RED HILL CONTAMINATION BRIEFING

Summary of Commission and CWRM Staff Efforts

Meeting of the Commission on Water Resource Management

January 7, 2022

PRESENTATION OUTLINE

- Frame Red Hill Contamination within the jurisdiction of the Commission
- Overview of Administrative Order On Consent (AOC)
- Existing Conditions
  - Aquifers and Water Resources
  - Wells, Water Use Permits, and Infrastructure
- CWRM & Ground Water Regulations to Date

CWRM & DOH Roles

- §174C-2(d) Declaration of policy: The state water code shall be liberally interpreted to protect and improve the quality of waters of the State and to provide that no substance be discharged into such waters without first receiving the necessary treatment or other corrective action.
- §174C-3 Definitions: “Emergency” means the absence of a sufficient quantity and quality of water in any area whether designated or not which threatens the public health, safety, and welfare as determined by the commission
- §174C-5(12) General powers and duties: …No other agency or department of the State shall assume the duties delegated to the commission under this paragraph, except that the department of health shall continue to exercise the powers vested in it with respect to water quality…

CWRM & DOH Roles

Department of Health

State Water Code Part V. Water Quality

- §174C-66 Jurisdiction over water quality – DOH shall exercise the powers and duties vested in it for the administration of State's water quality control programs as provided by law
- §174C-67 Exchange of information
- §174C-68 *Water Quality Plan* prepared by DOH
- Compliance and Enforcement of water pollution control laws
- Safe Drinking Water Branch (Groundwater)
- Clean Water Branch (Surface Water + ocean)
- Wastewater Branch

CWRM & DOH Roles

Other DOH Programs related to water

- State Laboratories Division (SLD)
- Solid and Hazardous Waste Branch (SHWB)
- Hazard Evaluation and Emergency Response (HEER) Office
- Environmental Resources Office (ERO)
- Compliance Assistance Office (ERO)
- Compliance Assistance Office (CAO)
- Environmental Information Manager (EIM)
- Office of Environmental Quality Control (OEQC)

CWRM & DOH Roles

CWRM Roles Related to Red Hill – **Water Quantity** focused

- Monitor Statewide water use
- Regulate Wells and Stream Diversions (permitting system)
- Water Resources Protection – Sustainable Yield and IIFS (Instream Uses)
- Protection of Public Trust Purposes – domestic use, DHHL reservations, maintenance of water in natural state, and T&C uses
- Water Use Permits and Conditions in designated water management areas– Navy, BWS, others
- Close coordination and partnership between CWRM and DOH programs

CWRM staff involvement

- Fuel Tank Advisory Committee (FTAC) semi-annual meetings
- Groundwater Modeling Working Group
- Monitoring Well Group

(Post Nov 20, 2021 release)

- Water Restoration Executive Updates and Synchronization (daily)
- Aquifer Recovery Focus Group (Tuesdays and Thursdays)
- Halawa Stream Ecological Monitoring Working Group

OVERVIEW

Administrative Order on Consent (AOC) – May 27, 2015
https://www.epa.gov/red-hill/red-hill-administrative-order-consent

Parties

- State of Hawaii Department of Health
- Environmental Protection Agency Region 9
- Commander Navy Region Hawaii, U.S. Navy
- Defense Logistics Agency

OVERVIEW (continued)

AOC Summary

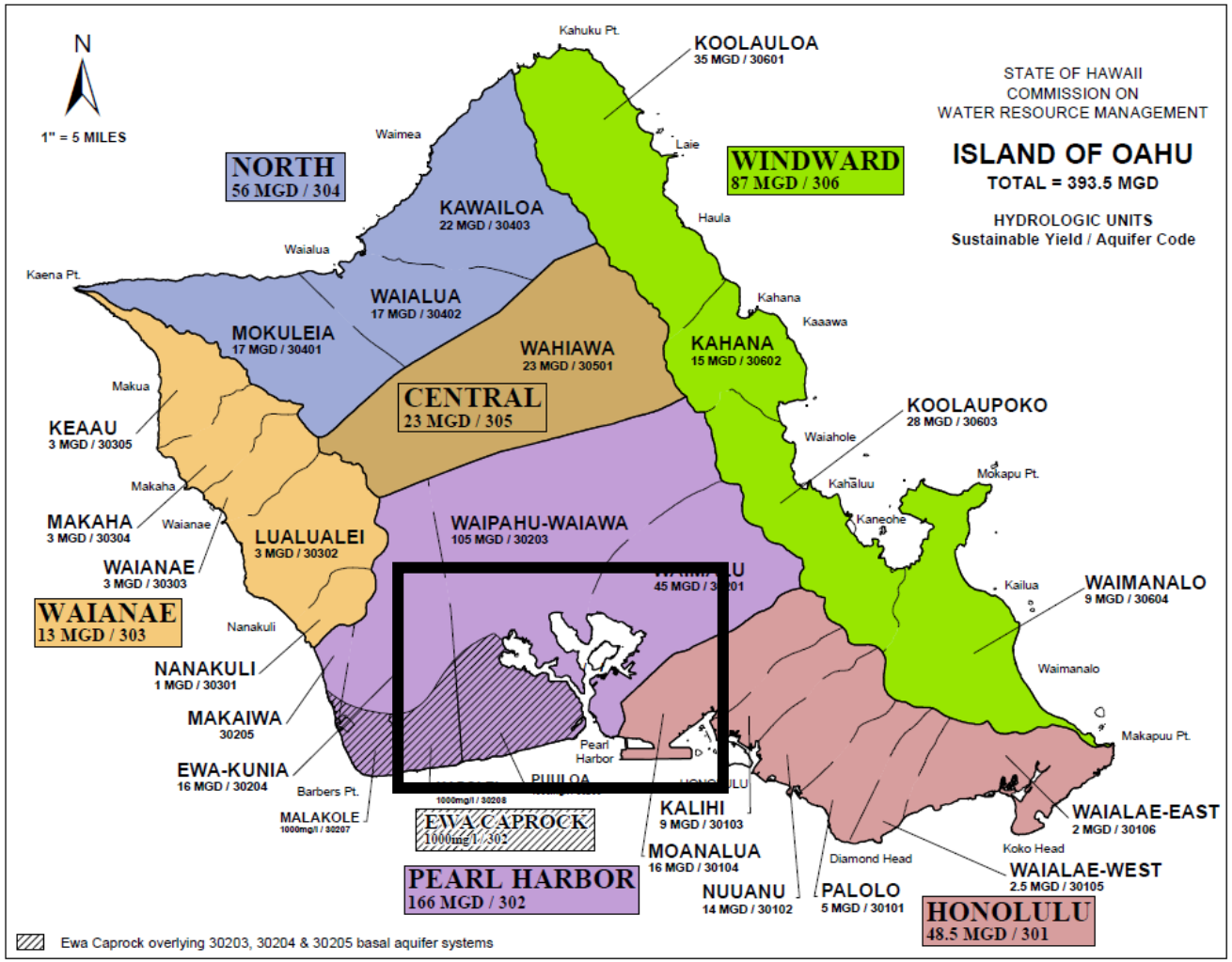
- Tank Inspection, Repair, Maintenance (TIRM)
- Tank Upgrade Alternatives (TUA)
- Release Detection/Tank Tightness Testing
- Corrosion and Metal Fatigue Practices
- Investigation and Remediation of Releases
- Groundwater Protection and Evaluation
- Risk/Vulnerability Assessment

OVERVIEW (continued)

Selected timeline (various tank leaks reported as far back as 1947 but not described here)

1940-1943 Red Hill tanks constructed
1988 Federal Underground Storage Tank regulations issued
Nov 10, 1998 – first report by Navy to Hawaii DOH of release from facility
May 6, 2021 – report of a release from facility
Nov 20, 2021 – report of a release from the facility
Dec 7, 2021 – Governor Ige orders the military to suspend operations at the Red Hill fuel storage facility and move toward emptying the fuel tanks

EXISTING CONDITIONS



GROUNDWATER HYDROLOGIC UNITS ON OAHU AND SUSTAINABLE YIELDS

WAIMALU (45 MGD)
WAIPAHU-WAIAWA (105 MGD)
MOANALUA (16 MGD)

EXISTING CONDITIONS (continued)

CWRM Survey Branch assesses aquifer health primarily through:

- Monitor well program
- Water Use Reporting

EXISTING CONDITIONS (continued)

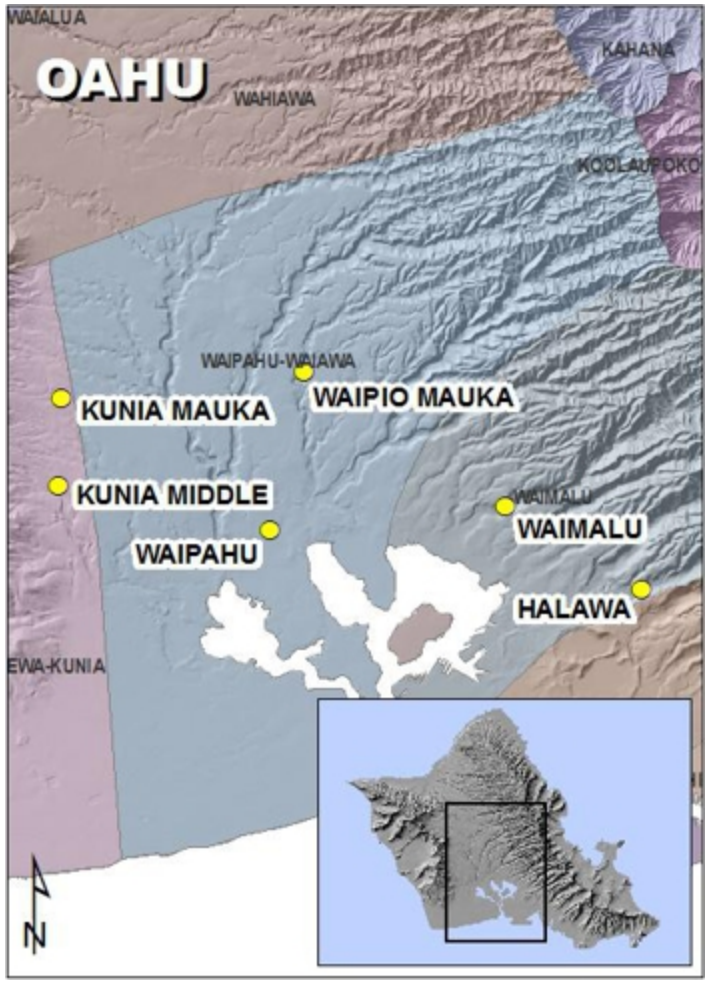
Monitor well program

Wells in Waipahu-Waiawa:

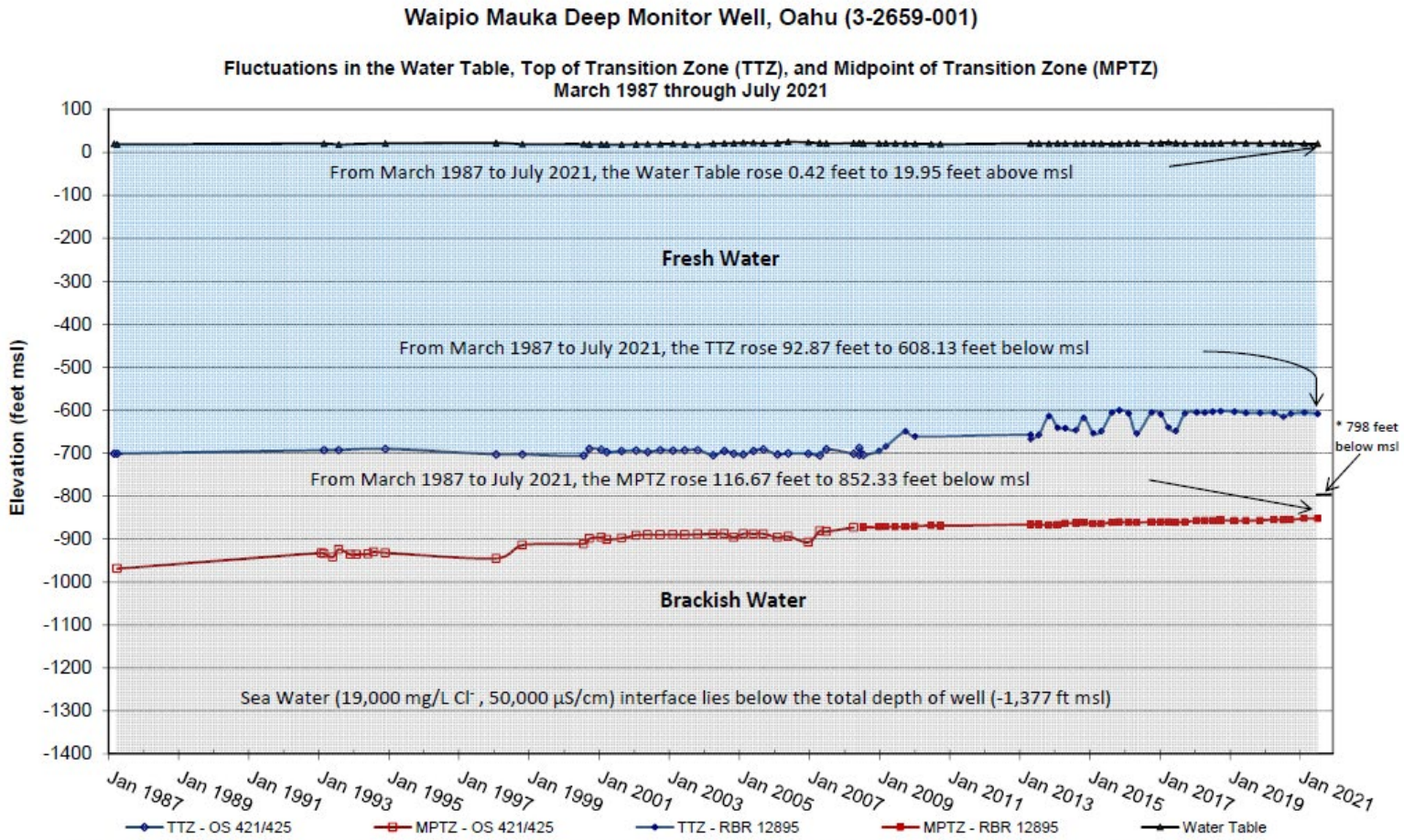
- Waipio Mauka
- Waipahu

Wells in Waimalu:

- Waimalu
- Halawa

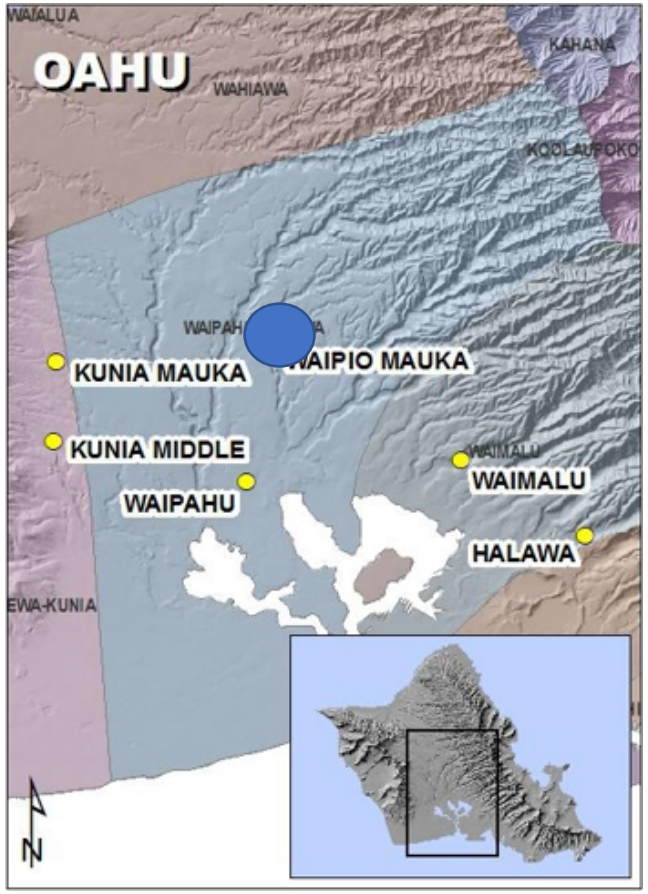


EXISTING CONDITIONS (continued)



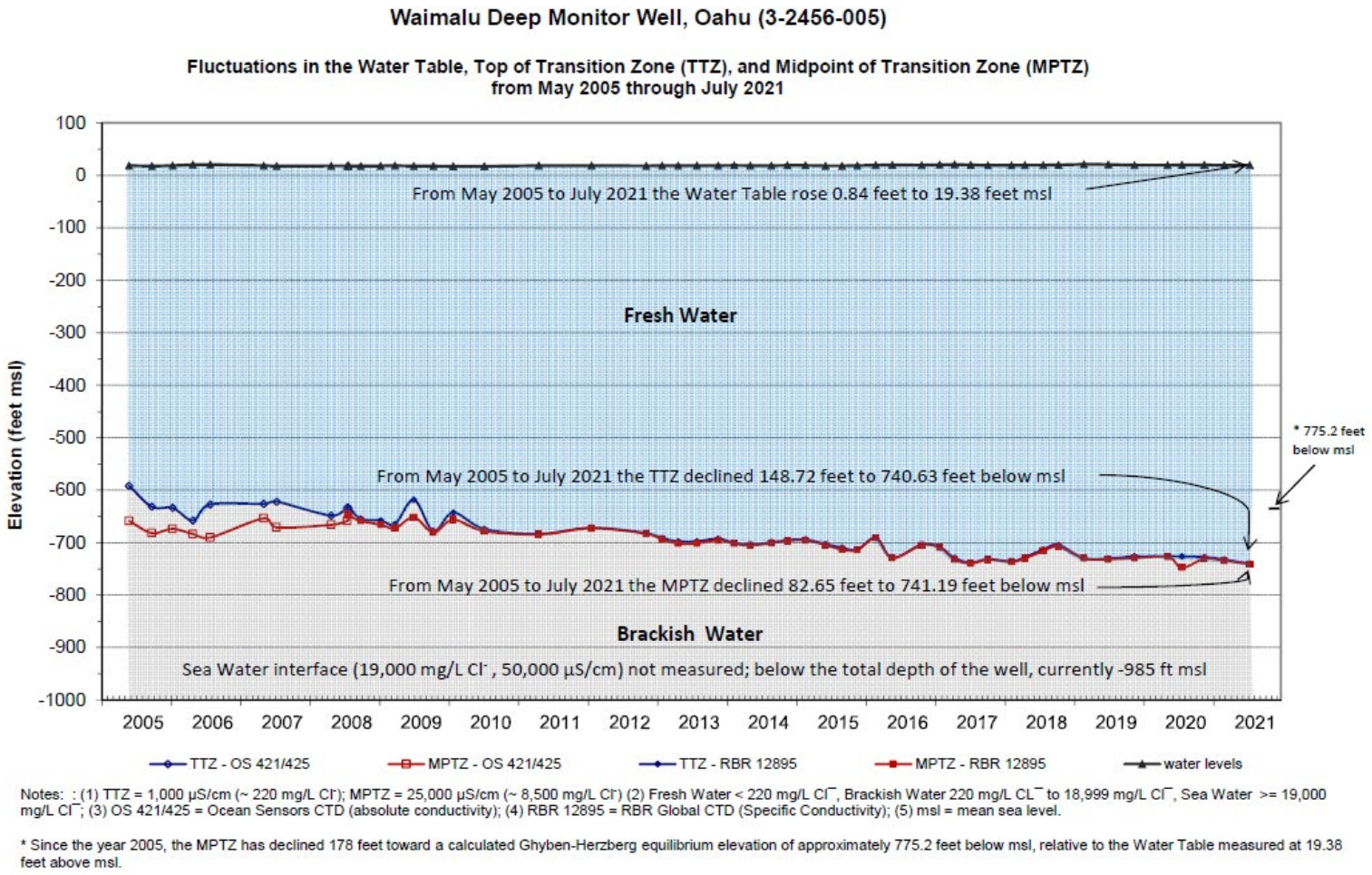
Notes: (1) TTZ = 1,000 µS/cm (~ 220 mg/L Cl⁻); MPTZ = 25,000 µS/cm (~ 8,500 mg/L Cl⁻) (2) Fresh Water < 220 mg/L Cl^-, Brackish Water 220 mg/L CL^- to 16,999 mg/L Cl^-, Sea Water >= 17,000 mg/L Cl^-; (3) OS 421/425 = Ocean Sensors CTD (absolute conductivity); (4) RBR 12895 = RBR Global CTD (Specific Conductivity); (5) msl = mean sea level

* Since the year 1987, the MPTZ has risen 116.67 feet, to below a calculated Ghyben-Herzberg equilibrium elevation of approximately 798 feet below msl, relative to the Water Table measured at 19.95 feet above msl.



last updated 8/2/2021

EXISTING CONDITIONS (continued)



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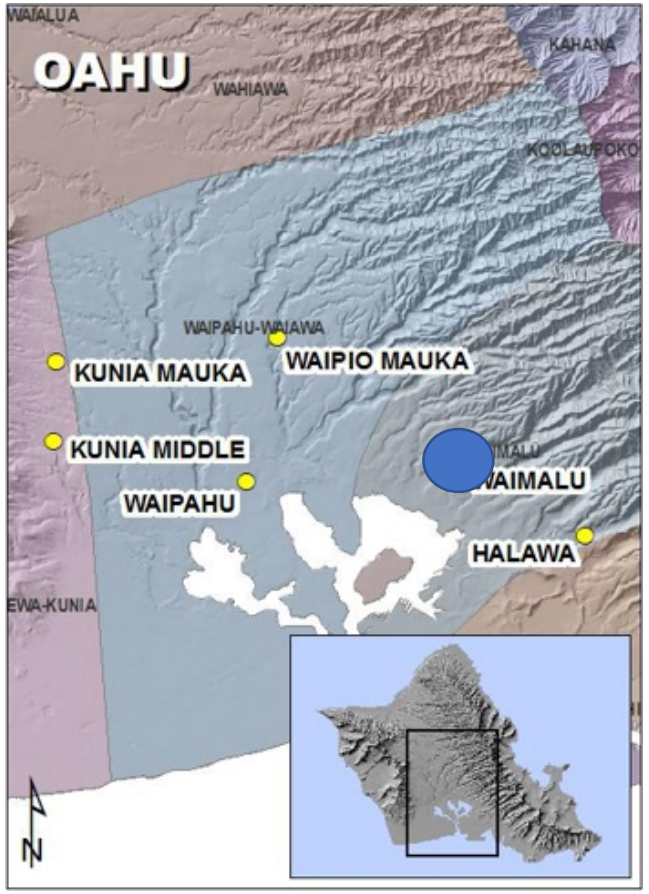
* Since the year 2005, the MPTZ has declined 178 feet toward a calculated Ghyben-Herzberg equilibrium elevation of approximately 775.2 feet below msl, relative to the Water Table measured at 19.38 feet above msl.



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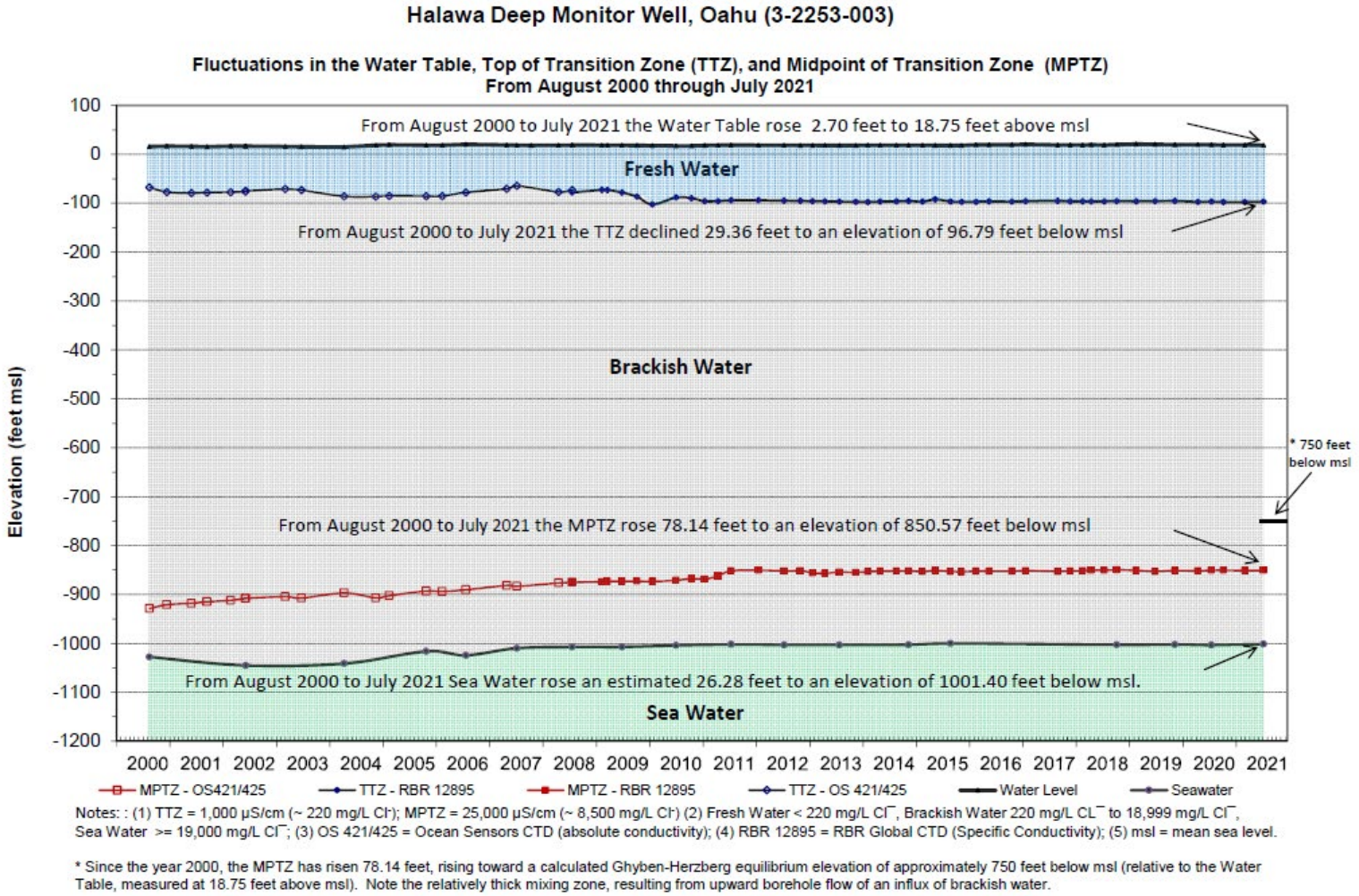
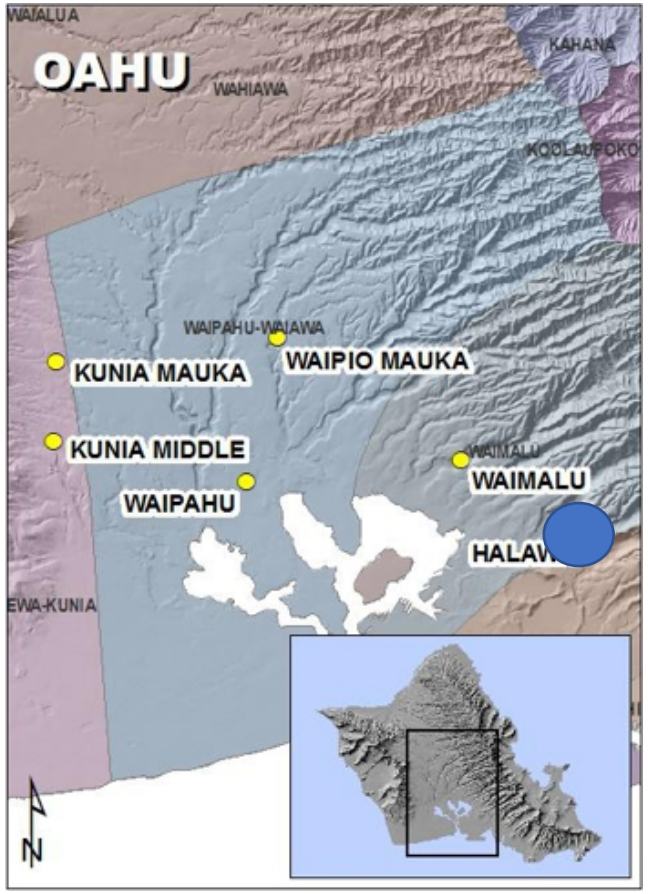
EXISTING CONDITIONS (continued)





