



## MEMORANDUM

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TO: Dr. Kathy Chaston, National Oceanic and Atmospheric Administration Coral Reef Conservation Program (NOAA CRCP), Tova Callender, National Fish and Wildlife Foundation (NFWF), and Todd Cullison, Hui o Ko'olaupoko (HOK)

FROM: Michelle West and Steve Kasacek, Horsley Witten Group (HW)

DATE: April 9, 2013

RE: Summary of Rain Garden Installation Clinic and Additional Retrofit Reconnaissance

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This memorandum provides a brief summary of the March 15-16, 2013 rain garden installation clinic at the Lahaina Civic Center and the Wahikuli Wayside Park in West Maui. The purpose of the clinic was to: 1) initiate implementation of the 2012 Wahikuli-Honokowai Watershed Management Plan; 2) kick-off distribution of the newly published Hawai'i Residential Rain Garden Manual; and 3) provide classroom and hands-on training for siting, designing, and constructing a rain garden.

This memo also documents findings from a March 13, 2013 field assessment at three potential retrofit sites that were identified in the Watershed Management Plan: Honokowai Beach Park, Pohaku/S-Turns, and Honokowai Structure #8. The purpose of the site assessment was to verify conditions and begin to advance potential concepts.

### **1.0 Wahikuli Wayside Park Rain Garden Clinic**

On Friday, March 15, 2013, a CRCP-sponsored training workshop was held at the Lahaina Civic Center to educate agency staff, landscapers, engineers, and others on how to site, design, construct, and maintain a rain garden. The half-day classroom training included sessions on rain garden features, site selection, design, and maintenance, and was followed the next day with a hands-on installation in Wahikuli Wayside Park. The Wahikuli Wayside Park installation was designed to capture outdoor shower drainage, as well as stormwater runoff from a parking lot, bathroom roof, and surrounding walkways (Figure 1). To our knowledge, this is the first rain garden installation for managing outdoor showers—a documented source of bacteria.

#### **1.1 Classroom Sessions**

Tova Calendar (NFWF) arranged the facility and coordinated participant invitations, press announcements, and registration. HW and HOK were the primary trainers during the clinic. Attached is a workshop agenda, material/supply costs list, and workshop evaluation summary. Each participant was given a hard copy of the Hawai'i Residential Rain Garden Manual,

developed by HOK. Electronic copies of all instructional materials, slideshows, and other rain garden documentation can be found at: <http://www.westmauir2r.com/r2r-projects.html>.

**Figure 1.** Before and after photos showing the drainage area and complete rain garden with labels.



Electronic copies of the Hawai'i Rain Garden Manual can be downloaded from:  
[http://www.huihawaii.org/projects\\_documents/RainGardenManual-web-res-smaller.pdf](http://www.huihawaii.org/projects_documents/RainGardenManual-web-res-smaller.pdf).

Press releases about the clinic can be found at:

- <http://mauiNOW.com/2013/03/07/rain-garden-installation-planned-at-wahikuli/>
- <http://www.mauiNews.com/page/content.detail/id/570596.html>
- <http://mauiNews.com/page/content.detail/id/571026/Flood-of-volunteers-at-rain-garden-workshop.html?nav=10>



There were over 65 participants at the two-day installation clinic, including: agency staff from County of Maui (Department of Planning, Department of Parks and Recreation, and Department of Water Supply), State of Hawai'i Department of Land Resources Division of Aquatic Resources, NOAA, West Maui Soil and Water Conservation District; professional landscapers; Ka'anapali Land Management Corporation; homeowners; students from the University of Hawai'i; members of non-profit organizations (CORAL, Maui Nui Marine Resource Council, Maui Ocean Stewards, and Maui Cultural Lands); a teacher from Princess Naihenaena Elementary School; and others (see attachments for a complete participants list).

## 1.2 Installation Summary

A number of planning meetings were required in advance of the workshop to choose an ideal site, develop a design plan (Figure 2), secure materials, and navigate the permitting process. An SMA permit was required because the installation was within 50ft of the coastline. Tova Callender was primarily responsible for coordination of permitting and the installation efforts. This installation would not have been possible without the support of the County of Maui Department of Parks and Recreation (DPR) and the assistance of Parsons, a construction company that was working concurrently in the Park.



The installation at Wahikuli Wayside Park was constructed down gradient from an existing outdoor shower to collect, filter, and infiltrate shower discharges and stormwater runoff from the bath house roof and a portion of the parking lot. The installation involved the following key elements:

- In advance of installation, a special management area (SMA) permit was filed with County of Maui, and an archeologist was on site during excavation (see attached copy of approved permit letter).
- Rough excavation with an excavator of a 300 square foot rain garden (with gradual side slopes) along the ocean-side (*makai*) side of the new walkway (Figure 3) was completed two days in advance of the outdoor portion of the clinic. Fine grading was completed by participants with shovels and rakes. The excavator was deemed necessary because the existing soil fill in the area was difficult to dig in by hand and contained numerous boulders. Thus, digging would have consumed a majority of the volunteer time that was otherwise used for more instructive activities, such as creating the overflow spillway, amending the soil with compost and mulch, and planting. During excavation, the existing 6-inch outlet pipe from the outdoor shower was cut, with the unused portion abandoned and capped in place. An existing 1-inch irrigation pipe, which was not shown on received plans, was struck during digging. This incident was turned into an opportunity as the DPR was able to easily install a planned drip irrigation system for use in the rain garden during the critical first few months until the plants become established.
- Participants removed excess sod, roots, and rocks from the excavation spoils. The remaining soil was shaped to create the berm, and some of the large boulders were placed in the garden for aesthetic purposes. The berm was compacted by participants and shaped to a height of approximately one foot above the finished basin elevation.
- Participants backfilled the bottom 3 inches of the rain garden with compost, mixing it in with the native soil below to help support plant growth (Figure 4).
- Participants added a 3-inch mulch layer (Figure 4) to hold in the moisture around the plants and deter weed growth. This left a ponding depth of approximately 6 inches. The rain garden is intended to hold water temporarily after a rainfall event (for less than 30 hours).
- Participants planted a mixture of native and other locally available species including 'ae'ae, akulikuli, dwarf naupaka, ohelo kai, pohuehue, ilima papa, naio, akia, and ti (Figure 5), then finished installing the drip line irrigation system (Figure 6). A planting plan was prepared by HOK in advance (Figure 7). Newly installed plants were initially watered by hand, and later by the temporary drip irrigation system.
- The outlet was constructed by participants using a hand level and pocket rod to ensure the 3-4 foot wide section was level at 6 inches above the proposed ponding depth. They then laid filter fabric down, keyed it into the soil, and stapled it in place.
- Approximately 2-inch stone that had been purchased was washed and laid level over the filter fabric; large stones from the excavation were used as accents.

