



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

STAFF SUBMITTAL

for the meeting of the
COMMISSION ON WATER RESOURCE MANAGEMENT

August 18, 2020
Honolulu, Hawai'i

Approval of the Pearl Harbor Water Shortage Plan
Approval/Modification of Permittee Water Shortage Plans
Delegation of Authority to the Chairperson to Approve or Modify Permittee Water Shortage
Plans and the Pearl Harbor Water Shortage Plan
'Ewa-Kunia, Waipahu-Waiawa, Waimalu, and Makaīwa Aquifer System Areas,
Pearl Harbor Aquifer Sector Area and Ground Water Management Area, O'ahu

SUMMARY OF REQUEST:

That the Commission on Water Resource Management (Commission) approve the Pearl Harbor Water Shortage Plan ('Ewa-Kunia, Waipahu-Waiawa, Waimalu, and Makaīwa Aquifer System Areas; Exhibit 1).

LEGAL AUTHORITY

State Water Code Section 174C-62, Hawai'i Revised Statutes (HRS), requires the Commission to formulate a plan for implementation during periods of water shortage in designated water management areas. As part of the plan, the State Water Code requires the Commission to adopt a reasonable system of permit classification according to the source of water supply, method of extraction or diversion, use of water, or a combination thereof. As part of the plan, the Commission may impose such restrictions on one or more classes of permits as may be necessary to protect the water resources of the area from serious harm.

The State Water Code provides that the Commission, by rule, may declare that a water shortage exists within all or part of an area when insufficient water is available to meet the requirements of the permit system or when conditions are such as to require a temporary reduction in total water use within the area to protect water resources from serious harm. In addition, the State Water Code requires the Commission to publish a set of criteria for determining when a water shortage exists.

The set of criteria for water shortage determination is established under §13-171-41 Hawai'i Administrative Rules (HAR). This rule specifies that the Commission can issue water shortage declarations for water management areas or portions of water management areas where the Commission has determined and publicly declared that usage has caused, or may cause within the foreseeable future, any of the following:

- Withdrawals that exceed the recharge;
- Declining water levels or heads;
- Deterioration in the quality of water due to increasing chloride content;
- Excessive waste of water which can be prevented; or
- A situation in which any further water development would endanger the ground-water aquifer or the existing sources of supply.

Administrative Rule 13-171-42(c) provides that all permittees, unless exempted by the Commission, shall submit a water shortage plan outlining how it will reduce its own water use in case of a shortage. Every water shortage plan shall be subject to approval or modification by the Commission.

In accordance with the above rule, all water use permits issued by the Commission are conditioned on the submittal of a water shortage plan within 30 days of permit issuance. Staff is recommending approval/modification occur at the time of the development of the regional plan for the water management area.

PEARL HARBOR WATER SHORTAGE PLAN

The proposed Pearl Harbor Water Shortage Plan (PHWSP) will govern water shortage conditions for all permitted uses of fresh and brackish water (chloride concentrations of up to 16,999 mg/L) in the entire Pearl Harbor Aquifer Sector Area, which has been designated as a ground water management area. The PHWSP will be consistently implemented for each of its four aquifer system areas (ASA) on an individual basis. There are currently no permitted uses of fresh or brackish water in the Makaīwa ASA; however, there is a salt water well within its boundaries. Makaīwa ASA is included in this plan as part of the Pearl Harbor Ground Water Management Area in the event that future fresh or brackish uses are developed.

Critical elements of this plan include:

- Development of objective criteria (triggers) for water shortage declaration.
- Formulation of a reasonable permit classification system.
- Establishment of water use reduction amounts for permitted uses in times of water shortage.

On May 19, 2020, the Commission was briefed on the draft Pearl Harbor Water Shortage Plan (PHWSP). The briefing is available at:

<https://www.youtube.com/channel/UCvFwARB6RhS5CLnaALNif3w>. No changes to the plan were requested. Following the briefing, the PHWSP was finalized and is attached as Exhibit 2.

I. Criteria for water shortage declaration

Due to the reliance on the Pearl Harbor Aquifer Sector Area as a major source of drinking water supply for the island of O‘ahu, the Commission has established and maintained a deep monitor well (DMW) network for the region to track changes in aquifer conditions over time. There are a total of six (6) DMWs in Pearl Harbor, two (2) in each of its ASAs, except for Makaīwa ASA, which does not have any DMWs. The Commission’s DMWs are generally located away from pumping centers; are monitored quarterly for water levels and conductivity; and have relatively long period of records.

General criteria that would trigger a water shortage declaration are outlined in §13-171-41 HAR. From these general criteria, specific, objective criteria were developed to provide aquifer-wide water shortage triggers. In addition to drought declarations by the U.S. Department of Agriculture and Honolulu Board of Water Supply (BWS), observed water levels in the Commission’s six (6) DMWs are a trigger.

Three incremental water shortage stages are assigned: Watch, Alert, and Warning. The thresholds for low water levels in the water shortage Watch, Alert, and Warning stages are outlined in Table 5 of the PHWSP as summarized below. Water level tolerances at DMW sites were determined by examining the water level records from each of the DMWs. The examination determined that water shortage conditions would be triggered by deviations from the average water levels for each deep monitor well. These standard deviations can vary from -1 to -3 with higher negative values representing a greater departure from average water levels, thereby indicating a greater severity of water shortage conditions. Please refer to Section 4 of the PHWSP for additional information and details on the triggers.

PHWSP Table 5. Triggers for Water Shortage Stages

Stage	Trigger(s)
Stage 1: Water Shortage Watch	<ul style="list-style-type: none"> • USDA (United States Department of Agriculture) Secretarial Drought Designation for the county containing ASA; or • -1 standard deviation from average water levels in one or more CWRM DMWs in an ASA for 2 quarterly measurements.
Stage 2: Water Shortage Alert	<ul style="list-style-type: none"> • -2 standard deviations from average water levels in one or more CWRM DMWs for 3 monthly measurements; or • BWS Declaration of low groundwater conditions.
Stage 3: Water Shortage Warning	<ul style="list-style-type: none"> • -3 standard deviations from average water levels in one or more CWRM DMWs in an ASA for 2 monthly measurements.

CWRM = Commission

II. Permit Classification System

The permit classification system is based on type of use. Public trust uses are prioritized. Table 6 in the PHWSP shows the permit classifications for the three priority levels. The permit classes will govern the percent reduction that will be imposed during a water shortage for ground water that is withdrawn from the ASA(s) for which a shortage has been declared. The percent reductions will be based on the last monthly water use report prior to declaration of Stage 2: Water Shortage Alert.

Compliance with the imposed reductions will be monitored through the Commission’s water use reporting program. When a water shortage is announced, permit holders will implement cutbacks of water use within their water system in accordance with the priority classes to meet the percentage required. Please refer Section 4.3 of the PHWSP for more information and detail.

PHWSP Table 6. Permit classifications

Priority Level	Water Use Permit Classification	Description of Water Use Permit Class
1	Domestic	Domestic permit class means a well that is used for individual personal needs and for household purposes such as drinking, bathing, heating, cooking, noncommercial gardening, and sanitation.
	Habitat Maintenance	Habitat Maintenance permit class means a well that is used to maintain sensitive, protected ecological habitats.
2	Municipal	Municipal permit class means a well that is used for domestic, industrial, and commercial use through public services available to persons of a county for the promotion and protection of their health, comfort, and safety; priority of this use in a water shortage is for domestic needs.
	Military	Military permit class means a well that is used by the United States military to supply its bases and their activities; priority of this use in a water shortage is for domestic needs.
3	Agricultural	Agricultural permit class is defined as a well that is used for the growing, processing, and treating of crops, livestock, aquatic plants and animals, and ornamental flowers and similar foliage.
	Industrial	Industrial permit class means a well of which uses include water used for fabrication, processing, washing, and cooling, and also includes water used by petroleum refineries and industries producing chemical products, food, and paper products.
	Golf Course	Golf Course permit class is defined as a well that is used to grow, maintain, and sustain golf course activities.

III. Water Use Reduction Amounts

Once a water shortage is announced, water reductions are implemented in accordance with PHWSP Table 7 below.

PHWSP Table 7. Water Use Reduction Amounts

Stage	Cutback
Stage 1: Water Shortage Watch	Not applicable, 0% cutbacks
Stage 2: Water Shortage Alert	Percent reduction: <ul style="list-style-type: none"> • Follows % in individual water shortage plan
Stage 3: Water Shortage Warning	Percent reduction by Well Use Priority: <ul style="list-style-type: none"> • Priority 1: Following % IWSP • Priority 2: 15% • Priority 3: 20%

During a Stage 1: Water Shortage Watch, water use reductions are recommended, but not required.

During a Stage 2: Water Shortage Alert, permittees should follow the reductions proposed in their individual water shortage plans. Any cutbacks in pumping will be based on the water use permit holder’s last reported monthly pumpage report before the Stage 2: Water Shortage Alert is declared. Permittees who have not submitted an individual water shortage plan, or those who have proposed less than a 5% reduction in use should be required to reduce their usage at least 5%. To protect the aquifer(s) and the permittees own abilities to use public trust resources to meet their needs, all users must commit to a reasonable temporary reduction in use. Pursuant to §13-171-42 HAR, every permit holder’s water shortage plan shall be subject to approval or modification by the Commission. Implementation of the individual water shortage plans, with a minimum of 5% reduction in use, is estimated to result in a 5-10% reduction in total aquifer withdrawals. Also at this time, the Commission will begin the rule making process to officially declare a water shortage by rule, which is a prerequisite to implementing the mandatory water cutbacks needed to respond to the most severe water shortage stage as outlined in §174C-62(b) HRS.

During a Stage 3: Water Shortage Warning, the most critical stage, reductions in use will be governed by the priority classes. Implementation of the use reductions in Table 7 will result in an estimated 15% reduction in total aquifer withdrawals. While it is uncertain if a 15% reduction in pumpage would be sufficient to protect and restore the groundwater resource, 15% is a starting point that was created based on other shortage plans and what seems attainable. Staff would have to watch monitoring data for aquifer response to the pumpage cutbacks. The impact and effectiveness of the proposed cutback regime will need to be evaluated and assessed to guide future plan updates. If the actions aren't sufficient to restore the resource, the Commission can declare a water emergency.

Additional information and details on the proposed water use reductions are found in Section 4.5 and Appendix 1 of the PHWSP.

IV. PHWSP Stages, Triggers, and Response Actions

Table 5 in the PHWSP summarizes the stages, triggers, and response actions for all water shortage stages.

PHWSP Table 5. PHWSP Stages, Triggers, and Response Actions



Stage	Trigger(s)	Action(s)
Stage 1: Water Shortage Watch	<ul style="list-style-type: none"> • USDA (United States Department of Agriculture) Secretarial Drought Designation for the county containing ASA; or • -1 standard deviation from average water levels in one or more CWRM DMWs in an ASA for 2 quarterly measurements. 	<ul style="list-style-type: none"> • Joint call for water conservation via press release with BWS; and • Begin regular coordination with BWS, DOH and other large water purveyors and partners on data and messaging; and • CWRM to begin increased data collection including more frequent DMW (deep monitoring well) monitoring from quarterly to monthly and following up with non-compliant reporters.
Stage 2: Water Shortage Alert	<ul style="list-style-type: none"> • -2 standard deviations from average water levels in one or more CWRM DMWs for 3 monthly measurements; or • BWS Declaration of low groundwater conditions. 	<ul style="list-style-type: none"> • WUP holders in the affected ASA to begin implementing their individual water shortage plans; and • CWRM staff to begin emergency rule-making process to declare a water shortage; and • Continued coordination with entities identified in the water shortage watch stage; and • Continue monthly monitoring of CWRM DMWs; and • Enforcement of the water use reporting requirement.
Stage 3: Water Shortage Warning	<ul style="list-style-type: none"> • -3 standard deviations from average water levels in one or more CWRM DMWs in an ASA for 2 monthly measurements. 	<ul style="list-style-type: none"> • CWRM to complete emergency rulemaking process to declare a water shortage; and • CWRM to require permit holders to reduce their pumpage according to the regional water shortage plan permit classification scheme (Table 6) based on the permit holders last reported monthly pumpage prior to the Stage 2 Water Shortage being declared; and • Continued coordination with entities identified in the water shortage watch stage; and • Continued enforcement of water use reporting requirement; and • Continue monthly monitoring of CWRM DMWs.

CWRM = Commission

NOTICE OF WATER SHORTAGE DECLARATION

The State Water Code requires that a water shortage notice is published in a prominent place in a newspaper of general in the area of water shortage impact. The notice must be published each day for the first week of the shortage and once a week thereafter until the declaration is rescinded. Additionally, the Commission shall cause each permittee in the area to be notified by mail of any restriction on the use of water for the duration of the water shortage. The Commission further intends to provide notice on its website and monthly bulletin.

ENFORCEMENT

Upon declaration of a Stage 2 – Water Shortage Alert or Stage 3 – Water Shortage Warning, pumpage at individual well sources is to be reduced according to PHWSP Table 7. Any cutbacks in pumping will be based on the water use permit holder’s last reported monthly pumpage report before the Stage 2 - Water Shortage Alert is declared.

Section 13-168-7(b), HAR, provides that “The owner or operator of any well or stream diversion works or battery of such water sources shall file a report of total water usage on a regular monthly (calendar or work schedule) basis to the commission on forms provided by the commission on or before the end of the month following the month for which water usage is to be reported. The reports may include other use-related information such as type of use, salinity, and water level, as may be deemed appropriate and reasonable by the commission”.

Section §13-168-3(a), HAR, further provides that “Any person who violates any provision of this chapter or any permit condition or who fails to comply with any order of the commission may be subject to a fine imposed by the commission. Such fine shall not exceed \$5,000 per violation. For a continuing offense, each day's continuance is a separate violation”.

The Commission continually enforces the water use permit reporting requirement. Under a declaration of Stage 2: Water Shortage Alert or Stage 3: Water Shortage Warning, the Commission will step up its enforcement and carefully monitor reported water use with random spot checks of water use permit holder meter readings. Pursuant to Sections 13-168-3 and 13-168-7, HAR, fines may be imposed for failure to timely report water use. The requirement for filing monthly water use reports is also a standard condition of a water use permit, and under Section 174C-58, HRS, enforcement actions could also include revocation or suspension of a permit holder’s water use permit.

RESCINDING WATER SHORTAGE DECLARATION

A water shortage will end when the triggers in Table 5 are no longer applicable, water supply levels return to normal, and aquifer volumes are sufficient to meet the requirements of the permit system. At this time, the Commission should issue a press release and/or public notice (in the same location as previous updates) and a notice to permittees that the water shortage event has ended while still encouraging the public to maintain water efficiency practices. If the water shortage advanced into Stage 3: Water Shortage Warning, the Commission will also need to repeal the water shortage emergency rule that was enacted, pursuant to §174C-62(d) HRS.

“LIVING DOCUMENT” APPROACH

The permitted uses identified in Appendix 2 of the PHWSP are a snapshot-in-time. As time goes on, new permits may be issued, water use permit transfers may occur, and current permitted uses may be modified or revoked. In order to keep the plan current and relevant in the event that a water shortage occurs, staff recommends that the Commission adopt a "living document"

approach by delegating the authority to the Chairperson to approve or modify individual water shortage plans and update the regional water shortage plan, provided that the update is consistent with the policies and framework laid out in the PHWSP (i.e., permit classification system, percent reduction amounts, and IWSP modification/approval criterion).

ENVIRONMENTAL REVIEW (CHAPTER 343)

This planning study is exempt from the application of Chapter 343 HRS pursuant to §343-5(b) HRS and §11-200.1-8(a)(2) HAR. This is for a planning-level study and will not involve testing or other actions that may have a significant impact on the environment.

RECOMMENDATION:

Staff recommends that the Commission:

1. Approve the Pearl Harbor Water Shortage Plan for the Pearl Harbor Ground Water Management Area, attached as Exhibit 2.
2. Modify individual water shortage plans to require a 5% reduction in actual pumpage reported at the time that a Stage 2: Water Shortage Alert is declared for those permittees who have:
 - a. Not submitted an individual water shortage plan
 - b. Submitted an individual water shortage plan that does not include a percent reduction or that indicates a reduction of less than 5%.
3. Approve the individual water shortage plans for those permittees who have indicated a water use reduction greater than or equal to 5%.
4. Adopt a "living document" approach by delegating the authority to the Chairperson to approve or modify individual water shortage plans and the regional water shortage plan as new permits are issued or modified, provided that the update is consistent with the policies and framework laid out in this plan. Staff shall provide a report to the Commission on any revisions to the regional water shortage plan at least once every five years.

Ola i ka wai,




M. KALEO MANUEL
Deputy Director

Exhibits

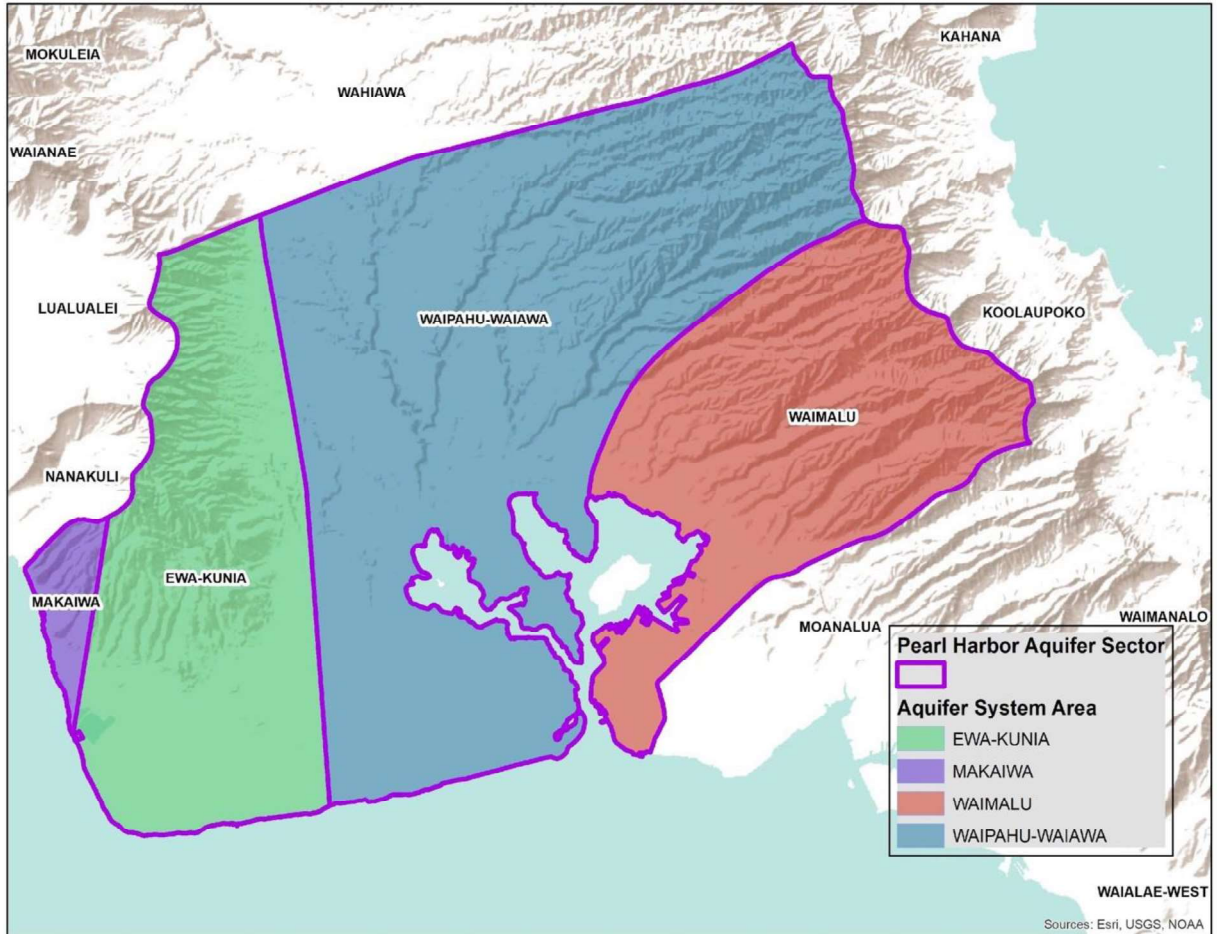
1. Location Map of the Pearl Harbor Aquifer Sector Area and Ground Water Management Area (‘Ewa-Kunia, Waipahu-Waiawa, Waimalu, and Makaīwa Aquifer System Areas)
2. Pearl Harbor Water Shortage Plan

APPROVED FOR SUBMITTAL:



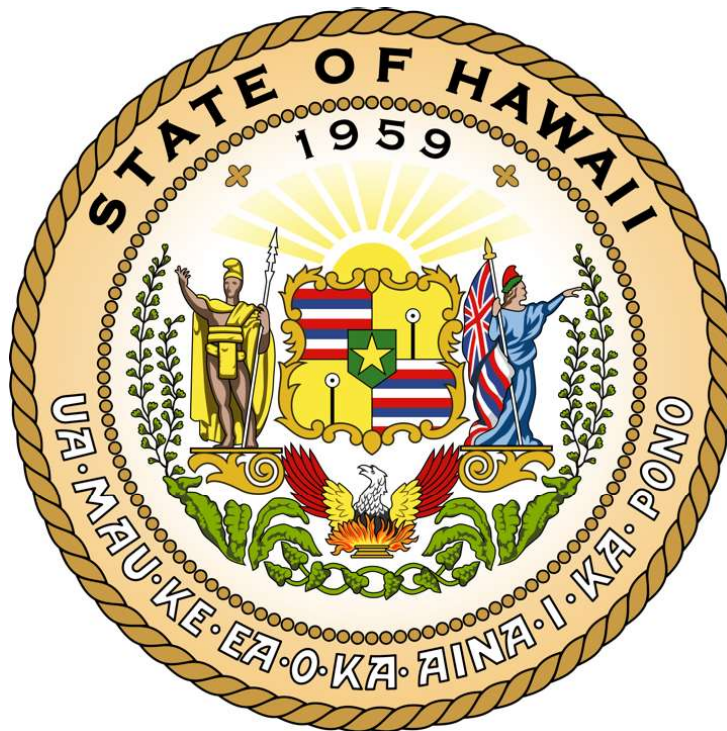
SUZANNE D. CASE
Chairperson

Pearl Harbor Aquifer Sector Area



Pearl Harbor Water Shortage Plan

August 2020



Prepared for:
State of Hawai'i Department
of Land & Natural Resources
Commission on Water
Resource Management

