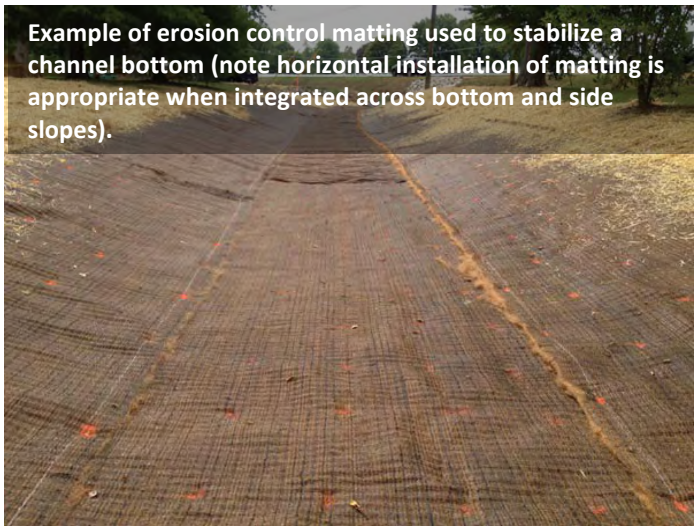
Flows discharge from the conveyance channel across highly compacted soils, carrying fine sediments into an existing concrete swale. The silt fence used to prevent flow from entering the concrete swale has already been removed.

The concrete swale discharges to an existing storm drain which is then piped below the highway. Clogging of infrastructure with sediment can lead to flooding problems and extra maintenance for DPW.

The paved construction entrance on the left works fine once construction vehicles are no longer tracking mud around the site. In this case, however, the unpaved entrance on the left is getting as much, if not more use.

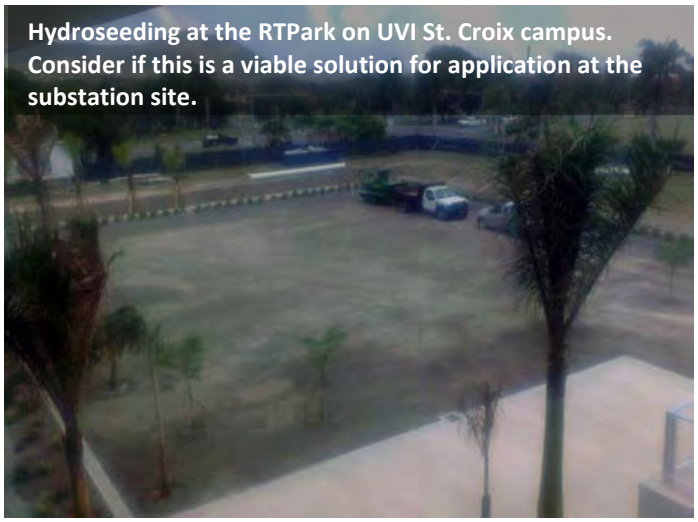
Figure 3. Examples of Erosion Control Options Discussed

This gravel entrance at a St. John construction project is an example of what a stabilized entrance should look like. The intent is to remove sediment from tires before it can be tracked onto the main road.



Example of erosion control matting used to stabilize a channel bottom (note horizontal installation of matting is appropriate when integrated across bottom and side slopes).

Consider rock lined channel or a combination of rock check dams with matting or vegetative stabilization technique.



Hydroseeding at the RTPark on UVI St. Croix campus. Consider if this is a viable solution for application at the substation site.

Rock and block inlet protection may be a low cost option for the drain inlet in the concrete channel

Figure 4. Excerpt from USVI Sediment and Erosion Control on Construction Sites Field Guide. Blankets should be trench-anchored at the top of slope to prevent runoff from going beneath them. Generally they are installed vertically in overlapping strips from the top of a slope. For channel applications, however, horizontal installation along the length (and bottom) of the channel is preferred to better accommodate flows. In either application, the upslope edge of the blankets must be properly anchored and trenched. Staple patterns are usually specified by the manufacturer.

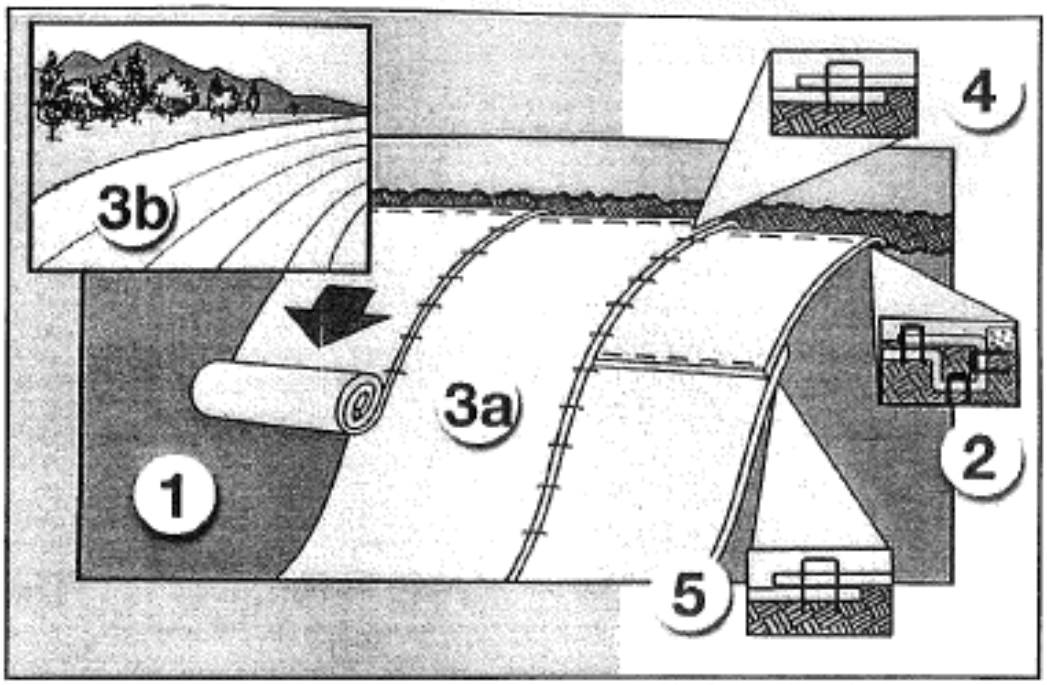


Figure 16. Erosion control mat slope installation example (*North American Green, 2002*).

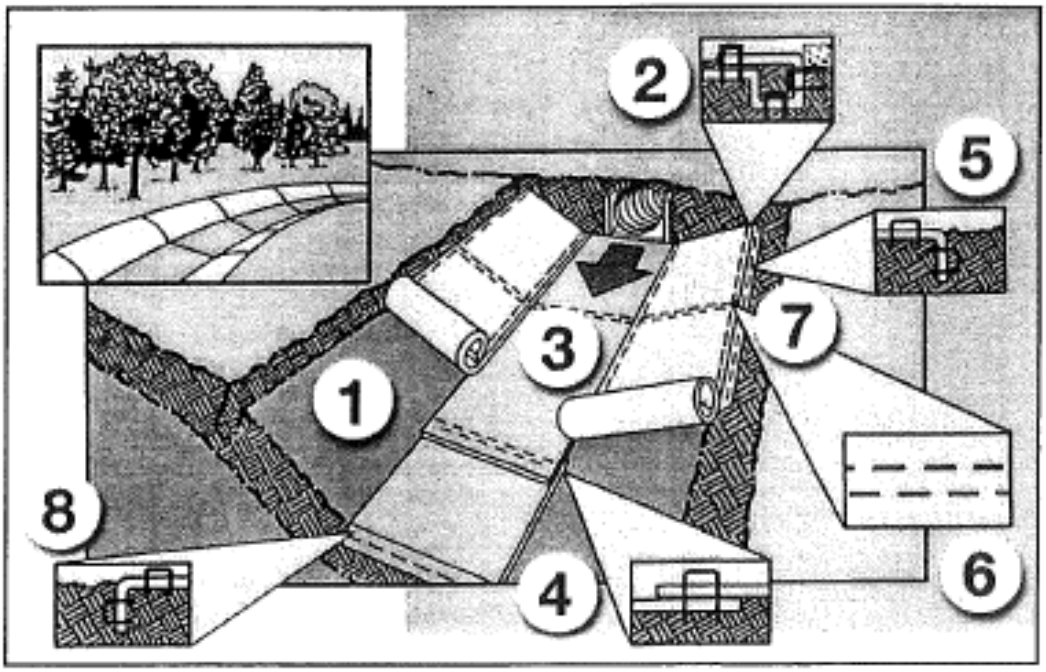
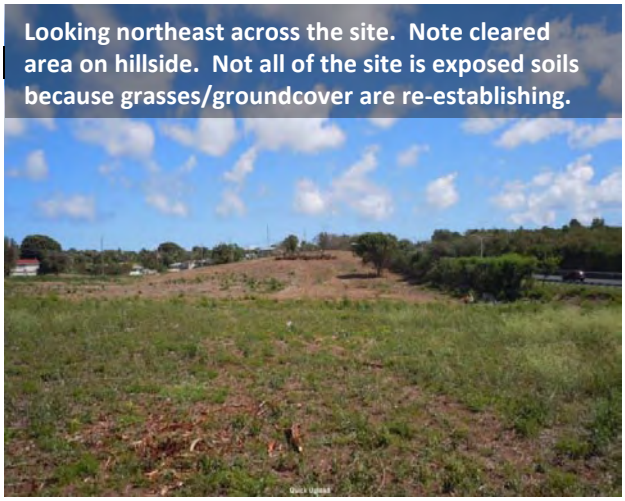
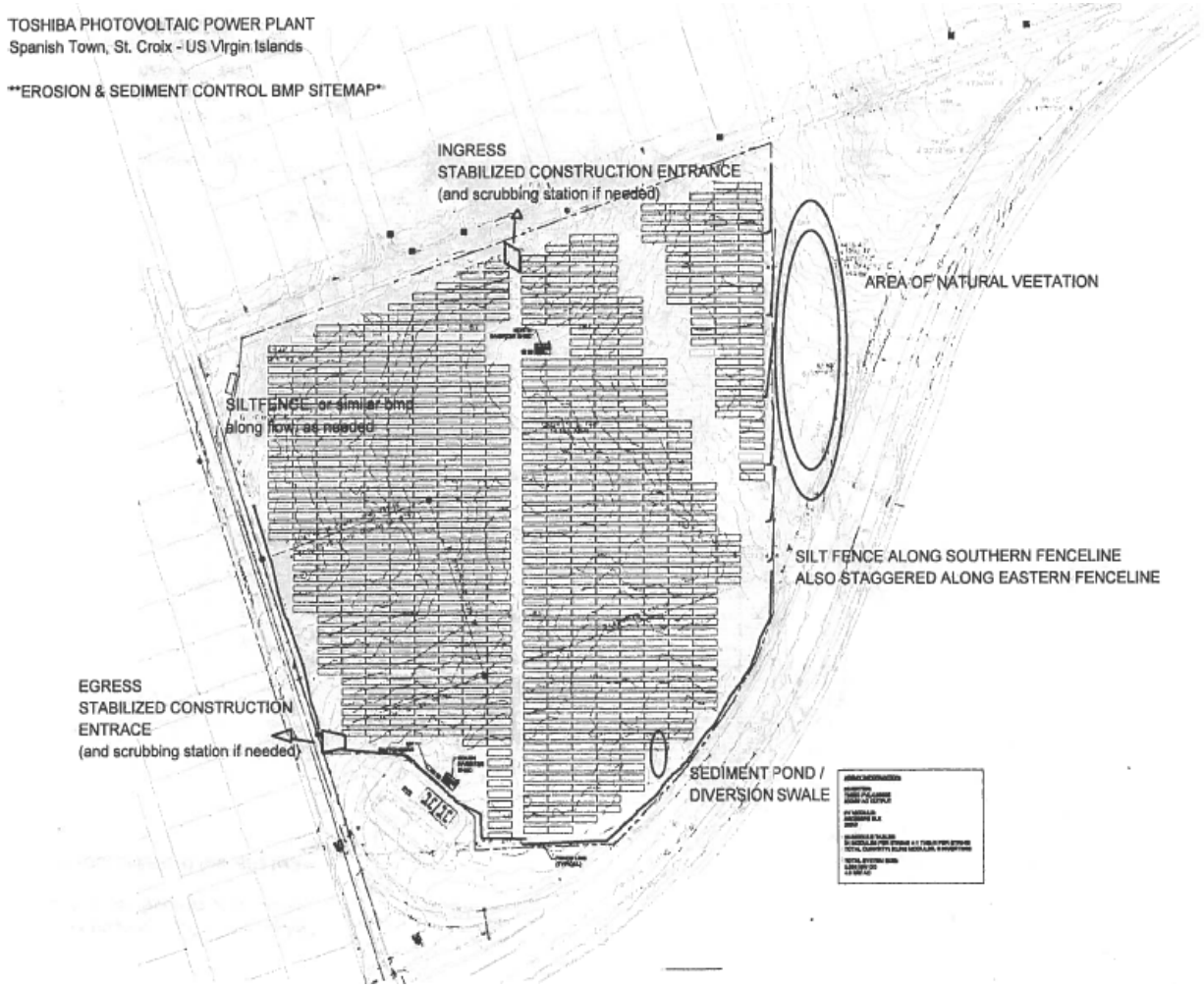


Figure 17. Example erosion control mat installation in a channel or drainage swale (*North American Green, 2002*).

Figure 5. Photos and conceptual ESC plan from the proposed Solar Array Project





Participants reviewed this conceptual ESC plan (not finalized) for the site, and came up with their own recommendations for reducing erosion and sedimentation.

Next, participants toured the completed RTPark 64 West Center facility for a first-hand look at green building features employed at one of the few LEED-certified buildings in the USVI (**Figures 6 and 7**). Mr. Orlando Santiago and Mr. Hector Rivera from Aireko managed construction of the RTPark and led the site tour. The main topics discussed included potable and non-potable water reuse, stormwater management, alternative energy systems, building materials, and structural features.

Figure 6. UVI RTPark 64 West Center provided a great opportunity to demonstrate green building features. .

Handouts

Each participant was provided a workshop folder with the ESC plan for the Substation/Solar Array project, brochures describing features and contact information for the RTPark, a green construction checklist brochure, and a DVD (with instructions) containing NOAA's Green Construction training materials. The DVD materials include modules (slideshows), videos, and field guides. Spanish versions of the checklist and DVD were also made available.

Attachment B includes a copy of the workshop flyer, packet materials (excluding the DVD), and a final participant list. IGLA provided additional information to participants on green building elements and a brochure for their residential green construction certification program.

Participation Incentives

After the training, IGLA sent eligible participants (non-government employees) an email notification for claiming one of four incentive awards listed below:

1. A 1-yr professional membership valued at $250
2. A 2-yr green leaf/family membership valued at $100
3. A residential tropical green certification voucher valued at $250
4. 2 hours of consultation services valued at $250

This includes limited technical support for projects or plans you have, a listing on IGLA's website (www.iglavi.org), a link to IGLA's email list serve with interesting and informative ideas and upcoming events, and access to experts.

Figure 7. Green Building Features Discussed during Tours of the UVI RTPark 64 West Center facility March 18 - 19.


Operation of the cooling tower and other components of the air conditioning system.


Installation and permitting issues associated with the wind turbine and rooftop PV system.


Cistern collection and filtering of rooftop runoff for domestic uses (e.g., toilets).


Building steel framing structure, building orientation, and the wastewater pumping system.


Stormwater management system design, installation, and rainwater reuse for landscape irrigation.


Impact resistant, glazed windows and impervious cover reduction of walkway.

March 19th Agency Seminar

This full-day seminar was the first held in the new conference room at the UVI RTPark. It was hosted and coordinated by DPNR Building Permits in collaboration with Horsley Witten (HW), NOAA, and IGLA. The audience for this workshop was territorial agency staff involved in funding, review, inspection, or implementation of development or redevelopment projects in the USVI. Over 40 individuals, including instructors, participated in the training, which included classroom lecture, group activities, a panel discussion, and a site tour (**Figures 8 and 9**). DPNR Building Permits, Coastal Zone Management, Environmental Protection, State Historic Preservation, and Fish and Wildlife staff were present, as well as representatives from the VI WMA, Energy Office, the VI Housing Finance Authority (VIHFA), and NOAA.

Morning Sessions

The morning agenda included a welcome and introduction by Mr. Bevan Smith, Director of Building Permits, Mr. Karl Knight, Director of the VI Energy Office, and Ms. Denise Kurg, Deputy Director of the RTPark. Mr. Doug White gave a presentation on what constitutes "green building" in the USVI and described IGLA's Green Certification Checklist. Discussions after his presentation included commentary that the Energy Office worked on the energy code for VI along with Puerto Rico and Pacific Islands, but it stayed in draft due in part to push back from industry. This discussion was followed by a tour of the RTPark facility, led by Mr. Orlando Santiago (Aireko) and Mr. Greg Miller (BGM Engineers and Surveyors). Mr. Dave Zumwalt, Director of the RTPark kicked off the tour by announcing that the 64West Center was awarded LEED-Silver certification. Some participants had gone through the tour the day before, so additional information was provided related to materials, interior design, and reduced water and energy consumption.

Figure 8. Mr. Bevan Smith, Jr. reminds everyone why green building is an important part of USVI's future and the role agencies play in advancing safe and effective implementation.