- For the inlet, filter fabric and stone were wrapped up around the pipe inlet and across to the makai side slopes and berm. This provides erosion control in case of large flow velocities out of the inlet pipe during intense rain events. Boulders were also placed here to slow incoming water and provide aesthetic appeal.
- After lunch, Todd Cullison (HOK), Michelle West (HW), and Steve Kasacek (HW) conducted three short “learning stations” to enhance participants’ knowledge of in-the-field rain garden design techniques. These stations included: site investigation, determining soil percolation rates, and leveling techniques. Site investigation looked at determining contributing drainage area and finding the best location for a rain garden. Soil infiltration testing was done in accordance with the Manual. Leveling techniques included using a hand level and pocket rod, as well as the “string method.” At the leveling station, participants also learned how to calculate slope.
- Erosion and sediment control at the site included utilizing the existing silt sock, tarps on the stockpiles, and the future application of grass seed on exposed soils.

**Figure 3.** Parsons donated personnel and an excavator to rough grade the rain garden in advance of the workshop. Note the level used to ensure correct elevations.



**Figure 4.** Amending soils with with compost, followed by adding mulch layer.



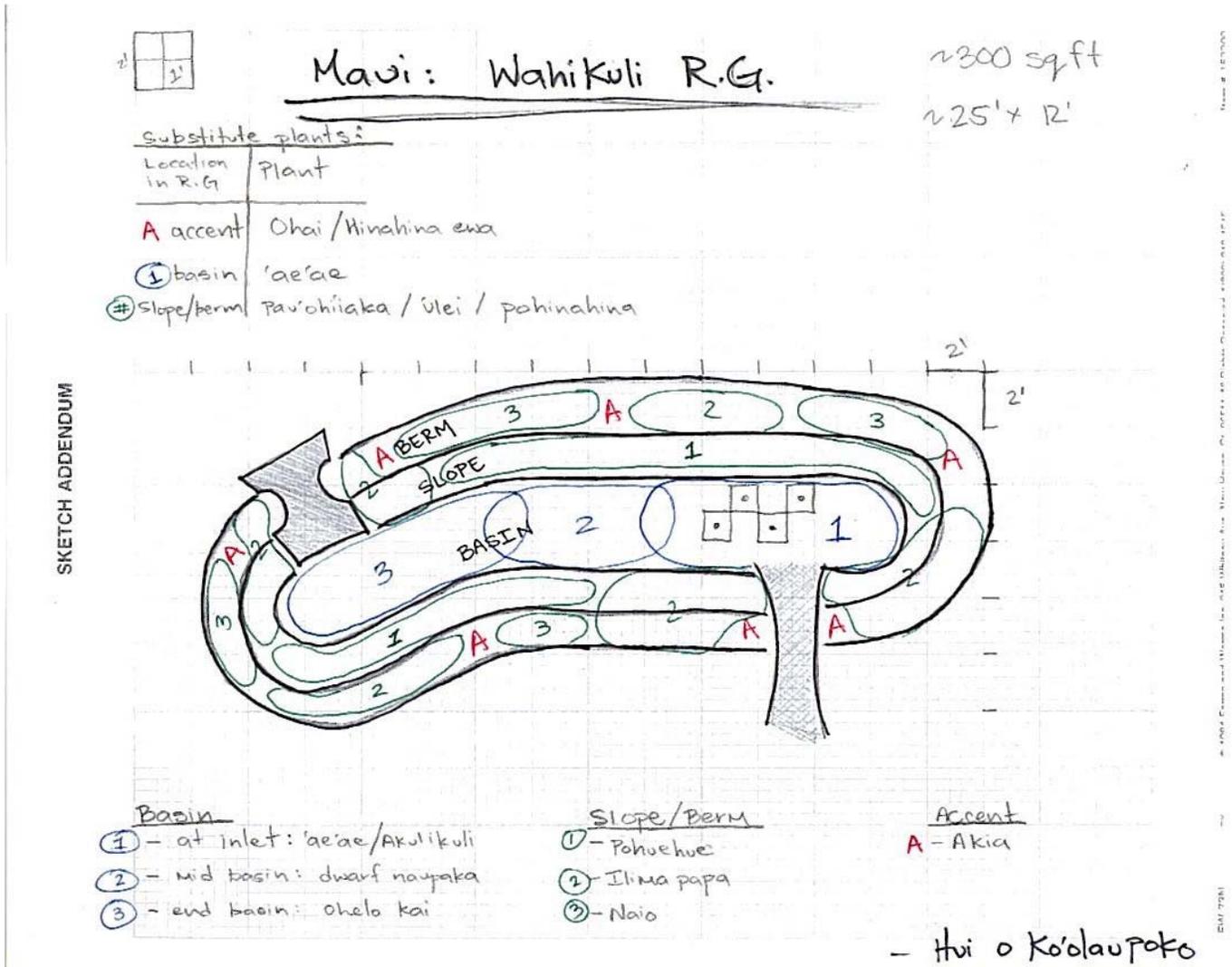
Figure 5. Planting through mulch layer.



Figure 6. The drip irrigation being laid out.



Figure 7. Rain garden planting concept for Wahikuli Wayside Park Installation (prepared by HOK).



### 1.3 Wahikuli Wayside Park Maintenance Plan

In the first few months following installation, more frequent inspections and maintenance effort will be required to support plant establishment. Less intensive care will be required after the first 6 months. A number of specific items are recommended for this installation as follows:

#### Short-term (first 3-6 months):

1. Every other day watering is recommended until plants have fully adjusted. The drip irrigation system was installed for this purpose. Efforts should be made to install the timer as soon as possible.
2. Keeping weeds out will likely be the biggest challenge, and weeding should be done on a weekly or more frequent basis for the first few months, at a minimum. Given the tenacity of tropical vegetation and the unknown origin/composition of mulch and compost, it would not be surprising for weeds to attempt a rain garden overrun.
3. Ensure that grass is planted in the bare area around the rain garden. Grass seed was left with the DPR. After planting, ensure grass is growing; reseed bare areas as needed.
4. During or after the first major rain event, check that uniform ponding occurs in the rain garden bed. Ensure there is no erosion or scouring at the outlet or inlet; add more stone if needed. Also, ensure water is flowing evenly over the full length of the spillway rather than concentrating and eroding a specific portion of the overflow.
5. If water remains ponded after 48 hours, consider adding sand to the compost/native soil layer. The rain garden is already potentially larger than it needs to be, so we don't anticipate this being an issue.
6. Alternately, the rain garden may dewater faster than expected (for instance, less than 4 hours after a storm >1.5 inches). If this is the case, monitor vegetation to see how it responds to the relatively dry conditions. Some replanting of more "droughty" species may be called for.
7. Observe the health of plants and be prepared to replace dead plants on an as needed basis, particularly in areas where vegetative density appears low.
8. Remove trash.

#### Long-term maintenance (6 months and beyond)

Many of the short-term items carry over here; the frequency can be reduced as needed for many of those items (e.g., annually or only after major storm events). Feedback from those conducting inspections and maintenance in the short-term is important to establishing an effective long-term plan. Consider some of the following:

- Since this is a demonstration site at a highly used park, the aesthetics of the rain garden will be extremely important; therefore, more landscape maintenance will likely be required than for the average backyard rain garden.
- Once plants are established, watering should not be necessary, except during much drier than normal weather conditions, if needed at all.