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EXISTING CONDITIONS (continued)

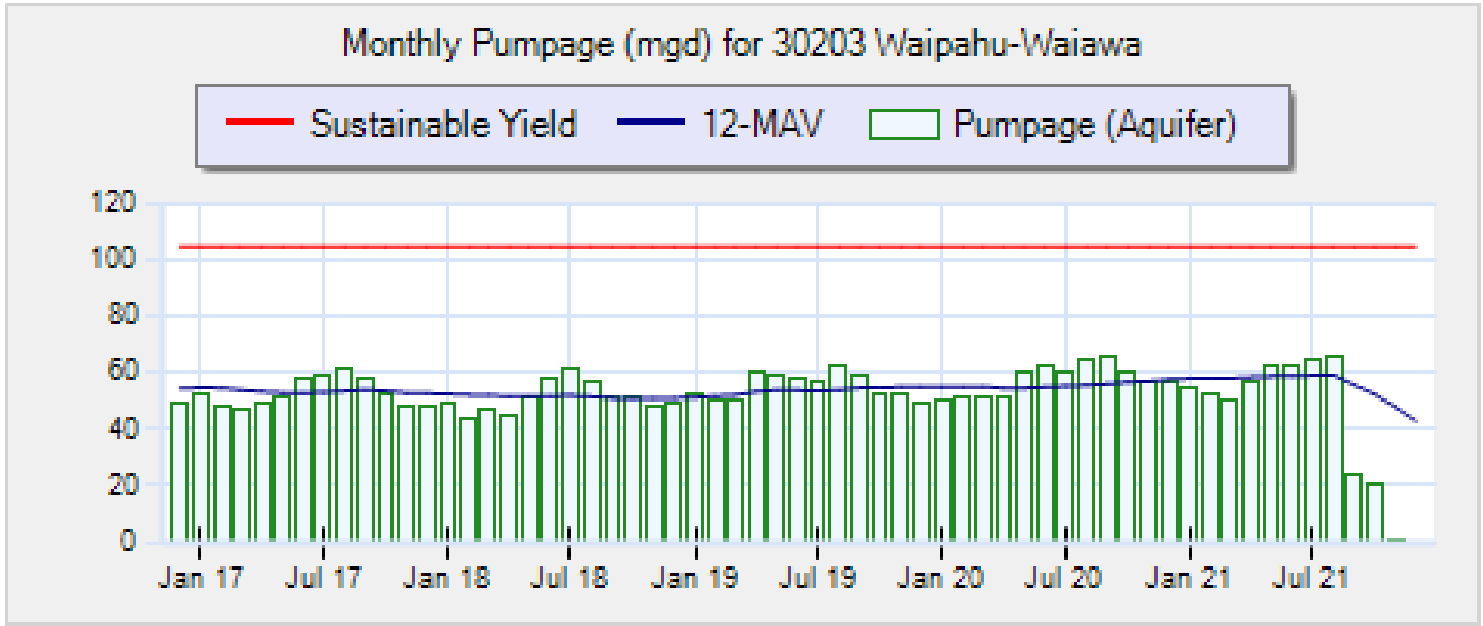
Waipahu-Waiawa Aquifer System Area

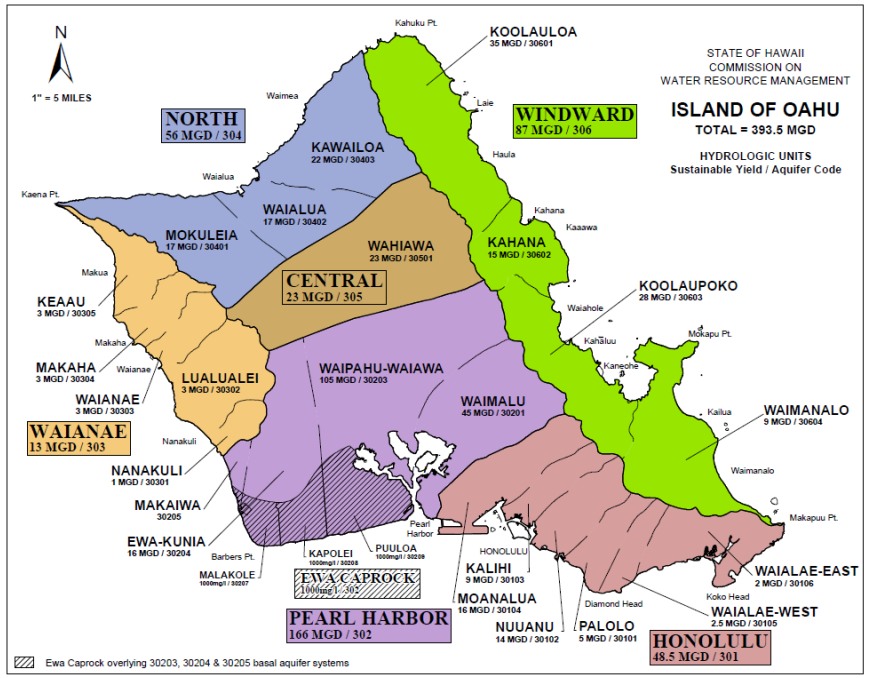
386 wells total

Sustainable Yield = 105 mgd

Allocations = 85.645 mgd

Latest 12-MAV=43.067 mgd





EXISTING CONDITIONS (continued)

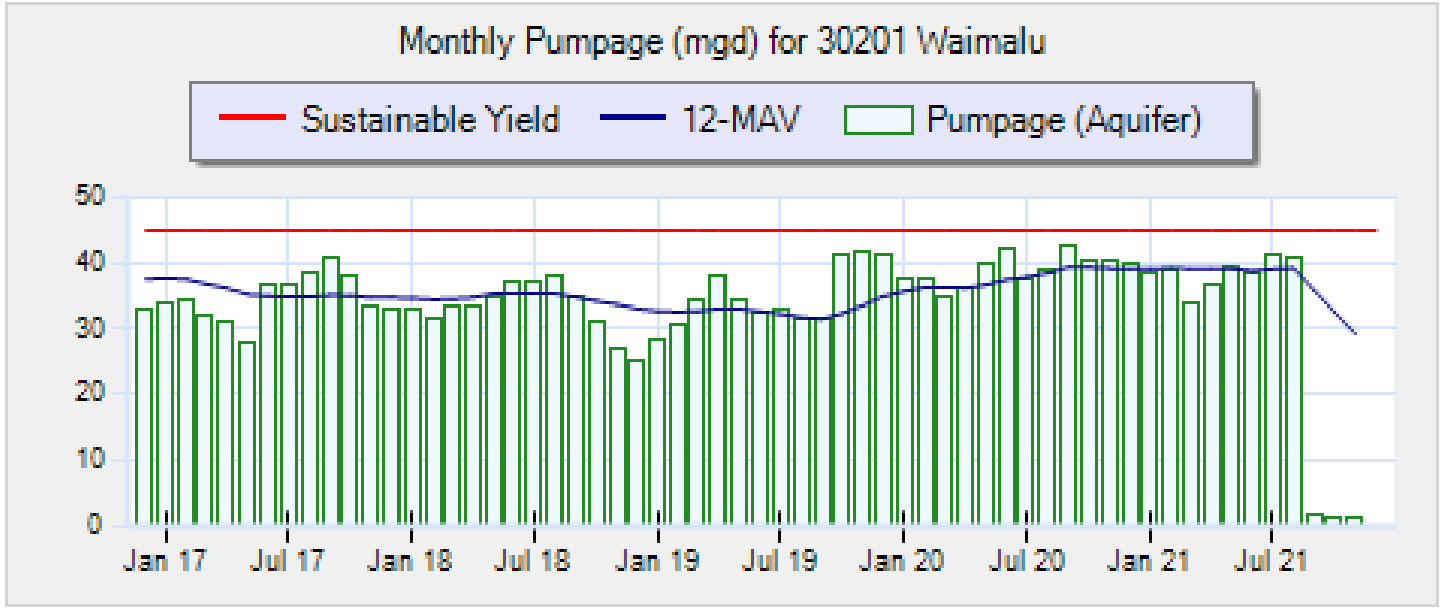
Waimalu Aquifer System Area

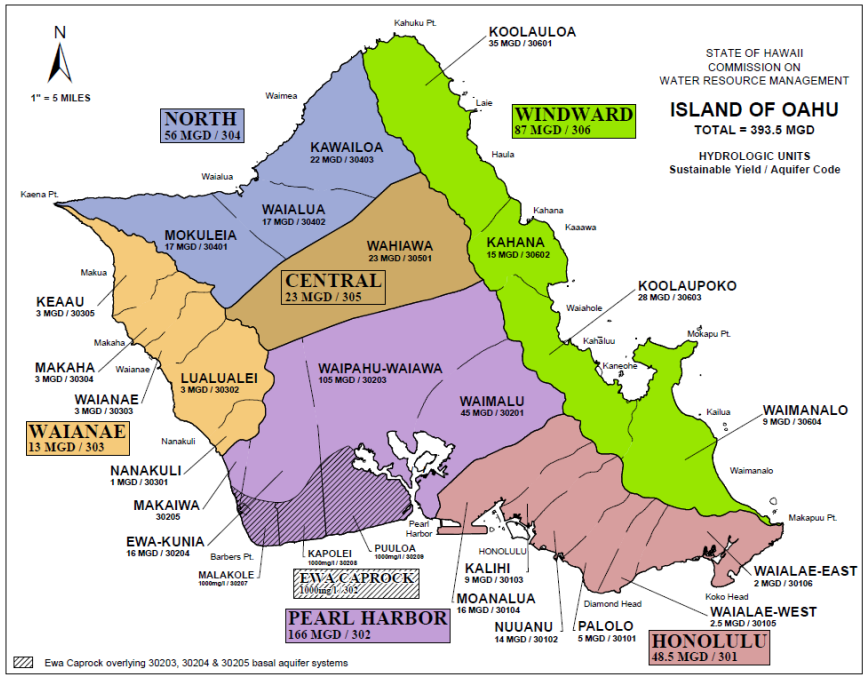
226 wells total

Sustainable Yield = 45 mgd

Allocations = 46.951 mgd

Latest 12-MAV=29.307 mgd





EXISTING CONDITIONS (continued)