Prepared by:
One World One Water, LLC
Connecting Engineering and
Policy



Table of Contents

1.	Background and Overview	6
1.1.	Water Shortage Plan Purpose and Scope	6
1.2.	Plan Objectives	7
1.3.	Plan Methodology and Development	7
1.4.	Rules and Regulations	8
1.5.	Relationship of Plan to Water User Permittees Including the Municipal Water Utility	9
1.6.	Relationship to Other Plans	9
1.7.	Water Shortage Planning in Other Regions	11
2.	Water Sources and Supply	14
3.	Water Use Permits and Individual Water Shortage Plans	14
4.	Water Shortage Implementation Plan	15
4.1.	Water Shortage Triggers, Stages, and Response	15
4.1.1	Water Shortage Triggers	16
4.1.2.	Stage 1 - Water Shortage Watch	22
4.1.3.	Stage 2 - Water Shortage Alert	22
4.1.4.	Stage 3 - Water Shortage Warning	23
4.2.	Threats to Water Quality	24
4.3.	Water Use Classifications	25
4.4.	Public Trust Uses	26
4.5.	Water Cutback Scenarios	28
4.6.	Rescinding Water Shortages	29
5.	Public Outreach and Awareness	30
6.	Enforcement	30

List of Tables

Table 1. Review of 12 Water Shortage Plans.....	12
Table 2. Review of 12 Water Shortage Plans Continued.....	13
Table 3. Permit Holders Without IWSPs	15
Table 4. Permit Holders With IWSP Proposing <5% Water Use Reduction.....	15
Table 5. Water Shortage Stages, Triggers, and Actions.....	24
Table 6. Water Use Permit Classification.....	26
Table 7. Water Shortage Cutback Scenarios.....	29

List of Figures

Figure 1. Pearl Harbor Aquifer Sector Area	7
Figure 2. Hawai'i Water Plan.....	10
Figure 3. Cross Section of Deep Monitor Wells	17
Figure 4. Deep Monitor Wells (DMW) in Pearl Harbor Aquifer.....	18
Figure 5. Standard Deviation Low Water Level Thresholds.....	18
Figure 6. Kunia Mauka DMW Water Levels	19
Figure 7. Kunia Middle DMW Water Levels.....	20
Figure 8. Waipio Mauka DMW Water Levels.....	20
Figure 9. Waipahu DMW Water Levels.....	21
Figure 10. Waimalu DMW Water Levels.....	21
Figure 11. Hālawā DMW Water Levels	22

Appendices

Appendix 1: Water Cutback Scenarios Summary Tables	32
Appendix 2: Individual Water Shortage Plans Review	33
Appendix 3: 12 Water Shortage Plans Reviewed	38
Appendix 4: Submitted Individual Water Shortage Plans	39

List of Acronyms

ASA	Aquifer System Area
BWS	Board of Water Supply (Honolulu, Oahu)
CWRM	State Commission on Water Resource Management
CWRM DMW	CWRM's Deep Monitoring Well
DHHL	Department of Hawaiian Home Lands
DMW	Deep Monitoring Wells
DOH	State Department of Health
DOH HEER	Hawai'i Department of Health's Hazard Evaluation and Emergency Response
HAR	Hawai'i Administrative Rules
HRS	Hawai'i Revised Statutes
IWSP	Individual Water Shortage Plan
MGD	Million Gallons Per Day
MPTZ	Midpoint Transition
USDA	United States Department of Agriculture
TTZ	Top of Transition
WUP	Water Use Permits

Definitions

Aquifer Sector Area: Regions that reflect broad hydrogeological similarities while maintaining hydrographic, topographic, and historical boundaries where possible.¹

Aquifer System Area: A smaller sub-region that is delineated within Aquifer Sector Areas based on hydraulic continuity and related characteristics and which is the basic ground water hydrologic unit.²

Individual Water Shortage Plan*: A plan in which each water use permittee is required by rule to submit as a condition of the water use permit based on evaluation and review of his/her own water system and needs. This plan determines the percent reduction (a quantitative amount) of water use that a permit holder will volunteer to reduce from actual monthly water use in the event of a water shortage condition within the aquifer.

Regional Water Shortage Plan*: A plan that is developed by the State Commission on Water Resource Management (CWRM) for implementation during periods of water shortage. As part of the plan, the CWRM shall adopt a reasonable permit classification system. The plan may impose such restrictions on one or more classes of permits as may be necessary to protect the water resources of the area.

Water Management Area: A geographic area which has been designated pursuant to Section 174C-41, HRS, as requiring management of the ground or surface water resource, or both.³

Water Use Classification Hierarchy or Hierarchy of Use*: The established hierarchy and priority of water uses based on the water use permit classification system for the aquifer sector and each of its aquifer systems.

Water Use Permit Holder*: A person or company who holds a current approved water use permit from the CWRM.

*Definitions were created specifically for this plan.

¹ Water Resource Protection Plan, 2008. State of Hawai'i Commission on Water Resource Management, http://files.hawaii.gov/dlnr/cwrmp/planing/wrpp2008update/FINAL_WRPP_TOC.pdf.

² Water Resource Protection Plan, 2008. State of Hawai'i Commission on Water Resource Management, http://files.hawaii.gov/dlnr/cwrmp/planing/wrpp2008update/FINAL_WRPP_TOC.pdf.

³ State Water Code. State of Hawai'i, <http://files.hawaii.gov/dlnr/cwrmp/regulations/Code174C.pdf>.

1. Background and Overview

1.1. Water Shortage Plan Purpose and Scope

Droughts, changes in water quality, overpumping, or technical issues can all result in a water shortage. To prepare for water shortage situations, the State Water Code, Chapter 174C, Hawai'i Revised Statutes (HRS) and Title 13 of the Hawai'i Administrative Rules (HAR) has directed the Commission on Water Resource Management (CWRM) to develop a water shortage plan for all water management areas to be implemented in the event that the CWRM finds that insufficient water is available to meet the requirements of the permit system or when conditions are such as to require a temporary reduction in total water use within the area to protect water resources from serious harm.

Due to the reliance on the Pearl Harbor Aquifer Sector Area as a major source of drinking water supply for the island of Oahu, the CWRM is prioritizing the development of a water shortage plan for this sector. This water shortage plan is developed specifically for implementation during periods of water shortage within the Pearl Harbor Aquifer Sector Area. It establishes policies for water use reductions to protect the integrity and health of our groundwater resources for as long as water shortage conditions exist. The Pearl Harbor Aquifer Sector Area (see Figure 1) consists of four aquifer system areas (ASA): the Waipahu-Waiawa Aquifer System Area, the Waimalu Aquifer System Area, the 'Ewa-Kunia Aquifer System Area, and the Makaīwa Aquifer System Area. This plan will govern water shortage conditions for all permitted uses of basal fresh and brackish water (chloride concentrations of up to 16,999 mg/L) in the entire Pearl Harbor Aquifer Sector Area and will be consistently implemented for each of the aquifer system areas on an individual basis. There are currently no permitted uses of fresh or brackish water in the Makaīwa Aquifer System Area; however, there is a saltwater well permit within its boundaries. Makaīwa Aquifer is included in this plan as part of the Pearl Harbor Aquifer Sector Area in the event that future fresh or brackish water uses are developed.

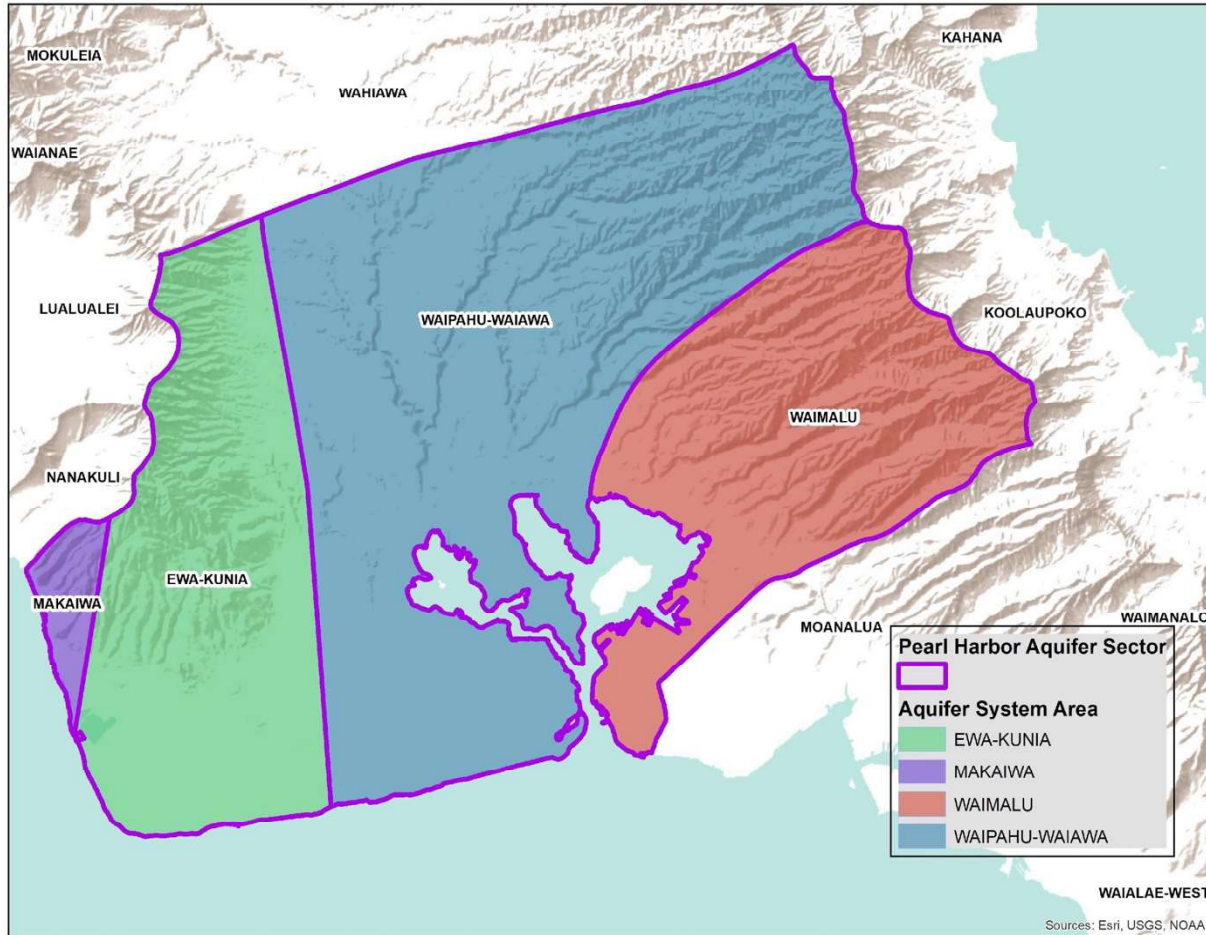


Figure 1. Pearl Harbor Aquifer Sector Area

1.2. Plan Objectives

The objective of this plan is to meet the requirements set forth in the State Water Code by developing policies and procedures to address water shortage conditions to protect groundwater resources in the Pearl Harbor Aquifer Sector Area and System Areas from serious harm, and to guide the CWRM in responding during water shortage conditions in these designated water management areas. Critical elements of this plan include:

- Development of objective criteria (triggers) for water shortage declaration;
- Formulation of a reasonable permit classification system; and
- Establishment of policies to reduce water use in times of water shortage.

1.3. Plan Methodology and Development

In order to create a water shortage plan specifically for the Pearl Harbor Aquifer Sector and its aquifer system areas, a process was developed in coordination with the CWRM staff. This started with reviewing both in-state and out of state water shortage plans (discussed in Section 1.7) to better understand the triggers used in other regions, enforcement practices, and public engagement techniques that make a water shortage plan successful. Next, applicable rules and regulations were reviewed in order to

understand the context of a sector specific water shortage plan within overarching water policies within the State of Hawai'i (Section 1.4).

A review of current individual water shortage plans, required of each water use permittee under Section 13-171-42(c), HAR, was also completed to identify which permittees had not submitted the required individual water shortage plan indicating how they proposed to reduce their water use in case of a water shortage. Meetings with water use permit holders were then held to discuss a water use permit classification system.

After consolidating all applicable background information, meetings were held with CWRM staff, Honolulu Board of Water Supply (BWS), and the U.S. Navy which are the largest water users in the sector. BWS also has regulations covering low groundwater level conditions. The purpose of these meetings was to analyze applicable triggers and possible responses to those triggers. Hawai'i Department of Health (DOH) was also engaged to coordinate on water quality driven water shortages.

Water shortage cutback scenarios were then reviewed to ensure that this plan proposes sufficient conservation requests during a shortage event. Discussions were held on potential public outreach mechanisms, and the plan was reviewed during a briefing with the CWRM. A draft plan was distributed to all permit holders, the Hawaii State Attorney General's Office, Department of Hawaiian Home Lands, Office of Hawaiian Affairs, and the Department of Health. The plan was then revised based on comments received.

1.4. Rules and Regulations

Under the Hawai'i State Constitution and through the administration of the State Water Code, the CWRM is the State of Hawai'i's (State) primary trustee responsible for protecting and enhancing the State's water resources, and the Hawai'i Department of Health is the primary trustee related to water quality. The CWRM is required to implement and conduct comprehensive water resource planning in its regulation and management of water resources, including the formulation of water shortage plans in designated water management areas. The CWRM's legal authority to formulate water shortage plans are found in Section 174C-62, HRS, and Sections 13-171-40 to -44, HAR (Hawai'i Administrative Rules). In accordance with this authority the CWRM may *"declare that a water shortage exists within all or part of an area when insufficient water is available to meet the requirements of the permit system or when conditions are such as to require a temporary reduction in total water use within the area to protect water resource from serious harm"*.⁴

Section 13-171-41, HAR, provides the following general criteria for water shortage declaration:

- (1) Withdrawals that exceed the recharge;
- (2) Declining water levels or heads;
- (3) Deterioration in the quality of water due to increasing chloride content;
- (4) Excessive waste of water which can be prevented; or
- (5) A situation in which any further water development would endanger the groundwater.

Both the State Water Code and Section 13-171, HAR, require the CWRM to adopt a reasonable system of permit classification according to source of water supply, method of extraction or diversion, use of water, or a combination thereof. Upon declaration of water shortage, the CWRM may impose such restrictions

⁴ State Water Code. State of Hawai'i, <http://files.hawaii.gov/dlnr/cwrm/regulations/Code174C.pdf>.

on one or more permit classifications as may be necessary to protect the water resources of the area from serious harm and to restore them to their previous condition.

This plan is an action plan that will govern water use reductions by water use permit holders during water shortage conditions in accordance with the requirements of the State Water Code. This plan outlines predetermined actions that may be implemented in a water shortage situation on an aquifer-wide basis or individual aquifer system basis. The criteria (triggers) for determining when a water shortage condition exists are further discussed in Section 4.

1.5. Relationship of Plan to Water User Permittees Including the Municipal Water Utility

Protecting groundwater resources during a water shortage impacts all those dependent on the use of groundwater. However, the primary management measures during a water shortage apply to water use permit holders: those that are extracting the groundwater resources. This water shortage plan is concerned with the health of the aquifer and the sustainability of permitted groundwater withdrawals. The State Water Code, Section 174C-48(b), HRS, states, *“In its regulation of water resources in designated water management areas, the commission shall delegate to the county boards of water supply the authority to allocate the use of water for municipal purposes, subject to the limits of water supply allocated to the county boards of water supply in their role as water purveyors.”*⁵ As such, the CWRM will closely coordinate with the BWS and other water use permit holders that purvey the allocated water to end users to ensure consistent messaging is communicated during a water shortage for all users, but will not be prescribing the individual response actions for each end user or how each water use permittee has to communicate to its end users.

The CWRM will coordinate with water use permit holders’ existing rules and regulations, including BWS, on implementation of their water use restrictions. BWS is by far the largest water user in the Pearl Harbor Aquifer Sector Area, and customers who receive water from BWS must comply as well with their Rules and Regulations, including Section 3-318: Low Groundwater Level Conditions, 3-319: Mandatory Restrictions Related to Alert Low Groundwater Condition, 3-320: Mandatory Restrictions Related to Critical Low Groundwater Conditions, 3-321: Penalties, 3-322: Procedures for Control of Water Use During Low Groundwater Level Conditions, and 3-323: Exemption of Private Wells Within Designated Groundwater Control Areas.⁶ BWS’s Rules and Regulations outline their phases of low groundwater conditions along with responses, enforcement, rate changes, and exemptions.

1.6. Relationship to Other Plans

Water shortage plans are designed to provide relevant data, details on water availability, and a communications strategy that are specific to the plan’s location. The Pearl Harbor Water Shortage Plan was developed through interviews with water use permittees and the Department of Health and research on water shortage plans in other areas. It has resulted in a plan that leverages best practices (those that were used consistently throughout the researched plans) and local conditions to provide water shortage declaration triggers and applicable responses in times of water scarcity.

Water shortage plans are action plans that focus on responding to short term water shortage conditions, as per Section 174C-62, HRS, and Sections 13-171-40 to -44, HAR. The broader planning framework to protect, conserve, and manage water is the Hawai’i Water Plan (see Figure 2). Water shortage planning is

⁵ State Water Code. State of Hawai’i, <http://files.hawaii.gov/dlnr/cwrm/regulations/Code174C.pdf>.

⁶ BWS Rules and Regulations. Board of Water Supply, <https://www.boardofwatersupply.com/about-us/rules-and-regulations>

integrated into the broader planning framework through Appendix 10.1 to 10.3 of the Water Resource Protection Plan (which is part of the Hawai'i Water Plan).

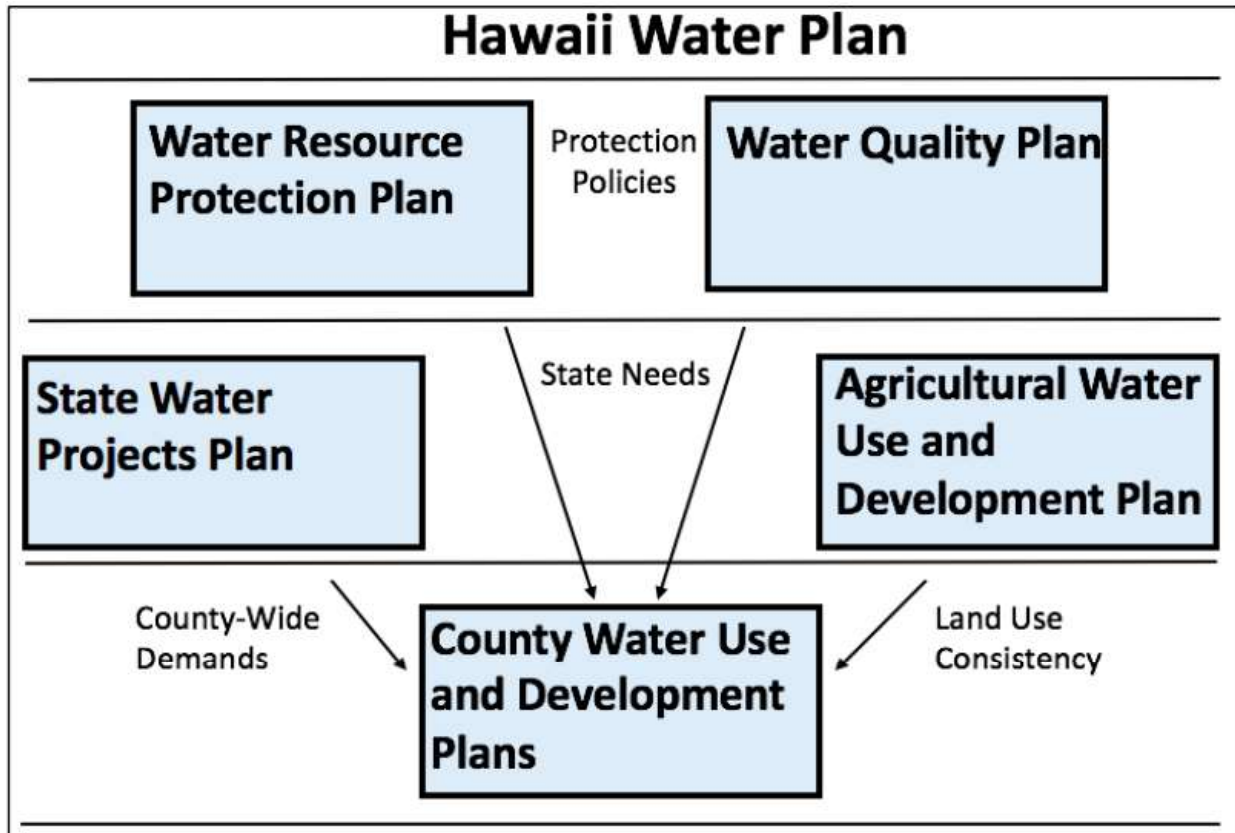


Figure 2. Hawai'i Water Plan.

Droughts can result in a water shortage and as such the Pearl Harbor Water Shortage Plan is consistent with the Hawai'i Drought Plan, which was most recently updated in 2017⁷. The Hawai'i Drought Plan is coordinated by the CWRM and the Hawai'i Drought Council, and acts as a 'living document' designed as an informative guide to help prepare for and reduce the negative impacts that drought conditions cause for the State of Hawai'i. The Hawai'i Drought Plan specifically emphasizes drought mitigation as a proactive approach to monitor and prepare for drought conditions. When differentiating between droughts and water shortages, a drought is a prolonged period of abnormally low rainfall, while a water shortage occurs when the water in an area is insufficient in providing for a region's demand, which may include drought (among other things). The Hawai'i Drought Plan was designed to improve the coordination and implementation of drought management strategies for the State of Hawai'i. It provides methods for drought monitoring, forecasting, impact assessments, and strategies for planning for the effects of the drought and mitigation of these effects. The updated Drought Plan highlights the progress that has been made with drought planning, particularly regarding the implementation of specific recommended actions. It includes information on both the short-term, immediate response actions to address imminent drought impacts and the long-term, ongoing, mitigation actions that will help prepare for future drought occurrences. The US Drought Monitor is the primary tool used to designate a drought in Hawai'i. The Drought Plan was designed to provide a coordinated framework to reduce the impact of

⁷ Hawaii Drought Plan. State of Hawai'i, <https://files.hawaii.gov/dlnr/cwrm/planning/HDP2017.pdf>.

human suffering and property losses during drought, while the purpose of water shortage planning is primarily to protect water resources. Drought designations are included in this Pearl Harbor Water Shortage Plan as an early trigger to watch for water shortages.