- Weeding frequency should be reduced and/or replaced by pruning and trimming activities once preferred species have enjoyed two or three full growing seasons.
- Since plant selection was a bit of an experiment, specific attention should be paid to what plants seem to thrive and in which inundation zone. You may consider switching out species with alternatives to improve color, texture, or to test inundation tolerance.
- Mulch replacement may need to occur on an annual basis, or more frequently depending on how this mulch responds to the site conditions. When replacing mulch, work the older mulch into the soil before placing the fresh mulch.
- Stone (and some bed material) may need to be removed/replaced in order to clean out accumulated sediment. The filter fabric may also need to be replaced or re-stapled if it is torn or moves (due to high velocities and general wear).
- Eventually, the growth of plants and the accumulation of mulch in the planting bed will reduce the available ponding area. This will require a more extensive maintenance effort to re-establish the design ponding capacity (6 inches from bed to overflow).
- As part of any additional work done in the park, improvements to the rain garden and surrounding area should be considered. Also, opportunities to amend surrounding soils and to plant trees and other vegetation should help with water uptake.

After significant rainfall, check that the ponding depth is as designed (6 inches) and that the ponding is level across the rain garden bed.



Check the outlet for level overflows, erosion, and/or scouring. Seed bare spots and add stone as necessary.

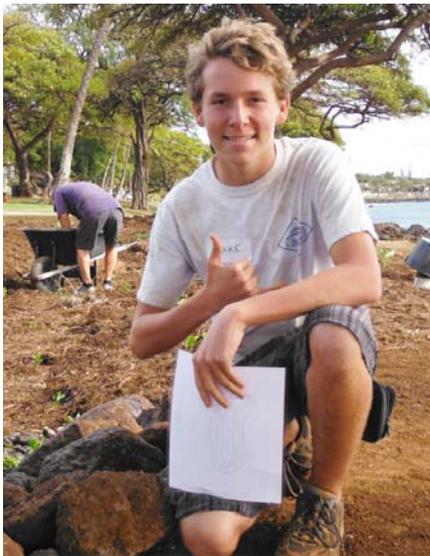


## 1.4 Follow-up Items

Some additional follow-up items for NFWF and NOAA include:

1. Ensure a timer has been installed on drip irrigation system to provide adequate and easily managed watering during the crucial first few months.
2. Ensure excavated rock and sod piles have been removed and that bare ground has been seeded with the provided Bermuda grass seed.
3. Adopt a long-term maintenance plan for the rain garden. The short-term maintenance responsibilities for the rain garden have been accepted by local Maui residents Jake Kuiper, Alan Kuiper, Ananda Stone, and Jez Gonsalves with support from the DPR (Figure 8). Long-term care plan should be agreed upon with DPR.
4. Prepare a schedule for tracking this rain garden's success, with particular emphasis on how the chosen plants are working. Send photos to HW, HOK, and NOAA of the rain garden over the next few months. Try to get out there when it is raining.
5. Prepare educational signage to be placed at the site to inform park users about the rain garden and its role in helping to protect water resources in Hawai'i. Special attention should be placed on the use of the rain garden to manage runoff from the outdoor shower. HW will work closely with NFWF and NOAA to complete this.

**Figure 8.** Jake Kuiper, one of the Maui residents who volunteered to help maintain the rain garden.



**Figure 9.** Participants and completed rain garden at the end of the installation clinic.



## 2.0 Retrofit Site Assessment

On March 13, 2013, HW and NOAA conducted a field reconnaissance of three potential retrofit sites identified in the 2012 Wahikuli-Honokowai Watershed Management Plan (the Plan) including: 1) a proposed baffle box at Honokowai Beach Park; 2) a proposed rain garden location at Pohaku/S-Turns; and 3) Structure 8, the existing Honokowai debris basin. Site conditions were compared with those listed in the Plan, and variations and alternatives to the proposed practices were discussed during the site visits. The focus of the site visits was to determine next steps for implementation. Below is a summary of these points.

### 2.1 Baffle Box at Honokowai Beach Park

The Plan proposed the installation of baffle boxes with booms for soaking up hydrocarbons and racks for capturing plant material within the existing storm drain system in various locations throughout the watershed. Honokowai Beach Park was listed as a priority location for one of these devices. The drainage area contributing to the proposed Honokowai baffle box was listed as approximately 24 acres with 80% impervious surfaces. Our field notes are as follows:

**Site Observations:** The baffle box was proposed in-line with an approximately 6'x3' concrete box culvert that discharges into a channel with standing water (Figure 10). There is very little gradient in the box culvert, which also had standing water in it. The channel is approximately 200 feet in length and is separated from the ocean by a sandy berm. It is subject to tidal action at times, particularly when the mouth is dredged, which was occurring during our site visit. While the channel is lined by some large trees, there is actually very little vegetation on its banks, which are showing signs of erosion (Figure 10).

**Retrofit Options:** A baffle box was originally selected for this location as an end-of-pipe treatment for a large, highly impervious drainage area. However, given the high cost of such a structure and relatively low effectiveness, alternative options were considered. Existing pavement grades and utilities (Figure 11) all make it difficult to fit other practices in that could treat such a large drainage area. However, a constructed wetland is a potential option (Figure 12). Constructed wetlands utilize a permanent pool and aquatic vegetation to remove pollutants and could provide an excellent opportunity for education and outreach.

**Site Limitations:** There may not be sufficient space (1.5% of the DA is a rule of thumb for constructed wetland sizing, which is equivalent to 0.36 acres). If the channel is considered a natural stream channel or wetland, permitting may be difficult. This system is also close to the beach, and considerations for the effects of rising sea level would need to be accounted for.

**Next Steps:** The most important step is to determine whether the channel is classified as a natural stream, and if so, whether or not sufficient area exists to install a constructed wetland adjacent to the channel (this would require much more disturbance of the area). If a constructed wetland is not possible here, we recommend further investigation of potential LID options (e.g., bioswales, infiltration practices, bioretention, green roofs, pervious pavements) throughout the drainage area.

Figure 10. Proposed baffle box outlet at Honokowai Beach Park (looking inland or *mauka*)