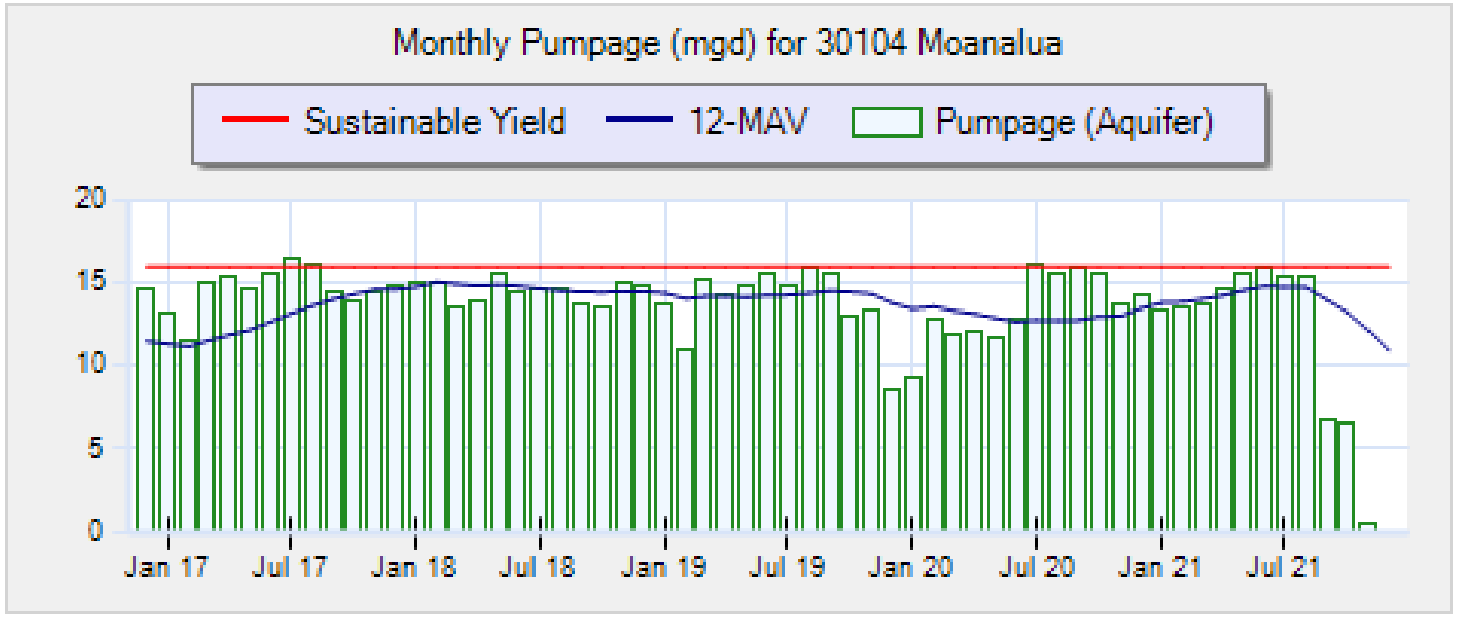
Moanalua Aquifer System Area

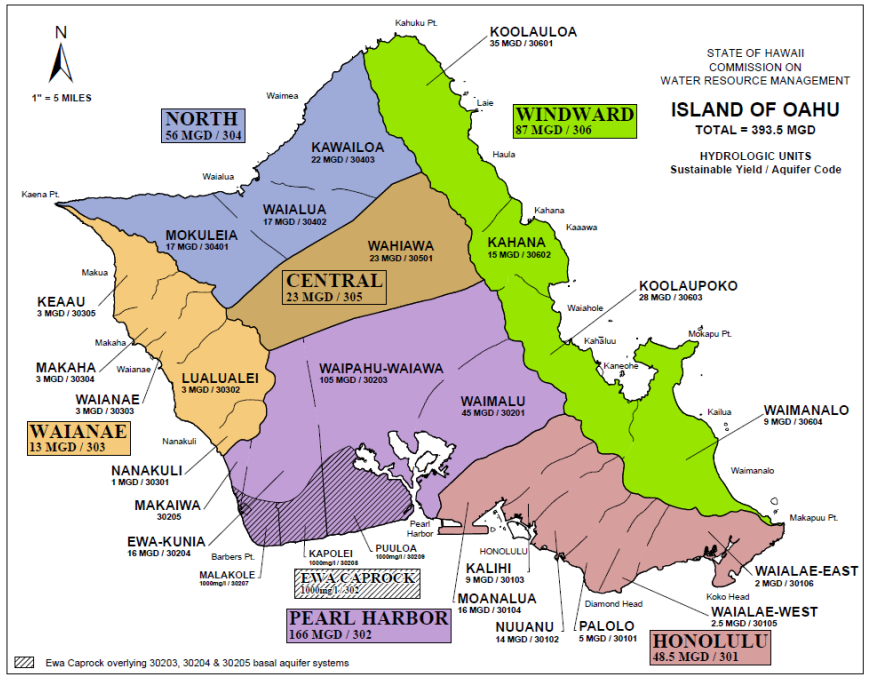
52 wells total

Sustainable Yield = 16 mgd

Allocations = 19.960 mgd

Latest 12-MAV=10.938 mgd





EXISTING CONDITIONS (continued)

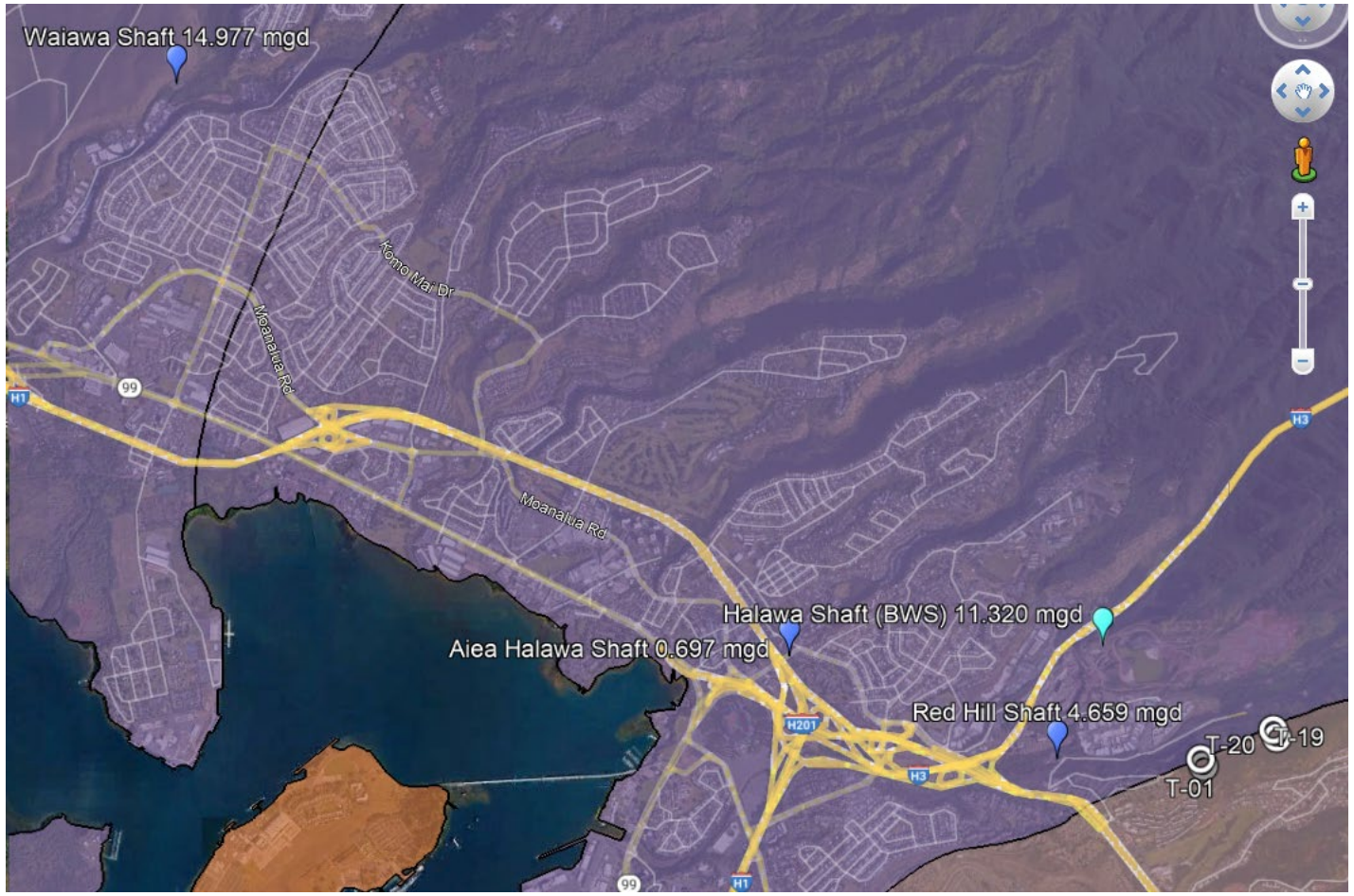
Fuel Tanks

Navy sources

- Red Hill Shaft
- Aiea-Halawa Shaft
- Waiawa Shaft

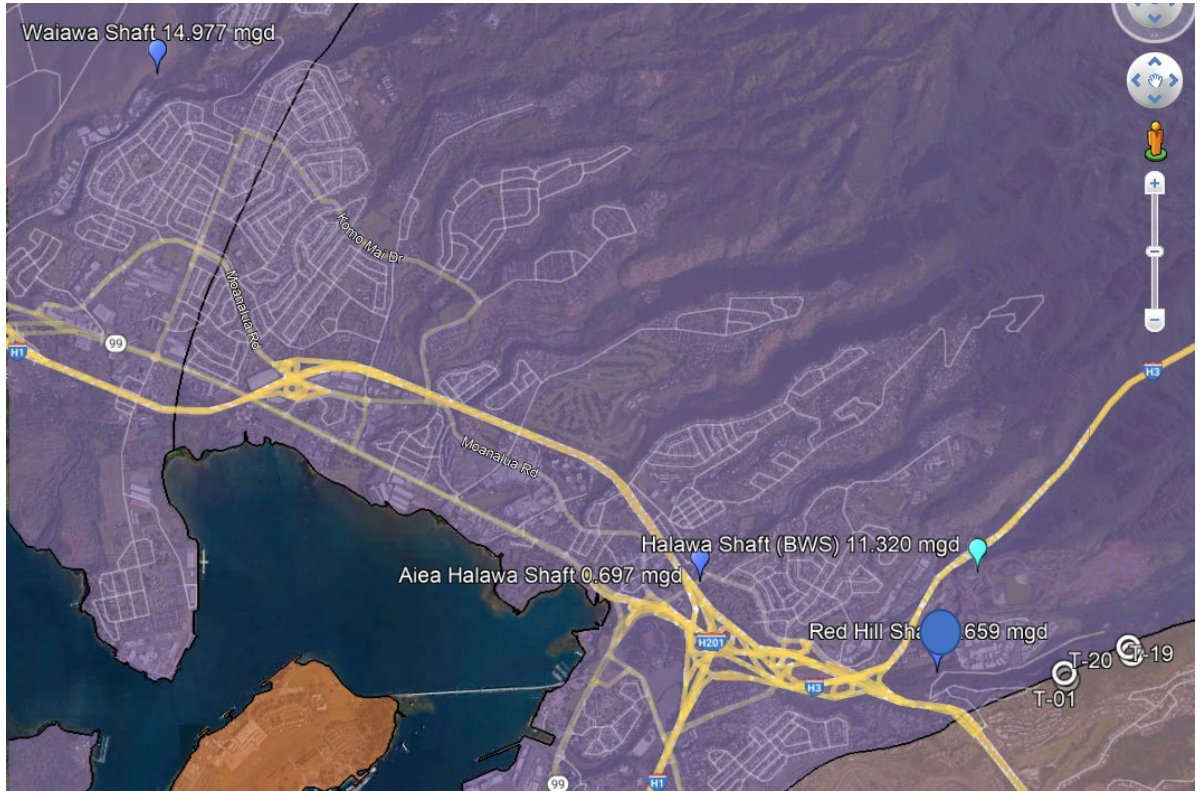
BWS source

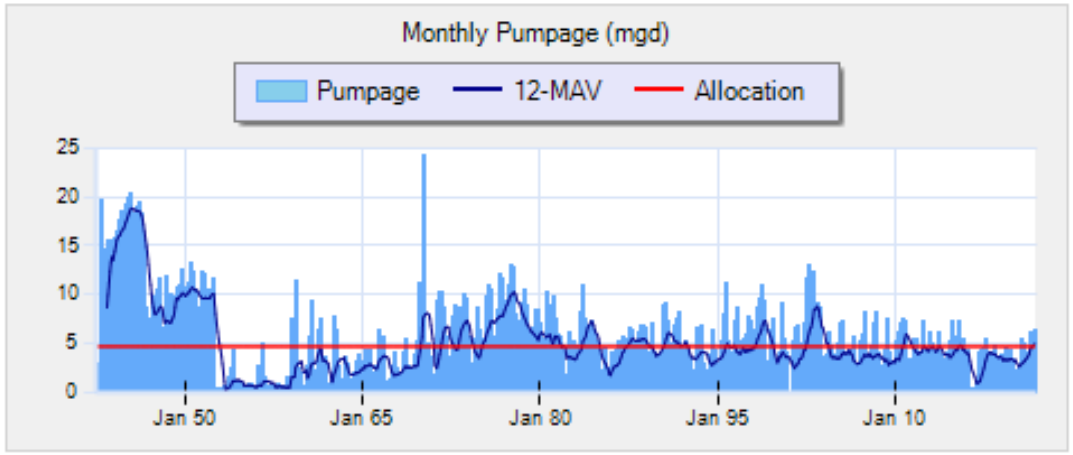
- Halawa Shaft



EXISTING CONDITIONS (continued)