This plan is also consistent with the State Water Code, which seeks to obtain the maximum beneficial use of waters in Hawai'i for domestic, aquaculture, irrigation, agriculture, power development, and commercial and industrial uses, while providing for public interest objectives and prioritizing public trust uses of water.⁸ Beyond the extent of this water shortage plan, the State Water Code also provides for the declaration of a water emergency, if the restrictions imposed under the water shortage plan are not sufficient in protecting public health, safety, or welfare, or the health of animals, fish, or aquatic life, public water supply, recreational, municipal or agricultural use, or any other reasonable use. The CWRM may declare a water emergency in both designated and non-designated water management areas and may issue orders emphasizing the existence of an emergency and the declaration of any orders that are deemed necessary⁹. These measures can include apportioning, rotating, limiting, or prohibiting the use of water resources within an area.



As stated earlier, each water use permit holder within the sector area also has to provide to the CWRM what they can individually limit voluntarily during a water shortage. These commitments are referred to as individual water shortage plans (IWSP). After each permittee evaluates their water system and needs, they determine a quantitative percent reduction that can be accommodated during a water shortage condition. Each IWSP is subject to approval or modification by the CWRM, pursuant to Section 13-171-42(c), HAR. Section 3 and Appendix 4 outlines the individual water shortage plans for water use permittees within the Pearl Harbor Aquifer Sector Area including those that are recommended for modification. Proposed modifications are also discussed in Section 3.

1.7. Water Shortage Planning in Other Regions

Water shortage plans are commonly used tools that help cities, states, and utilities prepare for the impacts of droughts, extreme service disruptions, disasters, and water quality issues. They are generally designed to determine the need for a water shortage declaration and inform the actions that will alleviate the pressures from that shortage. With multiple regions in the United States developing water shortage plans, a lot can be learned from the triggers, rules and regulations, enforcement practices, public engagement techniques, and monitoring approaches that each plan represents.

⁸ State Water Code. State of Hawai'i, <http://files.hawaii.gov/dlnr/cwrm/regulations/Code174C.pdf>.

⁹ State Water Code. State of Hawai'i, <http://files.hawaii.gov/dlnr/cwrm/regulations/Code174C.pdf>.

Forecasting the severity of a water shortage is challenging for even the most sophisticated utility. When attempting to define triggers and stages, the factors most commonly used in other plans include water table levels, streams or reservoir storage levels, weather forecasts, water quality, precipitation records, and supply information. In the twelve water shortage plans reviewed (see Appendix 3), the following table (Table 1) shows the percent of times each type of trigger was used. **Triggers are uniquely defined for each shortage plan, depending on the available data and the needs of the water users**, but in most plans it was recognized that governing bodies can declare a water shortage regardless of triggers if it is assumed that supplies are not sufficient to meet the demands of water customers. Besides water quantity, **water quality can also be an important factor in determining water shortages** and therefore triggers sometimes include chloride levels.

Triggers are based on:	Frequency used:
Groundwater head levels fall below a certain schedule	17%
Chloride levels	17%
Demand is expected to exceed supply	50%
Withdrawals exceed sustainable yield	8%
Probability of reaching reservoir storage level	8%
US Drought Monitor	25%
Percent increase in seasonal pumping times	8%

Table 1. Review of 12 Water Shortage Plans

Some drought plans also include details on reverting back from water shortage conditions. The State of Colorado, for example, considers drought implementation a cycle: looping from monitoring, to Phase 1, Phase 2, Phase 3, and then back to Phase 2 and eventually Phase 1. They include triggers for returning to lower phases and the appropriate actions for when this happens. **Including steps for when water shortage conditions improve can help provide the most seamless coordination after an event.**

The regulations and responses that result from each trigger depend on the location, including the type of customers being served, any conservation goals, and the largest water users in that region. **Responses are usually broken into mandatory or voluntary responses**, starting with a request for conservation as the initial appeal to consumers. Restrictions found in the various water shortage plans reviewed include:

- Limits on outdoor watering
- Elimination of over-seeding
- Water use for public health and safety only
- Limits on personal washing of vehicles
- Increase cooling tower cycle concentrations
- Allot water supply quantities per person
- Restrictions on filling swimming pools and fountains
- Convert parks to more efficient designs
- Prohibit spray irrigation

Enforcement is also a key aspect of water shortage planning, and **notable in the plans reviewed was a penalty or rate change to help enforce mandatory water restrictions**. BWS, for example, has a surcharge schedule for excess water use that can be established for critical low groundwater conditions. They can also use warnings and citations for violations of mandatory restrictions and if warranted, violators may be subject to the installation of flow restriction devices (paid for by the offender). Other locations use penalties, increasing in amount for each offense. Final offenses often result in discontinuance of service. A 2006 study by Virginia Polytechnic Institute that examined the effectiveness of drought management plans in reducing residential water use showed the importance of public outreach and enforcement.

According to the study, **aggressive information and enforcement results in a 22% estimated change in water use compared to a 5% reduction for low information and low enforcement.**¹⁰ Programs have also highlighted the importance of incorporating a mechanism for reporting violations. The following table shows the percent of occurrence for various enforcement techniques used in the plans reviewed.

Response	Frequency Used
Voluntary restrictions	75%
Mandatory restrictions	92%
Penalties or fines for not reducing consumption	50%
Rate surcharges during water shortage events	83%
Percent demand reduction goal	75%
Discontinuance of service for not complying	50%
Water allocations per customer	42%

Table 2. Review of 12 Water Shortage Plans Continued

As shown in the 2006 Virginia Polytechnic Institute study, **public outreach and information is a critical aspect of promoting conservation measures.** Each plan reviewed showed some form of public outreach when water shortages occur, from social media to newspapers to outreach letters. Some locations even utilize a telephone alert system to share the news with their constituents. Consistent messaging is key, and it often helps for agencies (if there are multiple organizations involved in outreach) to align their messaging so that the public is not confused on which tactics to perform.

After a water shortage, to understand if the measures used were helpful to combat the impacts, **multiple locations have in place a way of measuring effectiveness.** Public opinion polls are popular in testing the methods used for outreach and tracking system-wide consumption can provide data on how much a region conserved during a water shortage event. **Understanding how successful the measures of a water shortage plan are will help guide any regulation changes or future plan updates.**

Overall, a lot can be learned from reviewing the water shortage plans of other locations. **Clearly defining triggers and responses** is the most common thread throughout each plan, but each has takeaways that have helped inform the update of the Pearl Harbor Water Shortage Plan. The lessons learned that have specifically helped influence the content of this plan include:

- Develop the most efficient and widespread public outreach campaign.
- Plan for smoothly rescinding water shortage restrictions after the event.
- Define plans for water shortage enforcement including penalty fines for multiple offenses.
- Keep records at the end of any water shortage event to measure effectiveness and make changes to the process as needed.
- Include water quality as a factor in determining water shortage events.
- Develop detailed triggers that are specific to Hawai'i and vetted by key local stakeholders.
- Include voluntary measures at preliminary stages followed by more extreme, mandatory measures if conditions worsen. Recommend that water purveyors encourage water conservation measures such as prohibiting spray irrigation or reducing outdoor water usage.

¹⁰ *The Effectiveness of Drought Management Programs in Reducing Residential Water-Use in Virginia*, 2006. Virginia Polytechnic Institute and State University Blacksburg, https://vtechworks.lib.vt.edu/bitstream/handle/10919/49475/VWRRC_sr200629.pdf?sequence=1.

The most valuable lesson learned, however, is that **water shortage plans should be specific to their location**, taking into consideration the geography, hydrology, and resources that make each location unique. Since Hawai'i's is an island chain in the Pacific, localizing water shortage measures has been a key aspect of developing this plan.

2. Water Sources and Supply

The Pearl Harbor Aquifer Sector Area is located in central O'ahu. It is bounded by the Wai'anae Aquifer Sector Area to the west, the Central Aquifer Sector Area to the north, and the Windward and Honolulu Aquifer Sector Areas to the east and southeast (see Figure 1). The Pearl Harbor Aquifer Sector Area is comprised of four aquifer system areas: the Waipahu-Waiawa Aquifer System Area, Waimalu Aquifer System Area, the 'Ewa-Kunia Aquifer System Area, and the Maka'iwa Aquifer System Area. The Maka'iwa Aquifer System Area does not currently have any permitted fresh or brackish groundwater uses; however, there is a salt water well permit within its boundaries. Maka'iwa Aquifer is included in this plan should there be new permitted fresh or brackish water uses in the future. The location and boundaries of the aquifer system areas within the Pearl Harbor Aquifer Sector Area are shown on Figure 1.

With a sustainable yield of 166 million gallons per day (mgd), the Pearl Harbor Aquifer Sector Area has the largest sustainable yield of the six aquifer sectors on O'ahu. The Waipahu-Waiawa Aquifer System Area has the highest sustainable yield of the sector's three aquifer systems with 105 mgd. The Waimalu Aquifer System Areas has a sustainable yield of 45 mgd and the 'Ewa-Kunia is allotted 16 mgd. The Pearl Harbor Aquifer Sector Area supplies the major portion of municipal water on O'ahu.

3. Water Use Permits and Individual Water Shortage Plans

As of May 2020, there are 78 active water use permits (WUP) within the Pearl Harbor Aquifer Sector Area, which include 38 WUP held by BWS and 38 are held by other permittees with a collective allocation of 149 mgd. As previously stated, the sustainable yield for the aquifer sector area is estimated at 166 mgd. Each of these WUP holders is required to submit an individual water shortage plan outlining the percent reduction of water use that will be implemented during a water shortage. There have been multiple outreach efforts by the CWRM, primarily through mailing letters (between 1998 and 2020), to request the submission of IWSPs that outline the voluntary percent reduction.

Of the 38 WUP, excluding BWS, 32 have submitted responses and 6 continue to have no plan. See Table 3 for a summary of the permittees without a plan. While it is included as a condition of all water use permits, submission of an IWSP is to the permittees' benefit, as it is their opportunity to volunteer what they can do to help protect the resource in times of water shortage. Therefore, instead of approaching the lack of compliance with this water use permit condition as a permit enforcement issue, it is recommended that the CWRM impose a water use reduction of 5% for these permit holders during a water shortage event. A reduction of 5% is considered reasonable and achievable for even the most efficient systems, as everyone must do their part to alleviate aquifer pumping stress.

Pursuant to Section 13-171-42, HAR, each individual water shortage plan shall be subject to approval or modification by the CWRM. Of the submissions of individual water shortage plans, some respondents submitted IWSP with practices that they would implement during a water shortage for conservation without defining a percentage while others gave no percent reduction or a very low percent reduction (i.e., less than 5%). In order to achieve a temporary reduction in total water use to protect the groundwater resources from serious harm and to effectively manage and monitor water usage during a shortage in compliance with each permittee's IWSP, a percent reduction is preferred. These permit

holders are outlined in Table 4. It is recommended that these IWSPs be modified to reflect at least a minimum of 5% voluntary reduction during a water shortage.

The complete list of water use permits and their distribution between the three aquifer systems can be found in Appendix 2. Appendix 4 contains IWSPs that have been submitted by water use permit holders.

Water Shortage Plan	Water Use Permit #	Water Use Category	Well Name	Allocation (mgd)	Aquifer System Area
Lau Taro Farm	65	Agricultural	Lau Farm 2356-070	0.1	Waimalu
Kipapa Acres Association of Owners	642	Agricultural	Kipapa Gulch 2600-002	0.1	Waipahu-Waiawa
Taba Farm, Inc	749	Agricultural	2358-21, 22, 26, 29	0.864	Waipahu-Waiawa
Dr. Horton- Schuler Homes, LLC	805	Municipal	Multiple wells	7.969	Waipahu-Waiawa
Hoban E&C USA, Inc	902	Golf Course Irrigation	2301-01 - 2301-10	0.95	Waipahu-Waiawa
The Queens Medical Center	1085	Other	2201-003	0.18	Waipahu-Waiawa

Table 3. Permit Holders Without IWSPs

Water Shortage Plan	Water Use Permit #	Water Use Category	Well Name	Allocation (mgd)	Aquifer System Area
State of Hawaii Waimano Training School 1 and 2	110	Domestic	Waimano Training	0.136	Waimalu
Tadahiro Abe	456	Agricultural	2202-002	0.009	Waipahu-Waiawa
Pearl Country Club	466	Golf Course Irrigation	2356-054	0.33	Waimalu
Kenneth Simon	574	Domestic	2358-036	0.004	Waipahu-Waiawa
Robinson Kunia Land, LLC	767	Agricultural	2602-003	0.1	Waipahu-Waiawa
Waikele Farms	1024	Agricultural	2702-012	0.609	Waipahu-Waiawa

Table 4. Permit Holders With IWSP Proposing <5% Water Use Reduction

4. Water Shortage Implementation Plan

4.1. Water Shortage Triggers, Stages, and Response

As discussed in Section 1, the stages of water shortage should be uniquely defined based on available data and the needs of the community. Table 5 outlines the stages, triggers, and actions that are defined for the Pearl Harbor Aquifer Sector Area. Developing these indices started with a preliminary list of options based on the State Water Code and administrative rules, researching water shortage plans in other locations, understanding the context of water shortage in Hawai'i, and examining available data sources. Next,

discussions were held with the CWRM staff and experts from BWS to further gauge the availability of various data sources and their significance in determining water shortage stages.

4.1.1. Water Shortage Triggers

General criteria that would trigger a water shortage declaration are outlined in Section 13-171-41, HAR, and include: withdrawals that exceed the recharge, declining water levels or heads, deterioration in the quality of water due to increasing chloride content, excessive waste of water which can be prevented, or a situation in which any further water development would endanger the groundwater aquifer or the existing sources of supply. Where data are available, these general criteria were refined to develop quantitative, objective triggers.

Because of the importance of the Pearl Harbor Aquifer Sector Area as a major source of drinking water supply, the CWRM has established and maintained a deep monitor well network (DMW) in the region. To provide aquifer-wide water shortage triggers, water levels in the network of six CWRM DMWs were chosen based on the following considerations:

- The DMWs are generally located away from pumping centers and are distributed over the entire Pearl Harbor Aquifer System, and thus can provide more accurate indicators of overall aquifer conditions (see Figure 4).
- Water level fluctuations are more responsive to changes in the aquifer than are the top of transition (TTZ) and midpoint transition (MPTZ) elevations, which are much slower to respond to overall aquifer changes. Therefore, water levels are a good early warning indicator that water shortage conditions are occurring.
- The six DMWs are monitored quarterly for conductivity and temperature profiles throughout the entire water column, and five of the six are monitored hourly for water levels (the sixth well - Waipio Mauka DMW- is also planned to be fitted with an hourly water level transducer this year).
- The water level data for the DMWs includes historical data as early as 1986, thus providing a large data set to confidently calculate standard deviations for each well.
- Declining water levels in the DMWs are an indication of withdrawals exceeding recharge and direct evidence of declining water levels or heads.

Initially, triggers based on chloride concentration in selected wells were considered but were ultimately not used due to the following considerations:

- Chloride concentrations generally reflect local phenomena that are influenced by specific geologic conditions, well construction, pumping at the well, and many times are indicative of the particular well itself rather than aquifer-wide conditions.
- The lack of robust aquifer-wide chloride reporting and reporting quality control resulted in reduced data confidence.
- Sporadic and inconsistent chloride reporting was insufficient to generate a database of values with statistical significance.
- West-side wells ('Ewa-Kunia Honouliuli) with generally higher-chloride concentrations, would potentially trigger shortage stages not representative of aquifer-wide conditions. (BWS utilizes these wells to blend with fresher water wells within its integrated system to achieve acceptable chloride concentrations as part of its scheme to optimize groundwater withdrawals).

- Uncertainty in applying a concentration threshold (EPA secondary guideline of 250 ppm) - World Health Organization formerly listed 500 ppm, now <600 ppm, but now makes no recommendation for drinking limits
https://www.who.int/water_sanitation_health/dwq/gdwq0506.pdf pgs. 218 & 444)
- Declining water levels may effectively be used as a surrogate for increasing chloride content based on the Ghyben-Herzberg ratio (which states that, for every foot of fresh water in an unconfined aquifer above sea level, there will be forty feet of fresh water in the aquifer below sea level); thus, chloride levels are implicitly addressed, as declining water levels will ultimately result in a rise of the transition zone.

No data exists to quantify the other two general criteria for declaring a water shortage: excessive waste of water which can be prevented and a situation in which any further water development would endanger the groundwater aquifer or the existing sources of supply. Thus, the CWRM must qualitatively assess these criteria for water shortage declaration on a case-by-case basis.

Figure 3 shows the cross section of a DMW in a typical island aquifer such as the Pearl Harbor Aquifer Sector Area. Deep monitor wells pass through the freshwater basal aquifer and into the brackish and saltwater zones that lie beneath. These wells are located away from pumping centers and are used to monitor aquifer water levels, the thickness of the freshwater portion of the aquifer (freshwater lens), and the freshwater-saltwater transition zone (depicted in grey in Figure 3). Within the Pearl Harbor Aquifer Sector Area, CWRM staff monitors six DMWs on a quarterly schedule (see Figure 4). Two deep monitoring wells are within each aquifer system area, which will be used to declare water shortages in the specific aquifer system area that is affected (for example if only Waimalu Deep Monitor Wells were showing declines, water shortage would be declared for the Waimalu Aquifer System Area only).

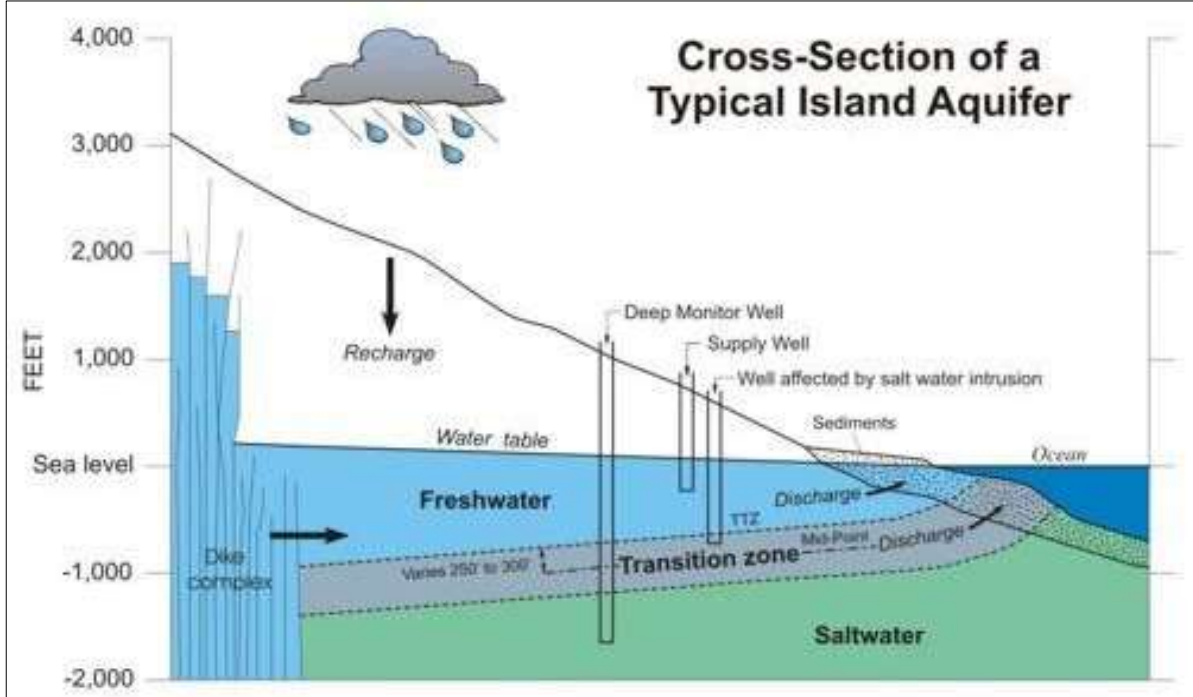


Figure 3. Cross Section of Deep Monitor Wells

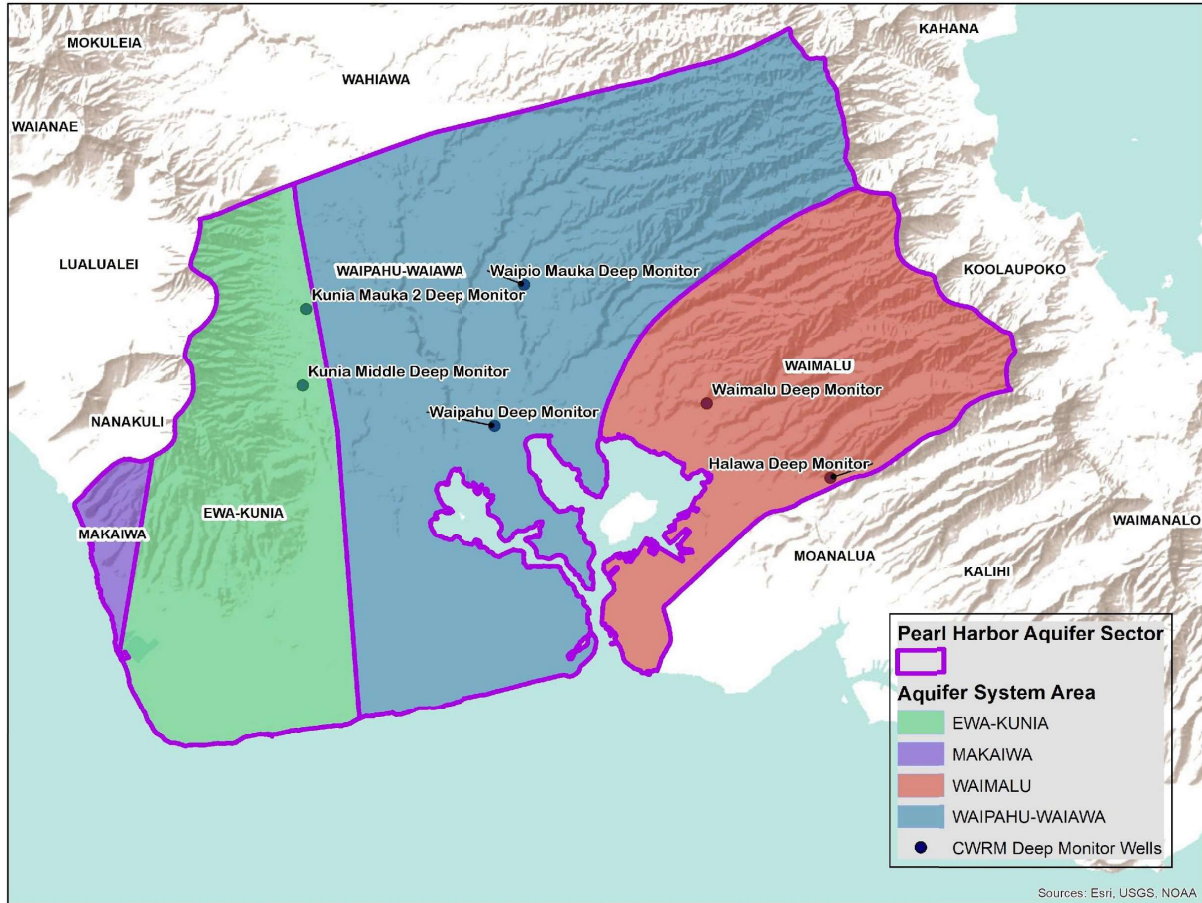


Figure 4. Deep Monitor Wells (DMW) in Pearl Harbor Aquifer

The thresholds for low water levels in the water shortage watch, alert, and warning stages as outlined in Table 5 were determined by examining the historical water level records from the deep monitor wells in the Pearl Harbor Aquifer Sector Area. The examination determined that water shortage conditions would be triggered by deviations from the average water levels for each deep monitor well. These standard deviations can vary from -1 to -3 with higher negative values representing a greater departure from average water levels, thereby indicating a greater severity of water shortage conditions (see Figure 5 for more details).