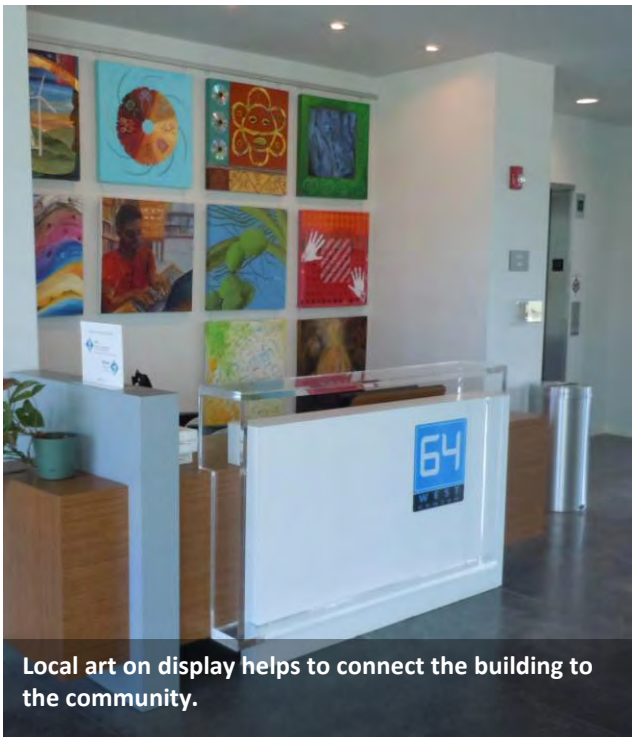
Figure 9. Additional site features toured during the Agency training.

The recycled glass used for sink counter tops in bathrooms as well as recycled cardboard stall partitions illustrate some of the material reuse principals of green design.

Participants took a look at the electrical room where building systems operations can be monitored.

The amount of natural lighting in the building increases the quality of the work environment.

Rainwater harvesting of rooftop runoff to supply water for toilets.



Local art on display helps to connect the building to the community.

Participants were asked to: 1) identify which features they thought were the most innovative or would be easily applied at other project sites, and 2) what code or permitting requirements need to be kept in mind to make the application successful. During the report out after the tour, the following features were commented on:

- The catchment in patio for collecting and conveying stormwater runoff from building and patio area to rain tanks in the front. Stormwater sizing for the RTPark was based on Virginia (or another eastern state's standards) to meet LEED requirements because the USVI doesn't have its own standards at this time (working on it). A question was raised as to whether or not enough rainfall data exists to conduct proper precipitation frequency analyses, however, HW just completed a rainfall frequency analysis using NWS data from all three islands and will be sharing the analysis soon.

- The vegetated swale –stormwater conveyance/management should be like that in all projects.

- A number of folks commented that the office space was their favorite part—allowing so much natural light into the building improved the quality of the working environment, which is a problem in the concrete, cold, windowless boxes of most government offices.

- Use of vegetation growing around walls and the type of windows that lead to cooling of building.

- The A/C system –it is important to make sure the pipes are correct material because the system already shows signs of rusting/corrosion. Thinks this type of system should be standard for commercial buildings.

Afternoon Sessions

After the site tour and lunch, the afternoon included a session on permitting of electrical systems by Mr. Lenny Farrante that included photos of a number issues association with solar installations. Dr. Nadine Noorhasan from VIWMA gave a presentation on permitting requirements for proper disposal of construction waste and made suggestions for minimizing waste including:

- Starting a Resource Depot on St. Croix similar to IGLA's on St. John or the for-profit center operating on St. Thomas.

- Establishing a VIWMA-administered database for builders that tracks used building materials that can be salvaged by other builders (like a Craig's list to network the building community).

- Active promotion of alternative uses/donation of common construction waste material (e.g., concrete, shingles, and appliances).

A short stormwater quiz using photos from local projects was used by NOAA and HW to touch on a number of regulatory and implementation issues related to temporary and long-term stormwater management.

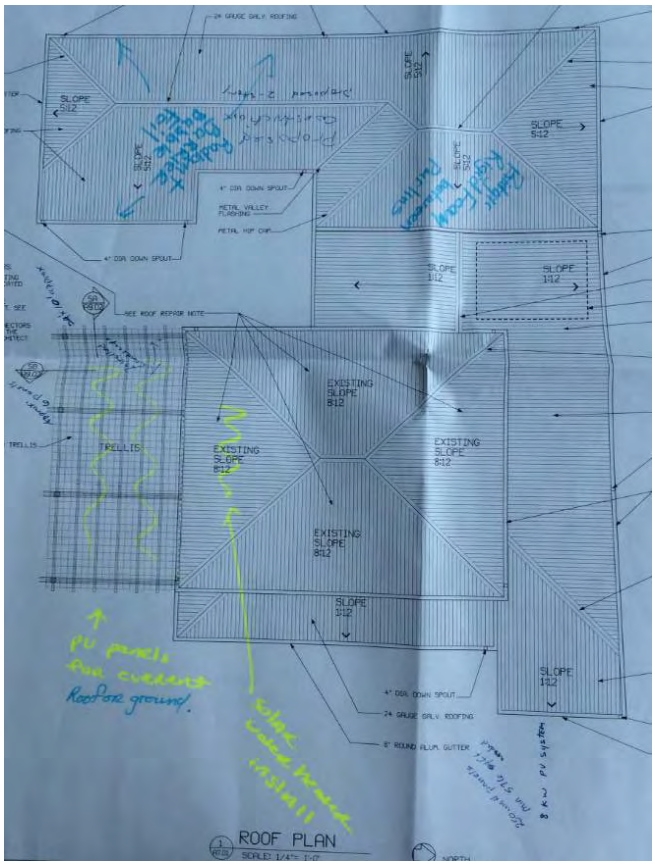
Mr. Sean Krigger, Director of the State Historic Preservation Office (SHPO), presented a renovation/ redevelopment project of a historic site on St. Thomas to be used for the SHPO office. Participants were divided into three groups to brainstorm ideas for incorporating green building practices into the project design (**Figure 10**).

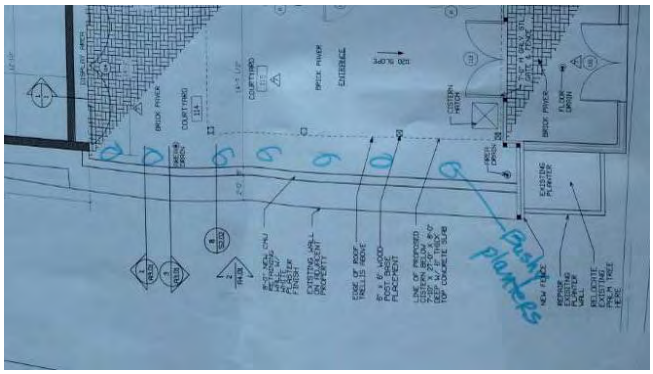
Table 2 summarizes the ideas from the SHPO brainstorming session. Each group was provided a 24x36 plan set of the existing conditions and proposed demolition plan, proposed roof plan, and proposed floor plan. In the interest of time, groups were asked to focus their discussion on one of three areas: Energy, Water, and Materials.

Table 2. Group Brainstorm on Options for Incorporating Green Features in VISHPO Project

Group	Suggestions
Energy Group	• Trellis could be used for maybe 6 solar panels, but there are a lot of trees around this area so probably not the best space for panels. However, the new construction with a flat roof should have solar panels. Should install a solar water heater. • Should insulate roof. • Plant foliage in planters along the road side of the building to keep it cooler and plant in planters and gardens in other parts of site where possible. • Use insulated concrete forms for construction rather than standard concrete construction.
Water:	• If they can't have cistern, need to be sure there will not be a problem on-site from runoff. There could be a cistern, but need to think about siting it, making sure slope is correct, and routing for downspouts from roof to collect water. Overflow would then end up in existing stormwater drains. • Suggest that trellis be porous paved or have catchment basin below to use water for irrigation. • There's a lot of roof so could just collect rainwater from part of it and send rest to stormwater system in town.
Demolition and Reuse	• Have to get demolition permits from DPNR and WMA. • Mulch the trees to be removed as part of the project and use the mulch in planters or in the park next door that's actually part of property. • Reuse shutters, brick, hardware, shingles, and wood such as historic beams. o Could use beams for interior stud walls or terrace but however they're used they should be visual pieces. o Reuse of bricks on pathways and have signage explaining the significance of the red and yellow brick. o Grind and reuse existing concrete for constructing ADA-compliant ramp. Use old concrete that has been ground up to fill the old cistern before laying flooring. o The aluminum windows could be pounded out and used as a base for kitchen cabinets. o Glass from windows could be ground up and used to create a central entrance piece for the building with VISHPO logo integrated into it. o Make sure all of project uses LED lighting and takes advantage of natural light.

Figure 10. Group activity to Brainstorm" Green" ideas for VISHPO project





Panel Discussions

The last session of the day included a panel of BP, DEP, and CZM representatives who shared their thoughts on how agency staff could improve the success of green building here in the USVI (**Figure 11**). Notes from their thoughts and comments from the audience include:

- Mr. Emanuel Liburd, Earth Change—biggest difference we can make during earth change activity is too promote phased clearing and/or minimize clearing to the actual footprint needed for construction. Make sure applicants know that once an area is disturbed, they will need to keep soil on the property through management practices such as perimeter controls and stabilization techniques. For the large sites, BP must coordinate with DEP, at least in Tier II.
- Ms. Amanda Acosta-Jackson, Plan Review—for projects to meet code compliance, they only have to meet the MINIMUM (e.g., safety of life, property). The culture is the biggest problem (designers, homeowners, regulators, homeowner associations) – need to look outside envelope and see how entire property interacts with neighboring properties and within community. It has taken a long time to evolve, but we all need to think about orientation and materials and lighting, etc. This is particularly important for VIHFA and low income properties. We need to change the trend. Builders and designers are key assets and can help educate homeowners.
- Mr. Alexis Doward, Inspector—the accepted method is to use too much material and is too costly. We need to educate the public and the building community to change their mindset (i.e., wood houses are fine). Dealing with homeowners during construction is very difficult – contractor's job is to get the most money out of the homeowner while doing the least amount of work while DPNR's job is to protect the homeowner (who pays DPNR employee salaries as VI taxpayers). When we give advice, LISTEN to us!!!
- Ben Keularts, TPDES program—for sites that are >1 acre disturbance, there is overlap between Tiers I and II. The fines are higher under the Clean Water Act and more details are required for stormwater pollution prevention plans. Can let people decide what alternatives to use for stormwater controls as long as they seem feasible for here in Territory. We defer to approved standards from other states for post-construction stormwater management. Updating of the handbook for VI-specific BMPs and rainfalls will be helpful.
- Mr. Ellerton Maynard, Floodplains—1993 floodplain management began to change in response to FEMA changes. Construction on grade in floodable areas had to stop.
- Ms. Carmelita Benta, Energy efficiency—the International Energy Conservation Code (IECC) doesn't deal with solar panels, windmills, or other energy producing projects. Does address lighting, heating, fans (including exhaust fans), conditional space for building envelope, thermal resistivity. Need to educate designers and builders to get them in compliance with code. Started with hand-holding to get them to comply, now trying to move them to more complicated implementation (e.g., quality of life) not just default values and meeting minimum requirements. Looking forward, want them to think about new technologies and think long-term about costs.

- Mr. JP Oriol, Coastal Management—education materials are key. We need to think about islands as systems of intertwining parts. It's not just this site, it's what is uphill and downhill (flooded housing community or coral reefs). Designers need to talk to their clients about how to have their views, native landscaping, and water quality. Regulators aren't "nay sayers;" we have a lot of information and can save them!! We are the last line of defense!

  Also, kudos to Building Permits for the good article in the paper on Monday. We don't always get good press, so when we do, woop woop!

Figure 11. Panelists from Building Permits, CZM, and DEP discussed their role in permitting and recommendations for improving success of green building projects in the USVI.

Comments and discussion points following the panelist presentations included:

- DPNR could insist that homeowners/applicants sit through permitting presentation when they come to DPNR as a requirement to get an introduction to greener options even if they come in with plans.
- Comment that cultural obstacles are hurting Territory.
- Suggest doing a DPNR annual fair with all the divisions maybe two weekends out of the year so DPNR staff would be available to people.
- Housing and Financing Authority suggested that agencies partner and that DPNR be part of the housing expo because there are workshops and DPNR could give some of the sessions. She wants them to partner and leverage resources and actually to assist in organizing the event. Same for WMA because Diane expressed interest in being invited and Adrienne noted that DPNR and WMA always participate with booths, but she wants them to be partners. Housing is always working to change the mindset so need to work together to teach people about options. This year the theme is about going green so it's perfect timing.

- The housing expo would be a good opportunity to start getting more information to homeowners about waste management.

- The same workshop agenda as we had today for designers, architects and draftsmen and get them to come and participate.

- The Territory needs to get rid of the two-tiered system.

- The implementation of energy code and housing design program in Territory should consider green incentives. Formalize partnership to continue what we're doing and get the word out before people start building. Suggested using regular nonpoint source steering committee meetings to bring agencies together and continue discussions about partnerships. Also suggested that we work to find a way to reach owners/designers/builders BEFORE they spend money on a refined plan.

Handouts

Each participant was provided a workshop folder with the agenda, participants list, brochures describing features and contact information for the RTPark, IGLA brochure on green building elements and a brochure for their residential green construction certification program, and a DVD (with instructions) containing NOAA's Green Construction training materials. The DVD materials include modules (slideshows), videos, and field guides.

Attachment C includes a copy of the workshop flyer, packet materials (excluding the DVD), and a final contact list.

Next Steps

The next step in this program series includes:

- IGLA to follow up with participant incentives and report back to Anne on final numbers so she can include in final report.
- DPNR BP to follow up with Substation and Solar Array site.
- RTPark to install replacement membranes and finalize net metering permits.
- NOAA, DPNR, IGLA, and HW to move forward with final set of trainings on St. Thomas, most likely to be held in early June.
- HW to post materials from this workshop on program registration website and send announcement to participants that materials and workshop summary are available.

Comments and recommendations made during these workshops and in the evaluation forms will be used to design the next set of trainings in St. Thomas, and to inform recommendations for NOAA turning over Our Islands Our Future training materials to DPNR for continuation of the program.

Attachment A:

Evaluation Form Summaries
Sign-in Sheets

St. Croix Green Building Training
Tuesday March 18, 2014
EVALUATION FORM SUMMMARY

1. Please check the workshop you attended:

- ✓ Tuesday, March 18, 2014 ***(n=15)***

2. Rate your agreement with the following statements. Circle your response.

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree, NA = does not apply.

	1	2	3	4	5	N/A	***AVG. SCORE***
I understand the basic principles of green building.			*1*	*8*	*6*		***4.3***
I am likely to review the information on the educational CD provided.				*5*	*10*		***4.7***
I would be interested in attending additional seminars on green building.				*3*	*12*		***4.8***
I am likely to join IGLA or use some of their servic other resources.			*3*	*7*	*4*	*1*	***3.1***

3. Did this workshop meet your expectations? ✓ Yes ○ No

100% (N=15)

4. Which part of the workshop did you consider <u>most</u> beneficial?

- *The discussion of rainwater management*
- *All aspects that were covered today*
- *Sediment control*
- *Analysis of the RTPark building and landscape*
- *The visit to the site [unspecified] (2)*
- *Access to actual green construction sites*
- *Learning more about stormwater control on job/construction sites*
- *On job site view are excellent [?]*
- *Field section*
- *Splitting up into teams to at WAPA/Solar panel field and finding best solution to contain the water (2)*
- *UVI RTPark tour*
- *The various water quality techniques explored at site visit*

5. Which part of the workshop did you consider <u>least</u> beneficial?

- *None/ N/A (4)*
- *Nothing, everything to me was very beneficial from beginning to end*
- *All good*

- *Forgot my wide-brimmed hat*
- *Taxi rides*
- *The RTPark was a little difficult to pull detailed information*

6. Overall rating of the entire workshop:

1 Poor	2	3 Good	4	5 Excellent	***AVG. SCORE***
			7	*8*	***4.5***

7. What suggestion do you have to improve the use of green building practices on St. Croix?

- *Increased awareness, more incentives, for good practices and accountability for poor practices*
- *Address water runoff from walls*
- *Needs to be required by DPNR*
- *Reach out to government agencies, private companies, and small businesses and provide guidance when these entities begin new projects*
- *Email updates and regular (quarterly) seminars. 4-hour blocks work well for private contractors.*
- *In high priority watersheds*
- *Some basic do's and don'ts or tips type of information might be a little helpful*
- *Education!! Let's mainstream the green!*
- *Offer incentives for green design and construction*
- *Use more recycled material from finish projects, etc*

Other Comments

- *Great program*
- *Thank you very much for this very informative seminar*
- *None*
- *Thanks for all your efforts*
- *Anne was a very good instructor along with the other lady from Puerto Rico; just overall everything was beautiful*

St. Croix Green Building Training
Wednesday March 19, 2014
EVALUATION FORM SUMMARY

1. Please check the workshop you attended:

✓ Wednesday, March 19, 2014 ***(n=20; includes 3 that were checked for both days)***

2. Rate your agreement with the following statements. Circle your response.

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree, NA = does not apply.

