Joint Base Pearl Harbor-Hickam (JBPHH) Public Water System No. HI0000360 & Aliamanu Military Reservation (AMR) Public Water System No. HI0000337

Drinking Water Distribution System Recovery Plan: *Stage 5 Long-Term Monitoring (LTM) Period 4 Sampling Results Report for Zone H1*

15 November 2022

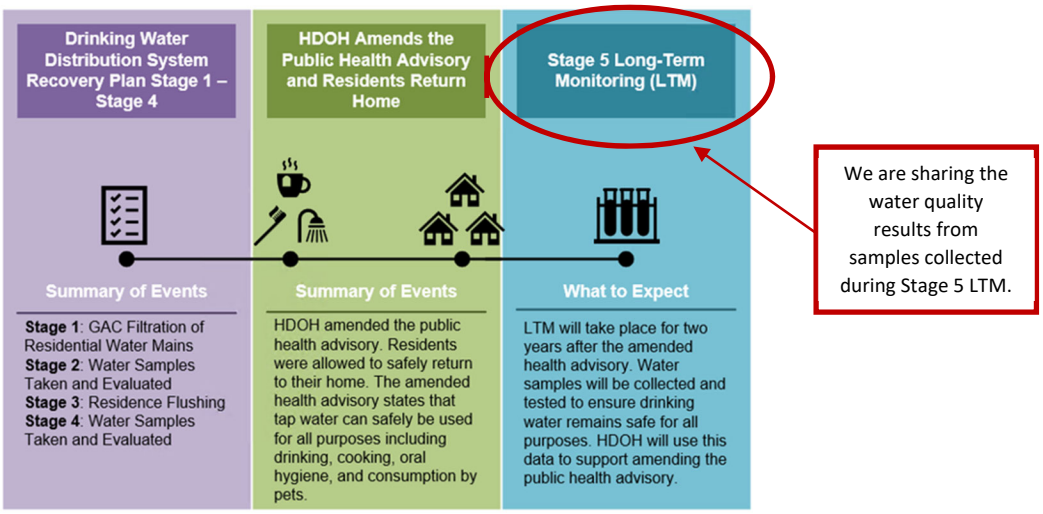
Neighborhoods included in Zone H1: Aliamanu Military Reservation (AMR)

EXECUTIVE SUMMARY FOR ZONE H1

This report documents the results of Long-Term Monitoring (LTM) testing for Zone H1. This information is being shared to update you on your water quality.

This LTM testing was performed after the November 29, 2021 Public Health Advisory for the JBPHH Public Water System[1] for Zone H1. This amendment was administered by the Hawaii Department of Health (DOH) on March 3, 2022.The health advisory for Zone H1 can be found online at: https://jbphh-safewaters.org. The amended health advisory states that tap water can be used for all purposes including: drinking, cooking, oral hygiene, and consumption by pets. The health advisory was amended based on a final review of all sample data and how the Navy water system maintains operations to ensure safe drinking water. The test results that led to the advisory amendment are summarized in the Stage 4 Residential Sampling Report. After the health advisory was amended, residents were advised that they can safely use their water for all purposes.

Zone H1 has been thoroughly flushed, sampled, and tested. This Zone has completed each stage (i.e., Stage 1 – Distribution System Flushing through Stage 4 – Building Sampling), as outlined in the Drinking Water Distribution System Recovery Plan.[2] This Zone meets the U.S. Environmental Protection Agency (EPA) and DOH drinking water standards used during this investigation, based on the samples collected and tested in Stage 2 (water mains) and Stage 4 (residences, buildings, and child development centers). Zone H1 is now in the LTM phase (a.k.a., Stage 5), described below. For additional information on the Stage 2, Stage 4, and Stage 5 sample results by Zone, please visit: https://jbphh-safewaters.org.



[1] Public Health Advisory for the JBPHH Public Water System: https://health.hawaii.gov/news/files/2021/11/21-165-DOH-advises-Navy-water-system-consumers-not-to-drink-consume-tap-water.pdf

[2] The Drinking Water Distribution System Recovery Plan was developed and approved by the Interagency Drinking Water System Team (IDWST). The DOH, EPA, Navy, and Army formed the IDWST to restore safe drinking water to all Navy Water System users. The JBPHH PWS #HI0000360 & ARM PWS #HI0000337 will continue the work of the IDWST by working to restore consumer confidence by ensuring tap water continues to be safe for human consumption (e.g., drinking, cooking, and oral hygiene).

Long-Term Monitoring

LTM will be performed as outlined in the Drinking Water Long-Term Monitoring Plan (DW LTM), dated June 2022. DW LTM will take place over the course of two years after the date of the amended health advisory, November 29, 2021. The purpose of LTM is to ensure tap water continues to be safe for human consumption (e.g., drinking, cooking, and oral hygiene). Residents/occupants will be notified if and when their house/building is scheduled to be sampled. Below is the schedule for LTM in Zone H1.

LTM Schedule for Zone H1

Sampling Event[1]	Summary of Sampling Activities	Completion Date[2]
Period 1	5% of houses/buildings (minimum of 5 houses/buildings)	March 21 – March 24, 2022
Period 2	5% of houses/buildings (minimum of 5 houses/buildings)	April 13 – April 29, 2022
Period 3	5% of houses/buildings (minimum of 5 houses/buildings)	May 17 – June 1, 2022
Period 4	10% of houses/buildings	June 22 – October 12, 2022
Period 5	10% of houses/buildings	June 2023
Period 6	10% of houses/buildings	December 2023
Period 7	10% of houses/buildings	March 2024

Notes:
[1] Sampling events are scheduled based on the amount of time (months) since the DOH health advisory was amended for this Zone.
[2] Completion dates are estimated based on the date the DOH health advisory was amended for this Zone.

Tables Included in this Stage 5 Sampling Results Report for Zone H1

Table 1-1. Contaminants Detected in Drinking Water Samples Collected from Residences in Zone H1