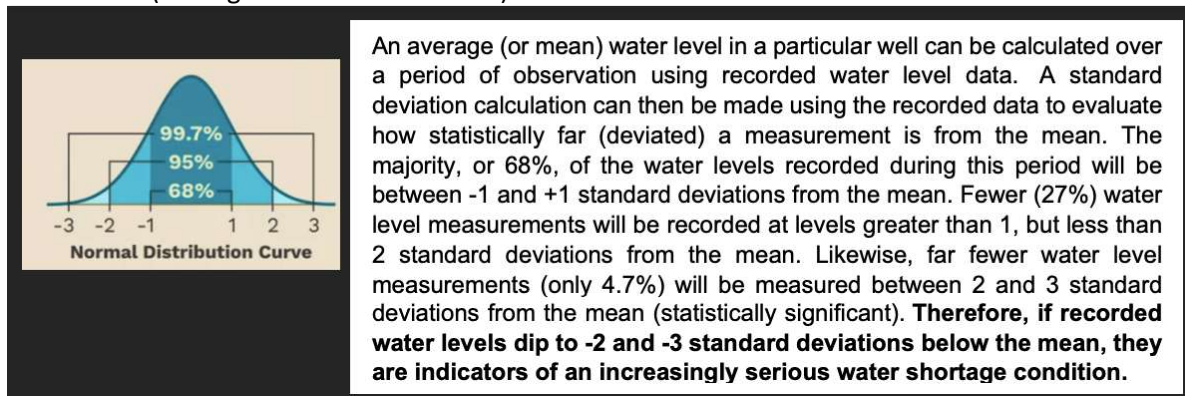


Figure 5. Standard Deviation Low Water Level Thresholds

The daily average water levels and trigger levels are plotted for each DMW in Figures 6 -11, note the tan shaded areas are historically where BWS had declared low groundwater conditions. Similar to the CWRM’s proposed scheme, BWS also identifies three stages of low groundwater conditions in their rules and regulations, the first stage being calls for voluntary water conservation. All past instances of BWS low groundwater conditions (1993, 2003, and 2008) were calls for first stage voluntary conservation. According to BWS, there was only one instance in the 1980’s where a higher stage of low groundwater conditions was reached, resulting in the implementation of mandatory restrictions.

Note that the period of record for each DMW differs, reflecting the date on which the particular DMW was installed. As time goes on and the period of record at each DMW is extended, the computed standard deviations, which are based on the record of daily average water levels, may change. These data and triggers need to be revisited over time and adjusted as necessary.

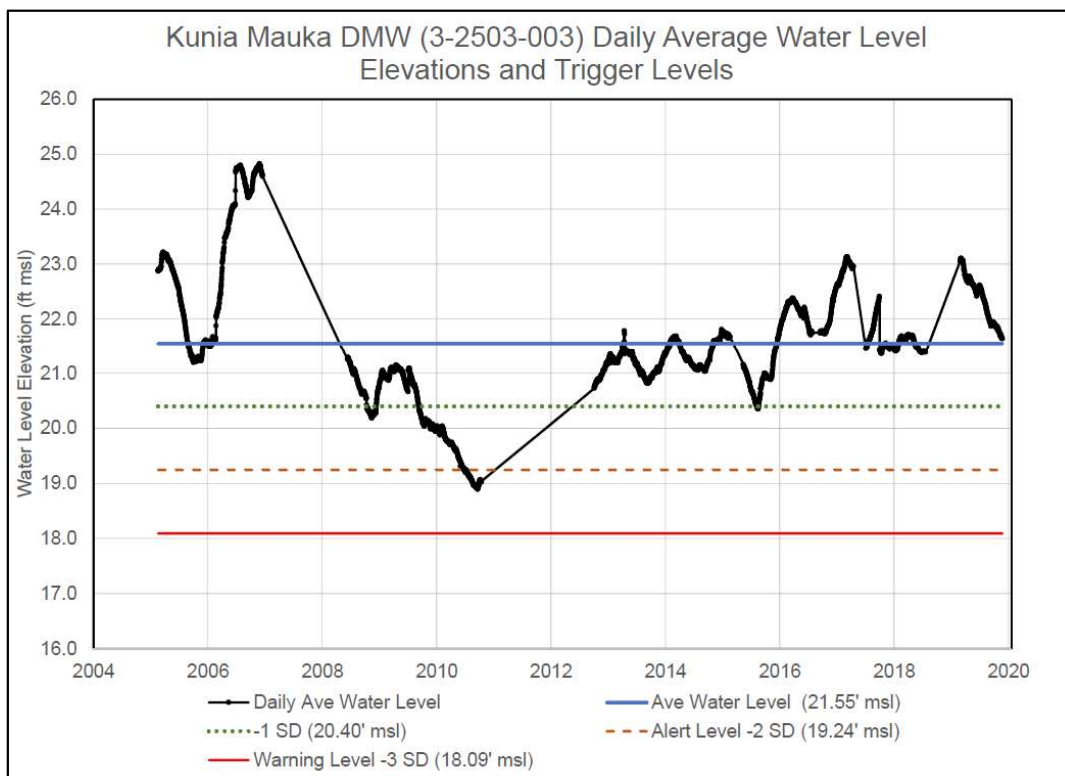


Figure 6. Kunia Mauka DMW Water Levels

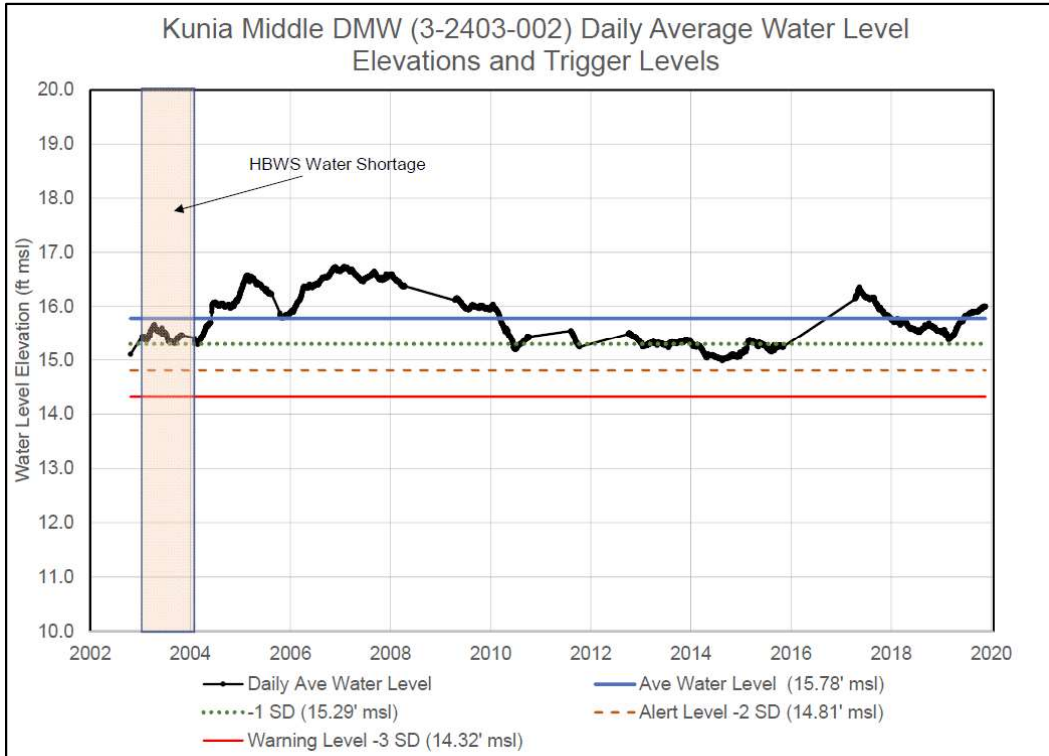


Figure 7. Kunia Middle DMW Water Levels

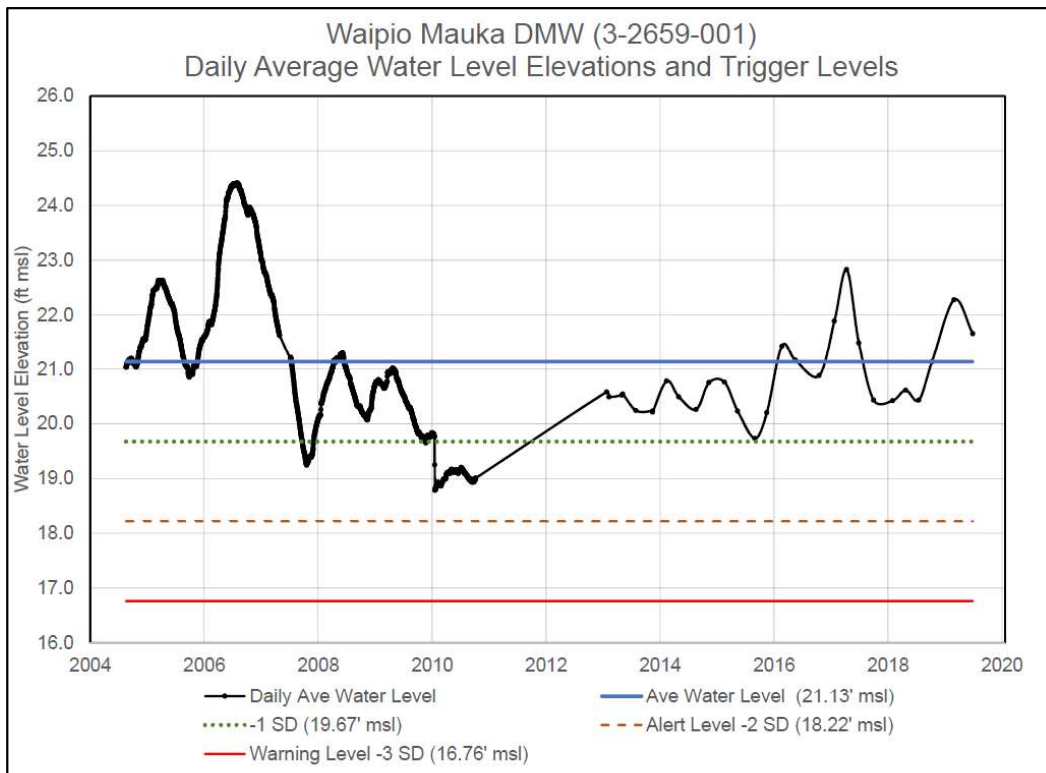


Figure 8. Waipio Mauka DMW Water Levels

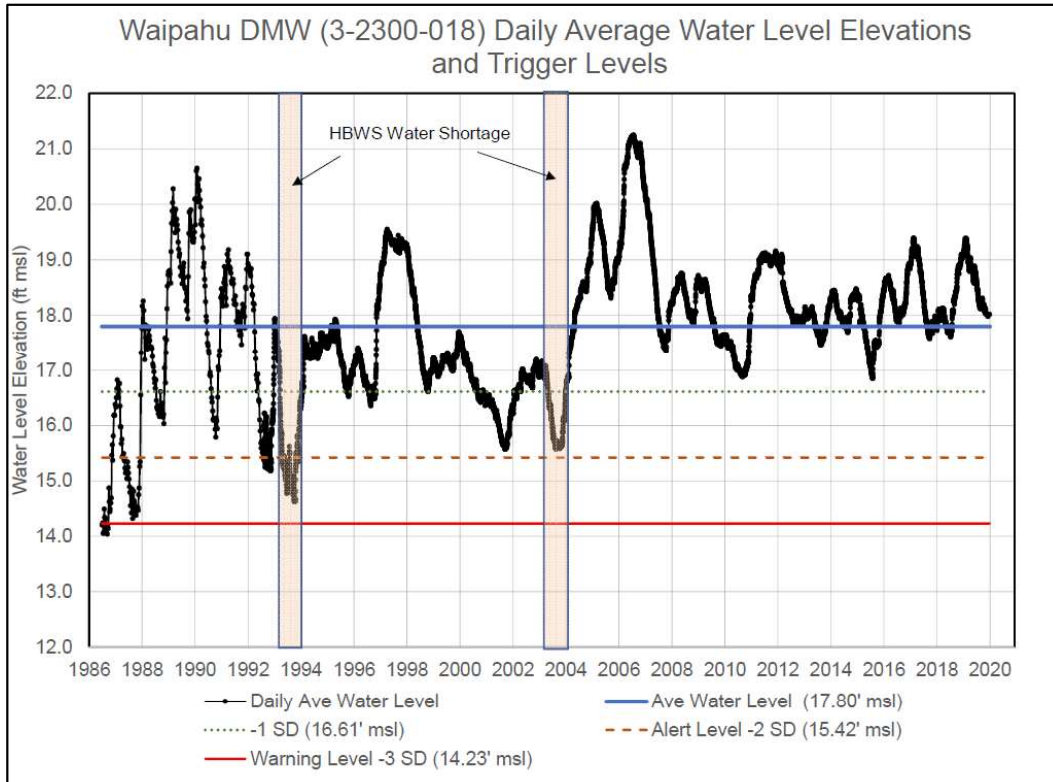


Figure 9. Waipahu DMW Water Levels

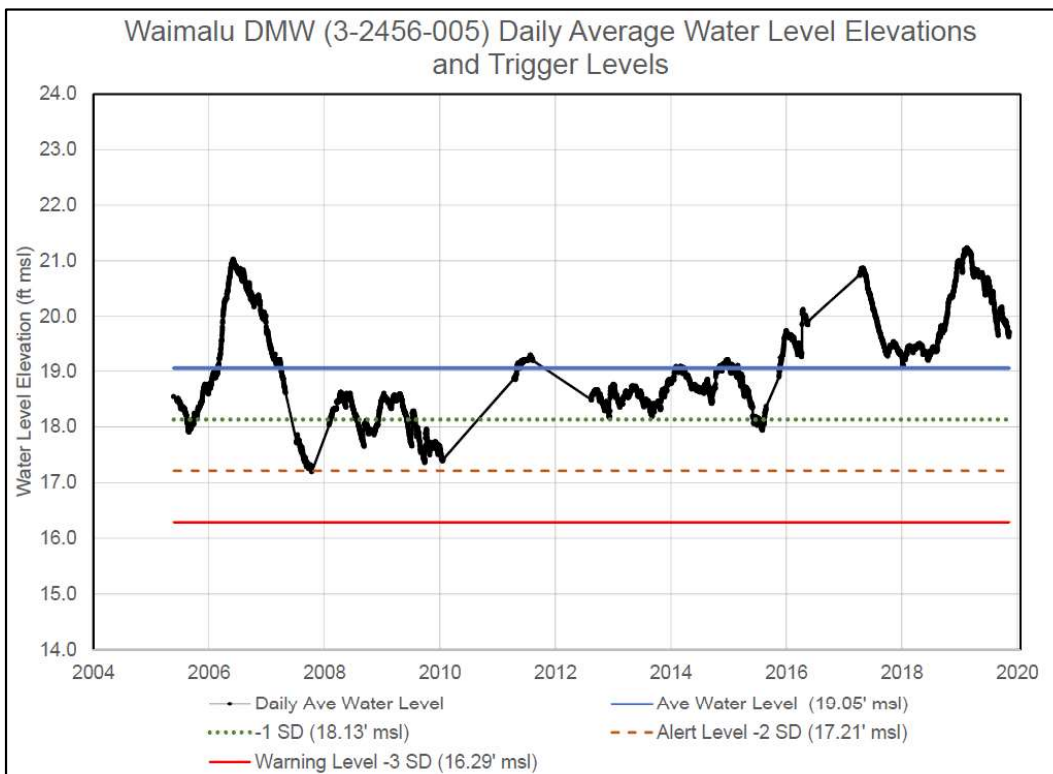


Figure 10. Waimalu DMW Water Levels

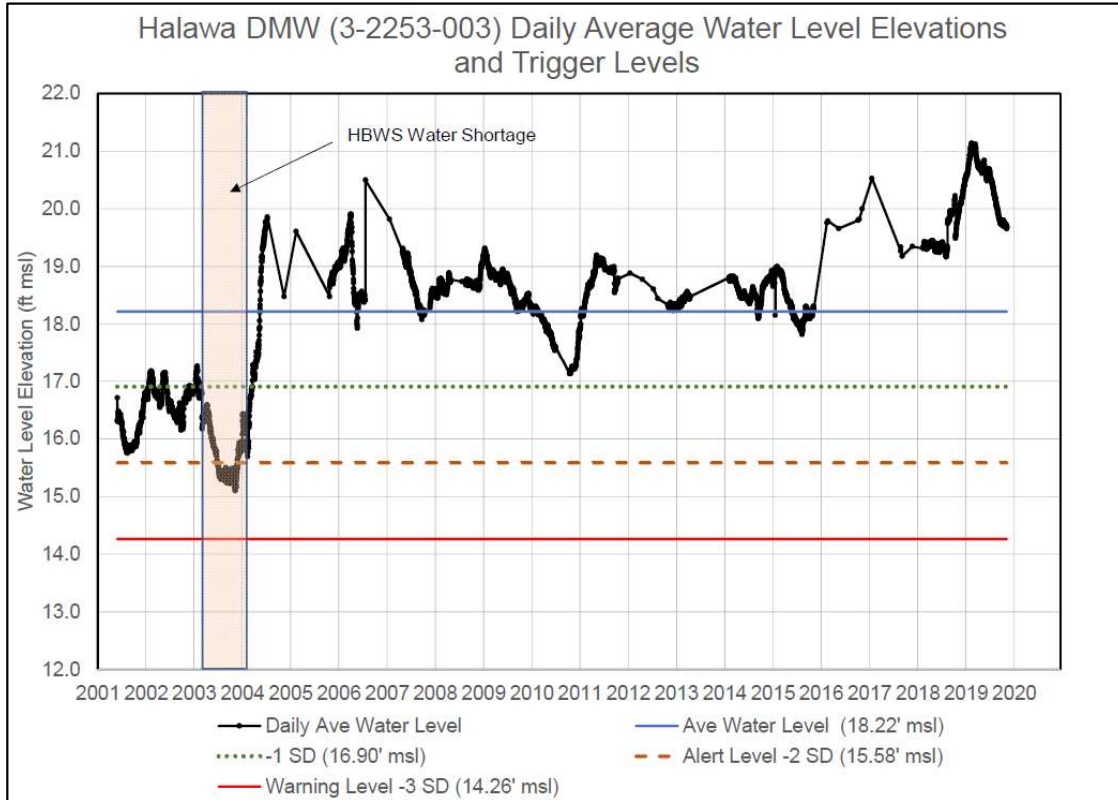


Figure 11. Hālawā DMW Water Levels

Based on the analysis above, low water level triggers were assigned for three incremental water shortage stages described below: watch, alert, and warning. To further inform CWRM’s data collection during and before a water shortage, two additional triggers will be considered for each water shortage stage. These are in a drought disaster designation by the Secretary of the U.S. Department of Agriculture and a low groundwater level declaration by the BWS. Table 5 identifies when these additional triggers will be considered.

4.1.2. Stage 1 - Water Shortage Watch

During the watch stage the key actions include increasing coordination with BWS, DOH, and other large water purveyors, and increasing water level monitoring frequency in addition to issuing a preliminary call for water conservation via press release and notice to individual permittees.