	1	2	3	4	5	N/A	***AVG. SCORE***
I understand the basic principles of green building.	*2*	*2*		*3*	*13*		***4.2***
I am likely to review the information on the educational CD provided.	*3*	*1*		*2*	*14*		***4.2***
I would be interested in attending additional seminars on green building.	*3*	*1*	*2*	*2*	*12*		***4.0***
I am likely to join IGLA or use some of their servic other resources.	*2*	*2*	*5*	*4*	*7*		***3.8***

3. Did this workshop meet your expectations? ✓ Yes ○No

100% (N=20)

4. Which part of the workshop did you consider <u>most</u> beneficial?

- *Landscaping*
- *Resource packet and attendant contact information*
- *Everything was beneficial and truly interesting*
- *[seeing examples of] green building in the USVI*
- *Site visit/tour through RTPark (repeated 4 times)*
- *Panelists information (2)*
- *The pictures and the quiz questions*
- *Runoff management*
- *Class project [the group activity with SHPO]*
- *Presentation by Doug White and participation of all present*
- *Visual aids and tour of facility showing what presenters were talking about*
- *Discussions (2)*
- *All parts (2)*

5. Which part of the workshop did you consider <u>least</u> beneficial?

- *n/a, none, all beneficial (8)*
- *Tour*
- *lunch*

6. Overall rating of the entire workshop:

1 Poor	2	3 Good	4	5 Excellent	***AVG. SCORE***
		1	*8*	*11*	***4.5***

7. What suggestion do you have to improve the use of green building practices on St. Croix?

- [*Have trainings?] twice a year*
- *Online resources for potential builders and more workshops*
- *More training*
- *Should we have the opportunity to continue the program, the next step would be to integrate agency personnel with the professionals-architect, engineers, HE operators*
- *Education and outreach to public (4)*
- *Incentives*
- *Cover cost of green buildings*
- *Educate the public and school children in jr high and high school—that way they are introduced to green construction before they become adults and set in the old ways*
- *Saturday tours of the RTPark facility*
- *Possible alternative site visits next time*
- *Remake the VI Code*

Other Comments

- *Comprehensive and thorough*
- *We should have done introductions not just by agency, but by department*
- *I really was impressed with the organization and contents of this session*
- *Great job/keep up the good work (3)*
- *Thank you Anne*

Sign In Sheet

March 18, 2014 Green Construction

Last Name	First name	Company	Signature	Day Phone	Email
Adams	Shantell	Virgin Islands Port Authority		340-513-1403	SAdams@viport.com
Albany Nicholas	Tawana	VI Waste Management Authority		340-692-0505	talbany@viwma.org
Amanda	Jackson-Acosta	DPNR		340-773-1082	amanda.jackson@dpnr.vi.gov
Beamer	Kenneth	UVI		3406924034	kenneth.beamer@live.uvi.edu
Benta	Carmelita	Department of Planning and Natural Resources		340-773-1082	carmelita.benta@dpnr.vi.gov
Buckney-Small	Jonathan	DPNR		3407731082	jonathan.small@dpnr.vi.gov
Carl Neb Ka Ra	Christopher	Per Ankh, Inc		340 643 6273	nebasarra@gmail.com
Carrasco	Bienvenido	Milagro's Construction		340-643-3860	soniarosa15@yahoo.com
Carrubba	Lisamarie	NOAA Fisheries Service		787-851-3700	lisamarie.carrubba@noaa.gov
Dickenson	Courtney	DPNR-DEP		340-773-1082	courtney.dickenson@dpnr.vi.gov
Doward	Alexis	DPNR	HERE	3402770470	l.e.excorp@gmail.com
Emmline	Simmonds	V.I. Waste Management Authority		340-712-4985	esimmonds@viwma.org
Farchette III	John	DPNR		718-3367	john.farchette@dpnr.vi.gov
Frett	Kai	Energy Doctor LLC		340-998-2960	energydoctorusvi@yahoo.com
Geiger	Thomas	UVI-AES		5632493291	thomas.geiger@uvi.edu
Herishetapaheru	Neb Ka Ra	Natural Builders and Quality Developers. LLC			nbkara@gmail.com
Hibbert	Marlon	NOAA		340-718-1238	marlon.hibbert@noaa.gov
Hilgemann	Louis	Iowa State University			louish@iastate.edu
Hodge	Harold	Hodge Heavy Equipment and Trucking Service, Inc.		772-4527	hodgeheavyequip@gmail.com
Hodge	Nathaniel	Hodge Heavy Equipment and Trucking Service, Inc.		643-7787	nathaniel_hodge@yahoo.com
Kitchell	Anne	Horsley Witten Group		508-833-6600	akitchell@horsleywitten.com
Liburd	Emaunel	DPNR		340-773-1082	emaunel.liburd@dpnr.vi.gov
Maynard	Ellerton	DPNR		340-773-1082	ellerton.maynard@dpnr.vi.gov
Murphy	Kevin	Christiansted Port Terminal Corp.		340-277-1026	captain.kevinmurphy@yahoo.com
Parrilla	Jayson	VI Waste Management Authority		9542436596	jparrilla@viwma.org

				SIGNATURE		
3	**Pelle**	Devon	Sustainable Systems and Design Intenational	D. Pelle	340 244 7957	pelle.devon@hotmail.com
	Pemberton	Elvis	VI Waste Management Authority		2394439209	epemberton@viwma.org
	Santiago-Rios	Julio	Dept. of Planning and Natural Resources		3407721955	julio.santiago.rios@vi.gov
	Spaulding	Kenneth	Steven Hutchins Architects		340-778-8898	kspaulding@seharchitects.com
2	**Starr**	Rick			690-6671	Rkstarr@gmail.com
	Walcott-Rivera	Diane	VI Waste Management Authority	Diane Water. R.	340-712-4962	drivera@viwma.org
	Williams	Laurie	VI Waste Management Authority		340 690 4216 9	lwilliams@viwma.org
1	HAYNES	RAFAEL	Self	Rafael Haynes	340-277-0951	DILANMAN@AOL.COM
	PHILLIP	RON	~~RON PHILLIP~~ VI WASTE MGT	Ronald Phillip	340-277-9920	RPHILLIP@HOTMAIL.COM
	SMITH JR.	BEVAN	DPNR - PERMITS	SIGN		
	EMMANUEL	LAURA	DPNR - PERMITS			
	DEVINE	BARRY		HERE		
	BASS	IAN	J. Benton Construction			
	Santiago	Orlando	Aireko			
	Rivera-Russe	Hector	Aireko			

Sign In Sheet
March 19, Green Construction

Last Name	First	Agency	Signature	$10 Lunch	Paid
Albany Nicholas	Tawana	VI Waste Management Authority		No Thanks	
Alleyne	Derrick	VI Waste Management Authority		No Thanks	
Brown	Harold	Virgin Islands Energy Office		No Thanks	
Carrubba	Lisamarie	NOAA Fisheries Service		Yes, Vegetarian	☑ need pd
Cintron	Laila	DPNR		Yes	☐
Diana	Joshua	DPNR		Yes, Vegetarian	☐
Doward	Alexis	DPNR		No Thanks	
Farchette III	John	DPNR		Yes	☐
Farrante	Lenny	DPNR	HERE	Yes	☐
Frett	Kai	Office of the Lt. Governor		Yes, Vegetarian	☐
Green	John	Virgin Islands Housing Finance Authority		Yes	☐
Grum	James	VI Waste Management Authority		Yes, Vegetarian	☐
Hibbert	Marlon	NOAA		other	
Jackson-Acosta	Amanda	DPNR		Yes	☐
Joseph	Carl	Virgin Islands Energy Office		Yes, Vegetarian	☐
Keularts	Benjamin	DPNR		No Thanks	
Kitchell	Anne	Horsley Witten Group		Yes, Vegetarian	☐
Knight	Karl	Virgin Islands Energy Office		No Thanks	
Krigger	Sean L.	VI State Historic Preservation Office		Yes, Vegetarian	☐
Liburd	Emanuel	DPNR		Yes	☐
Lord	Patricia	Virgin Islands Energy Office		No Thanks	
Maynard	Ellerton	DPNR		Yes, Vegetarian	☐
Moreau	Michael	Virgin Islands Housing Finance Authority		Yes	☐
Nibbs	Anita	DPNR			
Noorhasan	Nadine	VI Waste Management Authority		No Thanks	

Oriol	JP	DPNR		No Thanks	
Parrilla	Jayson	VI Waste Management Authority		No Thanks	
Pemberton	Elvis	VI Waste Management Authority		No Thanks	
Peter	Vanessa	DPNR		Yes	☐
Richards	Gregory	DPNR			
Sanders	Theresa	Virgin Islands Energy Office		Yes	☐
Santiago-Rios	Julio	Dept. of Planning and Natural Resources		Yes	☑ veal pd
Smith Jr.	Bevan	DPNR		Yes, Vegetarian	☒ veal pd
Vanterpool	Terry	VI State Historic Preservation Office		Yes	☒ veal pd
White	Doug	Island Green Living Association		Yes, Vegetarian	☐
Williams	Laurie	VI Waste Management Authority		Yes	☐
Williams	Adrienne	Virgin Islands Housing Finance Authority		Yes	☐
Williams	Nevlin	DPNR		No Thanks	
Wooden	Eric	DPNR		Yes	☐
Walcott-Rivera	Diane	V.I. Waste Management			
Phillips	Ron	VI Waste Management Aut.			
Grey Miller		BGM Engineers+Surv			
Lia Ortiz	NOAA	NOAA Fisheries			
Boral R	VIHFA	VI Housing Finance Auth			
Lozette Walker	VIEO	VI Energy Office			
Carmelita	Benta	DPNR Permits			
Buckway-Small	Jonathan	DPNR			
Kurg	Denise	RT Park			
Zumwalt	David	RT Park			
Santiago	Orlando	RT Park / Aireko.			

Attachment B:

Builders Training Materials

Flyer
Digital Workshop Packet Materials
Final Participants List

USVI Green Construction Field Training

Tuesday, March 18, 2014

University of Virgin Islands, St. Croix
RTPark/64 West Center

WHAT? Get a jump on your competition by expanding your knowledge of green building techniques. What are the costs and benefits associated with going "green" for new construction and redevelopment projects? Join us in the field to discuss common design and implementation issues related to alternative energy, wastewater systems, and stormwater management.

WHEN? Tuesday, March 18, 2014. Sign in and coffee start at 8:00. The workshop wraps up around noon.

WHERE? Start at UVI's RTPark and then visit one or more field sites. We will be outside for the entire workshop, so bring water. ***Wear clothing and safety equipment appropriate for construction sites including hard hats, boots, and vests.***

WHO SHOULD ATTEND? Contractors, equipment operators, landscapers, and other building professionals.

WHAT'S THE COST? This half-day workshop is **FREE.** Attendees will receive a participation reward from the Island Green Living Association (IGLA), a minimum $100 value!

Preliminary Agenda at a Glance

8:30-9:00 **Sign in and Introduction to Green Building Workshop**

9:00- 10:00 **Green Design features of the RTPark/64 West Center**
Wondering what this building is all about? Take a closer look at the alternative energy, wastewater, and stormwater technologies that make this facility one of the first LEED buildings in the USVI. Talk with the contractors who installed these features about construction lessons learned.

10:00-11:30 -Field Site Visits
Tour one or more sites with contractors, operators, and regulators to evaluate "green" design features, installation and permitting considerations, and earth change requirements Learn about the Island Green Living Association's Green Construction Certification Program and how it can work for you.

12:00 **Return to UVI**

HOW DO I REGISTER? Space is limited, first come first serve. Register before **March 7** by going online www.horsleywitten.com/greenconstructiontraining/ or by contacting Erin Cabral directly at 508-833-6600 or ecabral@horsleywitten.com.

For more information on local green building programs and resources in the USVI, go to the Island Green Living Association website at www.iglavi.org.

Sponsored by the NOAA Coral Reef Conservation Program and the USVI Department of Planning & Natural Resources.



Construcción Verde en Islas Vírgenes Estadounidenses Entrenamiento en el Campo

martes, 18 de marzo del 2014

Universidad de las Islas Vírgenes, Santa Cruz
RTPark/64 West Center

¿QUÉ? Mejora la competitividad de su negocio expandiendo sus conocimientos sobre las prácticas de construcción verde. ¿Cuáles son los costos y beneficios asociados al uso de técnicas "verde" para proyectos de construcción nuevos y proyectos de redesarrollo? Acompañemos al campo para discutir temas relacionados al diseño e implementación de energía alterna, sistemas de aguas usadas y manejo de las aguas pluviales.

¿CUANDO? El martes, 18 de marzo del 2014. La inscripción y el café comenzaran a las 08:00am. El taller concluirá alrededor del mediodía.

¿DONDE? Comience en el RTPark de la Universidad de las Islas Vírgenes y luego visite uno o más proyectos. Vamos a estar afuera durante todo el taller, así que traiga agua. Utilice ropa y equipo de seguridad adecuado para los sitios de construcción.

¿QUIEN DEBE ASISTIR? Contratistas, operadores de equipos pesados, paisajistas y otros involucrados en construcción y desarrollo de los proyectos.

¿CUAL ES EL COSTO? Este taller es de medio día y es **libre de costo.** Los asistentes recibirán un premio por su participación de parte de Island Green Living Association (IGLA) ¡con un valor mínimo de $100!

Agenda Preliminar

8:30-9:00	**Registración y Introducción al Taller sobre la Construcción Verde**
9:00-10:00	**Las Características del Diseño del RTPark/64 *West Center*** *Se pregunta de qué se trata este edificio? Eche un vistazo más de cerca de las tecnologías alternas de energía, aguas residuales y aguas pluviales que hacen que estas facilidades sea uno de los primeros edificios LEED en las Islas Vírgenes. Hable con los contratistas que instalaron estos sistemas sobre sus experiencias durante la construcción.*
10:00 -11:30	**Visitas al Campo** *Visita uno o mas proyectos con los contratistas, operadores y reguladores para evaluar los componentes del diseño "verde", su instalación y consideraciones relacionados a los permisos y los reglamentos relacionados al movimiento de terreno. Aprende sobre el Programa de Certificación de Construcción Verde de la Asociación Isleña para Vivir Verde.*
12:00	**Regreso a la Universidad**

¿COMO REGISTRAR? El espacio está limitado. Regístrese en línea antes del **7 de marze** al siguiente página de web: www.horsleywitten.com/greenconstructiontraining/ o contacte a Erin Cabral directamente al 508-833-6600 o por email a ecabral@horsleywitten.com.

Para más información sobre programas locales de construcción verde y recursos en las Islas Vírgenes Estadounidenses, diríjase a la página de web de Island Green Living Association en www.iglavi.org.

Patrocinado por el Programa para la Conservación de Arrecifes de Coral de la NOAA y el Departamento de Planificación y Recursos Naturales de las Islas Vírgenes.

Green Building Training, St. Croix

Tuesday March 18, 2014
UVI RTPark, 64 West Center

Attendee List

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CZM
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Green Building Training, St. Croix