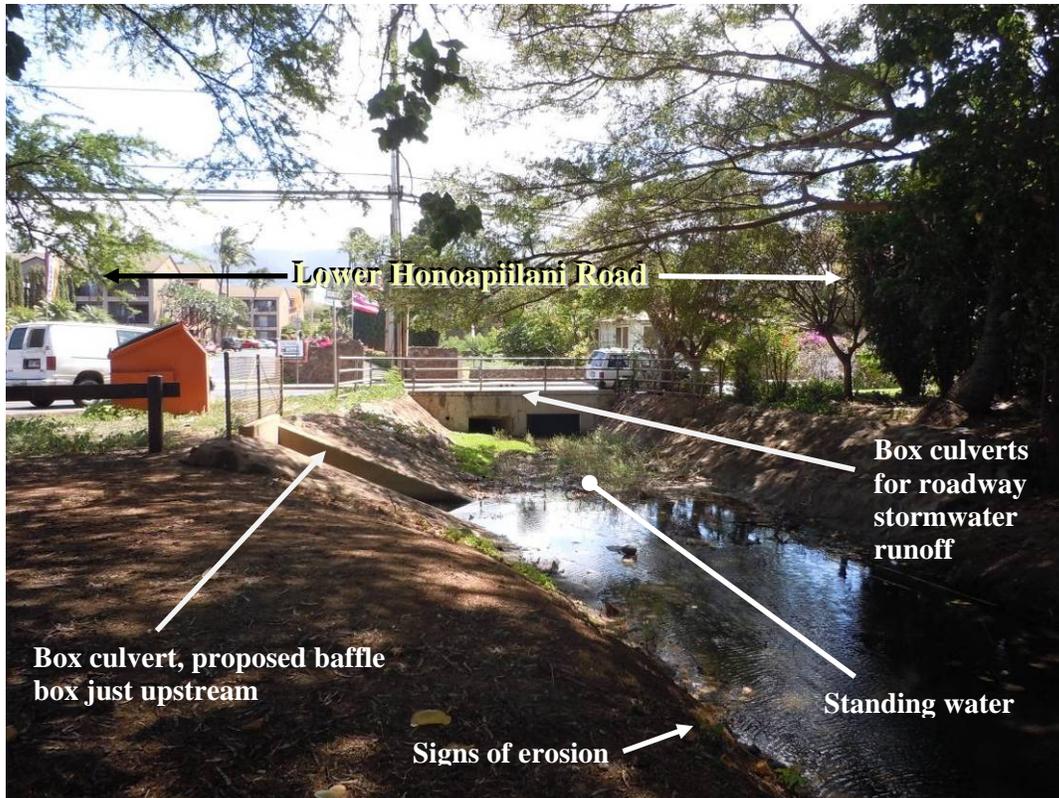
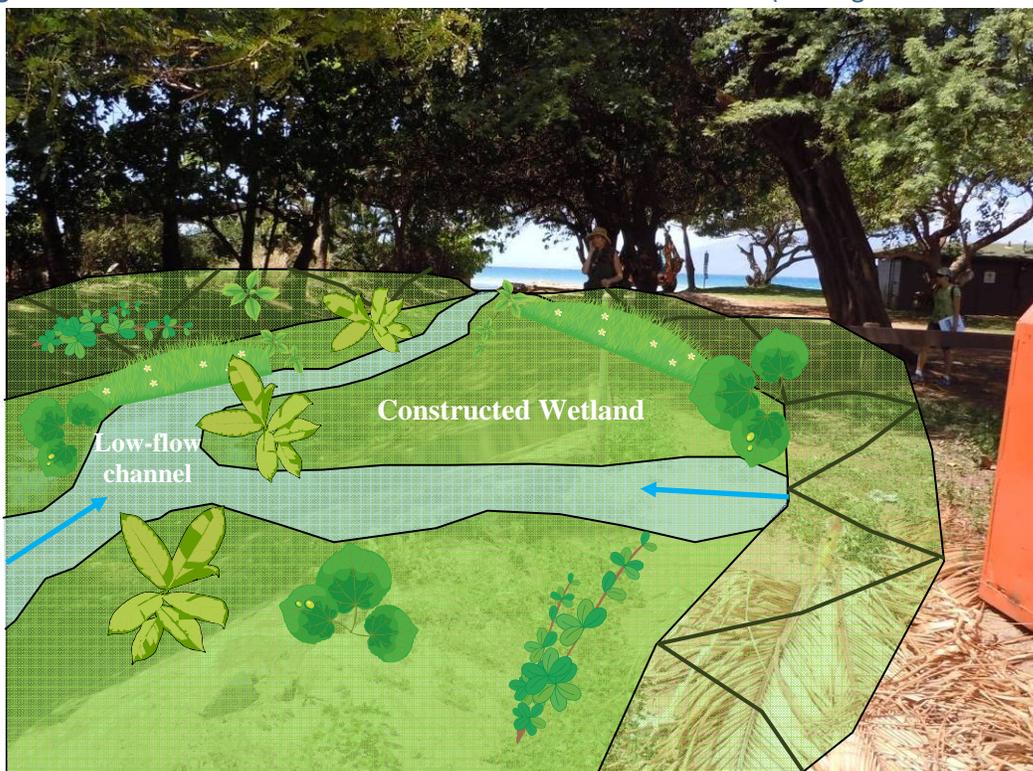


Figure 11. Proposed baffle box location at Honokowai Beach Park.



**Figure 12.** Possible constructed wetland at Honokowai Beach Park (looking ocean-ward or *makai*)



## 2.2 Pohaku Beach Park (S-turns) Rain Garden

The watershed plan calls for a rain garden to be installed on the southern end of Pohaku Park to manage runoff from part of the road and parking lot. Our field notes for this site are as follows:

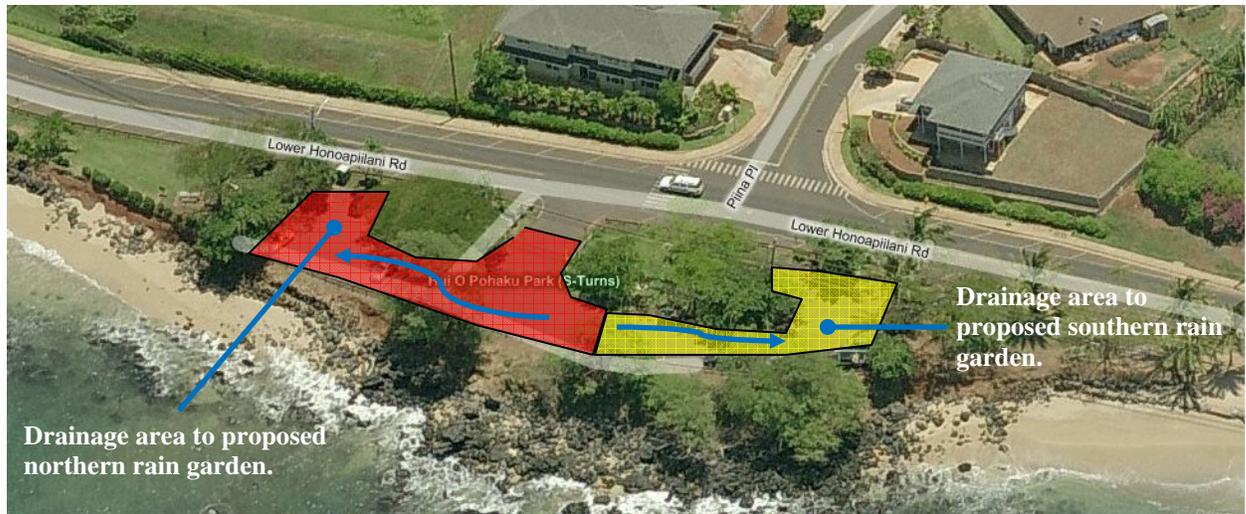
**Site Observations:** The drainage divide in the parking lot is different from that shown on the Plan; the high point is not located in the center of Lower Honoapiilani Road near the park entrance (Figure 13), but in the middle of the entrance drive itself. Also, there is another drainage divide in the parking lot with runoff flowing both to the north and south. Thus, there is actually an opportunity to install two rain gardens at this park.

**Rain Garden – South:** The contributing drainage area (CDA) for the southern rain garden is about 2,500 square feet; this requires an approximately 150 square foot rain garden depending on soil percolation rates. There is also an outdoor shower in this area, which provides an additional opportunity of treating shower discharge that currently flows under the walkway directly into the ocean. The large grassy area between the parking lot and the shower would be a good location for a rain garden, but it is heavily used by the public, and therefore, not an ideal location. However, there is an area adjacent to the shower that may be large enough to manage both shower and parking lot runoff, depending on required size and site limitations (Figure 14).