4.1.3. Stage 2 - Water Shortage Alert

Should water monitoring show that water levels continue to drop further, or if BWS declares low groundwater levels, the water shortage will be elevated to the alert stage. During the alert stage, all water use permit holders are to follow the cutbacks outlined in their individual water shortage plans. In determining the baseline for cutback amounts, the CWRM considered using the water use permit allocation limit, the twelve-month moving average (12-MAV) of reported pumpage, and the latest reported monthly pumpage prior to the declaration of a Water Shortage Alert Stage. The allocation limit was rejected, as many wells are not pumping at full allocation, so any cutbacks from that threshold may not in fact result in any reduced aquifer withdrawal. Similarly, use of the 12-MAV was also rejected because factoring in the reduced pumpage amounts in a wetter period may also not

result in any appreciable cutback. Because shortage conditions are the result of current aquifer conditions and pumpage, **any cutbacks in pumping will be based on the water use permit holder's last reported monthly pumpage report before the Water Shortage Alert Stage is declared.**

In 2018, more than 85% of production wells were in compliance with their reporting requirements (to see a summary of the 2018 production well volumes see Appendix 1). During this stage, the coordination and monitoring that was initiated in the watch stage will continue. Also at this time, the CWRM will begin the rulemaking process to officially declare a water shortage by rule, which is a prerequisite to implementing the mandatory water cutbacks needed to respond to the most severe water shortage stage, as outlined in Section 174C-62(b), HRS¹¹. Rulemaking procedures include public hearings, public comments via oral and written submission, petitions, or judicial declarations of validity and mediation if there is a contested case. Rulemaking also requires the Governor's approval and filing of the rules at the Lieutenant Governor's office with certified copies of the rules which must be specifically formatted¹². Water shortages need to be addressed swiftly, and the lengthy rulemaking process puts water resources at greater risk. Emergency rulemaking would allow waiving of some of the rulemaking requirements, expediting the rulemaking process should a water shortage occur. Emergency rulemaking can be utilized when there is imminent peril to public health and safety. Water shortages threaten both public health and safety with water being critical for consumption, sanitation and firefighting. Emergency rulemaking processes will be followed to declare a water shortage.

4.1.4. Stage 3 - Water Shortage Warning

If water levels continue to drop and do not recover, a warning will be declared (the third water shortage stage). During a warning, all water use permit holders are mandated to cut water use by a percentage identified by the CWRM ranging from the percent outlined in their IWSP, as may be modified by the CWRM, up to 20% based on the well use priority classification.

Table 5 outlines each of these water shortage stages and the applicable actions. Besides cutbacks and conservation, response actions also include increased collaboration, monitoring, and communication. The State Water Code requires that a water shortage notice is published in a prominent place in a newspaper of general circulation in the area of water shortage impact. The notice must be published each day for the first week of the shortage and once a week thereafter until the declaration is rescinded. Additionally, the CWRM shall cause each permittee in the area to be notified by mail of any restriction on the use of water for the duration of the water shortage. The CWRM further intends to provide notice on its website and monthly bulletin. Communicating and collaborating have proven to be irreplaceable actions during a water shortage event, as indicated in the other plans reviewed.

¹¹ State Water Code. State of Hawai'i, <http://files.hawaii.gov/dlnr/cwrm/regulations/Code174C.pdf>.

¹² Title 8 Public Proceedings and Records. Hawai'i Revised Statutes, http://files.hawaii.gov/dcca/oah/hrs/hrs_oah_91.pdf.



Stage	Trigger(s)	Action(s)
Stage 1: Water Shortage Watch	<ul style="list-style-type: none"> • USDA (United States Department of Agriculture) Secretarial Drought Designation for the county containing ASA; or • -1 standard deviation from average water levels in one or more CWRM DMWs in an ASA for 2 quarterly measurements. 	<ul style="list-style-type: none"> • Joint call for water conservation via press release with BWS; and • Begin regular coordination with BWS, DOH and other large water purveyors and partners on data and messaging; and • CWRM to begin increased data collection including more frequent DMW (deep monitoring well) monitoring from quarterly to monthly and following up with non-compliant reporters.
Stage 2: Water Shortage Alert	<ul style="list-style-type: none"> • -2 standard deviations from average water levels in one or more CWRM DMWs for 3 monthly measurements; or • BWS Declaration of low groundwater conditions. 	<ul style="list-style-type: none"> • WUP holders in the affected ASA to begin implementing their individual water shortage plans; and • CWRM staff to begin emergency rulemaking process to declare a water shortage; and • Continued coordination with entities identified in the water shortage watch stage; and • Continue monthly monitoring of CWRM DMWs; and • Enforcement of the water use reporting requirement.
Stage 3: Water Shortage Warning	<ul style="list-style-type: none"> • -3 standard deviations from average water levels in one or more CWRM DMWs in an ASA for 2 monthly measurements. 	<ul style="list-style-type: none"> • CWRM to complete emergency rulemaking process to declare a water shortage; and • CWRM to require permit holders to reduce their pumpage according to the regional water shortage plan permit classification scheme (Table 6) based on the permit holders last reported monthly pumpage prior to the Stage 2 Water Shortage being declared; and • Continued coordination with entities identified in the water shortage watch stage; and • Continued enforcement of water use reporting requirement; and • Continue monthly monitoring of CWRM DMWs.

Table 5. Water Shortage Stages, Triggers, and Actions

4.2. Threats to Water Quality

Water quality is also an important factor in determining water shortage declarations. Increasing chloride concentrations resulting from overpumping are not used directly as a trigger for water shortage as outlined in Section 4; however, chloride concentrations are collected and monitored by the CWRM along with other water level data to ensure overpumping doesn't threaten the water quality. Additionally, chloride levels are implicitly addressed through the negative standard deviations from average water level triggers, which indicate a shrinkage of the lens and rise in the transition zone.

For other threats to water quality, such as the Red Hill situation (where underground storage tanks may pose a threat to the resource) the CWRM will coordinate with DOH. Part of the Hawai'i Water Plan's (Figure 2) protection policies includes the Water Quality Plan, which DOH prepares. This plan outlines the regulations, standards, and resource management policies that define the quality to be maintained in groundwater resources. Some of the relevant programs within DOH as outlined in the Water Quality Plan relating to groundwater quality protection include: Source Water Protection program, assessment of pesticides impact on groundwater, Underground Storage Tank program, and a Hawai'i groundwater protection strategy. The strategy is in place to monitor and assess groundwater quality, identify and prioritize contamination threats, and ultimately mitigate priority contamination threats and prevent contamination.

The Water Quality Plan and the policies and programs in place aim to protect water quality; however, an emergency could occur that could threaten water quality, such as a spill of hazardous materials. In the case of an emergency where water quality impairment leads to a water shortage, the CWRM would work closely with the Hawai'i Department of Health's Hazard Evaluation and Emergency Response (DOH HEER) on-scene coordinator. DOH HEER has the responsibility and legal authority to respond to releases, threats of releases, or discoveries of hazardous substances, including oil, that present a substantial endangerment to public health or the environment¹³. DOH HEER's Technical Guidance Manual (available at <http://hawaiiidoh.org/tgm.aspx>) provides information and guidance for emergency responses including an overview of correct groundwater and surface water sampling procedures. According to DOH, a hazardous substance release includes any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of any hazardous substance, pollutant, or contaminant into the environment¹⁴. Discovery of such water quality threats can come from a variety of sources, including calls from county or state agencies, notification of a release of a hazardous substance that exceeds the reportable quantity, investigations by government, non-profits or academia, state-led site discovery efforts, environmental assessments, voluntary investigations, and public observations or complaints.

Once the HEER Office is aware of a hazardous substance release, emergency situations are acted upon as appropriate by the Emergency Preparedness and Response Section staff of the HEER Office. Response actions are dependent on the threat to public safety and are analyzed and reported by the HEER Office. Notifications to the public are regulated via the Hawai'i Environmental Response Law (HRS 128D).

In the event of a water quality water shortage, the CWRM would coordinate with HEER on response actions and communicate those to the WUP holders as needed. If response actions due to a water quality threat were in conflict with the water shortage plan cutback regimes or required increased pumping over sustainable yield to protect the quality of the groundwater, then CWRM would declare a Water Emergency and prescribe to the water use permit holders what actions they should take in accordance with the DOH response actions to protect the groundwater aquifer.

4.3. Water Use Classifications

In Stage 3: Water Shortage Warning, a water use classification scheme based on water use permit categories will be implemented. These classifications prioritize public trust water uses and were refined through discussion with CWRM staff and water use permit holders. This water shortage plan and the permit classes designated within Table 6 govern the percent reduction that will be imposed during a water

¹³ TGM for the Implementation of the Hawai'i State Contingency Plan. State of Hawai'i, Department of Health, <http://hawaiiidoh.org/tgm.aspx>.

¹⁴ TGM for the Implementation of the Hawai'i State Contingency Plan. State of Hawai'i, Department of Health, <http://hawaiiidoh.org/tgm.aspx>.

shortage for groundwater that is withdrawn from one or more of the ASAs within the Pearl Harbor Aquifer Sector Area. Compliance with the imposed reductions will be monitored through the CWRM’s water use reporting program. When a water shortage alert or warning is declared, existing and new water use permit holders will implement prioritizations and cutbacks of water use within their water system to meet the percentage required in Table 7, Water Shortage Cutback Scenarios. The water use permit classifications in Table 6 are based on the water use permit category (municipal, agriculture, etc.) assigned to the well source, not the end-uses of that water. Table 6 describes priority levels 1 through 3 including the water use permit class prescribed for each and a description of that class.

Priority Level	Water Use Permit Classification	Description of Water Use Permit Class
1	Domestic	Domestic permit class means a well that is used for individual personal needs and for household purposes such as drinking, bathing, heating, cooking, noncommercial gardening, and sanitation.
	Habitat Maintenance	Habitat Maintenance permit class means a well that is used to maintain sensitive, protected ecological habitats.
2	Municipal	Municipal permit class means a well that is used for domestic, industrial, and commercial use through public services available to persons of a county for the promotion and protection of their health, comfort, and safety; priority of this use in a water shortage is for domestic needs.
	Military	Military permit class means a well that is used by the United States military to supply its bases and their activities; priority of this use in a water shortage is for domestic needs.
3	Agricultural	Agricultural permit class is defined as a well that is used for the growing, processing, and treating of crops, livestock, aquatic plants and animals, and ornamental flowers and similar foliage.
	Industrial	Industrial permit class means a well of which uses include water used for fabrication, processing, washing, and cooling, and also includes water used by petroleum refineries and industries producing chemical products, food, and paper products.
	Golf Course	Golf Course permit class is defined as a well that is used to grow, maintain, and sustain golf course activities.

Table 6. Water Use Permit Classification

4.4. Public Trust Uses

Through its review of various contested case hearing decisions and orders, the Hawai’i Supreme Court has identified four purposes of the water resources trust: 1) maintenance of waters in their natural state, 2) domestic water use, 3) the exercise of Native Hawaiian and traditional and customary rights,¹⁵ and 4) Department of Hawaiian Home Lands (DHHL) reservations.¹⁶

¹⁵ Supreme Court Decision in Waiāhole Ditch Contested Case Hearing CCH-OA95-1.

¹⁶ Supreme Court Decision in Waiola O Moloka’i Contested Case Hearing CCH-MO96-1.

Permit holders are subject to implementing prioritizations and cutbacks wherever necessary to meet the requirements designated in Table 7 Water Shortage Cutback Scenarios. In meeting these prioritizations and cutbacks, public trust uses of water will be prioritized regardless of their water use permit classification.

As outlined in Section 1.4, Relationships of Plan to Water Use Permittees Including the Municipal Water Utility, this plan focuses on classifying and regulating the water that is directly extracted from the ground. Water use permit holders are then responsible for communicating and implementing this plan down to the end user level. The classification system does, however, consider prioritization of public trust uses from extraction all the way to the end user. The classification scheme (as listed in Table 6) prioritizes the wells that serve public trust end uses exclusively in priority 1, wells that have a combination of public trust end uses and non-public trust end uses are classified in priority 2, and wells that serve predominantly non-public trust end uses are classified in priority 3.

Municipal uses encompass many types of end uses, including both public trust and non-public trust uses. CWRM staff consulted with BWS to better understand how their policies and processes would prioritize public trust uses in the implementation of water shortage plan provisions. BWS explained that upon their declaration of low groundwater conditions or water shortage by CWRM, BWS has a number of tools at its disposal, which will be implemented in an increasingly restrictive progression depending on the severity of the drought and customer responsiveness. The tools include voluntary and mandatory restrictions, the ability to apply a surcharge to water rates, set allotments, install flow meters, or remove water meters in accordance with BWS Rules and Regulations Sections 3-318 to 3-322, Low Groundwater Level Conditions and Procedures for Control of Water Use During Low Groundwater Level Condition. BWS Rules and Regulations have the same effect as City ordinance.

BWS will focus notifications and conservation efforts first on non-public trust uses, such as outdoor irrigation, aesthetic and recreational water uses and other commercial, industrial and agricultural uses, before domestic public trust uses. Water supply must be available to support public health, safety and sanitation requirements, at a minimum. During a drought, BWS may reduce source production from dike sources known to interact with surface water to protect stream habitat and traditional and customary practices; and reduce pumping from basal sources with higher chloride content to prevent sea water intrusion for the protection of groundwater resources.

Furthermore, as a political subdivision of the State, BWS also has public trust responsibilities under Hawai'i's State Constitution and is therefore also duty bound to prioritize public trust uses. Towards this end, BWS has adopted the following policies that advance public trust protections in their Watershed Management Plans (i.e., regional Water Use and Development Plans), which are adopted via City ordinance:

- Promote Sustainable Watersheds
- Protect and Enhance Water Quality and Quantity
- Protect Native Hawaiian Rights and Traditional and Customary Practices

CWRM will delegate and defer to the BWS regarding messaging and communication to their end users but will share public trust responsibilities and oversight over municipal use cutbacks.

This plan's purpose is to protect the groundwater resources which sustain the environmental flows that are critical for the exercise of Native Hawaiian traditional and customary rights and other public rights to

the resource. This plan requires water use permit holders and those that extract groundwater resources to cut back groundwater withdrawals in a time of shortage which will serve to maintain flows to streams and nearshore waters on which Native Hawaiian traditional and customary rights and other public rights depend. Impacts to these rights should be fully examined in the water use permitting process and balanced against proposed increases in groundwater extraction. Provisions for water use permitting are addressed under separate sections of the State Water Code and Administrative Rules and are not addressed in this plan.

The Hawai'i Supreme Court found in Waiāhole Ditch Contested Case Hearing that:

*“The extraction of water from the ground before it reaches the surface or flows into streams or springs is not a traditional and customary Native Hawaiian resource management practice. It is an aberration. Id., at p. 44, ll. 3 - 6. Native Hawaiian custom and practice is to use the streams to supply water for domestic use and for gathering stream life, and for other subsistence, cultural, and religious practices. The ground water would remain in the water table to sustain the natural resources of the land and the ocean, id., at p. 44, l. 25-p. 45, l. 5, the nature deities of Native Hawaiians.”*¹⁷ (FOF 966 in Waiāhole 1)

While the extraction of groundwater isn't a traditional and customary practice, ground and surface waters do interact in varying degrees depending on the hydrogeology of the area. As outlined in the 2019 Water Resource Protection Plan Section 2.2.3, Inventory and Assessment of Resources, *“Most potable water is drawn from groundwater aquifers, potentially having impacts on surface water and coastal leakage, the ecosystems dependent upon them, and associated traditional and customary rights.”* Understanding the degree of interaction between surface and groundwater is complex and the interactions are difficult to quantify; therefore, ground and surface water resources are typically managed separately. The CWRM is committed to protecting traditional and customary rights and aspires to protect them in its planning and regulatory efforts, but there is also a need to better understand the uses and practices so that they can be appropriately incorporated into management frameworks.

Another critical public trust use identified by the Hawai'i Supreme Court are Department of Hawaiian Home Lands (DHHL) reservations. DHHL holds a reservation in the Waipahu-Waiawa Aquifer System Area that will be converted to a water use permit pursuant to Subchapter 6 of the Administrative Rules. Section 13-171-60(d), HAR, states *“Reserved water shall not be allocated from water management areas by the commission except upon application for a water use permit by the party, or parties, for whom the water was reserved”*. Upon DHHL's application for a water use permit, the CWRM will convert the requested amount from a reservation to a permitted use, at which time DHHL's water use permit will be incorporated into this plan and prioritized accordingly.

4.5. Water Cutback Scenarios

Once a water shortage stage is announced (based on the scenarios listed in Section 4), water reductions are implemented along with the cutbacks shown in Table 7. Reductions are broken down between stages and for permit classifications. In a water shortage watch, no cutbacks are applicable. Percentages for water shortage alert and water shortage warning were developed to reach a substantial million gallon per day cutback, with the goal of reducing 5-10% of total aquifer system/sector withdrawals in the alert stage

¹⁷ *Findings of Fact, Conclusions of Law, and Decisions of Order*, 1991. State of Hawai'i, <http://files.hawaii.gov/dlnr/cwrm/cch/cchoa9501/CCHOA95-1.pdf>

through cutback scenarios and 15% of total aquifer system/sector withdrawals in the warning stage. Starting with Stage 2 – Water Shortage Alert level declaration, reductions for the water shortage warning stage are in reference to the last reported pumpage prior to the Water Shortage Alert stage being announced. Summary tables from the water cutback scenario analysis can be found in Appendix 1.

The percentages for priority 1, 2 and 3 in the water shortage warning stage were established through discussions with the CWRM staff and key stakeholders along with reviewing cutback regimes in other locations. Historically, past water shortage events in Hawai‘i have shown that a 15-20% total reduction in aquifer groundwater withdrawals is attainable. The plans reviewed in Section 1.7 have shown that in other regions cutbacks are often 15-20% in the first two stages, with even steeper percentages in subsequent stages. In 2015, for example, Governor Jerry Brown of California issued a statewide mandatory restriction in water use of 25%¹⁸. The 2006 Virginia Polytechnic Institute study referenced in Section 1.7 showed that aggressive information and enforcement can result in a 22% estimated change in water use compared to a 5% reduction with low communication and low enforcement. During a water shortage alert or warning, compliance with reporting will be strictly enforced. Additionally, according to USEPA, outdoor water use accounts for 30% of residential water needs which can see substantial reductions through cutbacks on watering lawns, filling pools, or washing outdoor surfaces¹⁹. Based on these resources and discussions with key stakeholders, the cutbacks required for the Pearl Harbor Aquifer Sector Area are attainable.

Stage	Cutback
Stage 1: Water Shortage Watch	Not applicable, 0% cutbacks
Stage 2: Water Shortage Alert	Percent reduction: <ul style="list-style-type: none"> • Follows % in individual water shortage plan
Stage 3: Water Shortage Warning	Percent reduction by Well Use Priority: <ul style="list-style-type: none"> • Priority 1: Following % IWSP • Priority 2: 15% • Priority 3: 20%

Table 7. Water Shortage Cutback Scenarios

4.6. Rescinding Water Shortages

A water shortage will end when the triggers in Table 5 are no longer applicable and water supply levels return to normal and are sufficient to supply the needs of the community. At this time, the CWRM should issue a press release and/or public notice (in the same location as previous updates) and a notice to permittees that the water shortage event has ended while still encouraging the public to maintain water efficiency practices. If the water shortage advanced into the warning stage, the CWRM will also need to repeal the water shortage emergency rule that was enacted. Agencies involved in the water shortage should formally evaluate the procedures carried out, the challenges, and the successes to prepare for any future shortage events. Documentation should be made for future reference and key stakeholders should review the need for any projects that could assist future water shortage occurrences.

¹⁸ Sanders, Sam, *California Governor Issues 1st-Ever Statewide Mandatory Water Restrictions*, 2015. NPR, <https://www.npr.org/sections/thetwo-way/2015/04/01/396859879/california-governor-issues-1st-ever-statewide-mandatory-water-reductions>.

¹⁹ *Reduce Your Outdoor Water Use*, 2013. EPA, <https://www.epa.gov/sites/production/files/2017-03/documents/ws-factsheet-outdoor-water-use-in-the-us.pdf>.

5. Public Outreach and Awareness

In the event of a water shortage, clear and consistent messaging to the public is important in ensuring that community members are aware of the water shortage situation and understanding of what they can do to help. As stated earlier, the State Water Code, Section 174C-62, HRS, requires that when a water shortage is declared by rule, the CWRM shall publish a notice in a prominent place in a newspaper of general circulation throughout the area. The notice shall be published each day for the first week of the shortage and once a week thereafter until the declaration is rescinded. This will serve as a notice to all water users in the area of the condition of the water shortage. Additionally, the CWRM must notify each permittee in the area by mail of any restriction on the use of water for the duration of the water shortage. Subsequent rescindment must also be done by rule. The CWRM should also issue a press release and/or public notice (in the same location as previous updates), a notice to permittees that the water shortage event has ended and provide notice on its website and monthly bulletin. The CWRM begins regular coordination with BWS, DOH, and other large water purveyors and partners on data and messaging during the watch stage before a shortage is declared so that CWRM is aware of the individual water use permit holders' communication strategy to their end users, including BWS's communication strategy, so that messaging going out can remain as clear and consistent as possible.

6. Enforcement

Section 13-168-7(b), HAR, provides that *"The owner or operator of any well or stream diversion works or battery of such water sources shall file a report of total water usage on a regular monthly (calendar or work schedule) basis to the commission on forms provided by the commission on or before the end of the month following the month for which water usage is to be reported. The reports may include other use-related information such as type of use, salinity, and water level, as may be deemed appropriate and reasonable by the commission"*.

Section §13-168-3(a), HAR, further provides that *"Any person who violates any provision of this chapter or any permit condition or who fails to comply with any order of the commission may be subject to a fine imposed by the commission. Such fine shall not exceed \$5,000 per violation. For a continuing offense, each day's continuance is a separate violation"*.

The CWRM continually enforces the water use permit reporting requirement. Under a declaration of water shortage stage 2, alert or stage 3, warning, the CWRM will step up its enforcement and carefully monitor reported water use with random spot checks of water use permit holder meter readings. Pursuant to Sections 13-168-3 and 13-168-7, HAR, fines may be imposed for failure to timely report water use. The requirement for filing monthly water use reports is also a standard condition of a water use permit, and under Section 174C-58, HRS, enforcement actions could also include revocation or suspension of a permit holder's water use permit.

7. Recommendations

Based on meetings with stakeholders, discussions with the CWRM, and research on other locations, the following outlines recommendations during a water shortage, after a water shortage, and for water shortage planning. These recommendations will help implementing a water shortage plan run more smoothly while helping ensure that the necessary cutbacks are made.

Recommendations during a Water Shortage:

- Maintain high levels of public engagement during water shortage.

- Explore a diverse range of public outreach avenues (digital communications, emails, social media, along with print resources) and seek consistent messaging amongst water purveyors impacted by the shortage.
- CWRM staff should spot check water use permit holder meter readings.
- Ensure timely dissemination of the CWRM monitoring data to promote the transparent implementation of water shortage triggers and stages.
- Encourage water purveyors to recommend cutback measures (such as limits on outdoor watering or others provided in Section 1.7) to help reach cutback goals.