Tuesday March 18, 2014
UVI RTPark, 64 West Center

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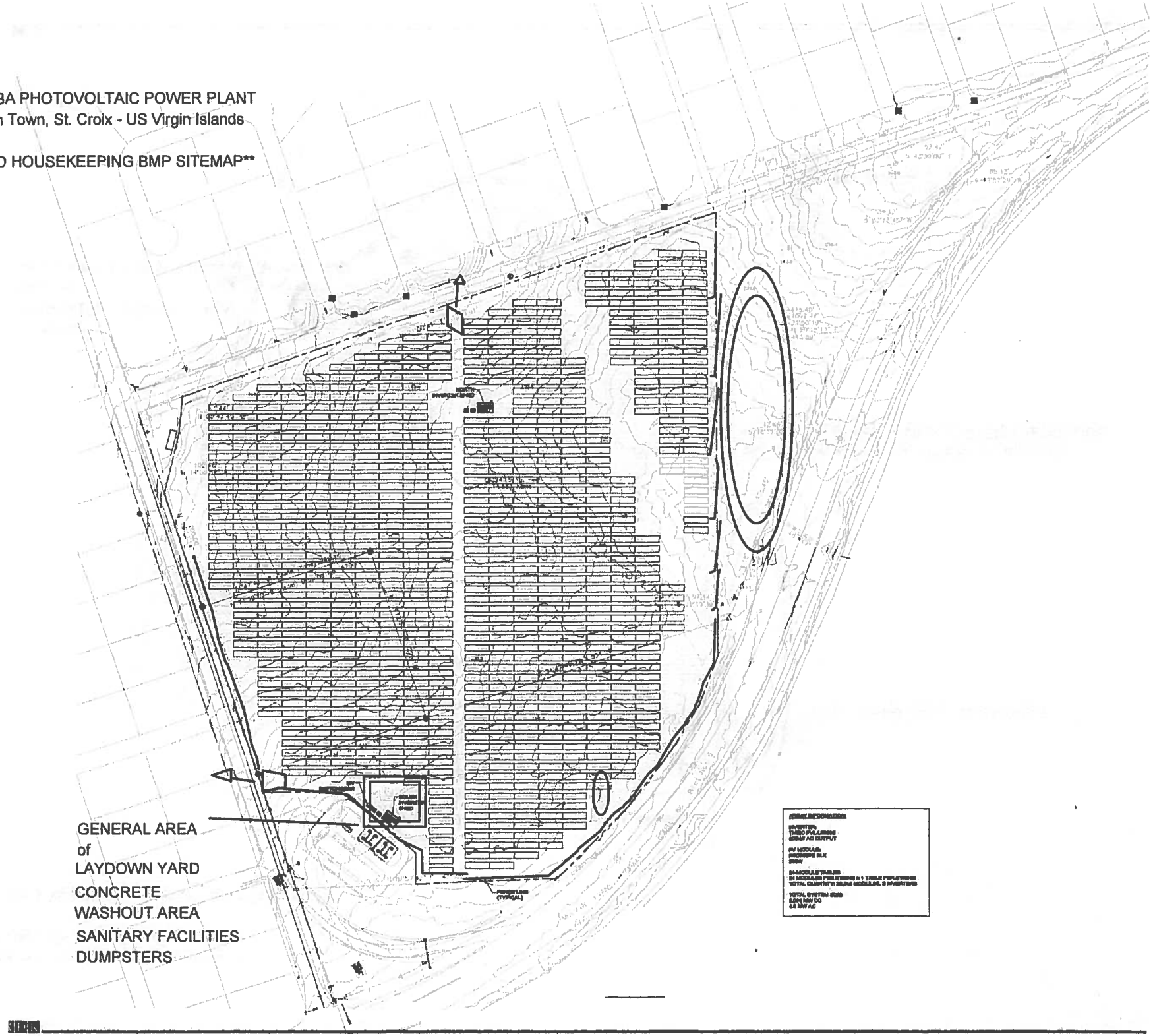
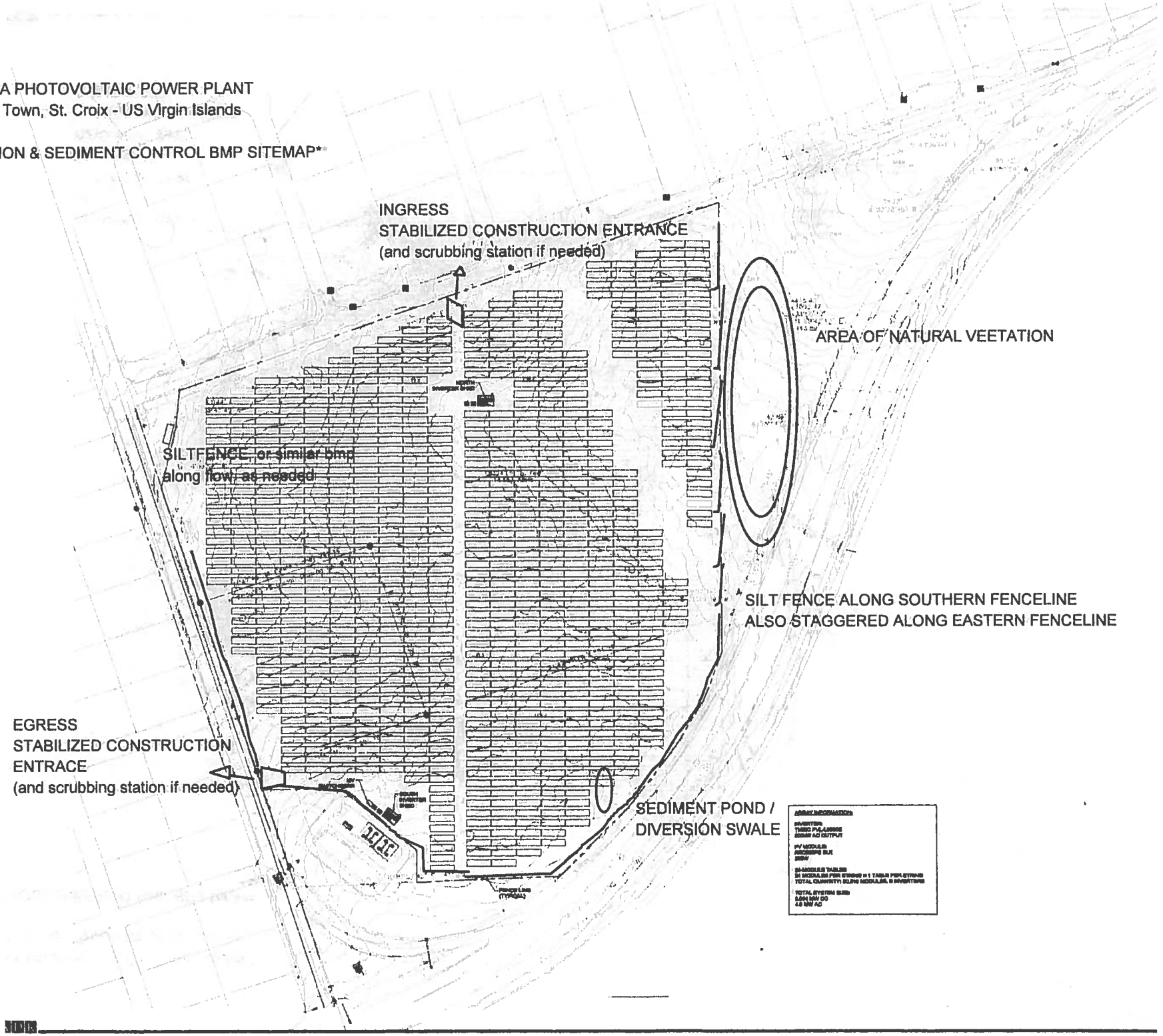
TOSHIBA PHOTOVOLTAIC POWER PLANT
Spanish Town, St. Croix - US Virgin Islands

GOOD HOUSEKEEPING BMP SITEMAP



TOSHIBA PHOTOVOLTAIC POWER PLANT
Spanish Town, St. Croix - US Virgin Islands

**EROSION & SEDIMENT CONTROL BMP SITEMAP*



OVERVIEW

Through state-of-the-art facilities and practices that promote a healthier and cleaner environment, RTPark has taken the initiative to deliver on the promise of sustainable design in the USVI. From optimized environmental and energy performance to site sustainability, and through the use of renewables, the 64 West Center serves RTPark's mission while demonstrating the inherent and increasingly practical value of "green" buildings in the USVI.

LEED, which stands for Leadership in Energy and Environmental Design, is an internationally-recognized green building program overseen by the US Green Building Council (www.usgbc.com/leed). LEED-certified buildings are designed to lower operating costs, reduce waste, conserve energy and water, and be healthier for occupants. The 64 West Center building has been designed to exceed the requirements for LEED certification for new construction projects.

64 West Center employs sustainable design in a number of ways:

- Light exterior color is designed to reflect daylight radiant heat
- North-south orientation of the building's long wing minimizes southerly exposure
- Storm water and rainwater management systems reduce facility water demands
- Permeable pavements, vegetated conveyance swales, bio-filtration, underground detention in rain tanks, underground cistern facilities collect water
- Energy demands are reduced through solar water heating, natural day-lighting, and high-efficiency lighting and cooling systems
- Renewable energy sources include a roof-mounted photovoltaic (solar array) system and wind turbine, providing reduction in electricity utilized by the building

SUSTAINABLE SITES & WATER EFFICIENCY

We designed a high-efficiency underground irrigation system, amongst draught-tolerant plants and where non-potable water (rainwater and gray water) is to be provided for sewage conveyance. We reduced the Heat Island Effect by designing a permeable surface to allow for water runoff to drain naturally which encompasses some 17,720 SQFT.

Low flow toilet and urinal flush valves, low flow sink aerator, and low flow lavatory faucets are all specified. Reclaimed water system is provided via an underground rainwater capture tank. Rainwater is then pumped back into building to be used for water closets, urinals, hose bibs and cooling tower make-up water.

ENERGY AND ATMOSPHERE & INDOOR ENVIRONMENTAL QUALITY

Our optimized energy performance includes lighting controls, natural day lighting, high-efficiency lighting and cooling systems, HVAC system monitoring and enhanced commissioning. On-site renewable energy technologies are sourced to a 20Kw Wind Turbine and a 34Kw Photo Voltaic Solar Panel and Solar Water Heater which will provide a renewable savings of 37% toward energy and cost.

MATERIAL AND RESOURCES

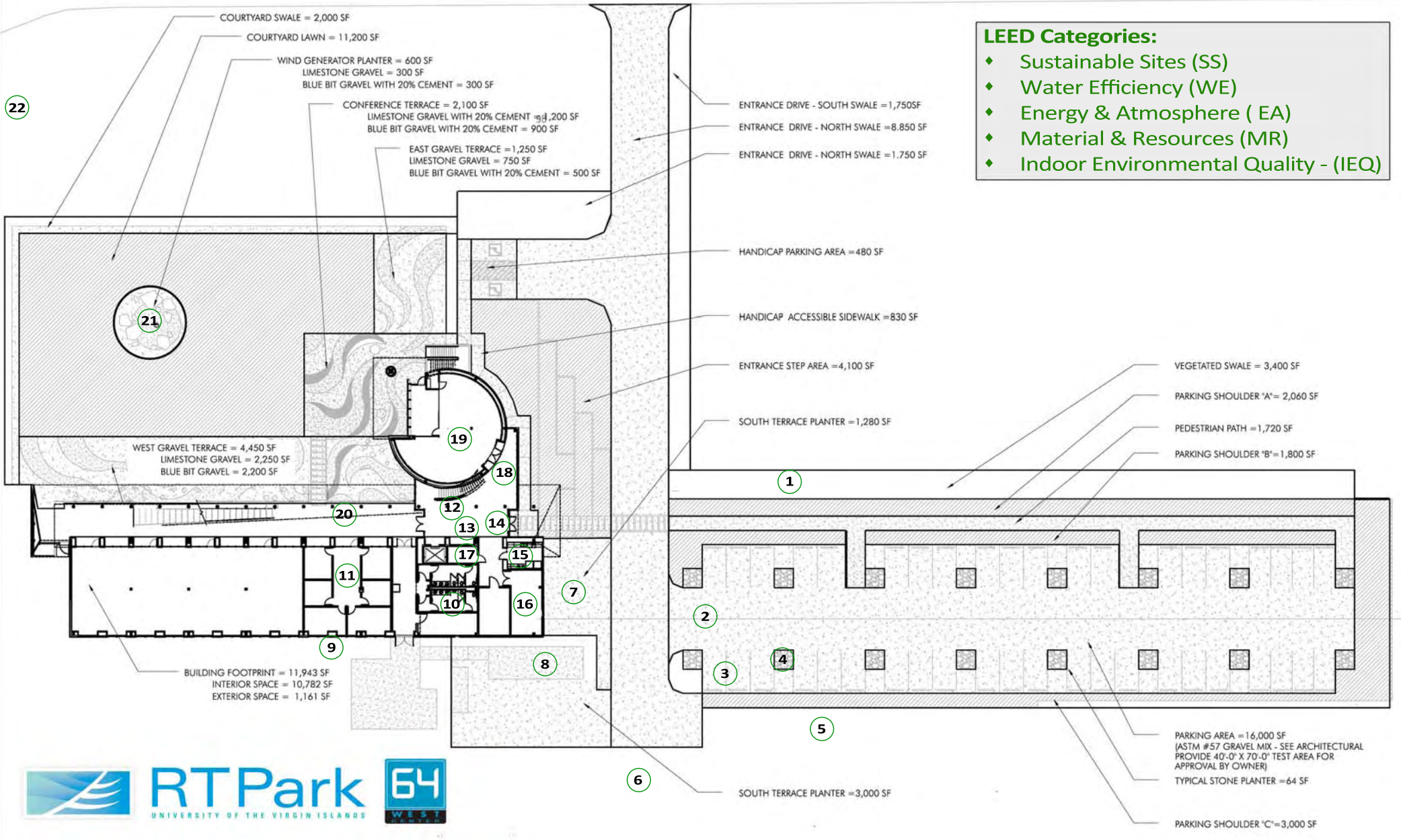
Recycled glass was incorporated in the kitchen and bathroom countertops, restroom partitions were fabricated from recycled cardboard and other components, and sustainable bamboo materials can be found in furnishings and wood finishes. Most floors are of polished concrete.

LEED certification standards also encourage the use of locally-grown and procured materials. The 64 West Center is graced with hand painted artworks by local artists, and hand crafted locally-produced concrete benches. In addition, many of the plants and trees are native and were grown by local nurseries.

Thank you for visiting 64 West Center!

"GREEN" Guided Tour

1. Raintank - WE
2. Pourous Parking Lot - SS, WE
3. LEED Parking for energy-conscious vehicles - SS
4. LED Lighting - EA
5. Stormwater Management/Bioswale - SS, WE
6. Open Space – Green Space - 87% - SS
7. Draught-tolerant Vegetation - WE
8. Mechanical Service Yard - EA
   a. Cooling Tower
   b. PV Inverter
   c. Emergency Generator
9. Glazing - EA, IEQ
   a. UV Rating
   b. Category 4 Wind Resistance
   c. Natural Lighting
   d. Cross Ventilation
10. Restrooms - WE, MR
    a. Low Flush Fixtures
    b. Recyclables
       i. Countertops
       ii. Toilet Partitions
       iii. Water
11. Executive Suites - EA, MR
    a. Occupancy Sensors
    b. Scheduled HVAC Controls
    c. Earth-friendly Furniture
    d. Natural Finished Floor
12. Locally-made Concrete Benches - MR
13. Local Artwork - MR
14. Recycling Program - Trash Bins - SS
    Separate: paper/plastic/ aluminum/trash
15. Kitchenette - EA, MR
    a. Bamboo Millwork
    b. Energy Star Appliances
16. Mechanical Systems/AC - EA, IEQ
17. Green Products - EA
    a. Weed Killer-vinegar, salt, Dawn
    b. Pest Control
    c. Cleaning Products
18. Indoor Plants - IEQ
19. Conference Room - EA, MR, IEQ
    a. Flooring - Recycled Rubber
    b. Mechanical Monitoring
       i. CO2 Levels
       ii. Humidity
    c. Recycled Doors
20. Photo-Voltaic (PV) System - EA
21. Wind Turbine - EA
22. Bus Stop - SS



LEED Categories:

- Sustainable Sites (SS)
- Water Efficiency (WE)
- Energy & Atmosphere (EA)
- Material & Resources (MR)
- Indoor Environmental Quality - (IEQ)

RT Park
UNIVERSITY OF THE VIRGIN ISLANDS
64 WEST

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How Do I Use Available Training Materials?

NOAA and other local partners have prepared educational materials that you can access to learn more about green building design and construction techniques or use to provide instruction to others. Specifically, these materials include slideshows and videos that can be used in a classroom setting, or viewed on your personal computer.

Supplemental field manuals are also provided in Spanish and English that can be used to guide hands-on learning activities.

Step 1. Verify that your computer software is compatible. These materials are currently in .ppsx format and require Microsoft Powerpoint 2007 or a more recent version. Free universal file viewers are available for download on the internet. Note that the slideshows contain embedded videos. The videos are in Quicktime (.mov file extension) and can be viewed with most media players.

Each slideshow is organized by Lessons and can be viewed at your own pace.

Step 2. Materials are divided by user category: designers, implementers (contractors, heavy equipment operators), agency personnel, and homeowners and others. Determine which interests you and select the appropriate slideshow or field manual from the DVDs provided (Spanish field guides on separate disk), or by going to NOAA's CoRIS website at http://data.nodc.noaa.gov/coris/library/NOAA/CRCP/project/20724/. Note that some of the information is the same in each set of modules while some is more detailed based on the intended audience.

Five videos are available starring local architects, native plant specialists, and government employees.

Step 3. If you are self-educating, each slideshow begins with an introduction that explains the goals and learning objectives of the material that will be presented. Go through the slideshows at your own pace.

Field manuals give instruction for hands-on activities that can be used to reinforce classroom lessons.

Step 4. If you are looking for someone to provide training, contact IGLA (http://www.iglavi.org)or Jonathan Small at DPNR CZM 302-773-1082 Ext. 2229 or jonathan.small@dpnr.vi.gov.

¿Como Puedo Utilizar los Materiales de Adiestramiento?

NOAA y otros socios locales han preparado materiales educativos que usted puede utilizar para conocer más sobre el diseño y las técnicas de construcción verde o utilizarlos para proveer instrucciones a los demás. Específicamente estos materiales incluyen presentaciones y videos que se pueden usar en un salón de clases o en su computadora personal. Manuales supleméntales para uso en el campo en inglés y español están incluidos que se pueden utilizar para guiar actividades educativas prácticas.

Paso 1. Verifique que el "software" de su computadora sea compatible. Estos materiales están actualmente en formato .ppsx y requieren Microsoft Powerpoint 2007 o una versión más reciente. Programas que permitan leer archivos de varios formatos están disponibles gratuitamente para su descarga del Internet. Note que las presentaciones contienen videos. Los videos son en "Quicktime" (extensión del archivo .mov) y se pueden ver en la mayoría de los reproductores de multimedia.

Cada presentación está organizada por lecciones y las puede mirar a su propio paso.

Paso 2. Los materiales se dividen por categorías de usuarios: diseñadores, implementadores (contratistas, operadores de equipos pesados), el personal de agencia y los dueños de viviendas y otros. Determine cual le interesa y seleccione la presentación apropiada o el manual para el uso en el campo en el DVD provisto (los manuales para el uso en el campo en español se encuentran en un disco aparte), o puede visitar la página web de NOAA CoRIS en http://data.nodc.noaa.gov/coris/library/NOAA/CRCP/project/20724/. Note que parte de la información es la misma en cada conjunto de módulos mientras que otra es más detallada en base a la audiencia deseada.

Cinco videos están disponibles protagonizados por arquitectos locales, especialistas en las plantas nativas y empleados del gobierno.

Paso 3. Si usted se está auto educando, cada presentación comienza con una introducción que explica las metas y objetivos de aprendizaje del material que será presentado. Mire las presentaciones a su propio paso.