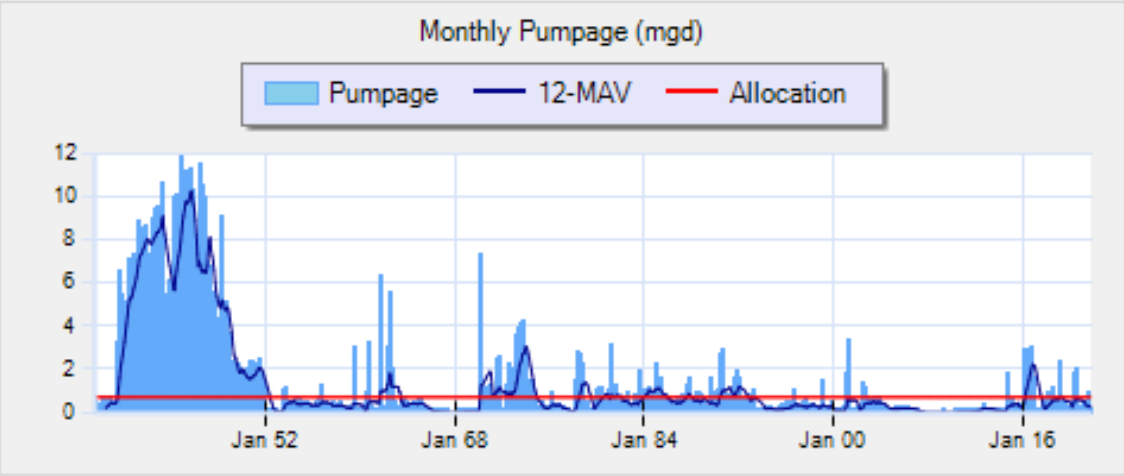
Red Hill Shaft
(State Well No. 3-2254-001)
Water Use Permit 00085
Allocation = 4.659 mgd
(23% of water system)
12-mav=5.055 mgd (11/21)

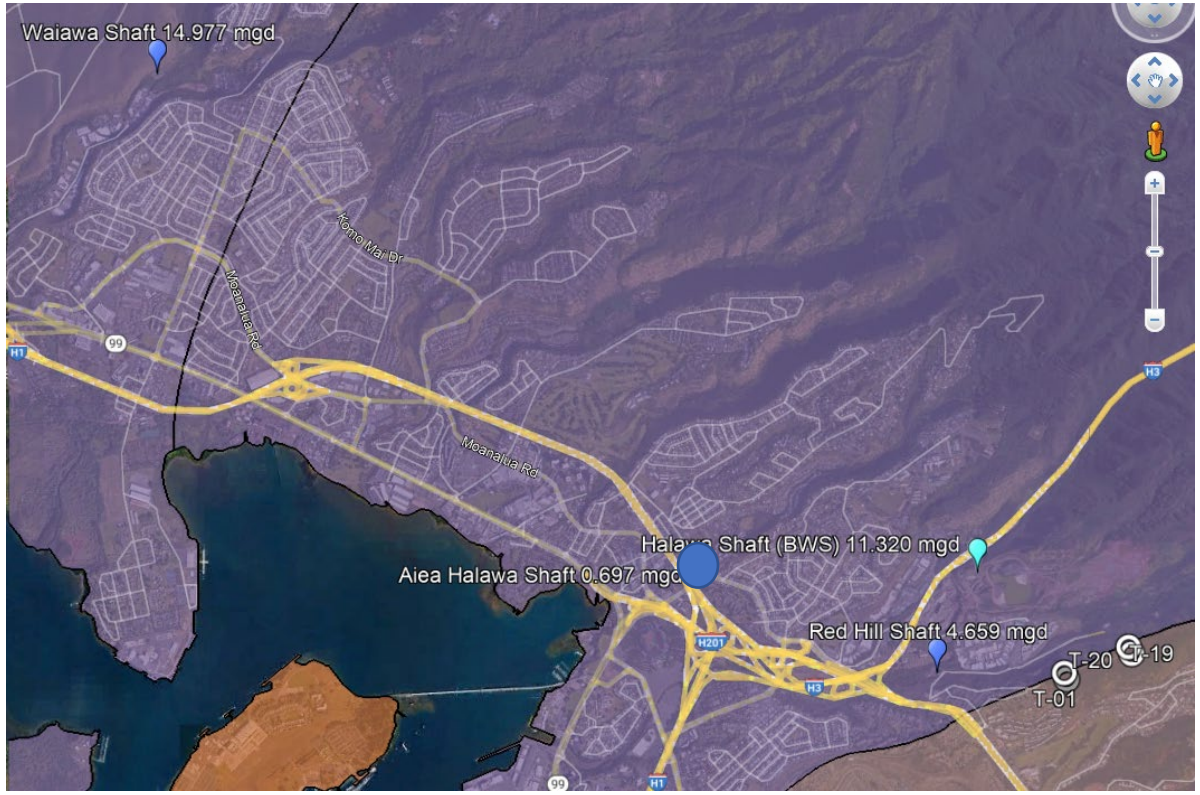




EXISTING CONDITIONS (continued)

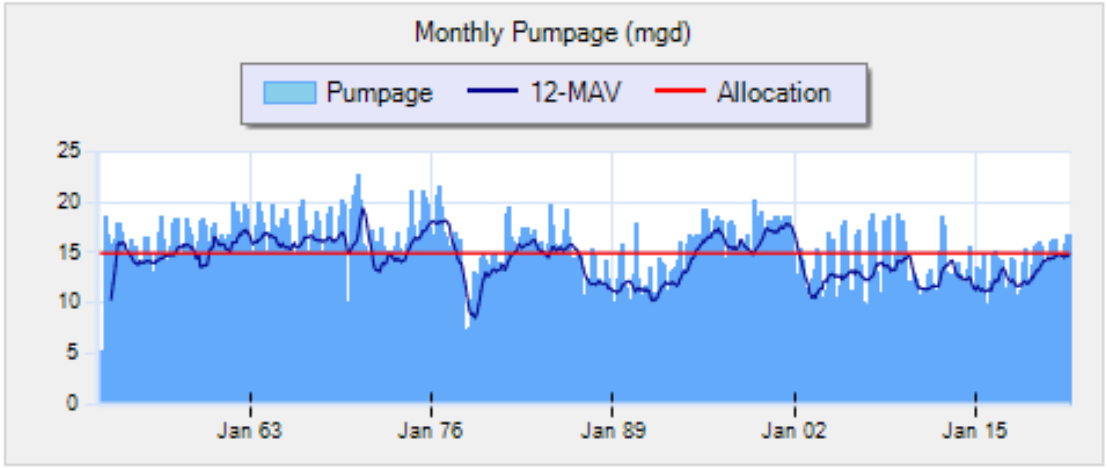
Aiea-Halawa Shaft
(State Well No. 3-2255-032)
Water Use Permit 00086
Allocation = 0.697 mgd
(3% of water system)
12-mav=0.272 mgd (11/21)

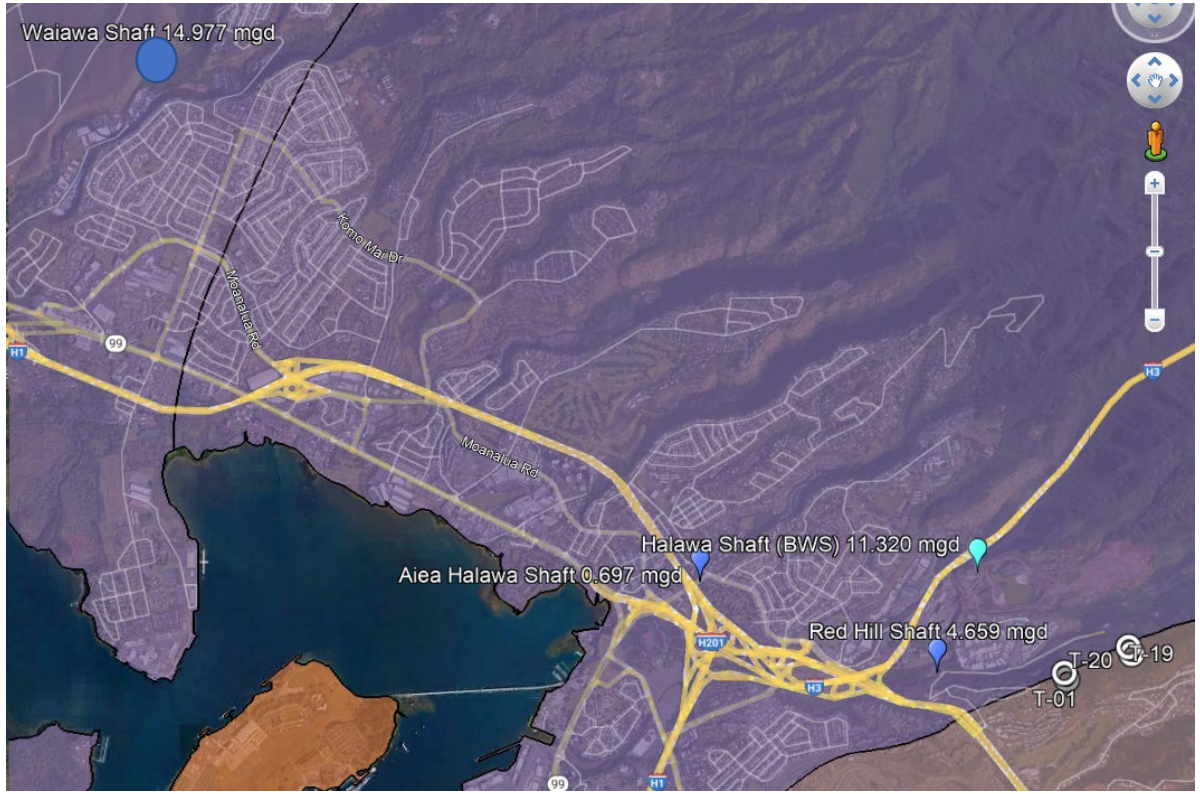




EXISTING CONDITIONS (continued)

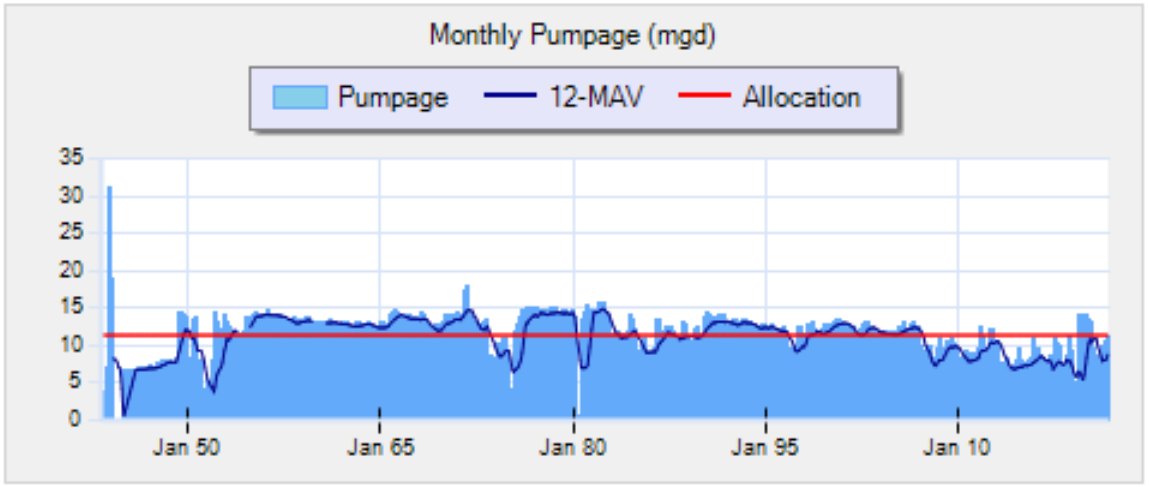
Waiawa Shaft
(State Well No. 3-2558-010)
Water Use Permit 00111
Allocation = 14.977 mgd
(74% of water system)
12-mav=17.696 mgd (11/21)

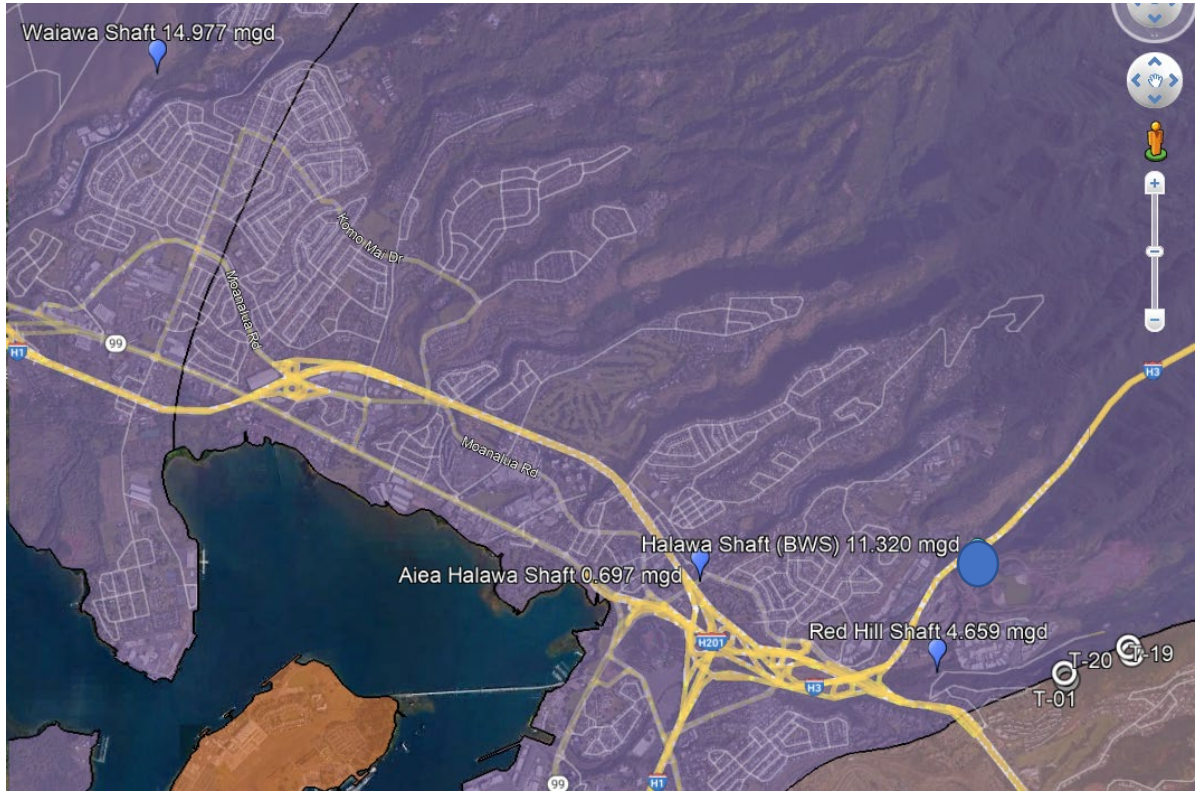




EXISTING CONDITIONS (continued)