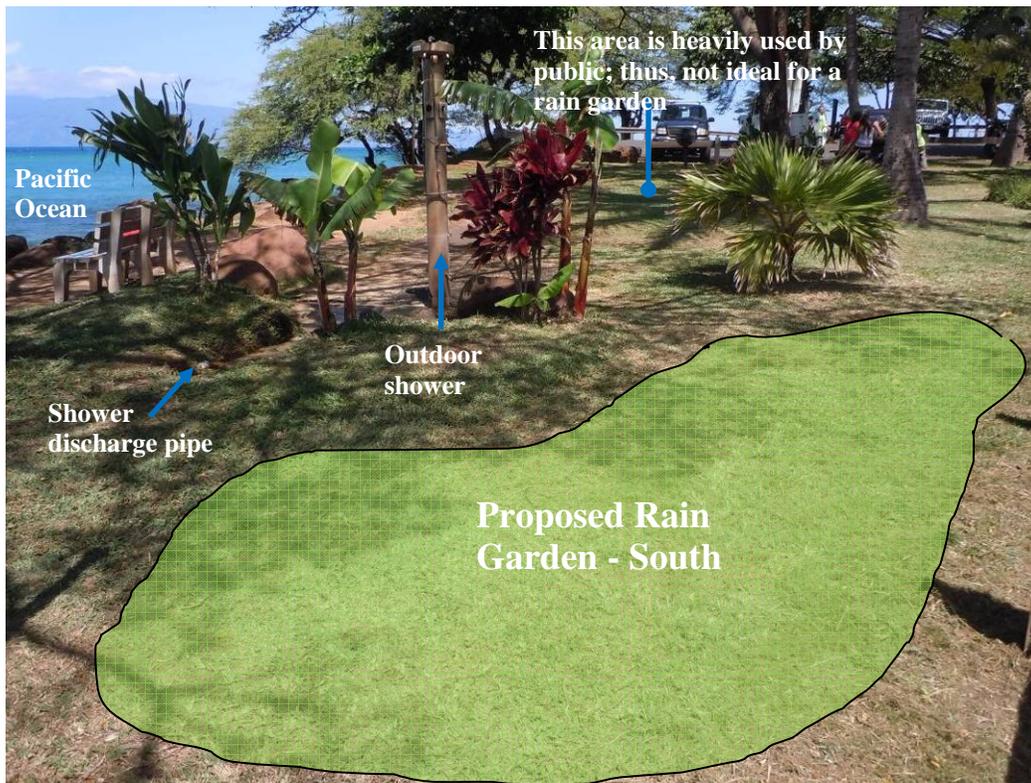
**Rain Garden – North:** The CDA for the northern rain garden is approximately 6,500 square feet; this requires an approximately 375 square foot rain garden to meet the target rainfall volume,

depending on soil percolation rates. There appears to be sufficient space available for this rain garden in the grassy area that is currently behind the portable toilet, which is out of the way of the walking path (Figure 15).

**Figure 13.** Revised drainage areas for two proposed rain gardens at Pohaku (S-turns) Park.



**Figure 14.** Proposed southern rain garden location at Pohaku (S-turns) Park.



**Figure 15.** Proposed northern rain garden location at Pohaku (S-turns) Park.



**Site Limitations** for both rain gardens include shallow tree roots, potential, irrigation lines, utilities such as guide wires, and benches and tables (including concrete pads).

**Next Steps:** The next steps for this site are to do a soil test in each of the proposed locations to come up with a final sizing, determine actual utility locations, create a detailed sketch of the two gardens, and propose the idea to DPR.

### 2.3 Structure 8 (Honokowai Debris Basin)

Structure 8 lies on the Honokowai Stream and is commonly referred to as a “desilting basin.” It has a large drainage area of approximately 4,000 acres, which consists mainly of conservation and agricultural land. Structure 8 discharges to a concrete-lined channel that carries runoff to the ocean. The runoff in this channel is often extremely turbid. Our field notes for this site are as follows:

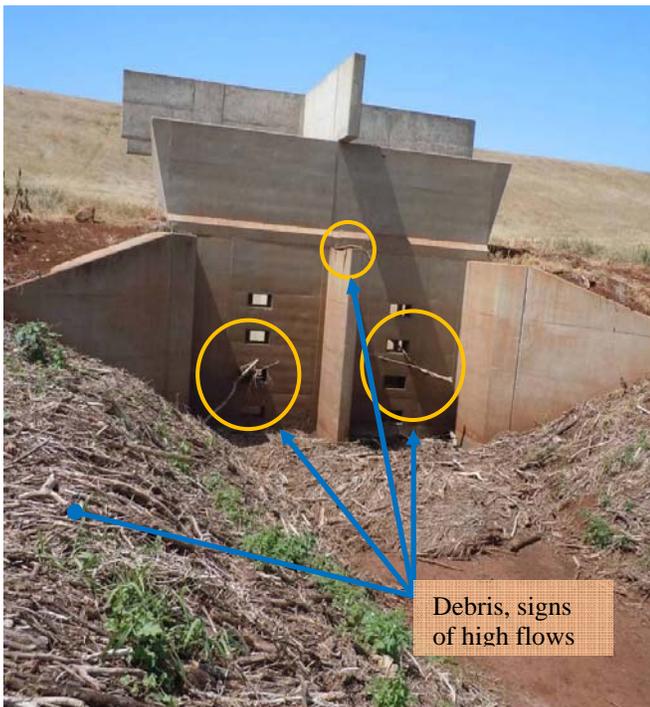
**Site Observations:** There are four sets of two openings along the face of the structure, instead of the three sets of two openings referred to in the Plan (Figure 16). The concrete overflow (rim) shows no signs of flow. In addition, the dam and bypass channel are very large, and there are no signs that water has ever reached those elevations (Figure 18), but that should be verified. However, there are signs of debris high up on the concrete structure (Figure 16),

which are good indicators of the high flows that this structure has experienced. This basin seems well-maintained; in fact, it was being mowed on the day of our site visit.

**Retrofit Options:** Given that there are times when the basin detains a large volume of water, a series of infiltration trenches placed in the basin would most likely clog rather quickly. However, the basin could be retrofitted with a long, meandering low-flow channel to improve sediment trapping and reduce potential for re-suspension during the more frequent rainfall events (Figure 17). In addition, the reconfiguration of the structure outlet low flow orifice(s) could increase detention time (extended detention) without affecting the safety of the structure. Any retrofit to the structure should be paired with improved slope stabilization and riparian buffers further up in the contributing watershed to reduce the amount of sediment carried to the basin.

**Next Steps:** In order to determine if a retrofit at this location is practical, further analysis of the as-built drawings and sizing calculations is required. Certain questions would need to be answered, either through additional research or by the County and/or State, such as: Do low flows ever reach the basin, or is it only subject to the large, flashy events? Is alteration of the concrete outlet structure and/or emergency overflow channel allowed? Permitting will be a major factor here; as will consistent communication with the County of Maui and the State of Hawai'i Dam Safety officials, and possibly the Army Corps of Engineers. This retrofit may have potential to serve as a model for improving water quality discharge from similar structures in Hawaii.