Los manuales de campo dan instrucciones para actividades que se pueden utilizar para reforzar las lecciones en el salón de clases.

Paso 4. Si usted está buscando a alguien para que le de adiestramiento, contacte a IGLA (http://www.igbavi.org/green/) o a Jonathan Small del Departamento de Planificación y Recursos Naturales, Manejo de la Zona Costera (DPNR CZM por sus siglas en inglés) al 302-773-1082 ext. 2229 o Jonathan.small@dpnr.vi.gov.

Our Islands Our Future

GUIDE TO GREEN BUILDING in the USVI

IMPLEMENTERS
Field Guide: CHECKLIST

DESIGNERS
Field Guide: CHECKLIST

February 2013

Funded by NOAA's Coral Reef Conservation Program through NOAA Fisheries Caribbean Field Office

Developed by The FHWGroup. Content guided by a steering committee of federal and VI agencies and NGOs

WORKING GREEN CONSTRUCTION CHECKLIST

Before Grading			Notes
You have all required approved, stamped permits on site prior to beginning any mechanized work.	☐ YES	☐ NO	
You know what natural features need to be protected. You can identify protected plants and animals and know what to do if you see them on site during construction.	☐ YES	☐ NO	
You ensure the footprint of the area to be disturbed is clearly marked on site. Heavy equipment operators have done a walk-through to view limits of site disturbance and areas and vegetation to be preserved.	☐ YES	☐ NO	
You ensure silt fencing is correctly installed along perimeter.	☐ YES	☐ NO	
You have built temporary barriers around all vegetation to be preserved on the site.	☐ YES	☐ NO	
You have studied project plans and the physical characteristics of the site and made modifications to the best management practices (BMPs) to be used based on slopes and soils.	☐ YES	☐ NO	
You have studied project plans and are familiar with project phasing and the locations of temporary and permanent BMPs for ESC and stormwater management.	☐ YES	☐ NO	
You have installed all required BMPs based on the project phasing prior to commencing any mechanized work.	☐ YES	☐ NO	
You have the project team's contact numbers readily available for questions that may arise as you begin grading.	☐ YES	☐ NO	

During Construction			Notes
You have planned required excavation and other earth movement work that results in exposed soils for completion outside the rainy season. You keep heavy equipment off steep slopes during the rainy season.	☐ YES	☐ NO	
You have ensured that all ESC and stormwater BMPs are properly installed BEFORE beginning any mechanized work on-site. This includes stabilized construction entrances.	☐ YES	☐ NO	

You have created berms and swales to contain runoff from cleared areas as you begin site clearing and grading. Brush from the site can be used to create berms and boulders can be used for more permanent structures (e.g retaining walls).	☐ YES	☐ NO	
You have installed temporary diversions of existing storm drains BEFORE beginning any site clearing.	☐ YES	☐ NO	
You ensure no excavation work will begin if soils will be exposed for 14 days or more.	☐ YES	☐ NO	
If there is a construction stoppage that has already lasted 14 days, you install erosion control measures IMMEDIATELY to minimize erosion of exposed soil.	☐ YES	☐ NO	
You create serrated cut slopes if cuts are steeper than 50% behind buildings and next to driveways and roads.	☐ YES	☐ NO	
You construct benches to break slopes of more than 20 to 40 feet and route runoff to a sediment trap or stabilize outlet to minimize sediment and runoff offsite.	☐ YES	☐ NO	
You do not cross or store equipment, vehicles, or construction materials in setbacks, buffers, or green belts.	☐ YES	☐ NO	
You protect vegetation by tunneling under roots to install utilities, avoiding piling excess soil on and around roots, and building retaining walls or terraces.	☐ YES	☐ NO	
You ensure that all soil stockpiles are covered to prevent erosion of material during rains.	☐ YES	☐ NO	
When large areas need to be cleared, you run heavy equipment up and down slope to create grooves and channel runoff across the slope to minimize gully formation.	☐ YES	☐ NO	
You compact all fill material and use fill that is free of vegetative and construction debris to ensure it can be well compacted.	☐ YES	☐ NO	
You ensure all BMPs are properly maintained as part of daily construction activities and a regular maintenance schedule.	☐ YES	☐ NO	

After Construction			Notes
You complete final site stabilization, including all permanent seeding and planting and the construction of final retaining walls on cut or steep slopes.	☐ YES	☐ NO	
You remove all temporary BMPs and properly dispose of all accumulated sediments on uplands away from ghuts and other wetlands and water bodies.	☐ YES	☐ NO	

You restore the permanent stormwater drainage system, including the removal of all storm drain diversions.	☐ YES	☐ NO
You have ensured the site owner is aware of the maintenance requirements for permanent BMPs and have assisted in creating a maintenance schedule for the property if one was not included as part of project design.	☐ YES	☐ NO

GREEN DESIGN CHECKLIST

General			Notes
The home is large enough to meet the occupants' requirements, but not so big that it increases energy use for cooling and cleaning.	☐ YES	☐ NO	
Site design minimizes construction and clearing footprints and protects native vegetation.	☐ YES	☐ NO	

Green Strategies			Notes
Design integrates hurricane protection	☐ YES	☐ NO	
Structures are well-integrated in natural landscape to minimize excavation and hillside cuts and preserve views	☐ YES	☐ NO	
Native/natural vegetation greenbelt considered	☐ YES	☐ NO	
Site design preserves visual privacy	☐ YES	☐ NO	
Native and protected plants/animals are identified and a plan for their protection is implemented during site design	☐ YES	☐ NO	
Grading and phasing of construction are linked to erosion and sediment control and stormwater management to protect the environment	☐ YES	☐ NO	
Small equipment used to excavate site for project to protect the environment	☐ YES	☐ NO	
Erosion control, sediment control, and stormwater management integrated over project lifetime -from design and construction to operation and maintenance	☐ YES	☐ NO	
Stormwater drainage and erosion control designed and implemented based on site characteristics	☐ YES	☐ NO	
Driveway and parking area designed to minimize erosion from stormwater runoff	☐ YES	☐ NO	

Material Use			Notes
Recycled materials or materials with recycled content have been included	☐ YES	☐ NO	
Local materials and suppliers have been included	☐ YES	☐ NO	
Building materials and appliances are durable and low maintenance	☐ YES	☐ NO	
Sustainable lumber has been used	☐ YES	☐ NO	
Materials have been included that moderate indoor temperatures(thermal mass) and improve indoor air quality	☐ YES	☐ NO	
Light and dark colored materials have been included to reflect and absorb heat as appropriate	☐ YES	☐ NO	
Demolition materials from existing structures have been designed for re-use, recycling, or disposing of appropriately	☐ YES	☐ NO	

Passive Design			Notes
Windows are located and sized appropriately to provide natural daylight, reducing the amount of electricity required for lighting the home	☐ YES	☐ NO	
Eaves or other light blocking devices have been incorporated to provide shading, to keep the home cool	☐ YES	☐ NO	
Windows and doors are located to get good natural cross ventilation and to ventilate bathrooms and any other areas that may tend to be damp	☐ YES	☐ NO	
Appropriately designed thermal mass moderates indoor air temperatures	☐ YES	☐ NO	
Ceilings are high enough to accommodate ceiling fans	☐ YES	☐ NO	
Windows are located and sized appropriately to provide natural daylight, reducing the amount of electricity required for lighting the home	☐ YES	☐ NO	

Design for Life			Notes
The home is adaptable for future changes in occupant lifestyles and accessible for all	☐ YES	☐ NO	
Indoor air quality has been addressed with the choice of non-toxic materials and finishes	☐ YES	☐ NO	
Energy Use			**Notes**
Artificial lighting has been minimized and is energy efficient	☐ YES	☐ NO	
Appliances (Refrigerators, TVs, DVDs, computers, etc.) are energy efficient	☐ YES	☐ NO	
A solar water heater is included	☐ YES	☐ NO	
Renewable energy (such as PV solar panels) have been included	☐ YES	☐ NO	
Water Use			**Notes**
Rain water storage tanks (cisterns) have been included	☐ YES	☐ NO	
Outdoor surfaces and vegetation to retain water have been included	☐ YES	☐ NO	
Low water use toilets have been used	☐ YES	☐ NO	
Grey water recycling systems have been used, including for irrigation, and maintenance schedules for these have been developed	☐ YES	☐ NO	

See also IGLA's Green Certification Checklist at www.iglavi.org

Nuestras Islas Nuestro Futuro

Guía para la Construcción Verde en las Islas Vírgenes Estadounidenses

Implementadores
Guía para uso en el Campo

Diseñadores
Guía para uso en el Campo

febrero 2013

Fondos provisto por el Programa para la Conservación de Corales de la NOAA a través de la Oficina de Campo del Caribe del Servicio Federal de Pesquerías Marinas

Desarrollado por el FHWGroup.
Contendido elegido por un comité timón formado por agencias federales y estatales y entidades no gubernamentales

TRABAJANDO VERDE - Preparación del Predio
Lista de Verificación

Antes de la Limpieza de la Vegetación Asegurase que:			Notas
Tiene todos los permisos requeridos aprobados y debidamente sellados por las diferentes agencias estatales y federales que aplican en el predio antes de comenzar a trabajar con maquinaria.	☐ SI	☐ NO	
Conoce las características naturales, puede identificar las plantas y animales protegidos y sabe que debe hacer si las ve en el sitio durante la construcción y cuales no deben ser impactados.	☐ SI	☐ NO	
Asegúrese que el área de impacto este claramente marcada. Los operadores de equipo pesado hayan caminado el área para ver los límites de la limpieza, y las áreas además de la vegetación que se deben proteger.	☐ SI	☐ NO	
Asegúrese que la barrera de sedimento esté instalado correctamente a lo largo del perímetro.	☐ SI	☐ NO	
Asegúrese que las barreras temporeras están construidas alrededor de toda la vegetación de ser preservada.	☐ SI	☐ NO	
Ha estudiado los planos del proyecto y las características físicas del sitio y ha hecho modificaciones de ser necesarias a las mejores prácticas de manejo (“BMPs”, por sus siglas en inglés) cuando sea necesario basado en las pendientes y los suelos.	☐ SI	☐ NO	
Ha estudiado los planos del proyecto y está familiarizado con las fases del proyecto y la ubicación de las BMPs temporeras y permanentes para el control de sedimento y la erosión, y el manejo de las aguas pluviales.	☐ SI	☐ NO	
Ha instalado todos las BMPs requeridas basados en los fases del proyecto antes de comenzar cualquier trabajo con equipo pesado.	☐ SI	☐ NO	
Tiene los números de contacto del equipo de trabajo a su disposición de surgir preguntas al comenzar la limpieza del sitio.	☐ SI	☐ NO	

Durante la Construcción Asegúrase que:			Notas
Ha planificado la excavación necesaria y otros trabajos de movimiento de terreno que resulten en suelos expuestos para completar fuera de la temporada de lluvia. Áreas de trabajo con equipo pesado se mantienen fuera de cualquier pendiente durante la temporada de lluvia.	☐ SI	☐ NO	
Ha asegurado que todas las BMPs para el control de sedimento y erosión, y las aguas pluviales hayan sido correctamente instaladas ANTES de comenzar cualquier trabajo mecanizado en el sitio. Esto incluye las entradas al proyecto.	☐ SI	☐ NO	
Ha creado bermas y zanjas para contener la escorrentía de las zonas despejadas a medida que comienza la limpieza de la capa vegetal y el aplanamiento. La vegetación que ha sido removida debe ser utilizada para crear bermas. Las piedras removidas se pueden utilizar para estructuras más permanentes, tales como muros de contención.	☐ SI	☐ NO	
Ha instalado desvíos temporeros de los drenajes pluviales ya existentes ANTES de comenzar la limpieza en el predio.	☐ SI	☐ NO	
Se ha asegurado de que ninguna excavación comience si los suelos estarán expuestos por 14 días o mas.	☐ SI	☐ NO	
Si hay un paro de construcción que ya ha durado 14 días, instale las medidas de control de erosión INMEDIATAMENTE para minimizar la erosión del suelo expuesto.	☐ SI	☐ NO	
Ha creado taludes de corte acerrado si los cortes son más empinados que el 50% detrás de los edificios y al lado de caminos, y carreteras.	☐ SI	☐ NO	
Después de la construcción			**Notas**
Complete la estabilización final del predio, incluyendo todas las siembras permanente de grama y otras plantas, y la construcción final de los muros de contención en cortes o pendientes empinadas, como parte del movimiento del terreno final.	☐ SI	☐ NO	
Remueva todos las BMPs temporeras y disponga adecuadamente de todos los sedimentos acumulados en terrenos altos lejos de las quebradas, otros humedales y cuerpos de agua.	☐ SI	☐ NO	
Restaure el sistema de drenaje de las aguas pluviales, incluyendo la remoción de todos los desvíos de los drenajes de las aguas pluviales.	☐ SI	☐ NO	

Asegúrese que el propietario del proyecto esté al tanto de los requisitos de mantenimiento para las BMPs permanentes y ha colaborado en la creación de un programa de mantenimiento para la propiedad si éste no fue incluido como parte del diseño del proyecto.	☐ SI	☐ NO	

LISTA DE VERIFICACIÓN DISEÑO VERDE

General			Notas
La casa es lo suficientemente grande como para satisfacer las necesidades de los ocupantes pero no tan grande como para incrementar los costos energéticos para el enfriamiento y la limpieza.	☐ SI	☐ NO	
El diseño del lugar minimiza la construcción y la huella de ser limpiada y protege la vegetación nativa.	☐ SI	☐ NO	
Estrategias Verdes			**Notas**
El diseño integra la protección contra los huracanes.	☐ SI	☐ NO	
Las estructuras están bien integradas al paisaje natural para minimizar la excavación y los cortes y preservar la vista.	☐ SI	☐ NO	
La vegetación nativa/natural ha sido considerado y preservado.	☐ SI	☐ NO	
El diseño del lugar preserva la privacidad visual.	☐ SI	☐ NO	
Las plantas y animales nativas y protegidas están identificados y un plan para su protección ha sido implementado.	☐ SI	☐ NO	
Aplanamiento y las etapas de la construcción están vinculadas al control de erosión y sedimento y el manejo de las aguas pluviales para proteger el ambiente.	☐ SI	☐ NO	
Se utilizará equipo pequeño para la excavación.	☐ SI	☐ NO	
El control de erosión y sedimentación y el manejo de aguas pluviales están integrado a lo largo de la vida del proyecto.	☐ SI	☐ NO	
El drenaje de las aguas pluviales y el control de la erosión se han diseñado e implementado basado en las características del predio.	☐ SI	☐ NO	
El camino de entrada y el área del estacionamiento están diseñados para minimizar la erosión causada por las aguas pluviales.	☐ SI	☐ NO	

Uso de Materiales			Notas
Materiales reciclados o materiales con un contenido reciclado han sido utilizados	☐ SI	☐ NO	
Materiales y suplidores locales han sido utilizados	☐ SI	☐ NO	
Materiales de construcción y los electrodomésticos son duraderos y de bajo mantenimiento	☐ SI	☐ NO	
Madera de construcción sostenible ha sido utilizado	☐ SI	☐ NO	
Se han incluido materiales que moderan las temperaturas interiores (masa térmica) y mejoran la calidad del aire interior	☐ SI	☐ NO	
Materiales de colores claros y oscuros han sido incluido para reflejar y absorber el calor según sea apropiado	☐ SI	☐ NO	
Los materiales de demolición de estructuras existentes han sido reutilizados, reciclados o su disposición de forma adecuada	☐ SI	☐ NO	

Diseño Pasivo			Notas
Las ventanas están colocadas y medidas adecuadamente para proveer luz diurna natural, reduciendo la iluminación de la casa requerida	☐ SI	☐ NO	
Aleros u otros dispositivos de bloqueo de luz se han incorporado para proporcionar sombra y para mantener la casa fresca	☐ SI	☐ NO	
Las puertas y ventanas están situadas para recibir ventilación natural cruzada y para ventilar los baños y otras áreas que tienden a estar húmedas	☐ SI	☐ NO	
El diseño de masa térmica es adecuado para moderar las temperaturas del interior de la casa	☐ SI	☐ NO	
Los techos son lo suficientemente altos para acomodar abanicos de techo	☐ SI	☐ NO	
Las ventanas están colocadas y medidas adecuadamente para proveer luz diurna natural, reduciendo la iluminación de la casa requerida	☐ SI	☐ NO	

Diseño para Toda la Vida			Notas
La casa es adaptable a futuros cambios en el estilo de vida de los ocupantes y accesible a todos	☐ SI	☐ NO	
La calidad de aire interior ha sido abordada con la elección de materiales no tóxicos	☐ SI	☐ NO	
Uso Energético			**Notas**
La iluminación artificial se ha minimizado y es energéticamente eficiente	☐ SI	☐ NO	
Los electrodomésticos (neveras, televisores, DVDs, computadoras, etc.) son energéticamente eficientes	☐ SI	☐ NO	
Un calentador solar de agua está incluido	☐ SI	☐ NO	
Energía renovable (tal como paneles solares tipo PV) han sido incluidos	☐ SI	☐ NO	
Uso de Agua			**Notas**
Tanques de almacenamiento del agua de lluvia (cisternas) han sido incluidos	☐ SI	☐ NO	
Superficies exteriores y la vegetación para retener agua han sido incluidos	☐ SI	☐ NO	
Inodoros de poco uso de agua han sido utilizados	☐ SI	☐ NO	
Sistemas de reciclaje de aguas grises han sido utilizados, incluso para el riego, y un programa de mantenimiento ha sido desarrollado	☐ SI	☐ NO	

También ver la lista preparado por el “Island Green Living Association” (“IGLA” por sus siglas en ingles) al: www.iglavi.org

Green Building Training
St. Croix 2014
EVALUATION FORM

1. Please check the workshop you attended:

- ☐ Tuesday, March 18, 2014
- ☐ Wednesday, March 19, 2014

2. Rate your agreement with the following statements. Circle your response.

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree, NA = does not apply.