Contaminant	Typical Source of Contaminant	Units	DOH Project Screening Level	Basis of DOH Screening Level[2]	Stage 4 Sampling Summary		Stage 5 LTM Sampling Summary Period 1		Stage 5 LTM Sampling Summary Period 2		Stage 5 LTM Sampling Summary Period 3		Stage 5 LTM Sampling Summary Period 4		Stage 5 LTM Sampling Summary Period 5		Stage 5 LTM Sampling Summary Period 6		Stage 5 LTM Sampling Summary Period 7	
					February 2022		April 2022		May 2022		June 2022		December 2022		June 2023		December 2023		March 2024	
					No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]
Contaminants of Concern[1]																				
Benzene	Discharge from factories; Leaching from gas storage tanks and landfills	ppb[6]	5.0	MCL	0/117	-	0/52	-	0/50	-	0/52	-	0/106	-	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.		These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.		These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.	
Ethylbenzene	Discharge from petroleum refineries	ppb	700	MCL	0/117	-	0/52	-	0/50	-	0/52	-	0/106	-						
Toluene	Discharge from petroleum factories	ppb	1,000	MCL	0/117	-	0/52	-	0/50	-	0/52	-	0/106	-						
Xylenes (total)	Discharge from petroleum factories; Discharge from chemical factories	ppb	10,000	MCL	0/117	-	0/52	-	0/50	-	0/52	-	0/106	-						
1-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also, present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites.	ppb	10	EAL	0/117	-	0/52	-	0/50	-	0/52	-	0/106	-						
2-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also used to make vitamin K; and is present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites	ppb	10	EAL	0/117	-	0/52	-	0/50	-	0/52	-	0/106	-						
Naphthalene	Naphthalene is found in coal tar or crude oil and is used in the manufacture of plastics, resins, fuels, and dyes, and as a fumigant	ppb	17	EAL	0/117	-	0/50	-	0/50	-	0/52	-	0/106	-						
Total TPH[4]	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment	ppb	266[10]	ISP	3/117	ND - 160 (119)	5/52	ND - 71 (61)	7/50	ND - 73 (64)	4/52	ND - 58 (55)	42/106	ND - 111 (69)						
Total Organic Carbon (TOC)[5]	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources	ppb	4,000	ISP	62/117	ND – 9,720 (1,903)	6/52	ND - 640 (512)	0/50	-	0/52	-	0/106	-						
Free Chlorine (Field Test)[8]	Water additive used to control microbes	ppb	4,000	MCL	-	-	44/44	40 – 1,070 (549)	59/59	10 - 790 (431)	48/48	20 - 980 (535)	92/92	230 - 970 (624)						
Metals																				
Antimony	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	ppb	6.0	MCL	1/117	ND - 0.058 (0.058)	2/52	ND - 0.13 (0.12)	4/61	ND - 0.13 (0.12)	1/52	ND - 0.11 (0.11)	11/106	ND - 0.30 (0.17)	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.		These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.		These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.	
Arsenic	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes	ppb	10	MCL	24/117	ND - 0.46 (0.37)	5/52	ND - 0.86 (0.66)	0/61	-	0/52	-	11/106	ND - 2.5 (1.3)						
Barium	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits	ppb	2,000	MCL	117/117	1.1 - 4.1 (2.3)	52/52	7.8 - 14 (10)	61/61	2.9 - 7.4 (5.9)	52/52	3.2 - 4.5 (3.9)	106/106	2.0 - 3.2 (2.5)						
Beryllium	Discharge from metal refineries and coal-burning factories; Discharge from electrical, aerospace, and defense industries	ppb	4.0	MCL	0/117	-	0/52	-	1/61	ND - 0.20 (0.20)	0/52	-	1/106	ND - 0.22 (0.22)						
Cadmium	By-product of drinking water disinfection	ppb	5.0	MCL	0/117	-	0/52	-	1/61	ND - 0.36 (0.36)	0/52	-	1/106	ND - 0.11 (0.11)						
Chromium	Discharge from steel and pulp mills; Erosion of natural deposits	ppb	100	MCL	115/117	ND - 3.5 (1.6)	2/52	ND - 0.58 (0.56)	6/61	ND - 1.3 (1.1)	1/52	ND - 0.77 (0.77)	28/106	ND - 1.9 (1.1)						

Copper	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	1,300	MCL	117/117	4.6 - 160 (22)	52/52	0.72 - 81 (4.0)	61/61	2.1 - 42 (12)	52/52	4.3 - 110 (16)	106/106	2.9 - 72 (14)	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.	These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.	These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.
Lead	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	15	MCL	109/117	ND – 2.0 (0.41)	25/52	ND - 2.7 (0.42)	61/61	0.13 - 8.7 (0.80)[9]	52/52	0.13 - 1.8 (0.58)	106/106	0.13 - 4.9 (0.60)			
Mercury	Erosion of natural deposits; Discharge from refineries and factories; Runoff from landfills; Runoff from cropland	ppb	2.0	MCL	6/117	ND - 0.072 (0.063)	0/52	-	11/61	ND - 0.13 (0.051)	1/52	ND - 0.042 (0.042)	21/106	ND - 0.10 (0.039)			
Selenium	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines	ppb	50	MCL	44/117	ND - 2.8 (1.5)	0/52	-	59/61	ND - 1.1 (0.58)	36/52	ND - 2.1 (0.99)	70/106	ND - 3.8 (0.97)			
Thallium	Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories	ppb	2.0	MCL	3/117	ND - 0.090 (0.076)	2/52	ND - 0.056 (0.056)	1/61	ND - 0.51 (0.51)	2/52	ND - 0.056 (0.054)	8/106	ND - 0.63 (0.16)			
Volatile Organic Compounds (VOCs)																	
Total Haloacetic acids (sum of mono-, di-, trichloroacetic acids and mono- and dibromoacetic acids)	By-product of drinking water disinfection	ppb	60	MCL	-	-	1/52	ND - 1.2 (1.2)	0/50	-	1/52	ND - 1.3 (1.3)	2/106	ND - 0.79 (0.76)	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.	These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.	These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.
Total trihalomethanes (sum of chloroform, bromoform, bromodichloromethane, and di-bromochloromethane)	By-product of drinking water disinfection	ppb	80	MCL	-	-	33/52	ND - 13 (1.9)	5/50	ND - 22 (5.5)	24/52	ND - 21 (3.7)	48/106	ND - 14 (2.4)			
Synthetic Organic Compounds (SOCs) or Semi-Volatile Organic Compounds (SVOCs)																	
Benzo(a)pyrene	Leaching from linings of water storage tanks and distribution lines	ppb	0.20	MCL	0/117	-	0/52	-	0/50	-	0/52	-	1/106	ND - 0.018 (0.018)	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.	These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.	These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.
Bis(2-ethylhexyl)phthalate	Discharge from rubber and chemical factories	ppb	6.0	MCL	3/117	ND - 0.72 (0.7)	9/52	ND - 3.5 (1.1)	1/50	ND - 1.4 (1.4)	1/52	ND - 0.48 (0.48)	1/106	ND - 0.59 (0.59)			

Notes:

1. Contaminants are incident specific listed either detect or non-detect (ND). All other contaminants are only listed if detected.
2. The DOH uses multiple criteria to assess the safety of the drinking water including maximum contaminant levels (MCLs), previously established environmental action levels (EALs) and incident specific parameters (ISPs).
3. These numbers are the minimum and maximum values from all the test results. The average (or mathematical mean) includes all sample test results with a detectable contaminant. An average is the sum of the results (excluding non-detects) divided by the total number results with detection only. Acronyms and explanation of terms used in this table are presented on the following pages.
4. For more information regarding Total Petroleum Hydrocarbons, refer to the FACT SHEET What are Petroleum Hydrocarbons? Available online at: https://health.hawaii.gov/about/files/2021/12/21.12.16_What-Are-Petroleum-Hydrocarbons.pdf.
5. Total Organic Carbon (TOC), results report any constituent containing carbon, many of which are naturally occurring and some of which may be man-made. The DOH selected a TOC project screening level of 2,000 ppb under Stage 4. Each exceedance was investigated by reviewing the associated water quality data (e.g., BTEX results, TPH) and the IDWST determined that all TOC exceedances were inconclusive in association with petroleum hydrocarbons. Under the Drinking Water Long Term Monitoring Plan (under review during the LTM Period 1 report for Zone H1), DOH revised the TOC screening level to 4,000 ppb (previously 2,000 ppb).
6. Parts per billion (ppb) refers to the amount (or concentration) of a contaminant in the water.
7. Cells highlighted in green indicate the water sample results were below DOH Screening Levels.
8. On January 30 and February 25, 2022, DOH revised the LTM requirements to include the analysis of free chlorine. Chlorine is typically used as an additive to drinking water for disinfection purposes.
9. This does not include the April 14, 2022 initial and resample of lead testing from 3055 Calamondin Way (Field Sample Number: H1-TW-0013356-22092-A) or the initial or resample of April 15, 2022 lead testing from 3738 Amapa Lane (Field Sample Number: H1-TW-0013218-22092-A). These exceedances were associated with Premise Plumbing and are not associated with the JBPHH water distribution system, and are not included in this table. See section “What was found?” in the main text of this report for a complete discussion of these exceedances.
   a) The sample result taken from 3055 Calamondin Way on April 14, 2022 was 22.3 ppb for lead, which is over the action level of 15 ppb. The family was advised to not consume water and was provided bottled water. The faucet and five other adjacent faucets within the home were replaced, reflushed, and resampled on April 28, 2022. The resample results showed no exceedances.
   b) The sample result taken from 3738 Amapa Lane on April 15, 2022 was 22.4 ppb for lead, which is over the action level of 15 ppb. The family was advised to not consume water and was provided bottled water. The Army replaced the source faucet on April 22, 2022, and the Navy conducted additional sampling the same day. The resample results showed no exceedances.
10. Per the June 2022 Drinking Water Long-Term Monitoring Plan, the ISP for Total TPHs was changed to 266 ppb (previously it was 211 ppb). The June 2022 Drinking Water Long-Term Monitoring Plan is available online at: https://health.hawaii.gov/about/files/2022/08/JBPHH-Drinking-Water-LTM-Plan-FINAL-20220823.pdf.