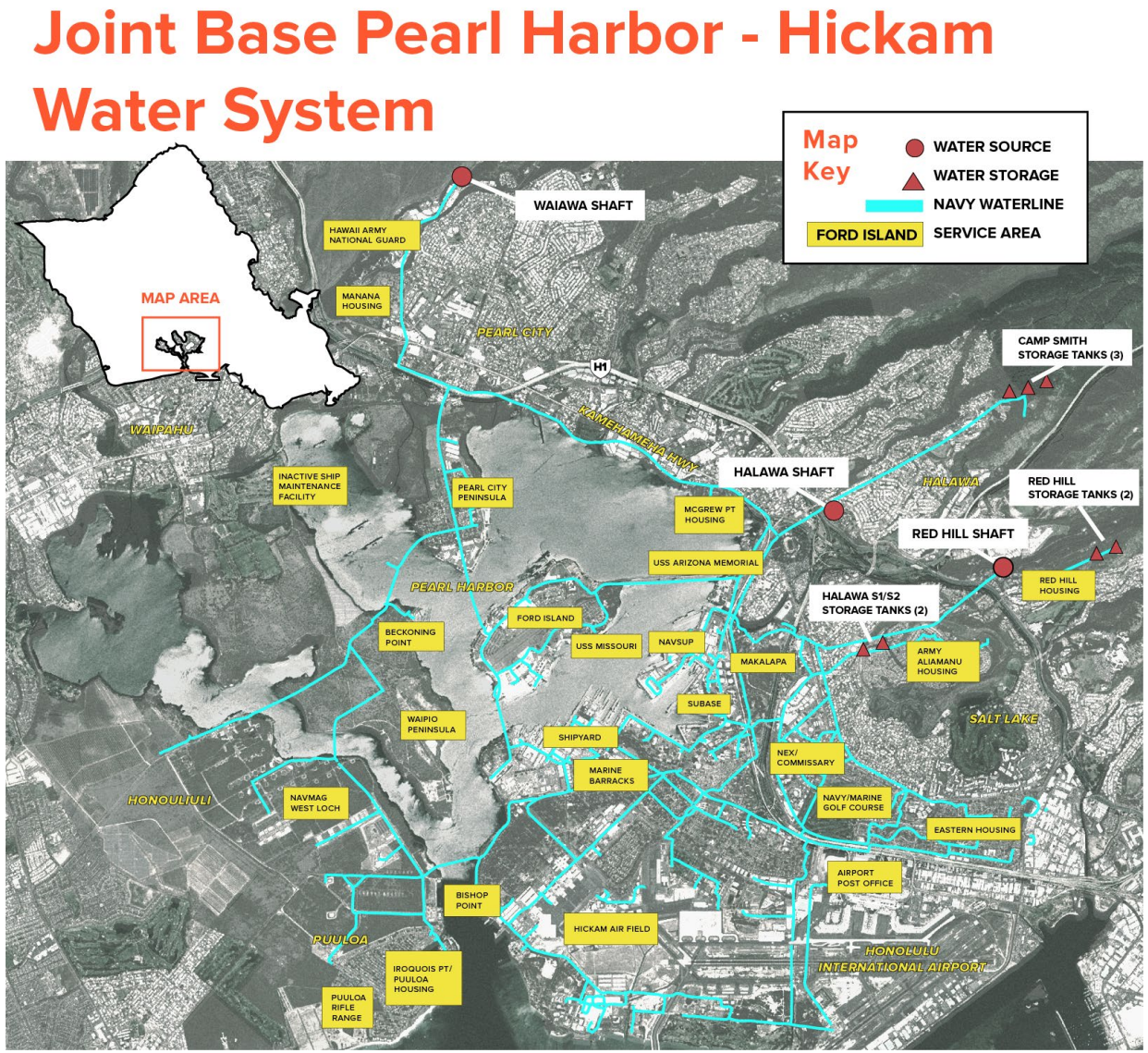
BWS Halawa Shaft
(State Well No. 3-2354-001)
Water Use Permit 00094
Allocation = 11.320 mgd
12-mav=8.737 mgd (8/21)





EXISTING CONDITIONS (continued)

Navy Water System



RESEARCH / STUDIES

Modeling efforts:

1) Groundwater Flow Model

- **Current iteration characterizes flow as mauka to makai**
- **Subject Matter Experts dispute that characterization**

2) Contaminant Fate and Transport Model

- **Not yet developed**

CWRM STATEMENTS

Commission 2015 and 2016 statements re: AOC

June 17, 2015 – Commission sends a letter to DOH stating concerns about time frames for various components being too long, and in general, requested:

1) Upgrade the facility to eliminate future releases
2) Locate and delineate the extent of the released fuel
3) Develop mitigation/recovery strategy to protect drinking water in vicinity of facility

CWRM STATEMENTS (continued)

Commission 2015 and 2016 statements re: AOC

February 4, 2016 – Commission sends a letter to DOH stating concerns about transparency, specifics of corrective action, and implementation timeframe for improvements.

- Asked for more oversight and review of documents
- Stated that annual meetings are inadequate
- Stated that immediate efforts need to be implemented to improve groundwater monitoring
- Recommended emergency response plan

GROUNDWATER REGULATION EFFORTS TO DATE

1. Permitting of monitor wells

- Assist Department of Health (typically these would be under their Underground Storage Tank program)
- Purpose of wells
  a) sentinel wells
  b) hydrogeologic investigation wells
- Two types of wells
  a) Conventional
  b) West-Bay

GROUNDWATER REGULATION EFFORTS TO DATE

West Bay well

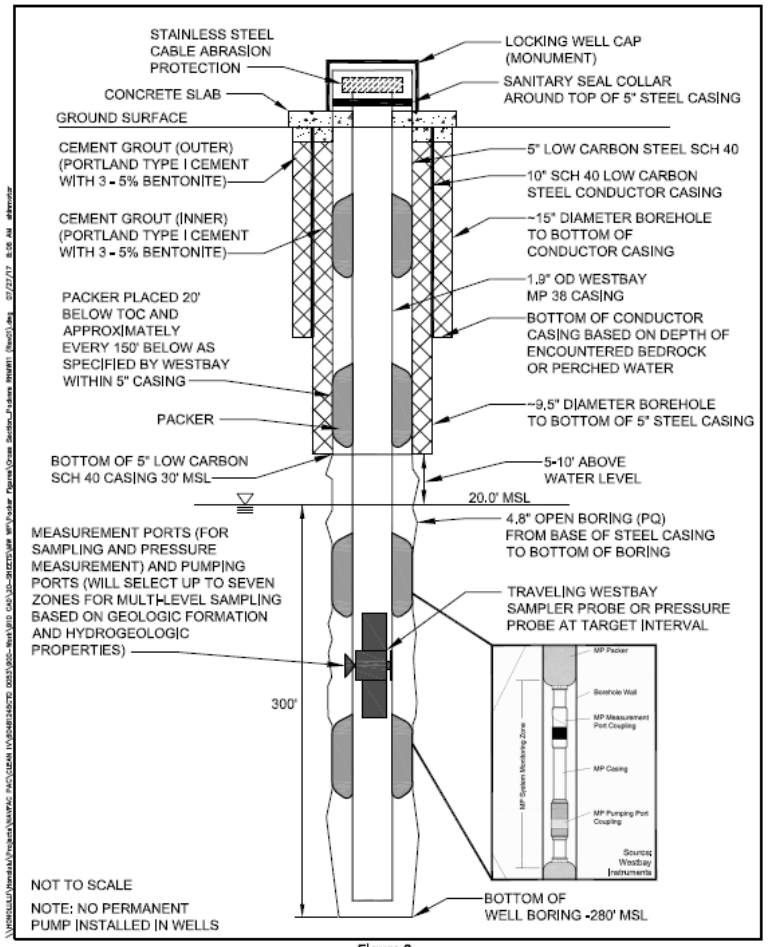
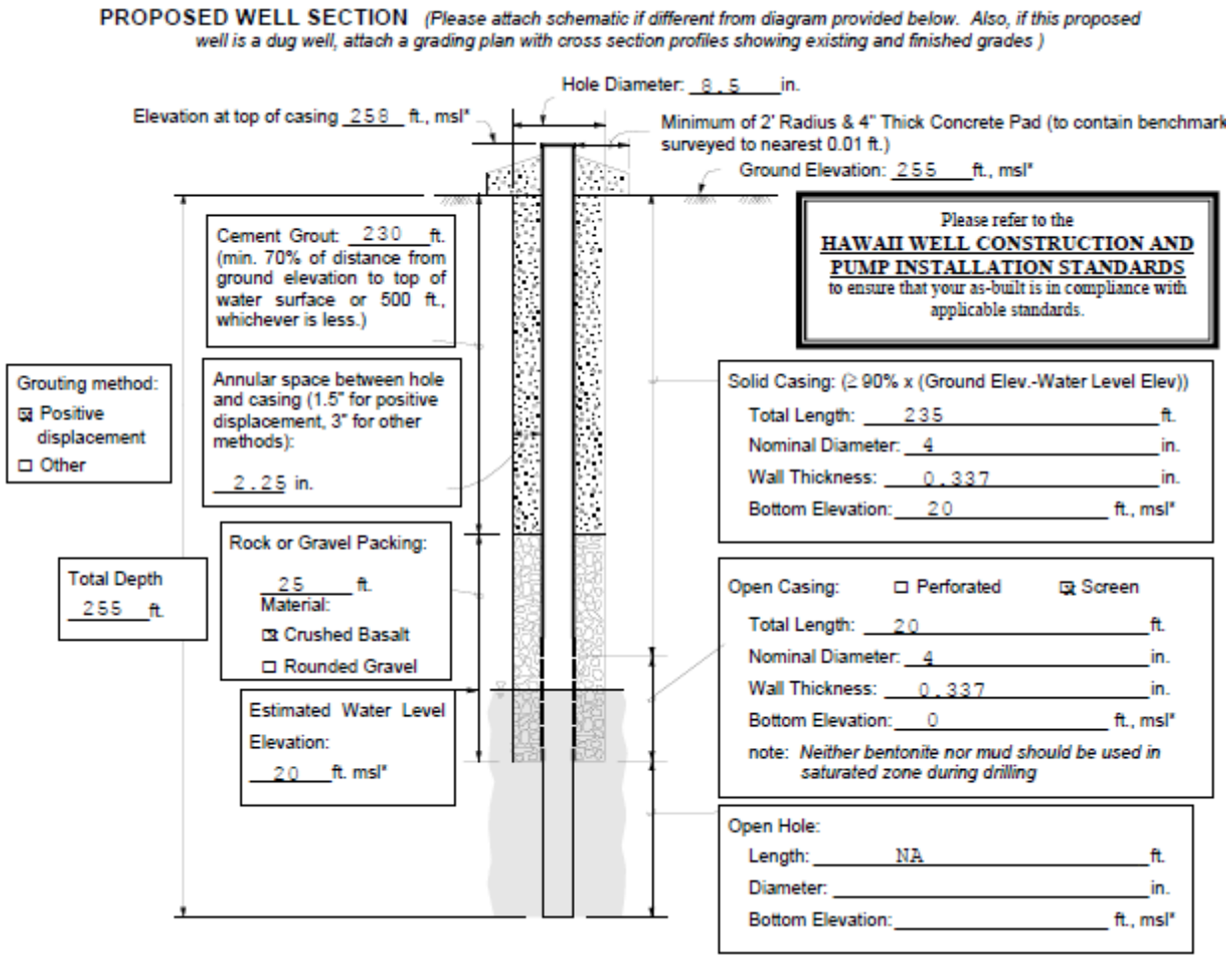