I understand the basic principles of green building.	1	2	3	4	5	NA
I am likely to review the information on the educational CD provided.	1	2	3	4	5	NA
I would be interested in attending additional seminars on green building.	1	2	3	4	5	NA
I am likely to join IGLA or use some of their services or other resources.	1	2	3	4	5	NA

3. Did this workshop meet your expectations? ○ Yes ○ No

4. Which part of the workshop did you consider <u>most</u> beneficial?

5. Which part of the workshop did you consider <u>least</u> beneficial?

6. Overall rating of the entire workshop:

<u>Poor</u>		<u>Good</u>		<u>Excellent</u>
1	2	3	4	5

7. What suggestion do you have to improve the use of green building practices on St. Croix?

Other comments:

THANK YOU FOR COMPLETING THIS FORM!

Attachment C:

Agency Training

Flyer
Agenda
Final Participants List

Agency Green Building Training

Wednesday, March 19, 2014

RTPark 64 West Center

UVI Albert Sheen Campus, St. Croix

WHAT? DPNR and other agencies play a significant role in ensuring proper implementation of "green" building practices in the USVI. What is "green" building and how does it differ from conventional development projects? What are the regulations, codes, and permitting procedures that guide it?

WHEN? Wednesday, March 19, 2014. Registration starts at 8:30, workshop ends at 4:00. ***Please bring $10 to cover lunch.***

WHERE? Meet in the conference room at the new RTPark 64 West Center at the entrance to UVI's campus. If you haven't been here before, now is your chance to check out St. Croix's first building eligible for LEED-certification.

WHO SHOULD ATTEND?

Agency staff responsible for funding, planning, inspection, or permitting of construction projects in the USVI.

DO I NEED TO REGISTER? YES!!! To help us plan for lunch, field trips, and space limitations, please take a moment to register online before **March 1** at www.horsleywitten.com/greenconstructiontraining/ or by contacting Erin Cabral directly at ecabral@horsleywitten.com, or 508-833-6600.

Draft Agenda at a Glance

8:30 **Registration**

9:00 **Welcome** *(Bevan Smith Jr., Director of Building Permits)* What is "green" building? What role do agencies have in green construction in the USVI?

9:30 **Building Green in the USVI** *(Island Green Living Association)* An overview of green building techniques and key steps in the development process where agency staff can influence implementation.

10:30 **Site Tour of RTPark Facility**
Explore the architectural design features, energy; water/wastewater, and stormwater systems that make the 64 West Center a LEED candidate.

1:00 **Alternative Energy and Building Materials** *(VI Energy Office and Building Permits).* Discuss key implementation and code compliance issues associated with alternative energy technologies in the USVI. Review alternative "green" materials available for construction.

1:30 **Earth Change and Post-Construction Stormwater Control** *(NOAA and Horsley Witten Group)* Discuss "green" construction practices and get an update on pending stormwater standards.

2:00 **Leading by Example: Agency Opportunities to go Green** *(State Historic Preservation Office)*
Brainstorm ways to incorporate green design into State Historic Preservation Office's redevelopment project.

3:00 **Permitting Panel** *(DPNR staff)*
Highlight most critical items DPNR staff need to be aware of when reviewing/inspecting green projects. Q/A session.

Sponsored by the USVI Department of Planning & Natural Resources and the NOAA Coral Reef Conservation Program

Green Building Training, St. Croix

Wednesday March 19, 2014
UVI RTPark, 64 West Center

Agenda

9:00-9:30 **Welcome and Introductions**—Bevan Smith, Jr., Director Building Permit, Karl Knight, Director of VI Energy Office, and Denise Kurg, UVI RT Park Director of Facilities
Set tone for day's discussions by describing the importance of "green" building to the USVI, outlining current and pending "green" regulations, and highlighting the role agencies play in green building implementation. Welcome participants to the UVI RTPark, a terrific backdrop to today's topic.

9:30- 10:30 **Green Building in the USVI**—Doug White, Architect, Island Green Living Association
Provide an overview of green building techniques applicable to the USVI and highlight key steps in the development or redevelopment process where agencies can support or impede implementation. What local resources are available for designers, builders, and agencies?

Break

10:30- 12:00 **Field Trip: RTPark/64 West Center**—Orlando Santiago, Aireko and Greg Miller, BMG Engineers and Surveyors. *Tour the facility with the construction manager to discuss installation and permitting lessons-learned of four key building features: passive design; wind and solar energy system; water/wastewater system; and stormwater management.*

Lunch *Registrants who signed up for box lunch need to bring $10 the day of the workshop.*

1:00-1:20 **Green Electrical Systems**—Lenny Farrante, Division of Building Permits
Discuss permitting of renewable energy systems in the USVI and situations that contribute to inefficiency within buildings and electrical systems.

1:20-1:50 **Managing Runoff Before, During, and After Construction—** Lisamarie Carrubba, NOAA Fisheries and Anne Kitchell, Horsley Witten**.** *Discuss "green" construction techniques related to earth change activities and the role of agency staff in preventing erosion and sedimentation issues during permitting and inspection. Discuss post-construction stormwater techniques; upcoming efforts to develop management standards in the USVI.*

1:50-2:00 **Minimizing and Disposing of Construction Waste—**Nadine Noorhasan, VI Waste Management Authority. *Waste minimization and material reuse are important parts of green building. What are VIWMA's permitting requirements for construction materials that go to the landfill?*

Break

2:15-3:00 **Leading by Example: Agency Opportunities to go Green—**Sean Krigger, Director State Historic Preservation Office. *Group exercise to brainstorm opportunities to incorporate green building techniques in a pending agency office redevelopment project.*

3:00-3:50 **Permitting Panel—**Alexis Doward, Carmelita Benta, Courtney Dickenson, Ellerton Maynard, Amanda Jackson-Acosta, Emanuel Liburd, and Benjamin Keularts. *Discuss the ways agency staff can influence "green" project success. Rest of session open to questions from participants.*

3:50- 4:00 **Final Words and Charge**- Bevan Smith, Jr. *Wrap up of day's workshop, key themes, and take home messages. Challenge participants to apply information on the job and as Crucians/Virgin Islanders.*

Green Building Training, St. Croix

Wednesday March 19, 2014
UVI RTPark, 64 West Center

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Green Building Training, St. Croix

Wednesday March 19, 2014
UVI RTPark, 64 West Center

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WORKSHOP SUMMARY

TO:	Lisamarie Carrubba (NOAA); Marlon Hibbert (NOAA); JP Oriol (DPNR CZM); Barry Devine (IGLA); Doug White (IGLA); Tracy Roberts (Springline); Gary Ray (Virgin Forest Nursery); Theresa Sanders (VIEO); Mike de Haas (Springline); Leonard Farrante (DPNR DBP); Ben Keularts (DPNR DEP); Nadine Noorhasan (VIWMA); Sean Krigger (VISHPO); Michael Bornn (Montessori School); Robert Moron (Magen's Bay Authority); Elissa Runyon (VI Appraisal Board); and Sarah Haynes (IGLA)
FROM:	Anne Kitchell
DATE:	July 1, 2014
RE:	Summary of USVI Green Building Seminars, St. Thomas

This memorandum provides a brief summary of the USVI Green Building seminar at the Sugar Bay Resort on June 10; field trips to three sites on the east end/Smith Bay on June 11; and an appraisers' forum held at the Department of Licensing on St. Thomas on June 11, 2014. The purpose of the effort was to: 1) continue a series of workshops on green design and construction in the USVI sponsored by NOAA, DPNR, and the Island Green Living Association (IGLA); 2) increase exposure for IGLA as a local technical resource; 3) showcase local green building examples; and 4) distribute educational materials related to designing, building, and living green in the USVI. In addition, a core group of local appraisers and realtors was convened to identify procedures for valuing green design and construction in the real estate market. This effort completes the NOAA funded *Our Islands Our Future* series of green building workshops targeting designers, implementers, agencies, and homeowners in the U.S. Virgin Islands.

A summary of each of the three events is provided below. **Attachment A** includes copies of agendas and handout materials from the St. Thomas activities. **Attachment B** includes evaluation forms and final participant lists.

June 10th Green Building Seminar

A one-day classroom-style workshop was held at Sugar Bay Resort targeting a broad audience. Over 40 participants representing primarily the building sector and local government were present, as well as representatives of the banking community. Sessions included presentations by local experts including:

- An overview by local architect, Doug White, of what makes a building "green" and what the Island Green Living Association is all about;
- A case study by Mike de Haas and Tracy Roberts of Springline Architects (presented by Tracy) on the actual cost of going green vs. conventional construction for their new office building (http://stjohnsource.com/content/news/local-news/2013/12/12/springline-architects-office-building-wins-leed-platinum-certific);
- A discussion by Dr. Gary Ray on the benefits of green landscaping practices, including the use of native species;
- A technical discussion by Theresa Sanders, Senior Energy Engineer with VIEO, on the efficiency of building envelopes and options for retrofitting local structures in the USVI to reduce heat transfer;
- Insights by DPNR-Division of Building Permits electrical inspector, Lenny Farrante, on PV installations gone awry and other electrical issues that affect energy efficiency;
- Tips for managing runoff on your site, especially during construction, by Benjamin Keularts from DPNR-Division of Environmental Protection;
- Guidance by Dr. Nadine Noorhasan, VIWMA Compliance Manager, for the minimization and proper disposal of construction waste on St. Thomas; and
- An opportunity led by Sean Krigger to make suggestions on "green" alternatives for an actual building renovation by the State Historic Preservation Office.

Each participant was provided with IGLA's residential green construction checklist and a folder with an agenda, evaluation form, IGLA incentive form, Springline Architects cost summary handout, TPDES permit handout, and the *Our Islands Our Future* green building educational DVD, as well as instructions for use of the DVD. The DVD materials include modules (slideshows), videos, and field guides. Spanish versions of the checklist and field guides were also made available as were copies of the public service announcements produced by IGLA for this project.

Participants at the June 10th Green Building seminar.

Comments and discussion points raised during the seminar are summarized in **Tables 1-3**. **Table 2** summarizes ideas generated in response to VIWMA's question about how to improve networking/communication between contractors as a way to recycle and reuse construction waste.

Table 3 summarizes the ideas from the SHPO brainstorming session. Each group was provided a 24"x36" plan set of the existing conditions and proposed demolition plan, proposed roof plan, and proposed floor plan. In the interest of time, groups were asked to focus their discussion on one of three areas: Energy, Water, and Demolition/Reuse. Ideas were also generated for this project during the workshop held previously on St. Croix. The St. Croix ideas are detailed in the report from that workshop.

Table 1. Comment Summary

Session	Questions and Comments
Doug White's presentation on Green Building and Design Elements	• Gary asked Doug about how to keep water moving in treatment wetland because of potential changes in decomposition due to water movement. Doug stated that from septic tank water overflows into treatment wetland with no maintenance. Great for building as terraces on sloping sites. • Gary noted that he thinks the trend in villas is going the opposite way in terms of getting bigger. Could spend money on certified lumber and other green components with high-end look, but smaller footprint, but that doesn't appear to be what's happening. • Doug noted that IGLA also has Green Villa Certification Program although it's more about maintenance as part of property management. Doug also noted that this is also about educating people about living in adequately sized spaces. • Susan commented that reason there was idea that VI soils weren't good enough for septic was because pits were too deep to get the evapotranspiration. Conventional approach puts drainages too deep for evapotranspiration to work which gives the impression that standard systems don't work.
Tracy Roberts's presentation on how much green ($) to go green	• Susan asked about insulated concrete form structures. Tracy said before it didn't make financial sense to use these but now due to 2012 Energy Code, it makes sense. • PV—new technology or changes in technology that could affect their installation. Tracy answered that they would have to remove them and start again. • Wind rating for PV—Tracy noted that it is only as good as the top coat used. • Geothermal—Tracy noted that the variable refrigerant flow unit doesn't use geothermal. She also said that she thinks the Senate just signed something to bring a company to study geothermal. • Ace Hardware asked about construction. Tracy noted that they used PGT impact windows, poured-in-place concrete, wood roof. • Gary asked about lack of landscaping and recommended creation of buffer of native trees, palms and shrubs away from building to curb radiation coming at building. Also asked about maintenance of retaining basin – putting in ecosystem in terms of plants is good, but also have to manage for non-native fauna like Cuban tree frogs, toads, and coquis. Tracy noted there are largely no windows on west side and the trees are growing up. They don't have plantings in stormwater basin and it is largely dry.
Gary Ray's presentation on native landscaping	• Question about cutting down fruit trees in project. Gary noted that these aren't native plants, but can be incorporated in landscaping. • Anne asked about how to get native plants. Problem with confusion or "same" plants from Florida being used and brought in to VI. These haven't been cleaned and are bringing pests that are affecting the native species. VI needs regulations and restrictions related to importing vegetation.

Session	Questions and Comments
	• Question about using plants like limestone grass now that there is hydroseeding rather than seeds currently noted in regulations that aren't from here. Gary noted that the trouble is finding seed, but are trying to get it into hydromix. Problem with limestone grass is that they have specific soil requirements. • Question about turpentine trees and how to establish them. Gary noted that turpentine trees can be grown from cuttings. Can also use "local" fruit trees that can include trees that aren't native but don't affect native species because they aren't invasive – can use ironwood and guavaberry, for example.
Theresa Sanders on building envelopes	• Gary noted that they should come up with list of plants that threaten cisterns due to roots that shouldn't be planted in certain portions of the property.
Lenny Farrante's presentation on electrical installations	• Question about fluctuations. Lenny responded that utility lines are connected throughout VI. Another person noted that line management is easier if you have various sources of power. • Question about penalties. Lenny noted that people get warnings for 1st and 2nd violations then they are fined on 3rd violation. • Question about creating a net licensing board. Some others noted that there would be an issue with people not wanting to be on any such board for political reasons. • Susan asked where he inspects and he said largely St. Croix, but Kasim Dewitt is the person in St. Thomas/St. John who is his counterpart. Lenny noted that, after a long, hard battle on St. Croix to get net metering working and make sure people did things to code, metering stopped even though they had achieved a balance with DPNR and businesses. There was discussion of a new bill that may stop net metering everywhere due to WAPA concerns about any sort of connections into their system. • Pedro asked about power supply in DPNR offices because it doesn't look like it reaches 120 and they have to replace battery backups regularly. Lenny noted that they would have to put in line conditioners and other devices, but really need an energy audit to see what room conditioning and everything else is (also really good to reduce issues first and then properly size your PV system). • Question about being off grid. Lenny noted that battery backups exist and are getting better. If something happens today, may not hit code for another 2 or 3 cycles. • Gary asked why sodium lamps are still being installed outside in VI. Lenny noted that LEDs don't attract insects. (can this be verified?)
Nadine Noorhasan's presentation on minimization and proper disposal of waste	• Questions about batteries and another person asked about E-waste. Nadine noted that businesses can use VI Regulated Waste to collect hazardous waste. Mendez Recycling will also take batteries. Importers of batteries are responsible for returning them and ensuring appropriate disposal. Businesses can get VIWMA permit for E-waste on one-on-one basis. Solid Waste Program of DEP also has permits for holding waste beyond certain volume, including E-waste, batteries, etc. • Question about permit requirements for residents doing their own work. Nadine notes that residents who do their own work and need to haul construction waste to landfill don't need permit.
Ben Keularts's presentation on managing runoff	• Susan recommended check dams and other things that slow the power of water coming downhill. • Ben recommended using NOAA data for hydraulic and hydrologic resources. Anne noted that Horsley Witten has added 40 years of rain data and stormwater analysis for updated VI handbook. • Gary noted that he is working on 2 types of sedges that can be used in porous pavers.