Table 1-2. Contaminants Detected in Drinking Water Samples Collected from Schools in Zone H1

There are no schools in this Zone.

Table 1-3. Contaminants Detected in Drinking Water Samples Collected from Child Development Centers in Zone H1

Contaminant	Typical Source of Contaminant	Units	DOH Project Screening Level	Basis of DOH Screening Level[2]	Stage 4 Sampling Summary		Stage 5 LTM Sampling Summary Period 1		Stage 5 LTM Sampling Summary Period 2		Stage 5 LTM Sampling Summary Period 3		Stage 5 LTM Sampling Summary Period 4		Stage 5 LTM Sampling Summary Period 5		Stage 5 LTM Sampling Summary Period 6		Stage 5 LTM Sampling Summary Period 7	
					February 2022		April 2022		May 2022		June 2022		December 2022		June 2023		December 2023		March 2024	
					No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Sample	Minimum – Maximum (Average)[3]
Contaminants of Concern[1]																				
Benzene	Discharge from factories; Leaching from gas storage tanks and landfills	ppb[6]	5.0	MCL	0/7	-	0/8	-	0/8	-	0/11	-	0/8	-	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.		These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.		These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.	
Ethylbenzene	Discharge from petroleum refineries	ppb	700	MCL	0/7	-	0/8	-	0/8	-	0/11	-	0/8	-						
Toluene	Discharge from petroleum factories	ppb	1,000	MCL	0/7	-	0/8	-	0/8	-	0/11	-	0/8	-						
Xylenes (total)	Discharge from petroleum factories; Discharge from chemical factories	ppb	10,000	MCL	0/7	-	0/8	-	0/8	-	0/11	-	0/8	-						
1-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also, present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites.	ppb	10	EAL	0/7	-	0/8	-	0/8	-	0/11	-	0/8	-						
2-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also used to make vitamin K; and is present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites	ppb	10	EAL	0/6	-	0/8	-	0/8	-	0/11	-	0/8	-						
Naphthalene	Naphthalene is found in coal tar or crude oil and is used in the manufacture of plastics, resins, fuels, and dyes, and as a fumigant	ppb	17	EAL	0/7	-	0/8	-	0/8	-	0/11	-	0/8	-						
Total TPH[4]	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment	ppb	266[9]	ISP	0/7	-	1/8	ND - 64 (64)	0/8	-	1/11	ND - 58 (58)	3/8	ND - 79 (72)						
Total Organic Carbon (TOC)[5]	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources	ppb	4,000	ISP	3/7	ND - 650 (507)	2/8	ND - 270 (260)	0/8	-	0/11	-	0/8	-						
Free Chlorine (Field Test)[8]	Water additive used to control microbes	ppb	4,000	MCL	-	-	8/8	60 – 850 (389)	8/8	10 - 780 (280)	8/8	10 - 770 (205)	8/8	100 - 480 (315)						
Metals																				
Antimony	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	ppb	6.0	MCL	0/7	-	1/8	ND - 0.12 (0.12)	1/8	ND - 0.17 (0.17)	2/11	ND - 0.21 (0.18)	0/8	-	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.		These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.		These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.	
Barium	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits	ppb	2,000	MCL	7/7	2.2 - 2.4 (2.3)	8/8	2.4 - 11 (7.5)	8/8	2.6 - 7.7 (6.3)	11/11	3.6 - 6.5 (5.3)	8/8	2.2 - 5.6 (3.3)						
Cadmium	By-product of drinking water disinfection	ppb	5.0	MCL	0/6	-	0/8	-	0/8	-	0/11	-	1/8	ND - 0.11 (0.11)						
Chromium	Discharge from steel and pulp mills; Erosion of natural deposits	ppb	100	MCL	7/7	1.3 - 1.5 (1.4)	3/8	ND - 1.4 (0.85)	0/8	-	0/11	-	8/8	0.79 - 2.1 (1.1)						
Copper	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	1,300	MCL	6/6	37 - 181 (72)	8/8	8.5 - 144 (32)	8/8	12 - 140 (53)	11/11	10 - 394 (122)	8/8	9.0 - 240 (79)						

Lead	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	15	MCL	7/7	0.21 - 8.5 (1.5)	8/8	0.13 - 3.8 (1.1)	8/8	0.34 - 0.90 (0.56)	11/11	0.38 - 2.2 (0.71)	8/8	0.21 - 1.2 (0.60)	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.	These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.	These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.
Selenium	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines	ppb	50	MCL	0/6	-	0/8	-	7/8	ND - 0.94 (0.56)	8/11	ND - 1.4 (0.81)	0/8	-			
Thallium	Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories	ppb	2.0	MCL	4/7	ND - 0.11 (0.081)	0/8	-	0/8	-	0/11	-	3/8	ND - 0.11 (0.071)			
Volatile Organic Compounds (VOCs)																	
Total Haloacetic acids (sum of mono-, di-, trichloroacetic acids and mono- and dibromoacetic acids)	By-product of drinking water disinfection	ppb	60	MCL	-	-	2/8	ND - 4.5 (4.2)	2/8	ND - 4.0 (3.7)	3/11	ND - 3.3 (2.9)	3/8	ND - 3.6 (2.7)	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.	These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.	These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.
Total trihalomethanes (sum of chloroform, bromoform, bromodichloromethane, and di-bromochloromethane)	By-product of drinking water disinfection	ppb	80	MCL	-	-	5/8	ND - 25 (11)	3/8	ND - 21 (14)	10/11	ND - 25.1 (9.1)	7/8	ND - 22 (7.1)			
Synthetic Organic Compounds (SOCs) or Semi-Volatile Organic Compounds (SVOCs)																	
Bis(2-ethylhexyl)phthalate	Discharge from rubber and chemical factories	ppb	6.0	MCL	0/6	-	0/8	-	1/8	ND - 3.9 (3.9)	0/11	-	0/8	-	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.	These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.	These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.