Recommendations after a Water Shortage:

- Keep records of water shortage cutbacks to review afterwards.
- Conduct a formal evaluation of the water shortage

Water Shortage Planning Recommendations:

- The CWRM modifies all existing WUP within this plan to have a minimum 5% reduction during a water shortage.
- Consider requiring the IWSP to be submitted at the time of the initial WUP application.
- Adopt a “living document” approach by delegating the authority to the Chairperson to update this water shortage plan as new permits are issued or modified, provided that the update is consistent with the policies and framework laid out in this plan.
- Increased coordination between the CWRM and DOH to ensure actions and roles are clear in the case of a water quality emergency.

Appendix 1: Water Cutback Scenarios Summary Tables

Water cutback scenarios have been developed to calculate the cumulative reduction in the water shortage alert and warning stages under the plan’s cutback regimes. The first stage of water shortage- the watch stage- does not have assigned cutbacks, therefore it does not have a cutback scenario.

In the water shortage alert stage the individual water shortage plan percent reductions were applied to the 2018 pumping data volumes from 56 wells in the Pearl Harbor Aquifer to calculate the reduction amounts. If there was no IWSP or the IWSP needs a revision (as listed in Section 3), the recommended percent reduction minimum of 5% was used.

In the water shortage warning stage cutbacks follow the ‘Well Use Priority’ classifications, with Priority 1 cutting back according to the respective IWSP, Priority 2 cutting back 15%, and Priority 3 cutting back 20%. These percent reductions were also applied to the 2018 pumping data volumes to calculate the reduction amounts. Similar to the calculation in the alert stage, if there was no IWSP or the IWSP needed revision as listed in Section 3, the recommended percent reduction minimum of 5% was used.

The tables below summarize the results of the cutback analysis broken into aquifer system area and also by water user permit class. During a water shortage alert the reduction is projected to be approximately 7-8% and 15% during a Water Shortage Warning. Note that because BWS is the largest user volumetrically, their cutbacks percentages strongly influenced the total percent reduction amounts.

Aquifer System Area	Pumping 2018 MGD	Alert MGD Reduction	Warning MGD Reduction	Alert % Reduction	Warning % Reduction
Ewa-Kunia	11.51	0.82	1.74	7%	15%
Waimalu	33.09	2.52	4.97	8%	15%
Waipahu-Waiawa	48.03	3.49	7.38	7%	15%
Grand Total	92.63	6.83	14.09	7%	15%

		Volumes (MGD)		
Aquifer System Area	Water Use Permit Class	Total Pumping 2018	Alert Reduction	Warning Reduction
Ewa-Kunia	Industrial	0.42	0.03	0.07
	Irrigation	1.26	0.09	0.19
	Military	1.34	0.07	0.20
	Municipal	8.49	0.64	1.27
Ewa-Kunia Total		11.51	0.82	1.74
Waimalu	Individual Domestic	0.04	0.00	0.00
	Irrigation	0.23	0.01	0.05
	Military	0.59	0.09	0.09
	Municipal	32.23	2.42	4.83
Waimalu Total		33.09	2.52	4.97
Waipahu-Waiawa	Habitat Maintenance	0.00	-	-
	Individual Domestic	0.16	0.02	0.02
	Industrial	-	-	-
	Irrigation	3.21	0.19	0.64
	Military	12.17	0.85	1.83
	Municipal	32.08	2.41	4.81
	Golf Course Irrigation	0.40	0.02	0.08
Waipahu-Waiawa Total		48.03	3.49	7.38
Grand Total		92.63	6.83	14.09

Appendix 2: Individual Water Shortage Plans Review

Tables are divided by Aquifer System Areas and Water Use Categories. *Italics* represent water use permits numbers that have no Individual Water Shortage Plan.

'Ewa-Kunia Aquifer System Area

Water Shortage Plan	Water Use Permit #	Water Use Category	Well Name	Allocation (mgd)
State of Hawaii, Land Division DLNR	75	Industrial	Ewa Desalt Basal	0.5
BWS	81	Municipal	Makakilo 2004-004	1.5
BWS	82	Municipal	BP Non- Potable 1	1
BWS	158	Municipal	2303-001 Honouliuli I-1	2.24
Ko Olina Co.	655	Golf Course Irrigation	Ko Olina 2006-13	0.7
BWS	811	Municipal	Honouliuli II: 1-4	4.48
Del Monte Fresh Produce: Kunia 1	928	Agricultural	Kunia 1	1.075
Grace Pacific Corp	983	Industrial	Makakilo Lower Quarry	0.256
Oceanwide Resort Paradise	1035	Other	2006-001-11	0.957
Kalaeloa Water Company LLC	1048	Military	2103-003	2.337
			Total	15.045

Waimalu Aquifer System Area

Water Shortage Plan	Water Use Permit #	Water Use Category	Well Name	Allocation (mgd)
Lau Taro Farm	65	Agricultural	Lau Farm 2356-070	0.1
BWS	71	Municipal	Newtown 1-3	1.5
BWS	72	Municipal	Waiau 1-3	1.89
Navy: Halawa Shaft	86	US Military	Aiea Halawa Shaft	0.697
BWS	94	Municipal	Halawa Shaft	11.32
BWS	97	Municipal	Kalauao P1- P6	11.75
BWS	98	Municipal	Waimalu I-1,2	0.08
BWS	102	Municipal	Kaahumanu I- 1,2	1.11
BWS	104	Municipal	Punanani 1-6	11.97
BWS	180	Municipal	Waiau HECO 2, Waiau 3	0
State of Hawaii Waimano Training	110	Domestic	Waimano Ridge 1,2	0.136
Pearl Country Club	466	Golf Course Irrigation	Pearl CC Golf	0.33
BWS	477	Municipal	Halawa 1-3	1.08
BWS	478	Municipal	Aiea 1,2	1.3
BWS	479	Municipal	Aiea Gulch 1,2	0.98
BWS	480	Municipal	Kaonohi I-1,2	1.35
BWS	481	Municipal	Kaamilo 1,2	1.2
Minami Farm	656	Agricultural	Waimalu	0.158
Total				46.951

Waipahu-Waiawa Aquifer System Area

Water Shortage Plan	Water Use Permit #	Water Use Category	Well Name	Allocation (mgd)
Hawaii Pacific Church of the Nazarene	57	Domestic	Pearl City Well 2358-49	0.003
BWS	58	Municipal	Waipahu I P1-P4	6
BWS	73	Municipal	Pearl City III	0.5
Harris Rug	84	Industrial	Pearl Harbor	0.003
Watanabe: Waipahu	90	Agricultural	Waipahu	0.68
Watanabe: Waipahu	91	Agricultural	Waipahu	0.4
BWS	92	Municipal	Hoaeae P1-P6	6.61
Dorothy Yoshimura	108	Irrigation	Waipahu	0.006
Navy: Public Works Center	111	US Military	Waiawa Shaft	14.977
Hawaii Country Club	454	Golf Course Irrigation	Hawaii Country Club	0.4
Tadahiro Abe	456	Agricultural	Honouliuli	0.009
Tadoa Abe	495	Domestic	Honouliuli_	0.002
Gary Takiguchi	500	Domestic and Irrigation	Honoululi__	0.019
Kenneth Simon	573	Agricultural	Pearl City	0.04
Kenneth Simon	574	Domestic	Pearl City_	0.004
Royal Kunia CC	575	Golf Course Irrigation	Royal Kunia CC	0.6
BWS	582	Municipal	Kunia II P1-P4	2.71
C&C Honolulu, Dept of Enterprise Srvs	585	Municipal	EP2	0
BWS	587	Municipal	Waipio Heights II 1,2	1
BWS	597	Municipal	Waipahu II 1-4	2.1
BWS	608	Municipal	Waipahu III 1-5	3.029

**Staff Submittal
Pearl Harbor Water Shortage Plan Adoption**

August 18, 2020

Pearl City Community Church	626	Domestic	Trias	0.005
US Fish & Wildlife	627	Habitat Maintenance	PHNWR 1	0.18
Kipapa Acres Association of Owners	642	Agricultural	Kipapa Gulch	0.1
Gentry Waiawa Well 1/ Waiawa Development	692	Golf Course Irrigation	Gentry Waiawa 1	0.524
Gentry Waiawa Well 2/ Waiawa Development	693	Golf Course Irrigation	Gentry Waiawa 2	0.458
Mark H Ortiz	742	Domestic	Honouliuli 2202-001	0.003
BWS	744	Municipal	Mililani III 7,8	1.25
BWS	745	Municipal	Mililani IV 9-12	2.022
Taba Farm, Inc	749	Agricultural	Pearl City__	0.864
BWS	761	Municipal	Waipahu IV 1-4	3
BWS	762	Municipal	Kunia I P2-P4	5
BWS	764	Municipal	Ewa Shaft	7.661
Robinson Kunia Land, LLC	767	Agricultural	Robinson No 1	0.1
Dr. Horton- Schuler Homes, LLC	805	Municipal	EP 18	7.969
BWS	806	Municipal	Kunia III 1-3	3.05
Roman Catholic Church	814	Domestic	Honouliuli__	0.11
BWS	832	Municipal	Pearl City Shaft 2458-001	1
BWS	833	Municipal	Pearl City I 1,2	1.15
BWS	834	Municipal	Pearl City II 1-3	1.5
BWS	835	Municipal	Waipio Heights P1,P2	0.5
BWS	836	Municipal	Waipio Hts I 1,2	0.5
BWS	837	Municipal	Waipio Hts III 1,2	1.25
BWS	838	Municipal	Mililani I P1-P5	2.67
BWS	839	Municipal	Mililani II P5, P6	1.59
BWS	840	Municipal	Manana 1	0.7

Staff Submittal
Pearl Harbor Water Shortage Plan Adoption

August 18, 2020

Hoban E&C USA, Inc	902	Golf Course Irrigation	Waipahu WP1	0.95
Kamehameha Schools	966	Other	Waiawa 575FT 2	0.3
Waikele Farms	1024	Agricultural	Waikele 2	0.609
The Queens Medical Center	1085	Other	EP 2	0.18
Total				84.287

Appendix 3: 12 Water Shortage Plans Reviewed

- Honolulu Board of Water Supply Rules and Regulations
<https://www.boardofwatersupply.com/about-us/rules-and-regulations/chapter-iii>
- Code of the County of Maui (2010) County of Maui Code:
https://library.municode.com/hi/county_of_mau/code_of_ordinances?nodeId=TIT14PUSE_ART1_WA_CH14.06AWACOCOWAUSDUWASH
- Maui County Administrative Rule- Iao Aquifer:
<https://www.mauicounty.gov/DocumentCenter/View/1606/code16-9?bidId=>
- Carmichael Water District Water Shortage Contingency Plan (2016):
<https://carmichaelwd.org/wp-content/uploads/2017/12/Final-2016-WSCP-.pdf>
- Seattle Water Shortage Contingency Plan:
<https://www.seattle.gov/Documents/Departments/SPU/Documents/SPU%20Water%20Shortage%20Contingency%20Plan%202019%20WSP.pdf>
- San Diego Water Shortage Contingency Plan (2017):
<https://www.sdcwa.org/sites/default/files/Water%20Shortage%20Contingency%20Plan%20August%202017.pdf>
- Mesa Water Shortage Plan (2018):
<https://www.mesaaz.gov/home/showdocument?id=5454>
- Goleta Water District Drought Preparedness and Water Shortage Plan (2014):
<https://www.goletawater.com/assets/uploads/documents/FINAL%20GWD%20Drought%20Management%20Plan%20July%202014.pdf>
- City of Durham Water Shortage Response Plan (2016):
<https://durhamnc.gov/DocumentCenter/View/4291/Water-Shortage-Response-Plan-12-2016?bidId=>
- Water Shortage Response Plan, Montreat (2010):
https://townofmontreat.org/wp-content/uploads/2018/06/WATER_SHORTAGE_RESPONSE_PLAN_REVISED_04082010.pdf
- Lanai Drought Response Plan (2015):
Not available online
- The Colorado Drought Response Plan (2013):
https://drought.unl.edu/archive/plans/drought/state/CO_2013.pdf

Appendix 4: Submitted Individual Water Shortage Plans

(this page intentionally left blank)

Received ~ 8/12/02

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



GILBERT S. COLOMA-AGARAN
CHAIRPERSON

BRUCE S. ANDERSON
MEREDITH J. CHING
CLAYTON W. DELA CRUZ
BRIAN C. NISHIDA
HERBERT M. RICHARDS, JR.

LINNEL T. NISHIOKA
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

JUL 25 2002

Ref: 2358-49 wsp.let

Mr. Robert Killen
District Superintendent
Hawaii Pacific District Church of the Nazarene
P.O. Box 6254
Honolulu, HI 96818

Dear Mr. Killen:

We are writing to request that you submit a water shortage plan for the Pearl City Well (Well No. 2358-49), as required under Administrative Rule §13-171-42(c), which states:

"All permittees, unless exempted by the Commission, shall submit a water shortage plan outlining how it will reduce its own water use in case of a shortage. Every water shortage plan shall be subject to approval or modification by the Commission."

Your water shortage plan should identify what you are willing to do should the Commission declare a water shortage situation in the Waipahu-Waiawa Ground-Water Management Area. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which shall consider and incorporate appropriate provisions set forth within your water shortage plan for implementation. Therefore, your help in submitting a water shortage plan will be beneficial in the Commission's formulation of an overall Water Shortage Plan. At a minimum, we request that you identify the percent reduction (e.g. 5%, 10%, 15%, etc.) in water use that can be sustained indefinitely during a water shortage situation by filling in the table below:

Well Name (Well No.)	Permitted Use	Allocation (mgd)	Percent Reduction in Water Use
Pearl City Well (2358-49)	Irrigation of Church Facilities	0.003	5%

DEPARTMENT OF LAND AND NATURAL RESOURCES
Land Division
Engineering Branch

SEP 9 2002

32 SEP 9 12:15

TO: Linnel T. Nishioka, Deputy Director
Commission on Water Resource Management

FROM: Andrew Monden, Chief Engineer



SUBJECT: Water Shortage Plan for Well No. 1905-04

The subject well is a feedwater source for the Demonstration Desalting Plant and has not been used since the plant was closed in July 1995. For our purposes, a 100% reduction in water use can be accommodated.

We are in the process of transferring the plant to the Honolulu Board of Water Supply (BWS) and anticipate the transfer to be completed by December 2002. We will be requesting a transfer of the allocation to BWS as the transfer of the plant nears finalization. We are not aware of BWS' plans for the plant and thus, long term water shortage plans for this well will need to be identified by them.

If you have any questions, please call Alyson Yim at extension 70259.

attachment

MEMORANDUM FOR THE RECORD

FROM: Lenore Nakama
SUBJECT: Water Shortage Plan for Harris Rug Well (2201-14)

Mr. Harris called on 8/28/02 in response to our letter requesting a water shortage plan. He said he has not used the well in 8 to 10 years because he had a stroke and has been in recovery. I asked him if he had any future plans to use the well because, if not, we would like to revoke the water use permit so that someone else could use it. He asked how he could reobtain an allocation if he decided to use the well in the future. I told him that he would need to reapply for a permit. He said that the well is good and produces good quality water, he may decide to restart his business, and so he would like more time to think about it. I informed him that the water use permit is specific to his rug cleaning business and that the permit needs to be modified if he wants to use it for another purpose.

Because there is no current use or any immediate plans to use the well, Mr. Harris will not be submitting any water shortage plan at this time.



DEPARTMENT OF THE NAVY
JOINT BASE PEARL HARBOR-HICKAM
850 TICONDEROGA ST STE 110
JBPHH, HAWAII 96860-5102

11000
JB4/Ser 273
31 March 2020

RECEIVED
COMMISSION ON WATER
RESOURCE MANAGEMENT
2020 MAR-31 PM 12:29
Apr 6

State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809

Dear Sir or Madam:

SUBJECT: U.S. NAVY WATER SHORTAGE PLANS FOR PEARL HARBOR AQUIFER

In reference to your request from our Pearl Harbor Water Shortage Plan meeting on March 3, 2020, we are submitting the updated water shortage plans for Waiawa and Halawa water pumping stations that are located within the Pearl Harbor Aquifer. We look forward to working with the Water Commission to preserve Oahu's groundwater sources.

If you have any questions or need more information, please contact Mr. Randy Kawamura at (808) 471-0891 or email randy.kawamura@navy.mil. Thank you for your time, consideration and assistance on this matter.

Sincerely,

R. E. HARMEYER
Captain, CEC, U.S. Navy
Public Works Officer, JB4
By direction

- Enclosure: 1. Waiawa Well Water Shortage Plan
2. Halawa Well Water Shortage Plan

86

Water Shortage Plan for Halawa Well No. 2255-32
(Water Use Permit No. 086)

1. The following plan is designed to be implemented in three separate phases with each phase reducing water consumption by an increasing amount.
2. When a water shortage situation occurs, water customers of Joint Base Pearl Harbor-Hickam Water System will be requested to take the specific actions listed for each individual phase of the plan as follows:

A. **Watch Phase:**

- (1) Eliminate the washing of all personal and government vehicles with hoses and sprayers; including the closure of all on-base mechanized vehicle wash facilities. Utilization of small buckets (three gallons or less) to wash vehicles will be authorized.
- (2) Limit watering of landscaped areas in military family housing to a maximum of TWO days a week. Limit watering in any one location to a maximum duration of 20 minutes. Watering days and hours for each housing area will be disseminated upon implementation of the Watch Phase.
- (3) Limit watering of parks, playgrounds, athletic fields and other common use areas to a maximum of ONE day a week. Limit watering in any one location to a maximum of 20 minutes. Watering days and hours shall be disseminated upon implementation of the Watch Phase.
- (4) Limit watering of all golf courses to TWO days a week. Limit watering in any one location to a maximum of 20 minutes.

B. **Alert Phase: (Reduce pumpage by 15%, or 0.1 MGD of allocated 0.697 MGD)**

- (1) Eliminate the washing of all personal and government vehicles with hoses and sprayers; including the closure of all on-base mechanized vehicle wash facilities. Utilization of small buckets (three gallons or less) to wash vehicles will be authorized.
- (2) Limit watering of landscaped areas in military housing to a maximum of ONE day a week. Limit watering in any one location to a maximum duration of 20 minutes. Watering days and hours for each housing area shall be disseminated upon implementation of the Alert Phase.
- (3) Eliminate the watering of all parks, playgrounds, athletic fields, and other common use areas.
- (4) Limit watering of all golf courses to ONE day a week. Limit watering in any one location to a maximum of 20 minutes.
- (5) Reduce consumption at all base industrial/administrative facilities by 10 percent.
- (6) Close swimming pools, lockers/showers, saunas and other water consuming recreational facilities at least three days a week.

Pearl Harbor Water Shortage Plan Adoption

FROM : TGIS_Flowers

FAX NO. : 8086770298

Mar. 04 2003 09:35AM P2

MAR-03-03 08-52 PROJ. WATER RESOURCE MGT

ID-0006070210

PAGE 2/3

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



GILBERT S. COLOMA-AGARAN
COMMISSIONER

BRUCE S. ANDERSON
MEREDITH J. CHANG
CLAYTON W. DELA CRUZ
BRIAN C. NISHIDA
HERBERT M. RICHARDS, JR.

LINDSEY T. NISHIOKA
DEPUTY COMMISSIONER

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

August 5, 2002

Ref: 2300-11 & 20 wpp.let

Mr. Al Watanabe
P.O. Box 1216 911200
Waipahu, HI 96797

Dear Mr. Watanabe:

We are writing to request that you submit water shortage plans for the Watanabe Wells (Well Nos. 2300-11 & 20), as required under Administrative Rule §13-171-42(e), which states:

"All permittees, unless exempted by the Commission, shall submit a water shortage plan outlining how it will reduce its own water use in case of a shortage. Every water shortage plan shall be subject to approval or modification by the Commission."

Your water shortage plan should identify what you are willing to do should the Commission declare a water shortage situation in the Waipahu-Waiawa Ground-Water Management Area. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which shall consider and incorporate appropriate provisions set forth within your water shortage plan for implementation. Therefore, your help in submitting a water shortage plan will be beneficial in the Commission's formulation of an overall Water Shortage Plan. At a minimum, we request that you identify the percent reduction (e.g. 5%, 10%, 15%, etc.) in water use that can be sustained indefinitely during a water shortage situation by filling in the table below:

Well Name (Well No.)	Permitted Use	Allocation (mgd)	Percent Reduction in Water Use
Watanabe (2300-11)	Irrigation	0.680	5 %
Watanabe (2300-20)	Irrigation	0.400	5 %

RECEIVED
LINDA SINGLE
GOVERNOR OF HAWAII

JAN 14 P 4 23



ERIC T. HIRANO
ACTING CHAIRPERSON
MEREDITH J. CHING
CLAYTON W. DELA CRUZ
BRIAN C. NISHIDA
HERBERT M. RICHARDS, JR.
DEAN A. NAKANO
ACTING DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96808

January 10, 2003

Ref: 2557-01 & 02

TO: Dierdre Mamiya, Administrator
Land Division
FROM: Dean A. Nakano, Acting Deputy Director
Commission on Water Resource Management
SUBJECT: Water Shortage Plan for Well Nos. 2557-01 & 02

We are writing to request that you submit a water shortage plan for the Waimano Training School Wells (Well Nos. 2557-01 & 02), as required under Administrative Rule §13-171-42(c), which states:

"All permittees, unless exempted by the Commission, shall submit a water shortage plan outlining how it will reduce its own water use in case of a shortage. Every water shortage plan shall be subject to approval or modification by the Commission."

Your water shortage plan should identify what you are willing to do should the Commission declare a water shortage situation in the Waimalu Ground-Water Management Area. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which shall consider and incorporate appropriate provisions set forth within your water shortage plan for implementation. Therefore, your help in submitting a water shortage plan will be beneficial in the Commission's formulation of an overall Water Shortage Plan. At a minimum, we request that you identify the percent reduction (e.g. 5%, 10%, 15%, etc.) in water use that can be sustained indefinitely during a water shortage situation by filling in the table below:

Well Name (Well No.)	Permitted Use	Allocation (mgd)	Percent Reduction in Water Use
Waimano Home & Training School (2557-01 & 02)	Domestic	0.136	1%

After you have filled in the last column on the above table, please make a copy of this letter and return it to us at the above address. Please retain the original for your records.