Table 2. Feedback for VIWMA on material reuse

Suggestions for Contractor Networking
• Facebook and other social media to post, websites, billboards near landfills in St. Croix and St. Thomas where people drop off waste • Housing and Finance Authority is semi-autonomous and they can tell VIWMA contractors they use • Bevan Smith may also be able to assist with information from DBP • Contractors over-estimate and over-purchase so need to educate clients about checking amounts of materials • Suggest putting quantity estimates on plans for some things • Mark Lichtenstein with VI Recycling could help • VIWMA gets to contractors through site inspection and permit process • Architects can add into specs the issue of permit for solid waste disposal to help in educating contractors and requirements for disposal of construction waste • More transfer stations on each island or decentralized areas for materials that can be reused

Table 3. Group Brainstorm on Options for Incorporating Green Features in VISHPO Project

Group	Suggestions
Energy Group	• Look at lighting first and recommend energy efficient, use either solar tubes or skylights to reduce standard lighting; shorter height interior non-load being walls of light filtering materials or glass partitions. • For electrical, try to get rid of phantom loads using dedicated circuits to be turned off after hours, including dedicated circuits for computers, backup batteries, etc. • For A/C, use variable speed, look into geothermal to see if it's possible possibly using existing cistern to dump excess heat from system, cool water, or recycle refrigerant through it (need to study this). • Considered green roof but decided it would be too much maintenance. • Suggested going to park next door and looking at removing exotics, prune large branches to protect building, replant with low-growing natives to get more shade
Water:	• Use existing cistern to retain water then send spillover to planter that will run along terrace and eventually to road to direct water out of site. • Didn't think they needed storage in roof area. • Bottom of planter solid then 8" of soil. Use bottom part of planter as solid barrier to protect adjacent property. Could also be terraced planter.
Demolition and Reuse	• reuse glass to make mosaic on ground at entrance or other decoration. • Reuse of historic hardware/ doors that could still work inside. • Reuse of wall siding, exterior shingles that probably can't be reused on exterior as they probably can't be waterproofed. Recommend transferring outside wall to inside of building to reflect what was historic character of building. This could work well with the glass partition idea of the energy group. Could also incorporate reuse of shingles. • Notes on plans are very good, but suggest that for things that can't be reused, it be specified that these be recycled and where. • Sheet metal roof over exterior terrace. • Tracy found it odd that plan has people going in under cover then go out into open then inside again so suggested improving roofing. Put older roof back on as decoration over new waterproofed roof. Suggest continuing wall for janitor storage. Bring back wall in corner into vertical cistern so you could collect water from roof of new addition. • Brick paver area should be on concrete slab with pavers according to plan, but Zach noted slab as proposed isn't reinforcement it's just shrinkage control so need to better design and strengthen slab. Reuse historic bricks in brick pavers as trail or design but, as Tracy noted, have to be sure this is ADA compliant. • Make sure back well stays and vertical cistern, etc. are tied in. Plans show roof and

Group	Suggestions
	gutters but plans need to also show the slopes and where to run gutters and slopes to collect water. • Put PV on back as long as site behind is okay and there aren't any big trees. Sean noted that he believes the back property will be developed so can't rely on solar.

June 11th Field Trip

This half-day field trip involved evaluating green building features at three sites: The Montessori School, Springline Architects's Office, and the Lindquist Beach Parking and Other Amenity upgrade/construction site. Participants met at the National Parks Pier parking lot and were transported by safari to each location. A summary of teaching points from each site is provided below.

Montessori School

Michael Bornn, head of the school, led the tour and started with a general overview of the 300+ student program and provided a brochure with map showing the primary features of the school improvement plan with an emphasis on alternative energy, recycling, water management, and building design that takes advantage of natural ventilation. Some of the key features (Figure 2) observed and discussed on the site visit included:

- Solar awning over the outdoor "gym"—shaded, rain protected location for sports and gatherings; open sided so naturally ventilated and no air-conditioning requirement, which is a huge cost savings; steel framed structure designed for hurricanes and earthquake; vertical cisterns used to collect rooftop runoff.
- 14 separate solar installations; been testing various panel types and weighing the cost/benefit of micro-inverters. They were one of the first major installations in the island and before adding buildings, were able to generate 100% of the needed electricity. Are 40 kW shy, but will be adding 60kW. Michael recommends avoiding Chinese manufactured panels.
- New buildings designed with flush roofs and windows at top and bottom of rooms to increase natural ventilation; replaced four13 SEER AC units with 8 21 SEER units with and improved efficiency;
- 100,000 gallon cistern added on to where revetment wall was constructed (saved 40% of cost); collects stormwater runoff from offsite neighborhood roads as well as upper part of property; water used to irrigate soccer field (which takes 25,000 gallons every time they turn on the sprinklers); custom-made inlet grates in parking lot convey runoff into cistern; water bill has gone down from $10,000/yr to $1-2k.
- Every building has a cistern
- Retention basin captures runoff from a large portion of the site and has a high infiltration rate, which helps recharge the school's well and prevents sedimentation of red hook bay;
- Reuse of asphalt from airport for the new entrance and upper parking lot; Michael claims it is relatively porous since not sealed/tarred;

- Property is within Tree Boa habitat so hand-clearing, corridors, and other protective measures are required;
- School had first aluminum recycling program in the USVI and is sadly, still one of the top recyclers in the USVI; recycled tires used for playground revetment; and
- Tree pit in front parking lot; rest of front parking still drains off site, however opportunities exist to retrofit with vegetated swale or linear rain gardens.

Springline Architects's Office

Tracy Roberts led the group on a tour of the LEED-platinum-certified office building. She pointed out some of the features (Figure 3) discussed the day before and answered questions the group had on some of the following topics:

- Outdoor bike rack and losing LEED points because no sidewalk to Redhook;
- Decisions on landscape plantings and sod;
- Interception and re-direction of off-site road runoff; existing detention basin and plans for joint stormwater management with adjacent property owners;
- Decisions on AC unit and individual office heating/air conditioning and lighting controls;
- Windows and lighting in conference room; issues with LED fixtures being too expensive;
- Downstairs floor plan and material reuse;
- Water conserving and energy star appliances, etc.
- Selection and installation of PV membrane system on roof and maintenance; discussion on battery replacement issues due to fluctuations in WAPA power.

Lindquist Beach/Smith Bay parking renovation

Robert Moron of the Magen's Bay Authority met the group at the entrance to Lindquist Beach/Smith Bay where parking lot and amenity renovations and new features are under construction (Figure 4a-b). Key discussions points included:

- Perimeter silt fence installations around parking lots; wire backed fencing; using 6-inch line demarcation as a quick visual indicator of proper trenching/backfill;
- Potential use of straw wattles called for on plans;
- Stabilized gravel construction entrance with tire wash and associated basin;
- Covered stockpiles;
- Permeable paving (recycled plastic) to be filled with pea stone/gravel for parking areas and lower drop off roads near beach;
- Advantageous tree species to be planted in landscaped parking islands;
- Steep fill slope on eastern parking lot may require more than erosion control matting to ensure stability;
- Wastewater system and tree protection effort caused rethinking of bathhouse;
- Buildings setback further from the beach; and
- Tree Boa habitat required hand clearing and preservation of corridors.

Figure 2. Some key green building features observed at Montessori School

Solar awning over open-aired gym was one of first large PV installations in the USVI.

New buildings have flush roofs and windows at the top and bottom of each classroom.

Cistern installed below upper parking lot, which is made from reused asphalt from airport.

Gravity fed cistern water used to irrigate soccer field.

Retention basin on top of permeable soils provides for 100% infiltration which recharges groundwater.

Tree Boa habitat requires special land clearing and corridor protection considerations.

Figure 3. Green Building and Design Elements Observed at Springline Architects Office Building

Figure 4a. Erosion and sediment control measures discussed at Smith Bay

Exposed soils at new location of parking lot are not protected from erosion, but rely on perimeter silt fence to prevent sedimentation off-site

Perimeter silt fence used to prevent sedimentation off-site. Steep slopes may require erosion control blankets and seeding to stabilize. Keep eye on steep fill slopes.

Great example of stabilized construction entrance and tire wash. Drainage collected in adjacent basin.

Use of rip rap to stabilize outfall location from erosive flows.

Don't forget to manage dewatering activities in a way that reduces muddy discharge (here it is sandy and not a problem).

Not a lot of trees can handle having half of their root zone removed. Tree protection should be considered during design phase and should be on construction plans.

Figure 4b. Permeable pavers to be used for parking lots and drop off loops at beach.

June 11th Appraisers' Forum

In the afternoon, a handful of appraisers and a bank representative met at the Department of Licensing and & Consumer Affairs with IGLA, NOAA, and Horsley Witten to discuss mechanisms for valuing green building design and construction features in the local residential housing market. Elissa Runyon was the organizer of the event and had attended the first Green Building workshop on St. John last year. This discussion was a direct result of an actual case in Estate Nazareth where a gentleman built a LEED-certified house, but the appraisal came out significantly lower in value than what was paid to build. The owner appealed but the local appraiser board thought appraisal was correct.

To kick off the discussion, Sarah Haynes presented on IGLA's residential green building certification as a way to provide an overview of various building and design techniques. Notes from the forum are provided in **Table 4**.

There is the recognition by local appraisers that "green" homes offer a lower operational cost and should have an inherent value, however:

- The local market/homebuyers aren't quite there yet;
- There is no standard procedure for valuing "green" features;
- It's not the multi-million dollar homes that care about saving $500/month on a WAPA bill, it's the regular homeowner who would account for "green" features in estimating monthly expenses (i.e., energy savings may result in homebuyers being able to pay more towards a monthly mortgage);
- There are not enough comps in this particular price range to generate comparative values or to distinguish between "green" values versus overall housing sales;
- Lenders haven't really asked for the distinction between "green" and "conventional;" and
- Appraisers need to be educated on what to look for/ask for and to understand benefits of going "green."

Table 4. Comment Summary

Topic	Comments
Appraisal community characteristics	• There are approximately 30 appraisers licensed Territory-wide • Appraisers are really eyes and ears for bank. • Appraisers don't drive pricing. • They have to do a 2-yr renewal to continue as appraisers.
The Market	• Comes down to what the client wants to pay because cost to build isn't necessarily same as appraised value. • Sometimes for listing there is more info that can include solar and other "green" aspects. Seeing more and more green but really only solar. • Replacement cost vs. construction cost vs. market value. Appraisals don't really have to do with what people say so client can make claims about what something cost to build, but this isn't taken into account in appraisal, which is based on market value in terms of what similar properties sold for. • St. John market is largely 2nd home for vacationing • St. Thomas and St. Croix market is mainly local people or people moving to VI who are purchasing homes to live in full time. • View is valuable, but it has to be a water view. Search multiple listing service (MLS) for doing appraisals for view and location (location being #1 selling point followed by the view). When someone is buying vacation villa on St. John, they probably don't care about how much they pay in energy costs. Even local folks who purchase homes don't think about issues like WAPA costs.
Water systems	• Appraisers can highly recommend that there be an inspection by an engineer or other professional and value will be contingent on inspection if they see a problem, such as an issue with septic or other aspect of property. Inspections are not required in VI though many homeowners pay for a 3rd party inspection. • Now may be mandatory to not have septic in coastal zone but they are still putting them in. Self-contained systems include French drains, package plants. Package plants often require energy source. Appraisers don't look at sewage system at all and banks don't require any sort of certification that treatment systems are working. • Don't have extra category for rainwater collection but do put in comments and consider it more valuable if property has good water management. • Would add value for irrigation system and good water cistern.
Energy	• Would be difficult to value a subjective decision on the part of the homeowner to change out an inefficient appliance or A/C system. • Community-wise don't have a lot of examples and things that are tried and true, not enough people buying into alternate energy right now. Same issue with trash. Really need to get together dollar amounts for public to show them the cost of building and living green compared to standard building and living methods.
Green materials	• Locally, idea of reuse hasn't gathered as much momentum as it should. Talked about whether reuse of older materials could affect appraisal. • For appraisal, if roof isn't leaking or rusty, for example, age doesn't matter or affect appraisal. For membranes and other treatments on roof, see if maintained.
Landscaping	• To a limited extent, do value properties differently with mature trees vs. patchy grass. Won't change value dramatically for the most part. • Would have to know what's native vs. non-native in terms of water usage and maintenance requirements to then try and incorporate some of this in valuation. • They do have subjective values for landscaping.
Methods for Costing	• Consider incorporating cost to operate property. • Can there be a metric or metrics in appraisal like life cycle, energy savings? • How do we get people to think about operation costs not just sticker price? Maybe people can't spend as much on mortgage because of size of WAPA bill. Can we start to think about energy issue here?

Topic	Comments
	• Elissa had a case with a solar array in St. John. Asked person cost to install, WAPA bill before installation and WAPA bill after. Took differential for 5-yr period, thinking that after 5 yrs there would be new technology and she wanted things to be comparable. Capitalized over 5 yrs as an income stream in appraisal value. • Donna has a recent case where people bought a house, said they invested $90,000 in solar panels and now they are selling property with their asking price incorporating solar. She was glad she didn't need to justify the incorporation of solar in the asking price because the market had gone up so that accounted for a higher asking price. • Hard to measure value of green construction because not a lot of sales data right now. • Bank prefers market-sales approach vs. cost-replacement approach. Need to get statistics from IGLA on homes that are green certified and green certified villas?
Education	• Need to have conversation with insurance companies as well so they don't keep raising rates and understand that things like proper roof construction and design shouldn't be penalized because it's a wood roof, for example. • Feel realtors have more direct affect to fine tune value and we need to be educating people at the point when they are buying land or a residence or renovating or building an addition to generate income so should reach out to brokers, sales people and architects. Elissa thinks everyone needs to be educated.

The group determined that we are in the early stages of tackling this issue and a first step will be educating local appraisers and realtors regarding green buildings. The National Association of Appraisers is working on calculations for things like solar and the changes to national standards for appraisals are implemented every 2 yrs by adding or subtracting standards.

IGLA could be a good reference for them and the appraisers should combine the incentive awards for participation in the forum to get consultation time from IGLA experts. IGLA could work with appraisers to develop an inventory of "green" buildings in USVI that can be used for training appraisers and realtors on green design and construction considerations. Elissa and others agreed to continue this effort by setting up a draft checklist with materials, costs, and other things for giving points to green materials. They want to develop some standards with colleagues to work on a checklist of what to look for when doing inspections even if it doesn't add dollar values right now.

Participation Incentives

Seminar and forum participants were given a certificate from IGLA to claim one of four incentive awards ranging from a value of $100-$250. Table 4 summarizes the numbers of incentives claimed to date.

Table 5. Summary of Incentives requested at STT trainings

Incentive	Value	# Requested to date	Total Incentive Value
1-yr professional IGBA membership	$250	5	$1,250
2-yr green leaf/ family IGBA membership	$100	3	$300
Residential Tropical Green Certification Voucher	$250	0	$0
2 hours of consultation services	$250	4	$1000
		12	***$2,550***

Next Steps

Comments and recommendations made during these workshops and in the evaluation forms will be used to inform recommendations for NOAA turning over *Our Islands Our Future* training materials to DPNR for continuation of the program.

This was the final set of workshops to be provided under the NOAA program. The next steps to wrap up include:

- HW to post materials from this workshop on program registration website and send announcement to participants that materials and workshop summary are available.
- IGLA to process incentive award requests and to follow up with participants who asked for membership or consultation assistance.
- Elissa Runyon and other appraisers to continue to educate peers and begin to draft a set of standards internally to evaluate the value of green practices and construction materials.
- HW to meet with NOAA, DPNR, and IGLA to generate recommendations for transitioning green building education and training to DPNR.

Attachment A:

Agendas
Handouts

Green Building Training, St. Thomas

June 10-11, 2014

Agenda

Tuesday, June 10, 2014

Sugar Bay Resort

8:00 **Registration—***coffee/tea/light breakfast*

8:30-9:00 **Welcome and Introductions**—JP Oriol, Director CZM
Set tone for day's discussions by describing the importance of "green" building to the USVI
Turn over to Anne and/or Marlon for discussion of day's agenda and for icebreaker.

9:00-9:45 **Overview of Green Building in the USVI**—Doug White, Architect and IGLA
What is "green building" from passive design, energy, water, landscaping, and construction perspective? Describe IGLA's residential and villa green certification program. What are some local resources are available for designers, builders, and agencies?

Break

10:00- 10:45 **Nuts and Bolts: The Cost of Green Building**—Tracy Roberts and Mike de Haas, Springline Architects. *Does going green have to cost more than conventional design? Springline will show the cost of their LEED-Platinum office building and discuss key decisions made during the design and construction process.*

10:45-11:30 **Green Landscaping Draws from Nature** – Dr. Gary Ray, Restoration Ecologist
Natural communities are the highest ideal for landscaping. We maximize preservation and use native plants to rebuild natural landscapes and to feature charismatic specimens in the garden. Dr. Ray will highlight natural communities, ornamental native plant selection, and discuss ways to protect the sea from the subdivision, and the site from its new "footprint."

Lunch *On Your Own*

1:00-2:00 **Energy Efficient Buildings: Building Envelopes and Alternative Energy System Installations —** Theresa Sanders (VI Energy Office) and Leonard Farrante (DPNR-Building Permits) *Theresa will review existing building stock, identify problem areas, and discuss options for improving energy efficiency by reducing solar heat gain, installing insulation and improving occupant comfort. Mr. Farrante will explore common issues to avoid when installing PV and other alternative energy systems.*

2:00-3:00 **Green Construction**—Ben Keularts (DPNR-Environmental Protection) and Dr. Nadine Noorhasan (VIWMA) *Discuss best practices to apply during critical phases of construction (e.g. clear/grading, ESC, final stabilization, and conversion to permanent stormwater management). Discuss techniques for waste minimization, material reuse, and proper disposal.*

3:00-4:15 **Leading by Example: Public Sector Opportunities to go Green—**Sean Krigger, Director SHPO.
Group exercise to brainstorm opportunities to incorporate green building techniques in an actual redevelopment project.