Notes:

1. Contaminants are incident specific, listed either detect or non-detect (ND). All other contaminants are only listed if detected.
2. The DOH uses multiple criteria to assess the safety of the drinking water including maximum contaminant levels (MCLs), previously established environmental action levels (EALs) and incident specific parameters (ISPs).
3. These numbers are the minimum and maximum values from all the test results. The average (or mathematical mean) includes all sample test results with a detectable contaminant. An average is the sum of the results (excluding non-detects) divided by the total number results with detection only. Acronyms and explanation of terms used in this table are presented on the following pages.
4. For more information regarding Total Petroleum Hydrocarbons, refer to the refer to the FACT SHEET What Are Petroleum Hydrocarbons?, available online at: https://health.hawaii.gov/about/files/2021/12/21.12.16_What-Are-Petroleum-Hydrocarbons.pdf.
5. Total Organic Carbon (TOC), results report any constituent containing carbon, many of which are naturally occurring and some of which may be man-made. The DOH selected a TOC project screening level of 2,000 ppb under Stage 4. Each exceedance was investigated by reviewing the associated water quality data (e.g., BTEX results, TPH) and the IDWST determined that all TOC exceedances were inconclusive in association with petroleum hydrocarbons. Under the Drinking Water Long Term Monitoring Plan (under review during the LTM Period 1 report for Zone H1), DOH revised the TOC screening level to 4,000 ppb (previously 2,000 ppb).
6. Parts per billion (ppb) refers to the amount (or concentration) of a contaminant in the water.
7. Cells highlighted in green indicate the water sample results were below DOH Screening Levels.
8. On January 30 and February 25, 2022, DOH revised the LTM requirements to include the analysis of free chlorine. Chlorine is typically used as an additive to drinking water for disinfection purposes.
9. Per the June 2022 Drinking Water Long-Term Monitoring Plan, the ISP for Total TPHs was changed to 266 ppb (previously it was 211 ppb). The June 2022 Drinking Water Long-Term Monitoring Plan is available online at: https://health.hawaii.gov/about/files/2022/08/JBPHH-Drinking-Water-LTM-Plan-FINAL-20220823.pdf.

Table 1-4. Contaminants Detected in Drinking Water Samples Collected from Other Buildings in Zone H1

Contaminant	Typical Source of Contaminant	Units	DOH Project Screening Level	Basis of DOH Screening Level[2]	Stage 4 Sampling Summary		Stage 5 LTM Sampling Summary Period 1		Stage 5 LTM Sampling Summary Period 2		Stage 5 LTM Sampling Summary Period 3		Stage 5 LTM Sampling Summary Period 4		Stage 5 LTM Sampling Summary Period 5		Stage 5 LTM Sampling Summary Period 6		Stage 5 LTM Sampling Summary Period 7	
					February 2022		April 2022		May 2022		June 2022		December 2022		June 2023		December 2023		March 2024	
					No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]
Contaminants of Concern[1]																				
Benzene	Discharge from factories; Leaching from gas storage tanks and landfills	ppb[6]	5.0	MCL	0/1	-	0/1	-	0/1	-	0/1	-	0/1	-	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.		These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.		These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.	
Ethylbenzene	Discharge from petroleum refineries	ppb	700	MCL	0/1	-	0/1	-	0/1	-	0/1	-	0/1	-						
Toluene	Discharge from petroleum factories	ppb	1,000	MCL	0/1	-	0/1	-	0/1	-	0/1	-	0/1	-						
Xylenes (total)	Discharge from petroleum factories; Discharge from chemical factories	ppb	10,000	MCL	0/1	-	0/1	-	0/1	-	0/1	-	0/1	-						
1-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also, present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites.	ppb	10	EAL	0/1	-	0/1	-	0/1	-	0/1	-	0/1	-						
2-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also used to make vitamin K; and is present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites	ppb	10	EAL	0/1	-	0/1	-	0/1	-	0/1	-	0/1	-						
Naphthalene	Naphthalene is found in coal tar or crude oil and is used in the manufacture of plastics, resins, fuels, and dyes, and as a fumigant	ppb	17	EAL	0/1	-	0/1	-	0/1	-	0/1	-	0/1	-						
Total TPH[4]	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment	ppb	266[9]	ISP	0/1	-	0/1	-	0/1	-	0/1	-	0/1	-						
Total Organic Carbon (TOC)[5]	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources	ppb	4,000	ISP	0/1	-	0/1	-	0/1	-	0/1	-	0/1	-						
Free Chlorine (Field Test)[8]	Water additive used to control microbes	ppb	4,000	MCL	-	-	1/1	550 – 550 (550)	1/1	30 - 30 (30)	1/1	80 - 80 (80)	1/1	40 - 40 (40)						
Metals																				
Antimony	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	ppb	6	MCL	0/1	-	0/1	-	0/1	-	0/1	-	1/1	0.13 - 0.13 (0.13)	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.		These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.		These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.	
Barium	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits	ppb	2,000	MCL	1/1	3.0 – 3.0 (3.0)	1/1	8.9 – 8.9 (8.9)	1/1	7.4 - 7.4 (7.4)	1/1	4.5 - 4.5 (4.5)	1/1	3.9 - 3.9 (3.9)						
Chromium	Discharge from steel and pulp mills; Erosion of natural deposits	ppb	100	MCL	1/1	1.8 - 1.8 (1.8)	0/1	-	0/1	-	0/1	-	1/1	1.5 - 1.5 (1.5)						
Copper	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	1,300	MCL	1/1	16 - 16 (16)	1/1	7.6 - 7.6 (7.6)	1/1	197 - 197 (197)	1/1	99 - 99 (99)	1/1	196 - 196 (196)						
Lead	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	15	MCL	1/1	0.19 - 0.19 (0.19)	0/1	-	1/1	1.3 - 1.3 (1.3)	1/1	2.0 – 2.0 (2.0)	1/1	0.57 - 0.57 (0.57)						

Selenium	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines	ppb	50	MCL	1/1	1.8 - 1.8 (1.8)	0/1	-	1/1	1.5 - 1.5 (1.5)	1/1	1.3 - 1.3 (1.3)	0/1	-			
Volatile Organic Compounds (VOCs)																	
Total Haloacetic acids (sum of mono-, di-, trichloroacetic acids and mono- and dibromo acetic acids)	By-product of drinking water disinfection	ppb	60	MCL	#N/A	#N/A	0/1	-	0/1	-	0/1	-	1/1	1.1 - 1.1 (1.1)	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.	These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.	These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.
Total trihalomethanes (sum of chloroform, bromoform, bromodichloromethane, and di-bromochloromethane)	By-product of drinking water disinfection	ppb	80	MCL	-	-	1/1	1.9 - 1.9 (1.9)	1/1	0.68 - 0.68 (0.68)	1/1	0.66 - 0.66 (0.66)	1/1	10 - 10 (10)			
Synthetic Organic Compounds (SOCs) or Semi-Volatile Organic Compounds (SVOCs) – ND																	

Notes:

1. Contaminants are incident specific, listed either detect or non-detect (ND). All other contaminants are only listed if detected.
2. The DOH uses multiple criteria to assess the safety of the drinking water including maximum contaminant levels (MCLs), previously established environmental action levels (EALs) and incident specific parameters (ISPs).
3. These numbers are the minimum and maximum values from all the test results. The average (or mathematical mean) includes all sample test results with a detectable contaminant. An average is the sum of the results (excluding non-detects) divided by the total number results with detection only. Acronyms and explanation of terms used in this table are presented on the following pages.
4. For more information regarding Total Petroleum Hydrocarbons, refer to the FACT SHEET What Are Petroleum Hydrocarbons?, available online at: https://health.hawaii.gov/about/files/2021/12/21.12.16_What-Are-Petroleum-Hydrocarbons.pdf.
5. Total Organic Carbon (TOC) test results report any constituent containing carbon, many of which are naturally occurring and some of which may be man-made. The DOH selected a TOC project screening level of 2,000 ppb under Stage 4. Each exceedance was investigated by reviewing the associated water quality data (e.g., BTEX results, TPH) and the IDWST determined that all TOC exceedances were inconclusive in association with petroleum hydrocarbons. Under the Drinking Water Long Term Monitoring Plan (under review during the LTM Period 1 report for Zone H1), DOH revised the TOC screening level to 4,000 ppb (previously 2,000 ppb).
6. Parts per billion (ppb) refers to the amount (or concentration) of a contaminant in the water.
7. Cells highlighted in green indicate the water sample results were below DOH Screening Levels.
8. On January 30 and February 25, 2022, DOH revised the LTM requirements to include the analysis of free chlorine. Chlorine is typically used as an additive to drinking water for disinfection purposes.
9. Per the June 2022 Drinking Water Long-Term Monitoring Plan, the ISP for Total TPHs was changed to 266 ppb (previously it was 211 ppb). The June 2022 Drinking Water Long-Term Monitoring Plan is available online at: https://health.hawaii.gov/about/files/2022/08/JBPHH-Drinking-Water-LTM-Plan-FINAL-20220823.pdf.

Table 1-5. Contaminants Detected in Drinking Water Samples Collected from Fire Hydrants in Zone H1

Contaminant	Typical Source of Contaminant	Units	DOH Project Screening Level	Basis of DOH Screening Level[2]	Stage 4 Sampling Summary		Stage 5 LTM Sampling Summary Period 1		Stage 5 LTM Sampling Summary Period 2		Stage 5 LTM Sampling Summary Period 3		Stage 5 LTM Sampling Summary Period 4		Stage 5 LTM Sampling Summary Period 5		Stage 5 LTM Sampling Summary Period 6		Stage 5 LTM Sampling Summary Period 7	
					February 2022		April 2022		May 2022		June 2022		December 2022		June 2023		December 2023		March 2024	
					No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]	No. of Detects out of Samples	Minimum – Maximum (Average)[3]
Contaminants of Concern[1]																				
Benzene	Discharge from factories; Leaching from gas storage tanks and landfills	ppb[6]	5.0	MCL	0/3	-	0/4	-	0/3	-	0/3	-	0/3	-	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.		These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.		These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.	
Ethylbenzene	Discharge from petroleum refineries	ppb	700	MCL	0/3	-	0/4	-	0/3	-	0/3	-	0/3	-						
Toluene	Discharge from petroleum factories	ppb	1,000	MCL	0/3	-	0/4	-	0/3	-	0/3	-	0/3	-						
Xylenes (total)	Discharge from petroleum factories; Discharge from chemical factories	ppb	10,000	MCL	0/3	-	0/4	-	0/3	-	0/3	-	0/3	-						
1-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also, present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites.	ppb	10	EAL	0/3	-	0/4	-	0/3	-	0/3	-	0/3	-						
2-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also used to make vitamin K; and is present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites	ppb	10	EAL	0/3	-	0/4	-	0/3	-	0/3	-	0/3	-						
Naphthalene	Naphthalene is found in coal tar or crude oil and is used in the manufacture of plastics, resins, fuels, and dyes, and as a fumigant	ppb	17	EAL	0/8	-	0/4	-	0/3	-	0/3	-	0/3	-						
Total TPH[4]	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment	ppb	266[10]	ISP	0/6	-	0/4	-	0/3	-	0/3	-	2/3	ND - 78 (74)						
Total Organic Carbon (TOC)[5]	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources	ppb	4,000	ISP	0/3	-	2/4	ND - 260 (250)	0/3	-	0/3	-	0/3	-						
Free Chlorine (Field Test)[9]	Water additive used to control microbes	ppb	4,000	MCL	-	-	3/3	340 – 630 (483)	3/3	400 - 470 (440)	3/3	600 - 880 (733)	3/3	340 - 530 (457)						
Metals																				
Antimony	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	ppb	6	MCL	0/3	-	0/4	-	0/3	-	2/3	ND - 0.19 (0.18)	0/3	-	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.		These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.		These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.	
Arsenic	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes	ppb	10	MCL	3/3	0.24 - 0.26 (0.25)	0/4	-	0/3	-	0/3	-	0/3	-						
Barium	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits	ppb	2,000	MCL	3/3	2.0 - 2.3 (2.2)	4/4	8.3 - 10 (8.9)	3/3	6.4 - 7.1 (6.7)	3/3	3.3 - 4.6 (4.1)	3/3	2.2 - 2.5 (2.4)						

Chromium	Discharge from steel and pulp mills; Erosion of natural deposits	ppb	100	MCL	3/3	1.5 - 1.5 (1.5)	0/4	-	0/3	-	0/3	-	3/3	1.1 - 1.1 (1.1)	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.	These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.	These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.
Copper	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	1,300	MCL	3/3	3.5 - 7.1 (5.1)	4/4	1.1 - 1.3 (1.2)	3/3	1.2 - 1.9 (1.6)	3/3	1.5 - 2.7 (2.1)	-[11]	-[11]			
Lead	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	15	MCL	3/3	0.21 – 1.0 (0.57)	3/4	ND - 0.37 (0.32)	2/3	ND - 0.46 (0.41)	3/3	0.15 - 0.45 (0.33)	-[11]	-[11]			
Selenium	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines	ppb	50	MCL	3/3	1 - 1.4 (1.2)	0/4	-	3/3	0.43 - 0.51 (0.48)	1/3	ND - 0.63 (0.63)	0/3	-			
Volatile Organic Compounds (VOCs)																	
Total trihalomethanes (sum of chloroform, bromoform, bromodichloromethane, and di-bromochloromethane)	By-product of drinking water disinfection	ppb	80	MCL	-	-	3/4	ND - 3.2 (2.3)	1/3	ND - 1.6 (1.6)	2/3	ND - 1.9 (1.7)	2/3	ND - 1.7 (1.3)	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.	These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.	These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.
Synthetic Organic Compounds (SOCs) or Semi-Volatile Organic Compounds (SVOCs)																	
2-Ethylhexyl adipate	Used as a solvent for lacquers, paints, and varnishes.	ppb	400	MCL	1/3	ND - 0.058 (0.058)	-	-	-	-	-	-	-	-	These samples will be collected 15 months after the health advisory was amended. Results will be reported in a LTM Period 5 Sampling Results Report.	These samples will be collected 21 months after the health advisory was amended. Results will be reported in a LTM Period 6 Sampling Results Report.	These samples will be collected 24 months after the health advisory was amended. Results will be reported in a LTM Period 7 Sampling Results Report.
Nitrobenzene	Used to manufacture dyes, pesticides, and synthetic rubbers; Discharge from chemical factories	ppb	-[7]	-[7]	1/5	ND - 0.040 (0.040)	-	-	-	-	-	-	-	-			

Notes:

1. Contaminants are incident specific, listed either detect or non-detect (ND). All other contaminants are only listed if detected.
2. The DOH uses multiple criteria to assess the safety of the drinking water including maximum contaminant levels (MCLs), previously established environmental action levels (EALs) and incident specific parameters (ISPs).
3. These numbers are the minimum and maximum values from all the test results. The average (or mathematical mean) includes all sample test results with a detectable contaminant. An average is the sum of the results (excluding non-detects) divided by the total number results with detection only. Acronyms and explanation of terms used in this table are presented on the following pages.
4. For more information regarding Total Petroleum Hydrocarbons, refer to the FACT SHEET What Are Petroleum Hydrocarbons?, available online at: https://health.hawaii.gov/about/files/2021/12/21.12.16_What-Are-Petroleum-Hydrocarbons.pdf.
5. Total Organic Carbon (TOC), results report any constituent containing carbon, many of which are naturally occurring and some of which may be man-made. The DOH selected a TOC project screening level of 2,000 ppb under Stage 4. Each exceedance was investigated by reviewing the associated water quality data (e.g., BTEX results, TPH) and the IDWST determined that all TOC exceedances were inconclusive in association with petroleum hydrocarbons. Under the Drinking Water Long Term Monitoring Plan (under review during the LTM Period 1 report for Zone H1), DOH revised the TOC screening level to 4,000 ppb (previously 2,000 ppb).
6. Parts per billion (ppb) refers to the amount (or concentration) of a contaminant in the water.
7. This contaminant does not have a DOH Screening Level and was only detected at low concentrations. It is not associated with fuels and is not considered a risk to human health associated with the fuel release that occurred at Red Hill in November 2021.
8. Cells highlighted in green indicate the water sample results were below DOH Screening Levels.
9. On January 30 and February 25, 2022, DOH revised the LTM requirements to include the analysis of free chlorine. Chlorine is typically used as an additive to drinking water for disinfection purposes.
10. Per the June 2022 Drinking Water Long-Term Monitoring Plan, the ISP for Total TPHs was changed to 266 ppb (previously it was 211 ppb). The June 2022 Drinking Water Long-Term Monitoring Plan is available online at: https://health.hawaii.gov/about/files/2022/08/JBPHH-Drinking-Water-LTM-Plan-FINAL-20220823.pdf.
11. Per the June 2022 Drinking Water Long-Term Monitoring Plan, Lead and Copper samples will only be collected from residences, other buildings and the entry points to the distribution system during LTM Months 4-24. The June 2022 Drinking Water Long-Term Monitoring Plan is available online at: https://health.hawaii.gov/about/files/2022/08/JBPHH-Drinking-Water-LTM-Plan-FINAL-20220823.pdf.

Table 1-6. Contaminants Detected in Drinking Water Samples Collected from JBPHH's Source Water (Waiawa Shaft – Post Chlorination)

Contaminant	Typical Source of Contaminant	Units	DOH Project Screening Level	Basis of DOH Screening Level[2]	Sampling Period: January 2022			Sampling Period: June 2022			Sampling Period: December 2022		
					No. of Detects out of Samples	Level Detected[3]	Meets DOH Screening Level? (Yes / No)	No. of Detects out of Samples	Level Detected[3]	Meets DOH Screening Level? (Yes / No)	No. of Detects out of Samples	Level Detected[3]	Meets DOH Screening Level? (Yes / No)
Contaminants of Concern[1]													
Benzene	Discharge from factories; Leaching from gas storage tanks and landfills	ppb[4]	5.0	MCL	0/1	-	Yes	0/1	-	Yes	0/1	-	Yes
Ethylbenzene	Discharge from petroleum refineries	ppb	700	MCL	0/1	-	Yes	0/1	-	Yes	0/1	-	Yes
Toluene	Discharge from petroleum factories	ppb	1,000	MCL	0/1	-	Yes	0/1	-	Yes	0/1	-	Yes
m,p,o-Xylenes	Discharge from petroleum factories; Discharge from chemical factories	ppb	10,000	MCL	0/1	-	Yes	0/1	-	Yes	0/1	-	Yes
1-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also, present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites	ppb	10	ISP	0/1	-	Yes	0/1	-	Yes	0/1	-	Yes
2-Methylnaphthalene	Used to make other chemicals such as dyes, and resins; also used to make vitamin K; and is present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites	ppb	10	ISP	0/1	-	Yes	0/1	-	Yes	0/1	-	Yes
Naphthalene	Naphthalene is found in coal tar or crude oil and is used in the manufacture of plastics, resins, fuels, and dyes, and as a fumigant	ppb	17	ISP	0/1	-	Yes	0/1	-	Yes	0/1	-	Yes
Total Petroleum Hydrocarbons (TPHs)	TPH is petroleum and can contaminate drinking water through spills and other releases into the environment	ppb	266[9]	ISP	0/1	-	Yes[3]	0/1	-	Yes	0/1	-	Yes
Total Organic Carbon (TOC)[4]	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources	ppb	4,000	ISP	0/1	-	Yes	0/1	-	Yes	0/1	-	Yes

Contaminant	Typical Source of Contaminant	Units	DOH Project Screening Level	Basis of DOH Screening Level[2]	Sampling Period: January 2022			Sampling Period: June 2022			Sampling Period: December 2022		
					No. of Detects out of Samples	Level Detected[3]	Meets DOH Screening Level? (Yes / No)	No. of Detects out of Samples	Level Detected[3]	Meets DOH Screening Level? (Yes / No)	No. of Detects out of Samples	Level Detected[3]	Meets DOH Screening Level? (Yes / No)
Free Chlorine (Field Test)[8]	Water Additive	ppb	4,000	MCL	-	-	-	1/1	670	Yes	-	-	-
Metals													
Antimony	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	ppb	6.0	MCL	1/1	0.092	Yes	0/1	-	Yes	0/1	-	Yes
Arsenic	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production waste	ppb	10	MCL	1/1	0.027	Yes	0/1	-	Yes	0/1	-	Yes
Barium	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits	ppb	2,000	MCL	1/1	1.7	Yes	1/1	1.7	Yes	1/1	2.2	Yes
Chromium	Corrosion of galvanized pipes; Erosion of natural deposits; Discharge from metal refineries; Runoff from waste batteries and paints	ppb	100	MCL	1/1	1.5	Yes	1/1	0.55	Yes	1/1	1.2	Yes
Copper	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	1,300	EAL	1/1	21	Yes	1/1	19	Yes	1/1	15	Yes
Lead	Corrosion of household plumbing systems; Erosion of natural deposits	ppb	15	EAL	1/1	0.27	Yes	1/1	0.23	Yes	1/1	0.29	Yes
Selenium	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines	ppb	50	MCL	1/1	0.70	Yes	1/1	1.3	Yes	1/1	1.3	Yes
Thallium	Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories	ppb	2	MCL	-	-	-	0/1	-	Yes	1/1	0.076	Yes
Volatile Organic Compounds (VOCs) – ND													
Synthetic Organic Compounds (SOCs) or Semi-Volatile Organic Compounds (SVOCs)													
Bis(2-ethylhexyl)phthalate	Discharge from rubber and chemical factories	ppb	6.0	MCL	0/1	-	Yes	1/1	0.52	Yes	1/1	0.55	Yes

Notes:
1. Contaminants are incident specific, listed either detect or non-detect (ND). All other contaminants are only listed if detected.
2. The DOH uses multiple criteria to assess the safety of the drinking water including maximum contaminant levels (MCLs), previously established environmental action levels (EALs) and incident specific parameters (ISPs).