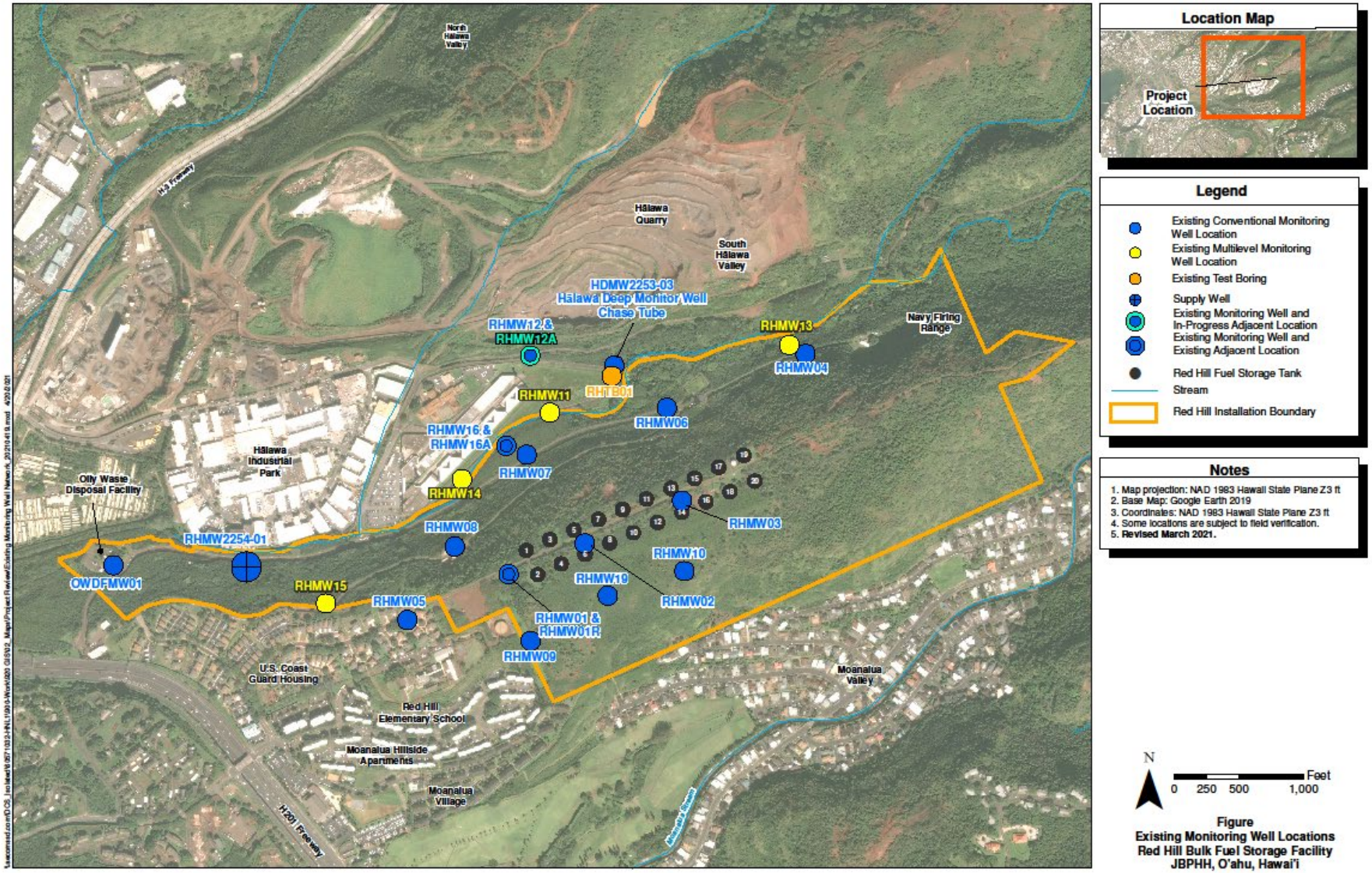
Figure 2
General Cross Section of Borehole and Multi-Level Westbay System Well
Red Hill Bulk Fuel Storage Facility Investigation
JBPHH, O'ahu, Hawai'i

Conventional well



GROUNDWATER REGULATION EFFORTS TO DATE (continued)

1. Permitting of monitor wells (continued)



GROUNDWATER REGULATION EFFORTS TO DATE (continued)

2. Coordination with Subject Matter Experts (SMEs)

Current team comprised of:

- Patrick Casey (CWRM)
- Robert Chenet (CWRM)
- Bob Whittier (DOH)
- Don Thomas (UH)
- Ryan Imata (CWRM)

This group meets regularly and advises on issues pertaining to monitor well design and placement, groundwater flow and fate and transport models, and other geology, groundwater flow and contaminant issues.

GROUNDWATER REGULATION EFFORTS TO DATE (continued)

3. Representation of DLNR and CWRM

- Fuel Tank Advisory Committee (Kaleo and Ryan on Committee)
- Groundwater Modeling Working Group (SME group)
- Water Restoration Executive Updates and Synchronization Meeting (daily meeting) (Suzanne, Kaleo and Ryan)
- Aquifer Recovery Working Group (various CWRM staff)

GROUNDWATER REGULATION EFFORTS TO DATE (continued)

4. Letter from Chair Case on December 3, 2021

- Requested immediate and real time transparency
- Expressed concern about Red Hill Shaft contamination and potential of contaminating the rest of the aquifer
- Requested timelier submission of water use reports from three Navy sources
- Asked how the Navy plans to make up water from shutting down Red Hill Shaft
- Requested implementation of shortage measures before relying on other sources

GROUNDWATER REGULATION EFFORTS TO DATE (continued)

4. Letter from Chair Case on December 3, 2021 (continued)

- Expressed concern about flushing efforts and the potential to adversely impact streams
- Requested plans for long-term treatment and disposal from the Red Hill Shaft
- Requested Navy be present at this Commission meeting to answer questions.

GROUNDWATER REGULATION EFFORTS TO DATE (continued)

5. **Additional data request from Navy**
   - Asked for weekly data from Waiawa Shaft for pumpage
6. **Participation in USGS Synoptic Survey**
7. **Coordination with BWS to collect additional data from various BWS sources**
8. **Staff met with BWS to discuss shut down of Halawa Shaft and which sources will be pumped to accommodate the difference**
9. **Assisted DOH with listing of all wells within 2 miles of Halawa Shaft**

NAVY LINES OF EFFORT

1) Flushing of water system
2) Source remediation (Red Hill Shaft)
3) Investigation of cause of contamination

Line of Effort 1: Navy System Flushing

- DOH CWB issues NPDES. Our focus has been on protecting stream and estuary resources from discharge and building in monitoring to ensure minimal to no impact – work with DAR and DOFAW to monitor this.
  - If any take or environmental impacts occur, seek compensation for impacts
- Monitor well pumpage of Waiawa to ensure that discharge flushing plan can be completed without adverse impacts

Line of Effort 2: Red Hill Shaft Remediation

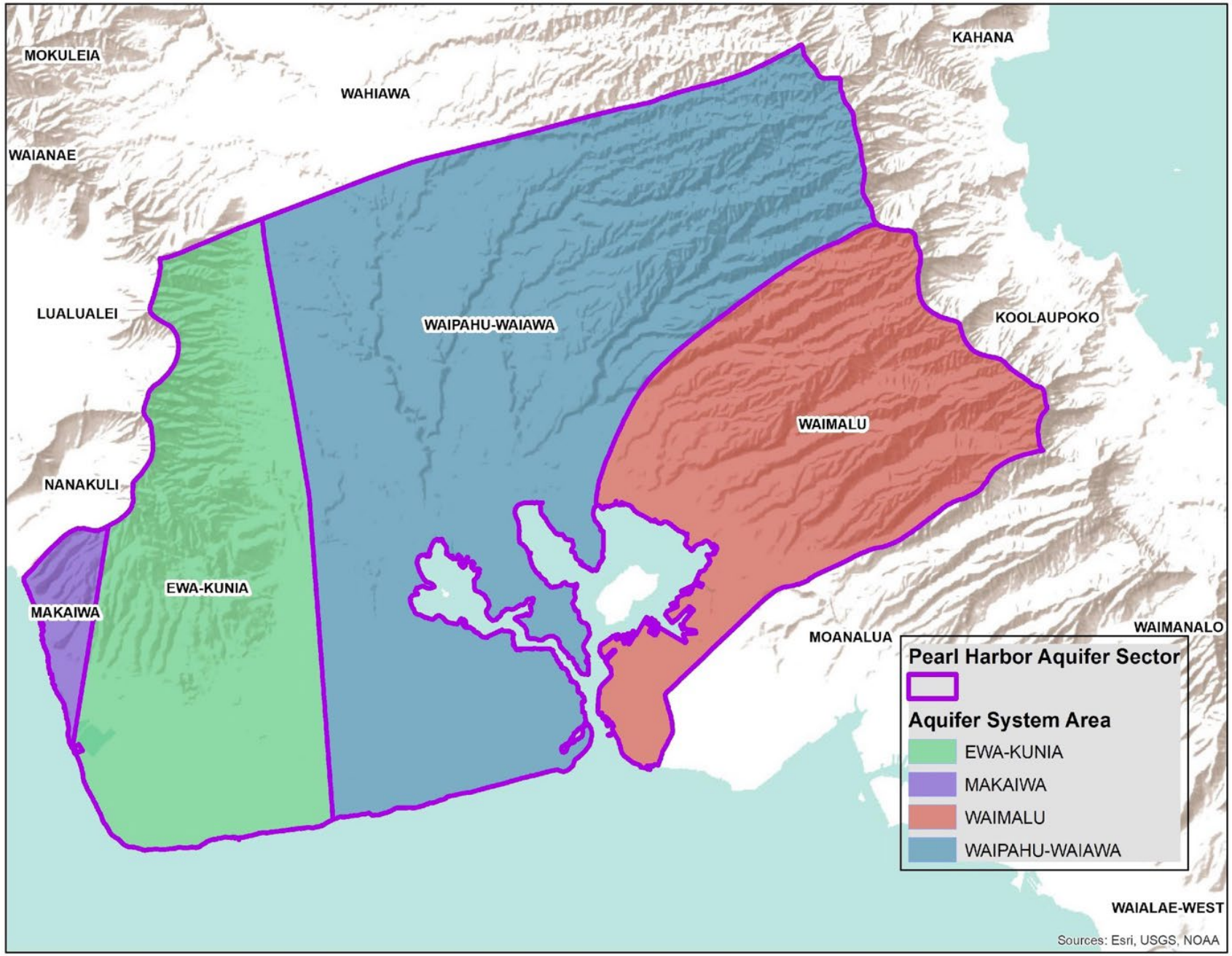
- Working to develop discharge and flushing plan with DAR and DOFAW as an attachment to NPDES discharge permit
  - Requesting Pre-During-Post surveys and monitoring in Hālawa Stream – source of proposed discharge
  - CWRM staff assisting with eDNA sampling
- Current WUP is less than proposed GAC installed capacity, so may require a proactive modification by Commission
- Monitor Red Hill Shaft to determine if WUP needs to be rescinded; May request Red Hill Shaft to be used for monitoring and remediation in event of additional spill while decision on fuel tanks is being determined

Line of Effort 3: Source of Contamination

- Review Shaft and Tunnel sources to determine if any modifications are required to protect aquifer from future contamination

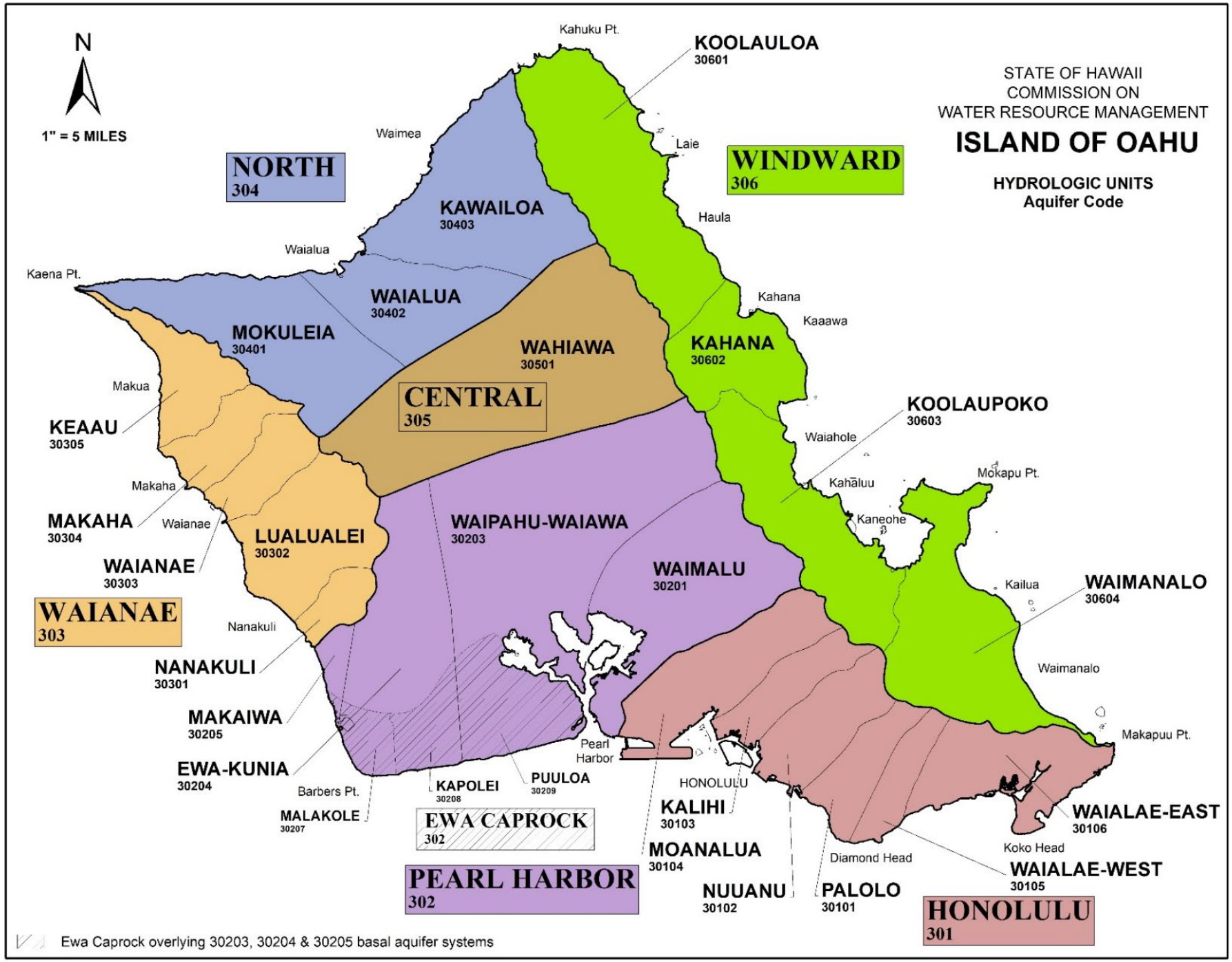
Pearl Harbor Water Shortage Plan

- Adopted by the Commission on August 18, 2020: https://files.hawaii.gov/dlnr/cwrm/submittal/2020/sb20200818C1.pdf
- Adopted plan established permit classification system and actions to be implemented in the event of a water shortage
- Established water shortage triggers based on hydrologic data collected from CWRM deep monitor wells (meterological/hydrolgic drought conditions)