**Figure 16.** Existing Structure 8 (facing *makai*).



**Figure 17.** Existing Structure 8 (facing *mauka*).



**Figure 18.** Existing Structure 8 (facing *mauka*)



## **Attachments**

Agenda

Supplies Cost List

Complete Attendance List

Evaluation Form Summary

SMA Permit

# Maui Rain Garden Workshop

March 15-16, 2013

Lahaina Civic Center/ Wahikuli Wayside Park



## Agenda – Day 1

- 8:00 – 8:30**                      **Registration**
- 8:30 – 8:45**                      **Introduction and Watershed Context**  
*Background on stormwater impacts and the Wahikuli Honokowai Watershed Management Plan.*
- 8:45 – 9:15**                      **What is a Rain Garden?**  
*Learn what a rain garden is, its function, and key features. Where are good places for rain gardens?*
- 9:15 – 9:45**                      **Rain Garden Design and Materials**  
*How do you determine how big the rain garden should be? What is so important about soils on site? How does water get in and out of the rain garden? What plants do you use? Where do you get materials? How much does it cost?*
- 9:45 – 10:20**                      **Rain Garden Sizing Exercise**  
*Break into groups and work on sizing calculations for Wahikuli Wayside Park Demonstration Rain Garden.*
- 10:20 – 10:30**                      **Break**
- 10:30 – 11:00**                      **Rain Garden Construction Sequence and Considerations**  
*What are the important steps when constructing a rain garden?*
- 11:00 – 11:20**                      **Rain Garden Maintenance**  
*What kind of maintenance is required in both the short and long terms?*
- 11:20 – 11:30**                      **Q/A and Rain Garden Wrap-up**

### Sponsors:



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## Tentative Agenda – Day 2

- 8:30 – 9:00**                    **Registration at Wahikuli Wayside Park**
- 9:00 – 12:00**                **Rain Garden Installation**  
*Hands-on installation of rain garden. Start with brief overview of project. Break up into groups as needed for fine grading, installing stone channel and overflow, soil amendments, mulch, etc.*
- 12:00 – 1:00**                **Lunch (Provided)**
- 1:00 – 2:30**                **Planting, Watering**  
*Recap morning work; make sure everyone understands the various components. Talk about plant placement, appropriate species. Install plants and water. Discuss specific maintenance items.*
- 2:30 – 4:00**                **Rain Garden Celebration in the Park**  
*Recap of all that was accomplished. Answer any last questions. Do the rain garden dance!*

***Please bring appropriate clothing to do landscaping work. Bring work gloves and a shovel. Shade and water will be provided, but you may want also want to bring a hat and your own bottle of water.***

**Maui Rain Garden Workshop Materials & Costs**

Item	Vendor	Cost	Notes
<b>Rain Garden Materials</b>			
Compost	Maui Earth Compost Inc.	\$207.00	3 CY
Mulch	Maui Earth Compost Inc.	\$105.00	3 CY
Compost and mulch hauling	JSB Enterprises	\$260.00	
Plants	Anna Palamino/Maui Nui Botanical Garden	donated	Native plants donated by the Maui DWS
Unwashed stone	Hawaiian Rock	\$38.00	1.5 CY, 3/4-3 inch stone
Stone hauling	C&J Hauling	\$105.00	
Drip irrigation material	Ace Hardware	\$40.00	10 LF 1" PVC, 4-90 degree elbows, primer and glue
Drainage pipe cap	ISI Hawaii	\$18.00	6" PVC cap to prevent shortcircuiting out the existing pipe
Fabric staples	DWS	donated	1 box donated by the Maui DWS
Filter fabric	DWS	donated	9 SY donated by the Maui DWS
<b>Rain Garden Prep</b>			
SMA permit	County of Maui	\$55.00	Special area management permit
Excavation	Parsons	donated	Excavator and operator
Archeologist	SHPD	\$475.00	Arranged through Parsons
Spray paint	DWS	donated	2 cans donated by the Maui DWS
<b>Workshop Materials</b>			
Tools	Volunteers	borrowed	Shovels, rakes, trowels, hack saw, wheelbarrows, hose, etc.
Friday in-class refreshments	Costco	\$138.00	Muffins, fruit, juice, and cookies
Saturday installation lunch	Comfort Zone Catering	\$573.00	Catered lunch; sandwiches, salad, fruit, dessert
Canopy		borrowed	Canopy for shade during outdoor installation
Ice	Times Supermarket	\$16.00	Ice to keep refreshments cool
Coolers	Tova Callendar/ Charley Dofa	borrowed	Coolers used to keep refreshments cool
Tarps, grass seed, and gloves	Lowes	\$78.00	Tarps to cover stockpiles, Bermuda grass seed for exposed soil, work gloves for participants
Trash bags	Times Supermarket	\$8.00	Recycling, trash

\* These costs are for the Wahikuli Wayside Park installation. We encourage looking into alternative suppliers for rock, compost, plants, and other supplies. The compost, mulch, and associated hauling are the largest expense items on this list, for example. We recommend looking for washed stone rather than the unwashed stone. Also, hauling was by far the greatest expense; finding closer vendors will help reduce costs.

## Participants List

Name	Friday	Saturday	Affiliation	contact info
1 Aaron Brothers		1	1 Homeowner	<a href="mailto:kuau77@gmail.com">kuau77@gmail.com</a>
2 Alan Davidson		1	1 UH MC/Maui Botanicals	da9@hawaii.edu
3 Alan Kuiper		1	1 Canoe Club	akuiper808@hotmail.com
4 Amy Hodges			1 MNMRC	hodges@mnmrc.org
5 Ananda Stone	1		1 UH Sustainable Science	splashvideo@yahoo.com
7 Bo Petty	1		1 NOAA Sanctuaries	<a href="mailto:bo.petty@noaa.gov">bo.petty@noaa.gov</a>
8 Catie Cullison			1	ccullison@pbrhawaii.com
9 Charlene Griffin			1 MNMRC	charonmaui@yahoo.com
10 Charley Dofa	1		1 Gardener	<a href="mailto:charleydofa@gmail.com">charleydofa@gmail.com</a>
11 David Johnson	1		1 Gardener	hawaiidhr@yahoo.com
12 Derrick Vasquez	1		1 Sheraton Landscaper	from Sheraton
13 Ed Aloii	1		1 UH Sustainable Science	ealoi@hawaii.edu
14 Ekolu Lindsey	1		1 Maui Cultural Lands	ekolumcl@hawaii.rr.com
15 Elaine Malina	1		1 SGS Landscaping	<a href="mailto:craterpair@hawaii.rr.com">craterpair@hawaii.rr.com</a>
16 Francis Malwetil	1		1 Landscaper	<a href="mailto:framal11@hotmail.com">framal11@hotmail.com</a>
17 Jeannie Brew			1 Master Gardener	<a href="mailto:beanniebrew@yahoo.com">beanniebrew@yahoo.com</a>
19 Jez Gonsalves	1		1 UH	jezelyn@hawaii.edu
20 Joe Pueschel			1 Homeowner	joseph.pueschel@gmail.com
21 John Seebart	1		1 Marine volunteer/homeowner	seebartj001@hawaii.rr.com
22 John Sughrue	1		1 Master Gardener	<a href="mailto:papakea201@gmail.com">papakea201@gmail.com</a>
23 Johnathan Lindsey	1		1 Maui Cultural Lands	<a href="mailto:ekolumcl@hawaii.rr.com">ekolumcl@hawaii.rr.com</a>
24 Karen Wetmore	1		Marine volunteer/homeowner	krn1124@yahoo.com
25 Lei Seeger	1		1 Marine volunteer/homeowner	<a href="mailto:seegerl@hawaii.edu">seegerl@hawaii.edu</a>
26 Linda Castro			1 DAR	tigershark373@yahoo.com
27 Liz Foote	1		1 CORAL	lfoote@coral.org
28 Mary Jorgenson	1		1 COM-Planning Dept	Mary.Jorgensen@co.maui.hi.us
30 Melinda Caroll	1		1 Homeowner	mcaroll@aloha.net
35 Sandy Callender			1 Gardener	
36 Sarah McLane	1		1 MNMRC	<a href="mailto:mclane@mnmrc.org">mclane@mnmrc.org</a>
38 Sheila Sarhangi	1		1 SeaWeb	ssarhangi@seaweb.org
39 Skippy Hau			1 DAR	Skippy.Hau@hawaii.gov
40 Jake Kuiper			1 Intermediate school student	akuiper808@hotmail.com
41 Terry Huth	1		1 Grow Some Good	green.iris@yahoo.com