3. These numbers are the minimum and maximum values from all the test results. The average (or mathematical mean) includes all sample test results with a detectable contaminant. An average is the sum of the results (excluding non-detects) divided by the total number results with detection only. Acronyms and explanation of terms used in this table are presented on the following pages.
4. For more information regarding Total Petroleum Hydrocarbons, refer to the FACT SHEET What Are Petroleum Hydrocarbons?, available online at: https://health.hawaii.gov/about/files/2021/12/21.12.16_What-Are-Petroleum-Hydrocarbons.pdf.
5. Total Organic Carbon (TOC), results report any constituent containing carbon, many of which are naturally occurring and some of which may be man-made. The DOH selected a TOC project screening level of 2,000 ppb under Stage 4. Each exceedance was investigated by reviewing the associated water quality data (e.g., BTEX results, TPH) and the IDWST determined that all TOC exceedances were inconclusive in association with petroleum hydrocarbons. Under the Drinking Water Long Term Monitoring Plan (under review during the LTM Period 3 report for Zone H1), DOH revised the TOC screening level to 4,000 ppb (previously 2,000 ppb). Available online at: https://health.hawaii.gov/about/files/2022/08/JBPHH-Drinking-Water-LTM-Plan-FINAL-20220823.pdf.
6. Parts per billion (ppb) refers to the amount (or concentration) of a contaminant in the water.
7. Cells highlighted in green indicate the water sample results were below DOH Screening Levels.
8. On January 30 and February 25, 2022, DOH revised the LTM requirements to include the analysis of free chlorine. Chlorine is typically used as an additive to drinking water for disinfection purposes.
9. Per the June 2022 Drinking Water Long-Term Monitoring Plan, the ISP for Total TPHs was changed to 266 ppb (previously it was 211 ppb). The June 2022 Drinking Water Long-Term Monitoring Plan is available online at: https://health.hawaii.gov/about/files/2022/08/JBPHH-Drinking-Water-LTM-Plan-FINAL-20220823.pdf.

Drinking Water Distribution System Recovery Plan: Stage 5 LTM Period 4 Sampling Results Report for Zone H1

What is the purpose of this Stage 5 LTM Period 4 Sampling Results Report?

This progress report presents the testing results from drinking water samples that have been collected from residents, buildings, Child Development Centers, and fire hydrants. These samples were collected after the health advisory had been amended and after DOH determined drinking water was safe for human consumption. The health advisory was amended after the first four stages of the Drinking Water Distribution System Recovery Plan[3] were completed in your Zone. The JBPHH PWS #HI0000360 & AMR PWS #HI0000337 are committed to ensuring safe tap water for human consumption.

We are sharing this information with you to keep you updated on your community's water quality.

What was found?

The tables on the previous pages present all contaminants that were detected in drinking water samples collected from residences, buildings, Child Development Centers, and fire hydrants in your Zone for LTM Period 1 through Period 4.The DOH used multiple standards/criteria (called DOH Project Screening Levels) to assess the safety of the drinking water to include:

- EPA and Hawaii DOH Maximum Contaminant Levels (MCLs) standards for drinking water;
- Previously established Environmental Action Levels (EALs); and
- Incident Specific Parameters (ISPs).

This report altogether demonstrates that the drinking water in your area (Zone H1) meets U.S. EPA and DOH standards that are applicable to the Navy Water System Incident.

All exceedances of DOH Project Screening Levels are thoroughly reviewed and investigated by the Navy, Army, and DOH, to (1) determine if the exceedance is associated with the JBPHH water distribution system or if it is associated with premise plumbing (i.e., it is localized to a specific faucet) and (2) determine the appropriate course of action to address the exceedance (e.g., re-flushing, replacing a faucet). There were no exceedances of screening levels in drinking water samples collected from residences, schools, child development centers, other buildings, or fire hydrants during LTM Period 1, LTM Period 3, and LTM Period 4 for Zone H1.

[3] Drinking Water Distribution System Recovery Plan: https://www.cpf.navy.mil/Portals/52/Drinking-Water-Distribution-System-Recovery-Plan.pdf

The following Premise Plumbing Exceedances were detected (and were investigated/addressed) in Zone H1 during LTM Period 2:

Exceedance Location	Plumbing Fixture	Contaminant	Initial Result	Action Taken	Final Result
3055 Calamondin Way[1]	Resident Faucet	Lead	22.3 ppb	Faucet Replaced, then Flushed	0.94 ppb
3738 Amapa Lane[2]	Resident Faucet	Lead	22.4 ppb	Faucet Replaced, then Flushed	0.14 J ppb

1. The sample collected from 3055 Calamondin Way on April 14, 2022, resulted in a lead exceedance of 22.3 ppb, which is over the action level of 15 ppb. Investigation into this exceedance determined that although it was likely to be a premise plumbing issue, further investigation was warranted through additional sampling. The faucet and five adjacent faucets within the residence were replaced, flushed, and resampled on April 28, 2022. All faucets at the residence were flushed and the resident was provided bottled water until results of the re-sampling were received. The re-samples collected on April 28, 2022 were below the action level. The resident was notified of the re-sample results.

2. The sample collected from 3738 Amapa Lane on April 15, 2022, resulted in a lead exceedance of 22.4 ppb, which is over the action level of 15 ppb. Investigation into this exceedance determined that although it was likely to be a premise plumbing issue, further investigation was warranted through additional sampling. The faucet was replaced, flushed, and resampled on April 22, 2022. The resident was provided bottled water until results of the re-sampling were received. The re-samples collected on April 22, 2022 were below the action level. The resident was notified of the re-sample results.

Total Organic Carbon (TOC) test results report any constituent containing carbon, many of which are naturally occurring and some of which may be man-made. The DOH selected a TOC project screening level of 4,000 parts per billion (ppb) for long term monitoring. Each exceedance is investigated by reviewing the associated water quality data (e.g., Disinfection byproducts and TPH results) for association with petroleum hydrocarbons. No TOC exceedances occurred in LTM Period 2, LTM Period 3, or LTM Period 4 for Zone H1.

What contaminants were tested?

Drinking water, including bottled water, can contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants tested can be obtained by calling the Hawaii DOH Safe Drinking Water Branch at 808-586-4258.

In order to ensure that drinking water is safe to drink, EPA and Hawaii DOH carefully monitor and regulate the allowable amounts of certain contaminants in water provided by public water systems. For this incident, the primary categories of monitored

contaminants include Volatile Organic Compounds (VOCs), Synthetic Organic Chemicals (SOCs)/semi-volatile organic compounds (SVOCs), metals, Total Petroleum Hydrocarbons (TPH), and Total Organic Carbon (TOC). A description of these contaminant categories can be found under *Explanation of Terms* located at the end of this report. The full list of contaminants that were tested for this Zone are presented in the laboratory reports that are located at: https://jbphh-safewaters.org. For complete information on the interagency response, please visit: https://www.cpf.navy.mil/JBPHH-Water-Updates/.

What happened leading up to the public health advisory being issued?

The Red Hill Bulk Fuel Storage Facility jet fuel spill event was reported to have taken place on November 20, 2021. Subsequent reporting of fuel-like smell or visual sheen in addition to complaints of health issues from ingestion or dermal contact with the Navy and Army system water were received by the Navy and DOH. On November 28, 2021, the Navy reported a chemical release of petroleum, a hazardous substance which entered the JBPHH drinking water distribution system from the Red Hill Shaft source. This release triggered an emergency response and DOH issuance of a public health advisory on November 29, 2021, for the entire JBPHH Public Water System No. HI0000360 (JBPHH System) and the consecutive Aliamanu Military Reservation Public Water System No. HI0000337 (AMR System).