Please respond to this letter within the next thirty (30) days. If there are any questions, please contact Lenore Nakama at 587-0218.

LN:ss

110
110



DEPARTMENT OF THE NAVY
JOINT BASE PEARL HARBOR-HICKAM
850 TICONDEROGA ST STE 110
JBPHH, HAWAII 96860-5102

11000
JB4/Ser 273
31 March 2020

RECEIVED
COMMISSION ON WATER
RESOURCE MANAGEMENT
2020 MAR 31 PM 12:28
Apr 6

State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809

Dear Sir or Madam:

SUBJECT: U.S. NAVY WATER SHORTAGE PLANS FOR PEARL HARBOR AQUIFER

In reference to your request from our Pearl Harbor Water Shortage Plan meeting on March 3, 2020, we are submitting the updated water shortage plans for Waiawa and Halawa water pumping stations that are located within the Pearl Harbor Aquifer. We look forward to working with the Water Commission to preserve Oahu's groundwater sources.

If you have any questions or need more information, please contact Mr. Randy Kawamura at (808) 471-0891 or email randy.kawamura@navy.mil. Thank you for your time, consideration and assistance on this matter.

Sincerely,

R. E. HARMEYER
Captain, CEC, U.S. Navy
Public Works Officer, JB4
By direction

- Enclosure: 1. Waiawa Well Water Shortage Plan
2. Halawa Well Water Shortage Plan

Water Shortage Plan for Waiawa Well No. 2558-10
(Water Use Permit No. 111)

1. The following plan is designed to be implemented in three separate phases with each phase reducing water consumption by an increasing amount.
2. When a water shortage situation occurs, water customers of Joint Base Pearl Harbor-Hickam Water System will be requested to take the specific actions listed for each individual phase of the plan as follows:

A. **Watch Phase:**

- (1) Eliminate the washing of all personal and government vehicles with hoses and sprayers; including the closure of all on-base mechanized vehicle wash facilities. Utilization of small buckets (three gallons or less) to wash vehicles will be authorized.
- (2) Limit watering of landscaped areas in military family housing to a maximum of TWO days a week. Limit watering in any one location to a maximum duration of 20 minutes. Watering days and hours for each housing area will be disseminated upon implementation of the Watch Phase.
- (3) Limit watering of parks, playgrounds, athletic fields and other common use areas to a maximum of ONE day a week. Limit watering in any one location to a maximum of 20 minutes. Watering days and hours shall be disseminated upon implementation of the Watch Phase.
- (4) Limit watering of all golf courses to TWO days a week. Limit watering in any one location to a maximum of 20 minutes.

B. **Alert Phase: (Reduce pumpage by 7%, or 1.0 MGD of allocated 14.997 MGD)**

- (1) Eliminate the washing of all personal and government vehicles with hoses and sprayers; including the closure of all on-base mechanized vehicle wash facilities. Utilization of small buckets (three gallons or less) to wash vehicles will be authorized.
- (2) Limit watering of landscaped areas in military housing to a maximum of ONE day a week. Limit watering in any one location to a maximum duration of 20 minutes. Watering days and hours for each housing area shall be disseminated upon implementation of the Alert Phase.
- (3) Eliminate the watering of all parks, playgrounds, athletic fields, and other common use areas.
- (4) Limit watering of all golf courses to ONE day a week. Limit watering in any one location to a maximum of 20 minutes.
- (5) Reduce consumption at all base industrial/administrative facilities by 10 percent.
- (6) Close swimming pools, lockers/showers, saunas and other water consuming recreational facilities at least three days a week.

BENJAMIN J. CAYETANO
 GOVERNOR OF HAWAII



RECEIVED
 12 SET 6 P12:10

GILBERT S. COLOMA-AGARAN
 CHAIRPERSON

BRUCE S. ANDERSON
 MEREDITH J. CHING
 CLAYTON W. DELA CRUZ
 BRIAN C. NISHIDA
 HERBERT M. RICHARDS, JR.

LINNEL T. NISHIOKA
 DEPUTY DIRECTOR

STATE OF HAWAII
 DEPARTMENT OF LAND AND NATURAL RESOURCES
 COMMISSION ON WATER RESOURCE MANAGEMENT
 P.O. BOX 621
 HONOLULU, HAWAII 96809

August 28, 2002

Ref: 2603-01 wsp.let



Tenuhiro Katagiri
 Mr. ~~Makoto Sekiguchi~~
 Hawaii Country Club
 P.O. Box 861634
 Wahiawa, HI 96786

Katagiri
 Dear Mr. Sekiguchi:

We are writing to request that you submit a water shortage plan for the Hawaii Country Club Well (Well No. 2603-01), as required under Administrative Rule §13-171-42(c), which states:

"All permittees, unless exempted by the Commission, shall submit a water shortage plan outlining how it will reduce its own water use in case of a shortage. Every water shortage plan shall be subject to approval or modification by the Commission."

Your water shortage plan should identify what you are willing to do should the Commission declare a water shortage situation in the Waipahu-Waiawa Ground-Water Management Area. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which shall consider and incorporate appropriate provisions set forth within your water shortage plan for implementation. Therefore, your help in submitting a water shortage plan will be beneficial in the Commission's formulation of an overall Water Shortage Plan. At a minimum, we request that you identify the percent reduction (e.g. 5%, 10%, 15%, etc.) in water use that can be sustained indefinitely during a water shortage situation by filling in the table below:

Well Name (Well No.)	Permitted Use	Allocation (mgd)	Percent Reduction in Water Use
Hawaii CC (2603-01)	Domestic; Irrigation	0.400	15%

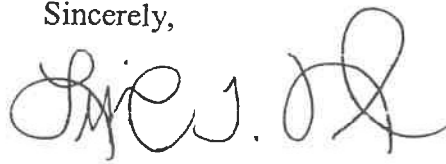
Pearl Harbor Water Shortage Plan Adoption

Mr. Makoto Sekiguchi
Page 2
August 28, 2002

After you have filled in the last column on the above table, please make a copy of this letter and return it to us at the above address. Please retain the original for your records.

Please respond to this letter within the next thirty (30) days. If there are any questions, please contact Lenore Nakama at 587-0218.

Sincerely,



LINNEL T. NISHIOKA
Deputy Director

LN:ss

BENJAMIN J. CAYETANO
 GOVERNOR OF HAWAII



GILBERT S. COLOMA-AGARAN
 CHAIRPERSON

BRUCE S. ANDERSON
 MEREDITH J. CHING
 CLAYTON W. DELA CRUZ
 BRIAN C. NISHIDA
 HERBERT M. RICHARDS, JR.

LINNEL T. NISHIOKA
 DEPUTY DIRECTOR

STATE OF HAWAII
 DEPARTMENT OF LAND AND NATURAL RESOURCES
 COMMISSION ON WATER RESOURCE MANAGEMENT

P.O. BOX 621
 HONOLULU, HAWAII 96809

August 5, 2002

Ref: 2202-02 wsp.let

Mr. Tadahiro Abe
 91-1235 Laulaunui Lane
 Ewa Beach, HI 96706

Dear Mr. Abe:

We are writing to request that you submit a water shortage plan for the Honouliuli Well (Well No. 2202-02), as required under Administrative Rule §13-171-42(c), which states:

"All permittees, unless exempted by the Commission, shall submit a water shortage plan outlining how it will reduce its own water use in case of a shortage. Every water shortage plan shall be subject to approval or modification by the Commission."

Your water shortage plan should identify what you are willing to do should the Commission declare a water shortage situation in the Waipahu-Waiawa Ground-Water Management Area. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which shall consider and incorporate appropriate provisions set forth within your water shortage plan for implementation. Therefore, your help in submitting a water shortage plan will be beneficial in the Commission's formulation of an overall Water Shortage Plan. At a minimum, we request that you identify the percent reduction (e.g. 5%, 10%, 15%, etc.) in water use that can be sustained indefinitely during a water shortage situation by filling in the table below:

Well Name (Well No.)	Permitted Use	Allocation (mgd)	Percent Reduction in Water Use
Honouliuli (2202-02)	Irrigation	0.009	0

456

ORIGINAL
**KOBAYASHI
SUGITA &
GODA**
ATTORNEYS • AT • LAW

999 Bishop Street, Suite 2600
Honolulu, Hawaii 96813-4430

Telephone: 808-539-8700
Facsimile: 808-539-8799
E-Mail: ksg@aloha.net

Bert T. Kobayashi, Jr.*	Rod S. Aoki
Kenneth Y. Sugita*	Christopher T. Kobayashi
Alan M. Goda*	Jonathan A. Kobayashi
Dale W. Lee*	Matthew H. Kobayashi
Lex R. Smith*	John A. Kodachi
David L. Monroy*	Burt T. Lau
Wendell H. Fuji*	Bruce A. Nakamura
Robert K. Ichikawa*	Gary K. Nakata
Janeen-Ann A. Olds*	Ronald T. Ogomori
Clifford K. Higa*	Ruth K. Oh
Charles W. Gall*	Wintechn K.T. Park
John F. Lezak*	David B. Tongg
Larry L. Myers*	Vivian W. Tsoi
Ernest H. Nomura*	Nathan H. Yoshimoto
Craig K. Shikuma*	

August 19, 1998

*A Law Corporation
 **Licensed to practice in
 Arizona and the Federal
 District Courts for the Districts
 of Hawaii and Arizona

Of Counsel:
 Bert T. Kobayashi, Sr.
 Michael J. McGivern**

OAH DISTRICT COURT WATER
 RESOURCE MANAGEMENT
 RECEIVED
 00 AUG 19 03:27
 RECEIVED

Commission on Water
Resource Management
State of Hawaii
Department of Land and
Natural Resources
P.O. Box 821
Honolulu, Hawaii 96809

Re: Pearl Country Club - Well No. 2356-54
Waimalu Ground Water Management Area, Oahu

Honorable Commissioners:

Attached hereto pursuant to Section 13-171-42(c),
Hawaii Administrative Rules, and Standard Permit Condition 17 to
Water Use Permit No. 466, please find Pearl Country Club's Water
Shortage Plan.

Please contact the undersigned should the Commission
have any questions regarding Pearl Country Club's Water Shortage
Plan or require any further information.

Very truly yours,

CLIFFORD K. HIGA
ROD S. AOKI
for
KOBAYASHI, SUGITA & GODA

Attachment

c: Mr. Glenn Kaya
Mr. Howard Hamada

214232.wp

WATER SHORTAGE PLAN FOR PEARL COUNTRY CLUB

In order to obtain a maximum level of efficiency in its water use, Pearl Country Club ("PCC") has, at its own considerable expense, installed a state-of-the-art, fully automated sprinkler/irrigation system to maintain its golf course facility. This system is capable of measuring relative humidity, wind velocity, solar radiation, rain fall, and temperature and only draws upon the water resource when all of these factors together indicate that such is required. PCC's system is one of only a very few such systems in the State. The result of the operation of this system is that PCC makes very efficient use of the water resource and does not waste the resource as may other facilities which do not have access to as sophisticated a system. Therefore, to the extent that a water shortage is declared, PCC would respectfully request that the Commission recognize and credit PCC's efforts at conservation of the water resource by allowing PCC a greater percentage of its historic level of water usage than may be allowed those facilities which do not have such a system in place.

Due to the fact that PCC has installed its automated irrigation system, in the event that a water shortage is declared by the Commission, water use at PCC may be easily and appropriately decreased as the Commission may order. As an example, to the extent that the Commission orders a 10% reduction in use, PCC may reduce watering in certain areas that are out of play. Should the Commission require a larger reduction, PCC may progressively decrease irrigation to fairway landing areas, tees, and greens as may be necessary.

214210.wp

State of Hawaii
Dept. of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, Hi

RECEIVED

98 NOV 6 P 1:32

COMMISSION ON WATER
RESOURCE MANAGEMENT

EMERGENCY WATER SHORTAGE USE PLAN:

Water Management area:	Waipahu-Waiawa
Aquifer Sector:	Pearl Harbor
Well Name:	Honouliuli
State Well No. :	2201-02
Permittee:	Tadao Abe
Address:	91-1219 Laulaunui Lane Ewa Beach, Hi 96706

The total requested water allocation was based on domestic and agricultural irrigation use. Domestic use was based on a typical 3 bedroom residential home with average lawn and foliage. Irrigation use is for low density vegetable farming of about a quarter of an acre.

Water conservation practices being used presently are hand irrigation during early morning or late afternoon, limited farming during summer months, and the minimizing of and recycling of water used to wash harvested vegetable crops.

In time of emergency water shortages, agricultural water consumption can be reduced by limiting irrigation to the maintenance of seed crop for future, post-shortage, farming. Domestic consumption can also be reduced by following Board of Water Supply and Commission recommendations. Emergency consumption can then be reduced to an estimated .0005 mgd to .001 mgd.

Submitted by;



Tadao Abe

October 30, 1998

BENJAMIN J. CAYETANO
 GOVERNOR OF HAWAII



GILBERT S. COLOMA-AGARAN
 CHAIRPERSON

BRUCE S. ANDERSON
 MEREDITH J. CHING
 CLAYTON W. DELA CRUZ
 BRIAN C. NISHIDA
 HERBERT M. RICHARDS, JR.

LINNEL T. NISHIOKA
 DEPUTY DIRECTOR

STATE OF HAWAII
 DEPARTMENT OF LAND AND NATURAL RESOURCES
 COMMISSION ON WATER RESOURCE MANAGEMENT
 P.O. BOX 621
 HONOLULU, HAWAII 96809

August 28, 2002

COMMISSION ON WATER
 RESOURCE MANAGEMENT

02 DEC 28 02
 RECEIVED
 Ref: 2001-02 wsr/let
 P 3: 15

Mr. Gary Takiguchi
 P.O. Box 1346
 Ewa, HI 96706

new # 60489

Dear Mr. Takiguchi:

We are writing to request that you submit a water shortage plan for the Honouliuli Well (Well No. 2201-02), as required under Administrative Rule §13-171-42(c), which states:

"All permittees, unless exempted by the Commission, shall submit a water shortage plan outlining how it will reduce its own water use in case of a shortage. Every water shortage plan shall be subject to approval or modification by the Commission."

Your water shortage plan should identify what you are willing to do should the Commission declare a water shortage situation in the Waipahu-Waiawa Ground-Water Management Area. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which shall consider and incorporate appropriate provisions set forth within your water shortage plan for implementation. Therefore, your help in submitting a water shortage plan will be beneficial in the Commission's formulation of an overall Water Shortage Plan. At a minimum, we request that you identify the percent reduction (e.g. 5%, 10%, 15%, etc.) in water use that can be sustained indefinitely during a water shortage situation by filling in the table below:

Well Name (Well No.)	Permitted Use	Allocation (mgd)	Percent Reduction in Water Use
Honouliuli (2201-02)	Domestic; Irrigation	0.019	5%

BENJAMIN J. CAVETANO
GOVERNOR OF HAWAII



GILBERT S. COLOMA-AGARAN
CHAIRPERSON

BRUCE S. ANDERSON
MEREDITH J. CHING
CLAYTON W. DELA CRUZ
BRIAN C. NISHIDA
HERBERT M. RICHARDS, JR.

LINNEL T. NISHIOKA
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 121
HONOLULU, HAWAII 96808

August 28, 2002

Ref: 2358-35,36,44.wsp.let

Mr. Kenneth Simon
c/o Kenneth Sikes
98-023 Hekaha St. #F2
Aiea, HI 96701

Dear Mr. Sikes:

We are writing to request that you submit a water shortage plan for the Pearl City Wells (Well Nos. 2358-35,36,44), as required under Administrative Rule §13-171-42(c), which states:

"All permittees, unless exempted by the Commission, shall submit a water shortage plan outlining how it will reduce its own water use in case of a shortage. Every water shortage plan shall be subject to approval or modification by the Commission."

Your water shortage plan should identify what you are willing to do should the Commission declare a water shortage situation in the Waipahu-Waiawa Ground-Water Management Area. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which shall consider and incorporate appropriate provisions set forth within your water shortage plan for implementation. Therefore, your help in submitting a water shortage plan will be beneficial in the Commission's formulation of an overall Water Shortage Plan. At a minimum, we request that you identify the percent reduction (e.g. 5%, 10%, 15%, etc.) in water use that can be sustained indefinitely during a water shortage situation by filling in the following table:

Mr. Kenneth Simon

Page 2

August 28, 2002

Well Name (Well No.)	Permitted Use	Allocation (mgd)	Percent Reduction in Water Use
Waipahu (2358-35 & 44)	Irrigation	0.040	5% IF NECESSARY
Waipahu (2358-36)	Domestic	0.004	☒ NONE

After you have filled in the last column on the above table, please make a copy of this letter and return it to us at the above address. Please retain the original for your records.

Please respond to this letter within the next thirty (30) days. If there are any questions, please contact Lenore Nakama at 587-0218.

Sincerely,

LINNEL T. NISHIOKA
Deputy Director

LN:ss

HOWARD H. HAMAMOTO

RECEIVED

96 JUL 25 A 8: 07

July 24, 1996

COMMISSION ON WATER
RESOURCE MANAGEMENT

Ms. Rae M. Loui
Deputy Director
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Loui:

Thank you for your June 27, 1996 letter transmitting our Water Use Permit for Well No. 2401-07.

As directed by you, I am submitting our Water Shortage Plan. Please call me if there are any questions.

For your information, I am working with the State Department of Health to satisfy Special Condition #2. I will forward to you a copy of their statement that all conditions have been satisfied as soon as I receive it.

Very truly yours,

ROYAL OAHU RESORT, INC.



Howard H. Hamamoto
Receiver

HHH/lyk

575

WATER SHORTAGE PLAN
Royal Kunia Country Club

During periods of water shortage and temporary reductions in pumpage from all sources is required on a temporary basis by the Commission, Royal Oahu Resort will cooperate to conserve water by decreasing the areas irrigated and the amount of water applied in the following manner:

Prioritize the specific areas to be irrigated in the order of importance:

- 1) Greens and Tees
- 2) Approaches
- 3) Fairways
- 4) Drip irrigation to trees
- 5) Rough areas

Reduction in the amount of water applied

- 1) A pro rata reduction of the average annual usage of water within a range of 15-20%. While any reduction below what is normally required is damaging, a reduction within this range will still allow the turf and landscaping to survive. Reduction in an amount greater than 25% will cause irreparable and irreversible damage.
- 2) With the exception of the Greens and Tees, which should be watered on a daily basis because of their porous construction and poor water retention capacity, other areas could be watered every other day on a rotational basis. Irrigation frequency and duration will be determined in accordance with site specific weather and terrain conditions as well as by the amount of water available for use.

575

LINDA LINGLE
GOVERNOR OF HAWAII



RECEIVED

03 MAR 21 09:39

PETER T. YOUNG
CHAIRPERSON

MEREDITH J. CHING
CLAYTON W. DELA CRUZ
CHIYOME L. FUKINO, M.D.
BRIAN C. NISHIDA
HERBERT M. RICHARDS, JR.

DEAN A. NAKANO
ACTING DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

March 6, 2003

Ref: 2359-10.wsp.let

Ms. Cheryl Uechi
Pearl City Community Church
933 Lehua Avenue
Pearl City, HI 96782

Dear Ms. Uechi:

We are writing to request that you submit a water shortage plan for the Pearl City Community Church Well (Well No. 2359-10), as required under Administrative Rule §13-171-42(c), which states:

"All permittees, unless exempted by the Commission, shall submit a water shortage plan outlining how it will reduce its own water use in case of a shortage. Every water shortage plan shall be subject to approval or modification by the Commission."

This requirement is also reflected in Standard Condition 16 of your water use permit, that was approved by the Commission on December 18, 2002.

Your water shortage plan should identify what you are willing to do should the Commission declare a water shortage situation in the Waipahu-Waiawa Ground-Water Management Area. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which shall consider and incorporate appropriate provisions set forth within your water shortage plan for implementation. Therefore, your help in submitting a water shortage plan will be beneficial in the Commission's formulation of an overall Water Shortage Plan. At a minimum, we request that you identify the percent reduction (e.g. 5%, 10%, 15%, etc.) in water use that can be sustained indefinitely during a water shortage situation by filling in the table below:

Well Name (Well No.)	Permitted Use	Allocation (mgd)	Percent Reduction in Water Use
Pearl City Community Church (2359-10)	Domestic	0.005	5 - 10%

626

Ms. Cheryl Uechi
Page 2
March 6, 2003

After you have filled in the last column on the above table, please make a copy of this letter and return it to us at the above address. Please retain the original for your records.

Please respond to this letter within the next thirty (30) days. If there are any questions, please contact Lenore Nakama at 587-0218.

Sincerely,



DEAN A. NAKANO
Acting Deputy Director

LN:ss

026

PEARL HARBOR WATER SHORTAGE PLAN - FIELD SURVEY Nov. 11, 2004

I. Permittee Background Information

WUP No. 627	Name of Applicant U.S. Fish & Wildlife	Contact Sylvia Pelizza	Phone Number 637-6330		
Applicant Mailing Address Oahu National Wildlife Refuge Complex 66-590 Kamehameha Hwy, Room 2C		City Haleiwa	State HI	Zip 96712	TMK 9-6-1:1
Well No. 2359-19	Pump Capacity 0.18	MGD	Type of Source Non-potable		

Water use description

Supplement rainfall into the existing pond.

Compliance with WUP Conditions:

Submitted monthly well pumpage <input type="checkbox"/>	Source Artesian well	Allocation 0.18	MGD	Method of measurement Flowmeter
Type of use Other use	Existing conservation measures None. Water system not in operation.			

II. Water System Profile

Description of existing water system components

Artesian well (not inservice), gravity distribution line, discharge into pond.

Description of service characteristics

Waiawa Unit of the Pearl Harbor Refuge Unit Area

Number of service laterals/end users/service population/area

35 acres

III. Water Demand

Existing monthly water use

None. Water system not in operation.

Water measuring method

Flow meter

Type of water used or needed

Non potable

Water use classification

Other use

627

PEARL HARBOR WATER SHORTAGE PLAN - FIELD SURVEY Nov. 11, 2004

IV. Existing Conservation Program

Conservation manager or contact

Mike Silbernagle

Permit Holder Existing Individual Water Conservation Plan

Field verified existing conservation measures

Conservation measures to continue

Notes on the effectiveness of existing conservation measures

Reservoir pond has gauges to determine the water level within the pond and be able to adjust the height of water in pond by season or weather condition. Well and water system to be placed in service fall of 2004.