42 Tom Atkins	1	1 KB HOA	<a href="mailto:tomtomtomatkins@yahoo.com">tomtomtomatkins@yahoo.com</a>
43 Wes Stern	1	1 Inherlite	<a href="mailto:inherlite@gmail.com">inherlite@gmail.com</a>
44 Anna Benesovska	1	COM-Planning Dept	Anna.Benesovska@co.maui.hi.us
45 Bryant Sparkman	1	SGS Landscaping	
46 Cheryl Sterling	1	COM-Planning Dept	<a href="mailto:cheryl.sterling@mauicounty.gov">cheryl.sterling@mauicounty.gov</a>
47 Chris Karcher	1	SGS Landscaping	
48 Cole Santos	1	COM- DWS	Cole.Santos@co.maui.hi.us
49 Doris Lang	1		<a href="mailto:doeland@yahoo.com">doeland@yahoo.com</a>
50 Flora Wong	1	Mater Gardener	<a href="mailto:floraw@me.com">floraw@me.com</a>
51 Gordon Firestein	1		<a href="mailto:gfirestein@seapact.com">gfirestein@seapact.com</a>
52 Joan Morris	1		<a href="mailto:natilijoani@aol.com">natilijoani@aol.com</a>
54 John Astilla	1	Sunshine Vetiver	<a href="mailto:johnastilla@gmail.com">johnastilla@gmail.com</a>
55 Kira Nims	1	WMSWCD	<a href="mailto:kira.nims@hi.nacdnet.net">kira.nims@hi.nacdnet.net</a>
57 Liz Bogdanski	1	Marine volunteer	<a href="mailto:ebogdanski@verizon.net">ebogdanski@verizon.net</a>
58 Marti Buckner	1	COM-DWS	<a href="mailto:Marti.Buckner@co.maui.hi.us">Marti.Buckner@co.maui.hi.us</a>
59 Maveric Peiso	1	SGS Landscaping	
60 Paul Taylor	1	COM-	<a href="mailto:paul.taylor@co.maui.hi.us">paul.taylor@co.maui.hi.us</a>
61 Rick Long	1	Maui Ocean Stewards	<a href="mailto:longric@gmail.com">longric@gmail.com</a>
62 Rowena Dadag-And	1	COM- DPW	<a href="mailto:rowena.dagdag-andaya@co.maui.hi.us">rowena.dagdag-andaya@co.maui.hi.us</a>
64 Sue Kiang	1	COM- Parks	<a href="mailto:sue.kiang@co.maui.hi.us">sue.kiang@co.maui.hi.us</a>
65 Tara Owens	1	COM- Planning Dept	<a href="mailto:taram@hawaii.edu">taram@hawaii.edu</a>
66 Tony Panlasigui	1	KLMC	
67 Violet Espania	1	Homeowner	572-1982
68 Wes Nohara	1	WMSWCD	<a href="mailto:wmitno@hawaii.rr.com">wmitno@hawaii.rr.com</a>
69 Carole Berthianone	1	Master Gardener	<a href="mailto:nrgriider@hotmail.com">nrgriider@hotmail.com</a>
70 Kiley Adolpho	1	Princess Naihenaena School	<a href="mailto:kmadolpho@gmail.com">kmadolpho@gmail.com</a>
	49	35	

# EVALUATION FORM SUMMARY

## Maui Rain Garden Installation Clinic

### March 15-16, 2013

**N=34**

**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 know how to choose a proper site for a rain garden.	0%	3%	3%	35%	59%	0%	4.5
I know how to size a rain garden.	0%	0%	9%	44%	47%	0%	4.4
I know how to maintain a rain garden.	0%	0%	9%	21%	68%	0%	4.5
I know how to create a planting plan for a rain garden	0%	3%	18%	44%	35%	0%	4.1
I know the costs involved with installing a rain garden	0%	0%	21%	38%	38%	0%	4.1
I know how to correct standing-water problems in a rain garden.	0%	3%	15%	47%	35%	0%	4.1

**2. Strengths and Weaknesses:**

Which aspects of the workshop did you consider most beneficial?

- Rain garden construction (2)
- All the practical stuff
- The idea itself
- Purpose, location, and creation guide
- All (4)
- How a rain garden functions, siting and sizing a rain garden
- The whole process
- Introducing this concept to public and the "where" and "how" of it
- The manual and explanations
- Application and benefits of rain gardens
- Introducing concept then giving how to
- The training manual and informative presentation
- Hands on tests, power point, lecture, manual
- Having the different presenters present their expertise was a perfect blend of sharing their knowledge using relevant HI examples and considerations; they kept it simple and the book is #1
- Rain garden size calculation (2)
- Hawaii specific

- Good to integrate exercises to learn the process (2)
- Overall concept of rain gardens
- Well informed speakers
- Determining sites and sizing and testing soil infiltration
- How to size and plan a rain garden
- How to size a rain garden and general construction as well as maintenance
- Very interesting. Most beneficial - function of a rain garden and how easy to do it

Which aspects of the workshop did you consider least beneficial?

- All aspects were beneficial
- Maintenance - because I am already familiar with landscape maintenance - it was still very informative!
- The permit process (4)
- None (5)
- Pricing could have been gone over more (2)
- Sometimes difficult to hear some speakers
- Slides too dark to see, sometimes difficult to hear speaker with ambient noise in a big room. Moved too slow at times, I don't think that this had to be 3 hours.
- Some slides were too small / busy to see
- Beeping smoke detector, not your fault! Workshop was great
- Need more information on planting plan - what plants go where
- How to correct standing water

3. Did this workshop meet your expectations?  Yes  No **100% Yes**

4. Overall rating of the entire workshop:	<u>Poor</u>		<u>Good</u>		<u>Excellent</u>	<b>Avg. Response</b>
	1	2	3	4	5	
	0%	0%	3%	15%	82%	<b>4.8</b>

Other comments:

- Can slides included in print materials be made available on the website?
- In the next version of the manual, include more permitting, SHPD considerations.
- It's all about the water
- Great!!
- Great job! I found the information was presented clearly and the presenters did a great job keeping the workshop interesting! Thanks!
- More practical exercise
- Mahalo and thank you for including the public works information and planning department, very helpful
- Very nice workshop. Might have been even easier to follow if presentation was ordered same as manual. For example: we talked about slope after sizing which is opposite of the manual.
- I'm interested in seeing more of these workshops taking place in other towns.
- Mahalo! (4)
- Very interesting and insightful
- Found all the information beneficial. Great visual presentation in slideshow and manual. Mahalo!