The Hawaii DOH, EPA, Navy, and Army formed the Interagency Drinking Water System Team (IDWST) to work on a coordinated effort to restore safe drinking water to all Navy Water System users.

Has the public health advisory been amended or lifted?

The health advisory for Zone H1 was amended on March 3, 2022 but has not been lifted for the entire JBPHH System. The amendment to the health advisory was based on the results of extensive flushing, sampling (10% of buildings), and testing activities performed in Zone H1. The IDWST evaluated multiple lines of evidence to determine whether or not drinking water was safe for consumption. DOH determined the water in Zone H1 was safe and residents/occupants could use their tap water for all purposes including drinking, cooking, oral hygiene, and consumption by pets. LTM of drinking water will be performed to ensure drinking water remains safe for all residents and occupants of JBPHH. Additional investigation may be required if new information becomes available that indicates contaminants are present in the drinking water that poses a threat to public health.

Where does our water come from?

The source of water for the Navy Water System now comes from the Navy Waiawa Shaft, which was not impacted by the release of Jet Fuel (JP-5) that occurred at Red Hill, November 2021. The Waiawa Shaft has been sampled, and EPA and the DOH confirmed that it meets all federal and state drinking water standards. The Waiawa

Shaft will be sampled (in subsequent sampling rounds) in accordance with the EPA and DOH requirements.

What has the IDWST done to clean the drinking water distribution system?

The IDWST evaluated multiple options for cleaning the Navy drinking water distribution system. It was determined that high-volume flushing of the Navy drinking water distribution system (all water mains/laterals/buildings) with 3 to 5 volumes of clean water from the Waiawa Shaft. Subsequently, extensive testing was performed to confirm that flushing was effective and safe drinking water restored to all Navy Water System users.

When was Long-Term Monitoring (LTM) water quality sampling conducted in Zone H1?

Between March 21, 2022 and March 24, 2022, drinking water samples were collected from residences, Child Development Centers, other buildings, and fire hydrants in Zone H1 as part of LTM Period 1.

Between April 13, 2022 and April 29, 2022, drinking water samples were collected from residences, Child Development Centers, other buildings, and fire hydrants in Zone H1 as part of LTM Period 2.

Between May 17, 2022 and June 1, 2022, drinking water samples were collected from residences, Child Development Centers, other buildings, and fire hydrants in Zone H1 as part of LTM Period 3.

Between June 22, 2022 and October 12, 2022, drinking water samples were collected from residences, Child Development Centers, other buildings, and fire hydrants in Zone H1 as part of LTM Period 4.

Where were samples taken?

Per the approved LTM plan, 10 percent (10%) of all homes and buildings within Zone H1 were sampled. There are no schools in this Zone. These houses/buildings are geographically distributed throughout the area to provide spatial coverage along the water supply line. In addition, the list of houses/buildings may be augmented based on additional information (e.g., houses/buildings where occupants reported specific health impacts, houses/buildings that are referred to the team by medical providers) may also be sampled.

Where can I get more information about the potential health effects associated with these contaminants?

Hawaii Department of Health (DOH)
https://health.hawaii.gov/about/navy-water-system-quality-updates/.
Call the DOH Safe Drinking Water Branch at 808-586-4258

US Environmental Protection Agency (EPA)
https://www.epa.gov/ground-water-and-drinking-water/forms/online-form-epas-office-ground-water-and-drinking-water.
Call EPA Region 9's Environmental Information Center at 1-866-372-9378

Explanation of Terms and Acronyms used in this Report

Action Level (AL). This AL is for Lead and Copper. The AL is a measure of the effectiveness of the corrosion control treatment in water systems. The AL is not a standard for establishing a safe level of lead or copper. The AL is the point at which certain provisions of the proposed standards must be initiated.

Contaminant. Contaminant is any physical, chemical, biological, or radiological substance or matter in water, and can be either healthy or unhealthy, depending on the particular substance and concentration. It could also be a physical parameter monitored such as pH or temperature.

DOH. Hawaii Department of Health

EPA. U.S. Environmental Protection Agency

Incident Specific Parameter (ISP). To more comprehensively monitor and respond to this specific petroleum contamination of drinking water, the DOH identified contaminants that require additional action prior to amending the Health Advisory. The ISPs are used as a line of evidence to evaluate the data generated in each Zone during the investigation conducted by the IDWST.

Maximum Contaminant Level (MCL). An MCL is the maximum permissible level of a contaminant in water which is delivered to any user of a public water system. The MCL is set to protect the public from acute and chronic health risks associated with consuming water containing these contaminants.

Metals. Metals are not derived from living sources and in general do not contain carbon. Metals include antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, copper, cyanide, fluoride, lead, mercury, nitrate, nitrite, selenium, and thallium. These contaminants get into drinking water supplies through industrial discharge or spills, erosion of natural deposits, corrosion, sewage discharge, fertilizer runoff, and other sources.

ND. Non-Detect. Results were lower than the laboratory detection limits. .

Project Specific Screening Level. DOH uses multiple criteria to assess the safety of the drinking water including maximum contaminant levels (MCLs) previously established environmental action levels (EALs) and incident specific parameters (ISPs).

Synthetic Organic Compounds (SOCs)/Semi-Volatile Organic Compounds (SVOCs). SOCs and SVOCs may be used interchangeably and are man-made, organic (carbon-based) chemicals that are less volatile than Volatile Organic Contaminants

(VOCs). They are used as pesticides, defoliants, fuel additives, and as ingredients for other organic chemicals.

DOH Environmental Action Level (EAL). The DOH Environmental Action Levels (EALs) are concentrations of contaminants in drinking water and other media (e.g., soil, soil gas, and groundwater) below which the contaminants are assumed to not pose a significant threat to human health or the environment. Exceeding these EAL does not necessarily indicate that contamination at the site poses environmental hazards but generally warrants additional investigation.

Total Petroleum Hydrocarbons (TPH). TPH is a term used to describe a large family of several hundred chemical compounds that come from crude oil. Crude oil is used to make petroleum products, which can contaminate the environment. TPH is comprised of detected results from TPH-Gasoline, TPH-Diesel, and TPH-Oil.

Total Organic Carbon (TOC). TOC is naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources.

Free Chlorine. Chlorine is added to drinking water as part of the treatment process. Adding chlorine is the most common way to disinfect drinking water. Disinfection kills bacteria, viruses, and other microorganisms that could cause disease or illness. Chlorine is effective and continues to keep the water safe as it travels from the treatment plant to the consumer's tap. Chlorine measurements provide another line-of-evidence for evaluating drinking water quality.

Total Trihalomethanes (TTHM). TTHM is the sum of the concentration in milligrams per liter of the trihalomethane compounds (trichloromethane [chloroform], dibromochloromethane, bromodichloromethane and tribromomethane [bromoform]).

Units. A unit is the concentration of contaminant found in the water. For this report, the units are expressed in U.S. Standard Units.

U.S. Standard Unit (Name)	Acronym	Equivalent International System of Units (Name)	Acronym
parts per billion	ppb	micrograms per Liter	μg/L

Volatile Organic Compounds (VOCs). VOCs are a class of chemicals that contain carbon and evaporate, or volatilize, easily into air at room temperature. VOCs are found in a variety of commercial, industrial, and residential products, including gasoline, solvents, cleaners and degreasers, paints, inks and dyes, and pesticides.