4:15-4:30 **Wrap Up**

Wednesday, June 11, 2014

Green Building Field Trip *(around Smith Bay/Redhook, St. Thomas East End areas).*

8:30 AM Meet at National Parks Pier Parking Lot, Vessup Bay/Nazareth. See Site Map

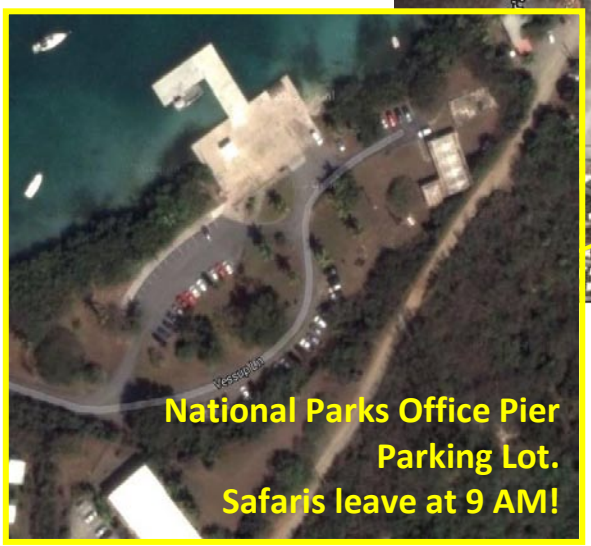
9:00 AM Load safaris and depart

9:00-11:45 Site Tours (three sites)

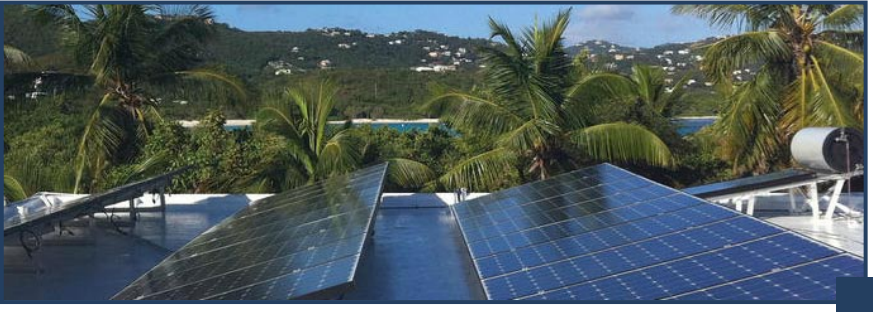
12:00 Return to Parking Lot

Springline Architects-Tracy Roberts and Mike de Haas *Tour LEED-Platinum office building with designers and owners. Discuss passive design features, LEED program, PV system, stormwater, lighting, fun quirks and material reuse, etc. Reiterate some of the cost/decision making steps, quality of work environment, and why they went this route.*

Lindquist Beach *Tour Magen's Bay Authority construction site to evaluate erosion and sediment control and "green" design features (e.g., permeable pavers) associated with planned visitor amenity improvements.*



Montessori School- Michael Bornn. *Tour "green" features of school including rainwater harvesting and one of the islands first solar energy systems, which provides over 90% of school's electric needs. This site collects, reuses, and infiltrates stormwater runoff from the property and surrounding neighborhood roads. Over the last three years, there has been no observed runoff leaving the site. Discuss design and construction lessons learned.*



Green Building Appraiser Forum: Valuation of "Green" Properties

June 11, 2014
2:00-4:30 PM

Department of Licensing & Consumer Affairs
Prop. & Procurement Bldg.
8201 Sub Base, Suite 1
St. Thomas, VI 00802

Residences and commercial buildings in the USVI are beginning to incorporate "green" design features to improve overall energy efficiency and reduce electric bills (e.g., photovoltaic systems, better insulation materials, energy-efficient appliances, and proper building orientation). Advanced wastewater, water reuse technologies, and native landscaping are being used to reduce the impact on the local environment and the demand on local water resources. Reuse and recycling of construction materials can play a role in reducing the burden on local landfills. Go to www.iglavi.org for more information on green building in the USVI.

How do we account for these features when evaluating property values? Is there a way to incentivize "green" building through the real estate marketplace.

Join us to discuss alternatives for recognizing the true value of going green in the USVI. For more information, contact Elissa Runyon at 340-693-7488.

AGENDA at a GLANCE

2:00-2:15 PM **Introductions and Purpose of Meeting** –Anne Kitchell, Horsley Witten Group

2:15- 2:45 PM **Overview of Residential Green Building Techniques and Programs—**Sarah Haynes, Island Green Living Association. *Features of the Residential and Villa Green Certification Programs*

2:45-4:30 PM **Assessing the Value of Green Properties—**Elissa Runyon, Appraiser. *Local case studies in property appraisals*

3:30-4:30 PM **Recommendations for Valuing Green Designs in the USVI—***Facilitated group discussion. How can we capture value of "green" properties (market vs. cost)? What are the challenges nationally and locally for making this happen? Develop a list of action items/ recommendations for moving forward.*

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To sign up for a full day technical training on Green Building on June 10th or to tour local green buildings the morning of June 11th, go to www.horsleywitten.com/greenconstructiontraining/

Is LEED affordable?

How Much Green to go Green?

Case Study:

Springline Architects Home Office in Estate Smith Bay
LEED Platinum Certification
Construction cost: $865,000
Total Square Feet: 2,800

LEED Specific Professional Fees:
Commissioning Paid: $5,940
Energy Modeling: $4,680
LEED AP: $6,000 (est)
LEED submittals: $8,000 (est)
Landscape Architect $2,000
Total fees = $26,620

LEED Specific System upgrades
AC system (approx): $20,000
Photovoltaic System: $17,000
Total system costs: $37,000

Total increase in construction cost specifically for LEED certification
$63,620 or 7.35%
Payback period **2.8 years**

Theresa Roberts, AIA
Principal,
Springline Architects

springline
architects

Case Study:

Payback Period:

Compare actual energy use to proposed and baseline calculations.
Energy modeling follows ASHRAE 90.1-2007 baseline.
LEED prerequisite requires 30% reduction from calculated baseline

Description	KWH	Cost
		0.54
Designed Energy Use		
"Standard" Designed building usage	81,948	$44,577.83
LEED Designed building usage	57,187	$31,108.41
Actual Energy Use		
KWH purchased from WAPA	26,133	$14,215.75
KWH produced by PV	14,000	$7,615.68
Total Usage	40,133	
Energy Savings		
Actual KWH saved below standard	41,815	$22,746.40
Actual KWH saved below designed	17,054	$9,276.98
Payback Period in years		
Hard cost of LEED		$63,620.00
Actual vs. "Standard"		2.80

springline architects

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Springline Office Building by Springline Architects, LLC

2013-2014

YAMAHA

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LEED PLATINUM

Springline Architects
6346 Estate Smith Bay
St Thomas, USVI 00802
www.Springlinearchitects.com
340-777-2345

To Applicant(s):

Revisions were made to Title 12 Virgin Islands Rules and Regulations in June of 2007 to include Stormwater Permitting for Construction Projects under the Territorial Pollutant Discharge Elimination System (TPDES) Program. A TPDES Stormwater General Permit (Permit No. VIGSA0000) was then developed and issued on December 1, 2007. The permit was then renewed on December 1, 2012. All existing and new projects that match the description in the General Permit need to apply for coverage under this permit. To apply, the Notice of Intent (NOI) form shall be submitted, along with a Stormwater Pollution Prevention Plan (SWPPP) that meets the requirements set forth in the General Permit. This SWPPP will need to be either developed or reviewed by a Professional Engineer licensed in the VI, and then stamped by a Professional Engineer licensed in the VI.

The following is a list of all documents needed to properly prepare and submit a complete application for coverage under the General Permit VIGSA0000:

1. **2012 General Permit VIGSA0000 (VI CGP):** Make sure to read the permit fully, including all the appendices, and determine what will need to be submitted in order to apply for coverage. It is of utmost importance that this permit is read and understood by the applicant, as coverage under this permit requires the Permittee to adhere to its requirements, and failure to do so may result in enforceable action.

2. The appendices of the General Permit VIGSA0000 covers ESA Review Procedures required to obtain coverage under VIGSA0000. In order to expedite the application, instead of the applicant setting up an ESA inspection and then submitting the application to be reviewed, DEP will share your application (sans ESA Review Letter and criteria determination) with Fish & Wildlife so they can perform the ESA inspection while the package is being reviewed. The site inspection will optimally be scheduled so it can be performed by any interested parties (DEP, F&W, Historical Offices) concurrently. After the inspection, F&W will submit its ESA Review Letter and SHPO (Historical) will submit its historical review to DEP to complete the submission package and allow DEP to finish the review. After full review, either a deficiency letter will be sent, or a letter stating it is complete and coverage will be issued.

3. **NOI:** The Notice of Intent (NOI) is the primary form to fill out, providing DPNR-DEP with your (the applicant) intent to be covered under the TPDES General Permit VIGSA0000. DPNR-DEP uses customized forms not yet available via the website. An electronic version can be emailed upon request.

4. **NOT:** The Notice of Termination (NOT) is the form that must be submitted when construction is completed and the permittee is ready to cancel coverage. Please note that until this form is submitted, you are considered still under the permit and must perform the required inspections and follow all permit requirements. DPNR-

DEP uses the customized forms not yet available via the website. An electronic version can be emailed upon request.

5. **SWPPP:** A Storm Water Pollution Prevention Plan (SWPPP) must be submitted along with the NOI form, and must meet all the requirements found in the permit VIGSA0000. The SWPPP can be created from scratch, but an EPA template can be provided that assists the applicant in addressing all the requirements found in the permit VIGSA0000.

6. **Hydrology Report & Associated Paperwork:** A hydrology study must be submitted with the SWPPP, showing all relevant calculations for pre- and post-development, along with calculations for BMP design. Furthermore, relevant maps, designs, schematics, and drawings must be included to show all relevant information described in the hydrology report and SWPPP.

The following is a list of documents that can assist in the development of an application package:

1. **SWPPP Development Guidance Document:** A SWPPP Development Guidance Document developed by EPA and can provide assistance in developing a SWPPP. It can be provided upon request or found at the EPA website here: http://www.epa.gov/npdes/pubs/sw_swppp_guide.pdf
   A SWPPP template (.doc file) that can be used to develop a SWPPP can be found here: http://www.epa.gov/npdes/pubs/sw_cgp2012_swppptemplate.docx

2. **VI Environmental Protection Handbook:** The VI Environmental Protection Handbook was developed by UVI's Extension service and the USDA. It is a useful resource for development of structural and non-structural Construction BMPs, and can be received as a pdf upon request.

3. **NRCS Virgin Islands Soils Survey:** NRCS performed a survey of the USVI and developed a guideline for determining soils and their properties throughout the Territory. It can be used to determine soil properties on your property that may be useful in calculating required values for your SWPPP and hydrology report. It can be found online, along with full maps of the Territory, at: http://websoilsurvey.nrcs.usda.gov/app/

Our Islands Our Future

USVI Green Building Training

In response to the growing recognition that conventional development practices in the USVI have led to natural resource impacts and water quality impairments, NOAA, DPNR and the Island Green Building Association (IGBA) have teamed up to provide:

- Guidance on practical siting, design, and construction practices to improve energy efficiency, conserve valuable soils and vegetation, and reduce impacts of erosion and stormwater runoff;
- Technical materials directed towards engineers, architects, builders, heavy equipment operators, agencies, and homeowners;
- Hands-on training planned for St. John, St. Thomas, and St. Croix; and
- Free memberships and other incentive packages from IGLA.

For more information on green building practices in the USVI and upcoming training workshops, go to: **www.iglavi.org**

Or Contact:

Lisamarie Carrubba, NOAA Fisheries
lisamarie.carrubba@noaa.gov (p) 787-851-3700

Anne Kitchell, Horsley Witten Group
akitchell@horsleywitten.com (p) 508-833-6600

How do I Use Available Training Materials?

NOAA and other local partners have prepared educational materials that you can access to learn more about green building design and construction techniques or use to provide instruction to others. Specifically, these materials include slideshows and videos that can be used in a classroom setting, or viewed on your personal computer. Supplemental field manuals are also provided that can be used to guide hands-on learning activities.

Step 1. Verify that your computer software is compatible. These materials are currently in .ppsx format and require Microsoft Powerpoint 2007 or a more recent version. Free universal file viewers are available for download on the internet. Note that the slideshows contain embedded videos. The videos are in Quicktime (.mov file extension) and can be viewed with most media players.

Each slideshow is organized by Lessons and can be viewed at your own pace.

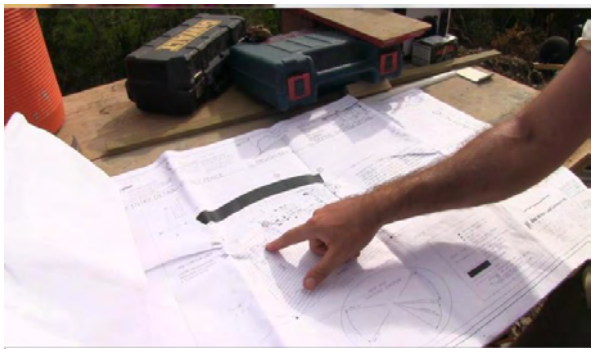
Step 2. Materials are divided by user category: designers, implementers (contractors, heavy equipment operators), agency personnel, and homeowners and others. Determine which interests you and select the appropriate slideshow or field manual from the DVD provided, or by going to IGBA's website (click on the Resources tab from the homepage and select "training slideshows" from the drop down menu) at http://www.igbavi.org.

Note that some of the information is the same in each set of modules while some is more detailed based on the intended audience.

Five videos are available starring local architects, native plant specialists, and government employees.

Step 3. If you are self-educating, each slideshow begins with an introduction that explains the goals and learning objectives of the material that will be presented. Go through the slideshows at your own pace. Each slideshow is divided into the following lessons:

Lesson 1: Guide to Green Design
Lesson 2: Guide to Site Assessment & BMP Selection
OR
Homeowners Guide to Choosing the Best Site
Lesson 3: Guide to Managing the Construction Process
Lesson 4: Guide to Green Landscaping



Field manuals give instruction for hands-on activities that can be used to reinforce classroom lessons.

Step 4. If you are looking for someone to provide training, contact IGBA or Jonathan Small at DPNR CZM 302-773-1082 Ext. 2229 or jonathan.small@dpnr.vi.gov.

Attachment B:

Evaluation Form Summaries
Sign-in Sheets

St. Thomas Green Building Training
Tuesday, June 10, 2014
EVALUATION FORM SUMMARY

(n=20) note: evaluation forms not collected for June 11 activities

2. Rate your agreement with the following statements. Circle your response.

1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree, NA = does not apply.

	1	2	3	4	5	N/A	***AVG. SCORE***
I understand the basic principles of green building.			*3*	*6*	*12*		***4.4***
I am likely to review the information on the educational CD provided.				*7*	*13*		***4.7***
I would be interested in attending additional seminars on green building.			*1*	*5*	*14*		***4.7***
I am likely to join IGLA or use some of their servic other resources.		*1*	*5*	*7*	*5*	*2*	***3.9***

3. Did this workshop meet your expectations? ✓ Yes ○ No

100% (N=18)

4. Which part of the workshop did you consider <u>most</u> beneficial?

- *The presentation by Dr. Gary Ray was awesome! His talk was essential. Plants not only provide beauty and oxygen, but stop NPS pollution and soil erosion. However, all the presenters were good.*
- *Erosion and sediment control*
- *Thus far, the presentation by Dr. Gary Ray on native vegetation; I have some experience with the rest*
- *Doug's presentation explaining IGLA certification checklist (2)*
- *Dr. Gary Ray (2)*
- *The cost of green building (2)*
- *Tracy Roberts on cost of building green. It's very cost-effective*
- *Green landscaping draws from nature*
- *Green landscaping presentation!!! Use our own native flora.*
- *Each session had useful information*
- *I learned a lot from every speaker. All were good—can't pick one and all are important.*
- *I learned from each one-great balance*
- *All of it (3)*
- *Lenny*

5. Which part of the workshop did you consider <u>least</u> beneficial?

- *Landscape is knowledgeable, but not much to do with energy; LEED numbers misleading*

- *My expectations on building envelope alternatives were not met. The topic was addressed as issues that are not energy efficient rather than the explanation of alternative envelope design.*
- *All was beneficial*
- *Waste management*
- *It was all great!*

6. Overall rating of the entire workshop:

1 Poor	2	3 Good	4	5 Excellent	***AVG. SCORE***
		5	*4*	*9*	***4.2***

7. What suggestion do you have to improve the use of green building practices on St. Thomas?

- *We need to have more training sessions for the general population—start with students. Perhaps before people get a building permit they should be required to take a class on "smart" green building. Workshops should be at different times to reach wider community.*
- *Provide practical information: simple handouts for people to see what happens when you add insulation, for example.*
- *Continued advocacy of green building, SWPPP, proper regulation and inspection. More use of pervious concrete and reuse of road runoff for irrigation, wetland wastewater treatment systems.*
- *What about transitioning "green" to "smart" building since no one wants to build "dumb," taking advantage of natural resources and making a difference in all the indigenous animals/sea life so that tourism remains alive and well in the islands.*
- *Green building certification to be a requirement in all new buildings being that many green building techniques are already being used. More education on the initial costs and then payoff on building green; more case studies than just the Springline office, such as residential examples.*
- *Mandate it in building codes*
- *More government participation*
- *Incentives*
- *More awareness of the benefits to the community—educate-LEGISLATE—we are a small island with very precious resources.*
- *Continue to have such workshops to educate the local people and government agencies*
- *Recycle through networking*
- *A central website*
- *Perhaps some brochures for green building materials*
- *More presentation on residential building/development*
- *Schedule collaboration meetings to meet @ Springline lunch and learns once a month to support all of our efforts going forward. Network.*
- *Permits verification*

Other Comments

- *Differences in IGLA incentives were not explained.*
- *Thank you. This was excellent and I learned a lot from everyone here!*
- *Free lunch!*
- *Great job Anne Kitchell! Also thanks to Bevan Smith, NOAA, IGLA. Thank you thank you*

USVI Green Building Seminar and Appraisers Forum
June 10-11, 2014 St. Thomas

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