- Hawaiian cultural: Pohaku removal or movement of the rocks. Landscapers do the majority, but they are educated in the Hawaiian protocols. Do the homeowners have any idea that they can't just back their trucks up to the beach / river beds and collect? What are DLNR rules, etc. I'm not sure myself, but it would be nice to respectfully bring this up and include in educational tools.
- Thanks for the coffee and snacks!
- The example slides "quiz" for siting rain gardens were very helpful as they helped participants apply the concepts and evaluate a site's appropriateness for a rain garden.
- Presenter team did a great job of making the topic accessible and engaging.
- Manual is AWESOME!!
- Info on permitting was helpful but would be good to get more concrete into that is less ambiguous - maybe create a chart or something to determine applicability? List of contacts / county divisions to check in with?
- Thank you for a very informative meeting (2)
- Great stuff! Thanks guys!
- Please consider contacting the Maui Association of Landscape Professionals (MALP) [malp.org](http://malp.org)  
Ken - HGP 877-6636 (Ken is the treasurer on the MALP board); it would be a great topic for a meeting that would capture even more of the landscape industry.

ALAN M. ARAKAWA  
Mayor

WILLIAM R. SPENCE  
Director

MICHELE CHOUTEAU McLEAN  
Deputy Director



COUNTY OF MAUI  
**DEPARTMENT OF PLANNING**

March 4, 2013

Ms. Tova Callender  
55 Konale Place  
Kihei, Hawaii 96753

Dear Ms. Callender:

**SUBJECT: SPECIAL MANAGEMENT AREA (SMA) MINOR PERMIT APPROVAL, SHORELINE SETBACK APPROVAL (SSA), AND ENVIRONMENTAL ASSESSMENT EXEMPTION (EAE) FOR THE RAIN GARDEN INSTALLATION, LOCATED AT THE WAHIKULI WAYSIDE PARK, LAHAINA, ISLAND OF MAUI, HAWAII; TMK: (2) 4-5-021:007 (SMX 2013/0026) (SM2 2013/0022) (SSA 2013/0014) (EAE 2013/0011)**

**SPECIAL MANAGEMENT AREA (SMA) MINOR PERMIT APPROVAL**

In response to your application received on January 15, 2013, and in accordance with the SMA Rules for the Maui Planning Commission (Commission), Sections 12-202-12 and 12-202-14, a determination has been made relative to the above project that:

1. The project is a development;
2. The project has a valuation not in excess of \$500,000.00;  
(Valuation: \$2,500.00)
3. The project has no significant adverse environmental or ecological effect, taking into account potential cumulative effects; and
4. The project is consistent with the objectives, policies, and SMA guidelines set forth in the Hawaii Revised Statutes (HRS), Chapter 205-A, and is consistent with the Countywide Policy Plan and Zoning.

**Pursuant to the aforementioned, you are hereby granted a SMA Minor Permit Approval (SM2 2013/0022), subject to the following conditions:**

1. That a State of Hawaii, Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD) approved Archaeological Monitoring Plan shall be implemented and strictly observed prior to commencement of any ground disturbing activities.

2. That all work shall immediately cease and the DLNR-SHPD office on Maui be contacted at (808) 243-5169 should any historical or archaeological artifacts be discovered during ground-altering activities.
3. That the project shall be in accordance with the description and plans submitted on January 15, 2013 and representations made to the Department of Planning (Department).
4. That the project shall be initiated by **March 31, 2014**, and shall be completed within one (1) year of said initiation.
5. That Best Management Practices (BMPs) shall be implemented to insure water quality and marine resources are protected. No construction materials should be stockpiled in the aquatic environment. All construction-related materials should be free of pollutants and placed or stored in ways to avoid or minimize disturbance. No debris, petroleum products or deleterious materials or wastes should be allowed to fall, flow, leach, or otherwise enter near shore waters. Any turbidity and siltation generated from activities proposed at the site should be minimized and contained in the immediate vicinity of construction through the use of effective silt containment devices. Construction during adverse weather conditions should be curtailed to minimize the potential for adverse water quality impacts. Appropriate measures to minimize dirt and water runoff, noise, and dust must be used.
6. That use of fertilizers, pesticides and herbicides for the proposed project is forbidden and any potential irrigation must be directed away from the shoreline.
7. That any green waste generated by the subject project shall be removed in a timely manner and shall not be allowed to accumulate on the subject parcel or where it may have an adverse impact.
8. That full compliance with all other applicable governmental requirements shall be rendered.

#### **SHORELINE SETBACK APPROVAL**

Further, in accordance with the *Shoreline Rules for the Commission* (Shoreline Rules), Sections 2-203-3, 12-203-4, 12-203-6, 12-203-11, 12-203-12, the Department provides you with the following analysis:

1. The proposed project may be partially occurring within the Shoreline Setback Area. All structures and activities in the shoreline setback area are subject to the restrictions provided for in the Shoreline Rules for the Commission, Chapter 12-203; and

Ms. Tova Callender  
March 4, 2013  
Page 3

2. The proposed project is allowed to be carried out within the Shoreline Setback Area as it has been determined by the Planning Director (Director) to be minor structure or minor activity.

**In consideration of the above determination, you are hereby granted a Shoreline Setback Approval (SSA 2013/0014).**

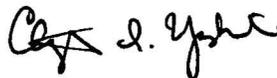
**ENVIRONMENTAL ASSESSMENT EXEMPTION**

Further, the proposed project was reviewed in accordance with Chapter 343, HRS, relative to Environmental Impact Statements because the proposed project involves the, "Use of shoreline area." Based on the scope of the proposed activity and the representations made by the Applicant, the Department has determined that the project qualifies as exempt from the preparation of an Environmental Assessment under: Class 4: "Minor alteration in the conditions of land, water or vegetation."

**Pursuant to the aforementioned, you are hereby granted an Environmental Assessment Exemption (EAE 2013/0011).**

Thank you for your cooperation. If additional clarification is required, please contact Staff Planner Anna Benesovska at [anna.benesovska@mauicounty.gov](mailto:anna.benesovska@mauicounty.gov) or at (808) 463-3867.

Sincerely,



CLAYTON I. YOSHIDA, AICP  
Planning Program Administrator

for WILLIAM SPENCE  
Planning Director

xc: Joseph W. Alueta, Acting Planning Program Administrator (PDF)  
Anna Benesovska, Staff Planner (PDF)  
ZAED (PDF)  
Development Services Administration  
CZM File (SMX/SM2/SSA)  
SSA File  
Project File  
General File

WRS:CIY:AB:cr

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