V. Water Conservation Measure Checklist

A. Metering

Source metering

Service-connection metering

Public-use metering

Fixed interval meter reading

Meter calibration, maintenance, repair, replacement

B. Water Accounting and Loss Prevention

Account for water, system audit

Leak detection and repair strategy

Loss-prevention program

C. Pricing N/A

Conservation Rate Structure

D. Education and Outreach N/A

Water user education and information through presentations, brochures, flyers, pamphlets Workshops

E. Retrofits and Rebates N/A

Retrofit kit, distribution of kits and targeted users

Direct toilet replacement programs

Plumbing rebates, promotion of new technologies, cooperation w/ other utilities

F. Landscaping Efficiency N/A

Promotion of landscaping efficiency Landscape planning and renovation Irrigation management

Xeriscaping Wind and moisture sensors Drip (subsurface/surface) tubing vs spray heads

Mulch to retain soil moisture Overspray identification Soil moisture testing

G. Water Reuse N/A

Promotion of water reuse, alternative water source for nonpotable water users

Availability to alternate water source and distribution systems

H. Water Use Regulations N/A

Water use standards and regulations

PEARL HARBOR WATER SHORTAGE PLAN - FIELD SURVEY Nov. 11, 2004

Notes

Well not in service.

Evaluation of Existing Water Conservation Plan, measures and proposed reduction percentage

Well not in service.

Recommendations to improve existing water conservation plan and implement new conservation measures

Well not in service.

Recommendations for modification of individual shortage plans

WUP holder has not submitted updated WSP reduction percentage form or original WSP percentage submitted as part of permit records.



RECEIVED

03 FEB 3 PM 18

January 29, 2003

COMMISSION ON WATER
RESOURCE MANAGEMENT

Mr. Dean Nakano
Acting Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

SUBJECT: WELL NO. 2006-13 – WATER SHORTAGE PLAN

Dear Mr. Nakano:

Returned herewith is the Commission's letter dated August 6, 2002 with the appropriate information filled in the table, as requested.

Future correspondence regarding the subject well should be directed to:

Jeffrey R. Stone
Ko Olina Intangibles, LLC
55 Merchant Street, Suite 1500
Honolulu, Hawaii 96813

Should there be any questions on this matter, please contact William Blaisdell at 673-7678.

Sincerely,

Ko Olina Intangibles, LLC
By Ko Olina Company, LLC, its sole member
By Ko Olina Partners, LLC, its sole manager

A handwritten signature in black ink, appearing to read "Jeff Stone", is written over the typed name of Jeffrey R. Stone.

Jeffrey R. Stone, Manager

JS:co
Attachment

c: Lenore Nakama
William Blaisdell

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



GILBERT S. COLOMA-AGARAN
COMMISSIONER

BRUCE S. ANDERSON
MEREDITH J. CHING
CLAYTON W. DELA CRUZ
BRIAN C. NISHIDA
HERBERT M. RICHARDS, JR.

LINNEE T. NISHOKA
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 821
HONOLULU, HAWAII 96809

August 6, 2002

Ref: 2006-13 wasp.let

Mr. Ken Williams
West Beach Estates
2024 North King Street
Honolulu, HI 96814

Dear Mr. Williams:

We are writing to request that you submit a water shortage plan for the West Beach Estates Well (Well No. 2006-13), as required under Administrative Rule §13-171-42(c), which states:

"All permittees, unless exempted by the Commission, shall submit a water shortage plan outlining how it will reduce its own water use in case of a shortage. Every water shortage plan shall be subject to approval or modification by the Commission."

Your water shortage plan should identify what you are willing to do should the Commission declare a water shortage situation in the Ewa-Kunia Ground-Water Management Area. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which shall consider and incorporate appropriate provisions set forth within your water shortage plan for implementation. Therefore, your help in submitting a water shortage plan will be beneficial in the Commission's formulation of an overall Water Shortage Plan. At a minimum, we request that you identify the percent reduction (e.g. 5%, 10%, 15%, etc.) in water use that can be sustained indefinitely during a water shortage situation by filling in the table below:

Well Name (Well No.)	Permitted Use	Allocation (mgd)	Percent Reduction in Water Use
W Beach Estates (2006-13)	Irrigation	0.700	5%

655

Pearl Harbor Water Shortage Plan Adoption

01/28/03 11:30 FAX 808 873 767

KO OLINA DVLPMNT

→ STONE COMPANIES

000

JAN-08-03 08:53 FROM: WATER RESOURCE MGT

ID: 0005870218

PAGE 3/3

Mr. Ken Williams
Page 2
August 6, 2002

After you have filled in the last column on the above table, please make a copy of this letter and return it to us at the above address. Please retain the original for your records.

Please respond to this letter within the next thirty (30) days. If there are any questions, please contact Lenore Nakama at 587-0218.

Sincerely,



LINNEL T. NISHIOKA
Deputy Director

LN:ss

Staff Submittal
Pearl Harbor Water Shortage Plan Adoption

LINDA LINGLE
GOVERNOR OF HAWAII



ALLAN A. SMITH
INTERIM CHAIRPERSON
MEREDITH J. CHING
JAMES A. FRAZIER
NEAL S. FUJIMURA
CHUYONG E. FUKINO, M.D.
LAWRENCE H. MIKE, M.D., J.D.
STEPHANIE A. WHALEN

KEN C. KAWAHARA, P.E.
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

June 21, 2007

Ref: 2455-02.wsp.let

Ms. Stephanie Tom
Minami Farm
P.O. Box 116
Aiea, HI 96701

Dear Ms. Tom:

We are writing to request that you submit a water shortage plan for the Minami Farm Well (Well No. 2455-02), as required under Administrative Rule §13-171-42(c), which states:

03

"All permittees, unless exempted by the Commission, shall submit a water shortage plan outlining how it will reduce its own water use in case of a shortage. Every water shortage plan shall be subject to approval or modification by the Commission."

Your water shortage plan should identify what you are willing to do should the Commission declare a water shortage situation in the Waimalu Ground-Water Management Area. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which shall consider and incorporate appropriate provisions set forth within your water shortage plan for implementation. Therefore, your help in submitting a water shortage plan will be beneficial in the Commission's formulation of an overall Water Shortage Plan. At a minimum, we request that you identify the percent reduction (e.g. 5%, 10%, 15%, etc.) in water use that can be sustained indefinitely during a water shortage situation by filling in the table below:

Minami Farm (2455-02) 03	Agriculture	0.158	5%
-----------------------------	-------------	-------	----

After you have filled in the last column on the above table, please fax this letter to our office at 587-0219, or make a copy of this letter and return it to us at the above address. Please retain the original for your records.

Please respond to this letter within the next fifteen (15) days. If there are any questions, please contact Lenore Nakama at 587-0218.

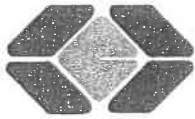
Sincerely,

KEN C. KAWAHARA, P.E.
Deputy Director

656

JLSK:ss

THE GENTRY COMPANIES



November 14, 2005

RECEIVED
05 NOV 15 AM 1:31

Mr. Peter T. Young
Chairperson
Commission on Water Resource Management
Department of Land & Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Young:

Subject: **Water Shortage Plan for WUP Nos. 692 & 693**
Gentry Waiawa Wells 1 & 2
State Well Nos. 2658-07 & 2658-08

The subject wells will be utilized to irrigate two golf courses within the Gentry Waiawa community development. Each golf course will have a fully automated irrigation system enabling irrigation applications to be reduced or stopped in any and all areas of the course to achieve the desired reductions of irrigation use. If and when the Commission on Water Resource Management declares a water shortage and requires a temporary cutback in usage, reductions could be made in several stages such as the following:

Stage 1. A reduction in usage to about 70 percent of total use could be achieved by reducing and/or eliminating irrigation of roughs and other out of play areas.

Stage 2. A reduction in usage to about 30 percent of total use could be achieved by also limiting irrigation in the fairways to landing areas.

Stage 3. If ultimately required, a reduction in usage to about 10 percent of total use could be achieved by only irrigating tees and greens, with sparse application on fairway landing areas.

Should you have any questions, please feel free to call me at 599-8345.

Very truly yours,
WAIAWA DEVELOPMENT LLC

PATRICE TOTTORI LIU
Project Director

cc: Lora Cachola, Kamehameha Schools

692/693



Hanalei
<hanaleicom@yahoo.com>
07/27/2007 11:45 AM

To lenore.y.nakama@hawaii.gov
cc
bcc
Subject Water shortage plan

Dear Lenore Nakama

My water conservation plan is to reduce the water use from my well by 10% in times of need or shortage.

From Mark Ortiz

my e-mail is honouliuli@hawaii.rr.com if you need to reach me

Take the Internet to Go: Yahoo!Go puts the Internet in your pocket: mail, news, photos & more.

Waikele Farms, Inc.
P.O. Box 27
Kunia, HI 96759

RECEIVED
COMMISSION ON WATER
RESOURCE MANAGEMENT
2020 JAN -2 AM 8:40

December 30, 2019

State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809

Re: Water Shortage Plan for Robinson No. 1
Well No. 3-2602-003

To Whom It May Concern,

In response to your request on 12/10/19 for a water shortage plan for the Robinson No. 1 Well (Well No. 3-2602-003), we will take the following action steps should the Commission declare a water shortage situation and require temporary pumping reduction.

To do our part to protect the water resources from serious harm, Waikele Farms will implement the following in this order as needed:

- 1) Reduce the watering of the windbreaks
- 2) Temporarily cease planting new crops
- 3) Outsource washing of vegetables
- 4) Destroy current crops if necessary

The above steps will be implemented as prioritized, based on the duration and severity of the water shortage situation. We will try to sustain the farming at a reduced level and continue to maintain the nursery for future plantings.

Aloha,

Larry Jefts

Cc: Ms. Caroline Robinson, Robinson Kunia Land LLC

767



ROMAN CATHOLIC CHURCH IN THE STATE OF HAWAII
DIOCESE OF HONOLULU
WITNESS TO JESUS

RECEIVED
COMMISSION ON WATER
RESOURCE MANAGEMENT
DEC 20 AM 8:17

Jeremy Kimura
Commission on Water Resource Management, State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

December 18, 2019

Re: Water Use Permit: Well No. 2101-01; TMK (1) 9-1-17-041

Dear Jeremy,

This letter is in response to the November 6, 2019 letter, received by my office on 12/10/19 and the subsequent email from you, dated December 12, 2019. The original letter and subsequent email is requesting an update to the Ground Water Use Permit, WUP No. 814 dated August 16, 2007.

As discussed in our telephone conversation of 12/12/19, there are no use changes since the issuance of the original permit. The property remains substantially vacant, only occupied year to year by a tenant who uses it primarily as storage. We have listed the property for sale and would imagine that the subsequent owner may have to submit an update.

Should we continue as the property owner if and when there is a water shortage, we can commit to reduce our water allotment by 5%; however, we reserve the right to have the subsequent owner submit its own commitment.

I understand that there will be a meeting planned for this purpose and look forward to being notified and attending. Please address all future correspondence to me at the contact information below and on the letterhead. Please send a copy to Lisa Sakamoto, the successor to William Burton.

My best,

Marlene R. De Costa, CPM®, RPA®
Director of Real Estate
T: 808.585.3332
E: mdecosta@rcchawaii.org

cc: Lisa Sakamoto

814

**Staff Submittal
Pearl Harbor Water Shortage Plan Adoption**

August 18, 2020

LINDA LINGLE
GOVERNOR OF HAWAII



ERIC T. HIRANO
ACTING CHAIRPERSON

MEREDITH J. CHING
CLAYTON W. DELA CRUZ
BRIAN C. NISHIDA
HERBERT M. RICHARDS, JR.

DEAN A. NAKANO
ACTING DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

January 7, 2003

Mr. Calvin Oda
Del Monte Fresh Produce (Hawaii) Inc.
94-1000 Kunia Road
Kunia, HI 96759

Dear Mr. Oda:

We are writing to request that you submit a water shortage plan for the Kunia and Kunia Basal Wells (Well Nos. 2703-01 & 02), as required under Administrative Rule §13-171-42(c), which states:

"All permittees, unless exempted by the Commission, shall submit a water shortage plan outlining how it will reduce its own water use in case of a shortage. Every water shortage plan shall be subject to approval or modification by the Commission."

Your water shortage plan should identify what you are willing to do should the Commission declare a water shortage situation in the Ewa-Kunia Ground-Water Management Area. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which shall consider and incorporate appropriate provisions set forth within your water shortage plan for implementation. Therefore, your help in submitting a water shortage plan will be beneficial in the Commission's formulation of an overall Water Shortage Plan. At a minimum, we request that you identify the percent reduction (e.g. 5%, 10%, 15%, etc.) in water use that can be sustained indefinitely during a water shortage situation by filling in the table below:

Well Name (Well No.)	Permitted Use	Allocation (mgd)	Percent Reduction in Water Use
Kunia & Kunia Basal (Well Nos. 2703-01 & 02)	Agriculture	1.075	10%

After you have filled in the last column on the above table, please make a copy of this letter and return it to us at the above address. Please retain the original for your records.

RECEIVED
 03 JUN 15 05: 31
 COMMISSION ON WATER
 RESOURCE MANAGEMENT
 2703-01 & 02 wsp

928

502

Mr. Calvin Oda
Page 2

January 7, 2003

Please respond to this letter within the next thirty (30) days. If there are any questions, please contact Lenore Nakama at 587-0218.

Sincerely,



DEAN A. NAKANO
Acting Deputy Director

LN:ss

928

Staff Submittal
Pearl Harbor Water Shortage Plan Adoption

August 18, 2020
Jeremy JK
Ryan
RECEIVED
COMMISSION ON WATER
RESOURCE MANAGEMENT
2020 MAR -2 AM 7:34



KAMEHAMEHA SCHOOLS®

February 27, 2020

Mr. M. Kaleo Manuel
Deputy Director, Commission on Water Resource Management
Department of Land and Natural Resources, State of Hawaii
PO Box 621
Honolulu, Hawaii 96809

RE: Water Shortage Plan for Well No. 3-2659-004

Dear Mr. Manuel:

Kamehameha Schools is writing in response to your November 6, 2019 request for a water shortage plan for Well No. 3-2659-004. We apologize for the delay and are submitting this Water Shortage Plan in compliance with your request and Hawaii Administrative Rules § 13-171-42(c).

BACKGROUND

On July 28, 1993, the Commission on Water Resource Management ("CWRM") approved a water use permit for Well No. 3-2659-004 to Gentry, who was leasing lands in Waiawa from Kamehameha Schools for development of a master planned residential community. Upon Gentry's abandonment of that development plan, the lands returned to Kamehameha Schools in 2012.

On November 27, 2012, CWRM approved the transfer of that water use permit from Gentry to Kamehameha Schools. Under the newly-transferred Water Use Permit No. 966, CWRM required the submission of a water shortage plan and monthly reporting of water use.

Since then, Kamehameha Schools has been refining development plans for the area, and consequently has not used any of the water permitted under Water Use Permit No. 966. In 2019, Kamehameha Schools presented preliminary plans to the Land Use Commission ("LUC") for development of the area under its Revised Waiawa Master Plan. It is anticipated that the Revised Waiawa Master Plan will be implemented over several decades, and in the interim the LUC has approved use of a portion of the area for a solar farm project. Accordingly, it is not anticipated that Kamehameha Schools will begin using the water permitted under Water Use Permit No. 966 in any significant amount until the entitlements for the Revised Waiawa Master Plan are obtained.

Wet



KAMEHAMEHA SCHOOLS®

WATER SHORTAGE PLAN

If CWRM declares a water shortage in the Waipahu-Waiawa Ground Water Management Area while Kamehameha Schools is in the process of obtaining entitlements for the Waiawa Master Plan, Kamehameha Schools will not commence water usage without providing reasonable notice and working cooperatively with CWRM to prevent adverse impacts to the water supply.

Once Kamehameha Schools has obtained all necessary entitlements for the Revised Waiawa Master Plan and begins to utilize water from Well No. 3-2659-004, Kamehameha Schools can submit a more detailed water shortage plan, which will provide for a certain percentage of reduction in domestic and irrigation water uses during the shortage period.

Kamehameha Schools hopes that this satisfies the requirement for a water shortage plan and will begin to submit monthly water usage reports to CWRM for Well No. 3-2659-004. Thank you for your assistance. Please feel free to contact Larry Sumida at (808)523-6200 should you have any questions about the foregoing.

Sincerely,

A handwritten signature in black ink, appearing to read "Serge M. Krivatsy".

Serge M. Krivatsy
Director, Planning & Development
Commercial Real Estate Division

LINDA LINGLE
GOVERNOR OF HAWAII



ALLAN A. SMITH
INTERIM CHAIRPERSON
MEREDITH J. CHING
JAMES A. FRAZIER
NEAL S. FUJIMURA
CHIYOME L. FUKINO, M.D.
LAWRENCE H. MIKE, M.D., J.D.
STEPHANIE A. WHALEN
KEN C. KAWAHARA, P.E.
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

June 21, 2007

Ref: 2104-01.wsp.let

Mr. Robert P. Singlehurst
Grace Pacific, Inc.
P.O. Box 78
Honolulu, HI 96810

Dear Mr. Singlehurst:

We are writing to request that you submit a water shortage plan for the Lower Makakilo Well (Well No. 2104-01), as required under Administrative Rule §13-171-42(c), which states:

"All permittees, unless exempted by the Commission, shall submit a water shortage plan outlining how it will reduce its own water use in case of a shortage. Every water shortage plan shall be subject to approval or modification by the Commission."

Your water shortage plan should identify what you are willing to do should the Commission declare a water shortage situation in the Ewa-Kunia Ground-Water Management Area. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which shall consider and incorporate appropriate provisions set forth within your water shortage plan for implementation. Therefore, your help in submitting a water shortage plan will be beneficial in the Commission's formulation of an overall Water Shortage Plan. At a minimum, we request that you identify the percent reduction (e.g. 5%, 10%, 15%, etc.) in water use that can be sustained indefinitely during a water shortage situation by filling in the table below:

Well Name (Well No.)	Permitted Use	Allocation (mgd)	Percent Reduction in Water Use
Lower Makakilo (2104-01)	Industrial	0.168	5%

After you have filled in the last column on the above table, please fax this letter to our office at 587-0219, or make a copy of this letter and return it to us at the above address. Please retain the original for your records.

Please respond to this letter within the next fifteen (15) days. If there are any questions, please contact Lenore Nakama at 587-0218.

Sincerely,

Ken C. Kawahara
KEN C. KAWAHARA, P.E.
Deputy Director

JLSK:ss

983

**Staff Submittal
Pearl Harbor Water Shortage Plan Adoption**

August 18, 2020

RECEIVED
COMMISSION ON WATER
RESOURCE MANAGEMENT
NOV 14 AM 10:50

November 12, 2019

M. Kaleo Manuel
State of Hawaii
Department of Land & Natural Resources
PO BOX 621
Honolulu, HI 96809

Aloha Mr. Manuel,

Thank you for your inquiry requesting a water shortage plan for our Waikele 2 Well (No. 3-2702-012). To satisfy this request, we would like to apply our general farm water rationing plan. This is a multi-step process.

To start, we would determine any potential alternate sources, if available. An option may be to borrow water from another farmer, that is permitted for our area. After this determination, we would:

1. Determine the quantity and estimated duration of shortage.
2. Reduce water supply to crop windbreak.
3. Reduce seedling creation – stop planting seedlings and stop transplanting.
4. Reduce acreage requiring water, by crop destruction.

I hope this satisfies your request. Please let me know if you have questions or need anything further.

Sincerely,



Larry Jefts
PO BOX 27
Kunia, HI 96759
808-688-2892

1024

Staff Submittal
Pearl Harbor Water Shortage Plan Adoption
OCEANWIDE RESORT COMMUNITY HI LLC

August 18, 2020

1099 ALAKEA STREET, SUITE 2400
HONOLULU, HAWAII 96813
TEL: 808.689.9888
FAX: 808.689.9889

RECEIVED
COMMISSION ON WATER
RESOURCE MANAGEMENT
2020 JAN -2 AM 8:40



Dec 26, 2019

Via U.S. Postal Mail

Ms. Suzanne Case, Chairperson
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, Hawaii 96809

**RE: WUP 1035 (previously WUP 670) Water Shortage Plan for
Oceanwide Resort Community HI LLC**

Dear Ms. Case:

Thank you for your letter dated December 10, 2019 requesting for the water shortage plan. As requested, the following is our water shortage plan:

In the event of a water shortage, Oceanwide Resort Community HI LLC will cut back on the agricultural usage by Five percent (5%) from the permitted daily usage of 0.957 million gallons per day.

Please update the main contact from Oceanwide Resort Community HI LLC to Dawei (David) Miao, and if there are any questions or concerns, please do not hesitate to contact the undersigned at david.miao@oceanwideus.com or (808)689-9890.

Sincerely,

Dawei (David) Miao
President
Oceanwide Resort Community HI LLC



KALAELOA WATER COMPANY

737 Bishop St. Suite 2750
Honolulu, HI 96813

March 24, 2020

State of Hawaii, Department of Land and Natural Resources
Commission on Water Resource Management
ATTN: Ryan Imata
P.O Box 621
Honolulu, Hawaii 96809

Mr. Imata:

The Hawaii State Water Code requires a water shortage plan from all water use permit holders to aid in preparation for the potential event of a water shortage. In the event the Commission declares a water shortage situation in the Ewa-Kunia Ground Water Management area, Kalaeloa Water System ("KWC") is prepared to reduce pumpage by five percent (5%).

If such an event were to occur, KWC would make efforts to implement water conservation practices to accomplish said reduction, including but not limited to installation of water efficient fixtures, a facility water audit, and other industry-standard practices.

If the Commission desires to discuss the contents of this letter, please coordinate with Alexandra Dosen at 808-585-7901, or, alex.dosen@huntcompanies.com.

Sincerely,

A handwritten signature in black ink, appearing to read "MS", is written over a light blue circular stamp.

Mitch Silver
Authorized Representative
Kalaeloa Water Company

1048