MOKULEIA
WAHIAWA
KAHANA
WAIANAE
LUALUALEI
WAIPAHU-WAIAWA
KOOLAUPOKO
WAIMALU
NANAKULI
EWA-KUNIA
MAKAIWA
MOANALUA
WAIMANALO
WAIALAE-WEST
Pearl Harbor Aquifer Sector
Aquifer System Area
EWA-KUNIA
MAKAIWA
WAIMALU
WAIPAHU-WAIAWA
Sources: Esri, USGS, NOAA

Pearl Harbor Water Shortage Plan

- Actions include agency coordination, public messaging, and tiered water reductions
- Requires close coordination with DOH in the event of a threat to water quality
- PHWSP includes Makaīwa, ʻEwa-Kunia, Waipahu-Waiawa, Waimalu Aquifer System Areas (ASYA)
- *Does not include Moanalua ASYA*
- Currently no other CWRM water shortage plans



06/20/2018

Map Projection: Universal Transverse Mercator

Water Shortage Plan §174C-62 HRS

- The commission shall formulate a plan for implementation during periods of water shortage.
- The commission, by rule, may declare that a water shortage exists within all or part of a water management 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.

Water Shortage Criteria §13-171-41 HAR

(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

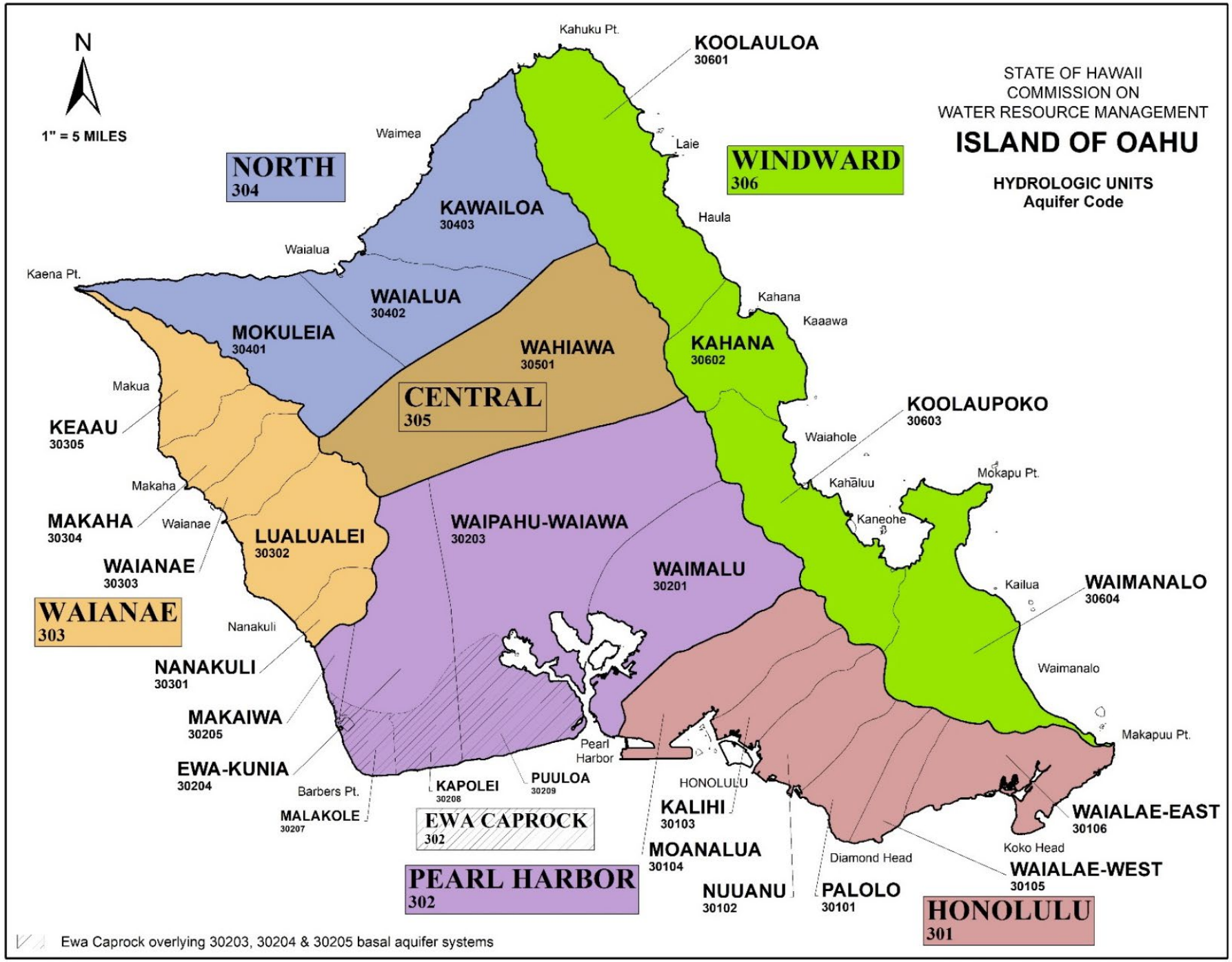
(5) A situation in which any further water development would endanger the ground water aquifer or the existing sources of supply.

Water Emergency §174C-62(g) HRS

- If an emergency condition arises due to a water shortage within any area, whether within or outside of a water management area, and if the commission finds that the restrictions imposed under subsection (c) are not sufficient to protect the public health, safety, or welfare, or the health of animals, fish, or aquatic life, or a public water supply, or recreational, municipal, agricultural, or other reasonable uses, the commission may issue orders reciting the existence of such an emergency and requiring that such actions as the commission deems necessary to meet the emergency be taken, including but not limited to apportioning, rotating, limiting, or prohibiting the use of the water resources of the area. Any party to whom an emergency order is directed may challenge such an order but shall immediately comply with the order, pending disposition of the party's challenge. The commission shall give precedence to a hearing on such challenge over all other pending matters.

Pearl Harbor Water Shortage Plan

- In Pearl Harbor Aquifer Sector Area (ASEA) – triggers in PHWSP are unmet; however, staff must closely monitor water levels and chlorides/conductivity which may be affected by how Navy will make up for ~5.356 mgd loss of supply from Red Hill Shaft in Moanalua Aquifer System Area and Aiea Red Hill Shaft in Waimalu ASYA
- Honolulu Aquifer Sector Area (ASEA) includes Pālolo, Nuʻuanu, Kalihi, **Moanalua**, Waiʻalae-West, Waiʻalae East Aquifer System Areas
- Moanalua ASYA – Navy plans to pump Red Hill Shaft at 5 mgd and possibly up to 18 mgd to flush source



06/20/2018

Map Projection: Universal Transverse Mercator

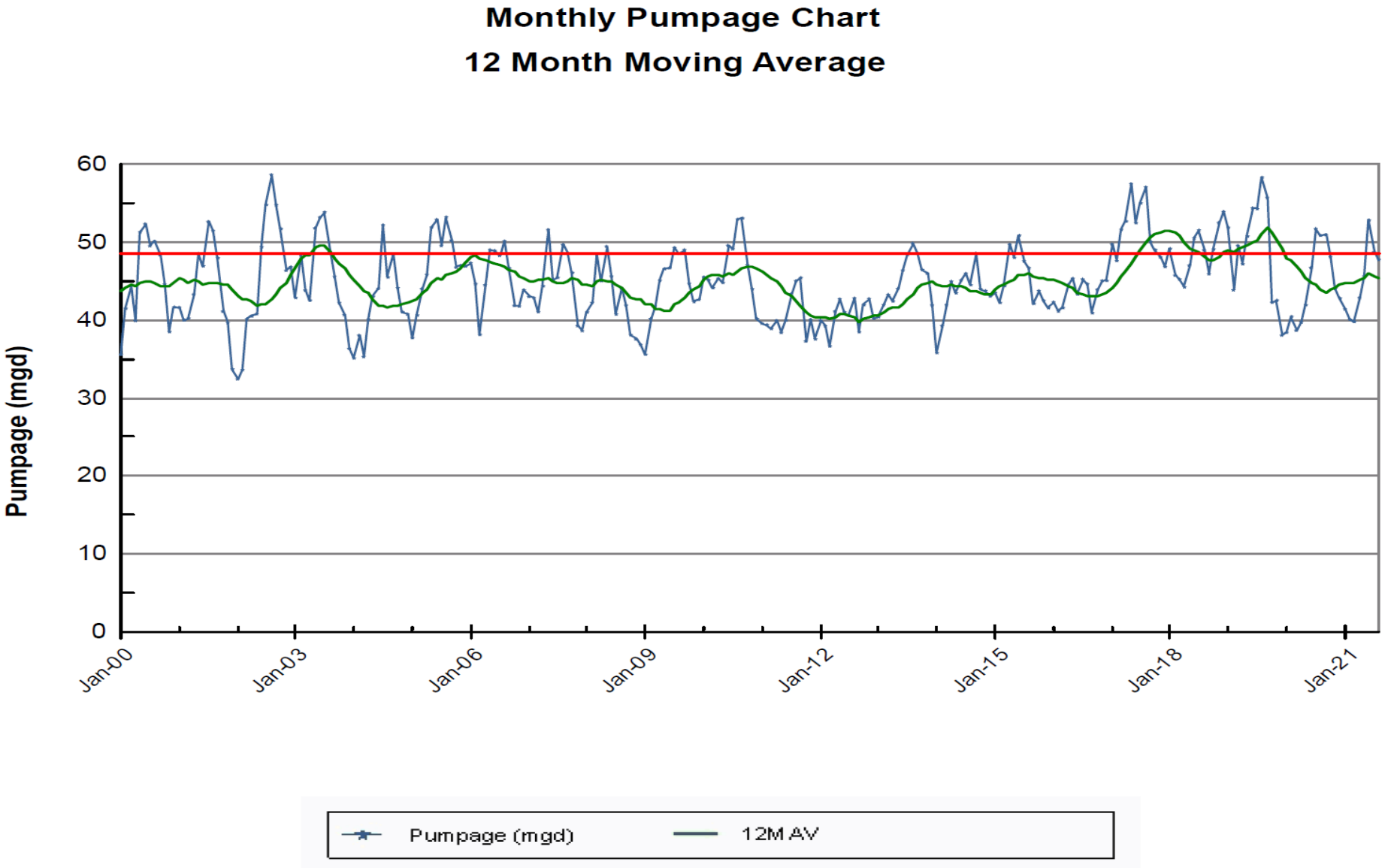
HBWS Response to Red Hill Shaft Contamination

- Honolulu BWS shut down Hālawa Shaft, Hālawa Wells and ʻAiea Wells, water use permitted allocation 13.7 mgd from Waimalu ASYA
- HBWS is formulating a plan to deal with this loss of supply
- HBWS island-wide Wet season demand is low ~130 mgd
- HBWS island-wide Dry season demand is ~150 mgd
- HBWS is not calling for unusual customer conservation yet, but has signaled that it may do so during the Dry season

HBWS Response to Red Hill Shaft Contamination

- CPC Synopsis: La Niña is favored to continue through the Northern Hemisphere winter 2021-22 (~95% chance) and transition to ENSO-neutral during the spring 2022 (~60% chance during April-June).
- Honolulu ASEA is being pumped close to SY
- Judicious pumping in the Honolulu ASEA during the Dry season is required to prevent upconing (seawater intrusion) and increased chlorides/salinity

Honolulu Aquifer Sector Area



CURRENT AND FUTURE CWRM STAFF EFFORTS

1. **Continue to represent CWRM and DLNR in various meetings**
   - Assurance that CWRM and DLNR's mission statements are advocated
2. **Continue to monitor the aquifer through Deep Monitor Well Program and water use reporting data**
3. **Continue to assist with modeling efforts**
4. **Assist Clean Water Branch in providing requirements for data collection associated with possible damage to resources from discharges related to flushing efforts**

POSSIBLE COMMISSION ACTIONS FOR TODAY

1. **Establish a Permitted Interaction Group**

Next Steps and Future Actions

- Monitor Water Use Reports for both Navy and BWS and determine if action on WUP modification or revocation is necessary
- Similar item on all monthly CWRM agenda moving forward or possibly special separate CWRM meetings