



# Documentation to Amend Drinking Water Health Advisory in Zone C3

Joint Base Pearl Harbor Hickam (JBPHH)  
O‘ahu, Hawai‘i

Interagency Drinking Water System Team  
Zone C3 Removal Action Report  
March 2022

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**Line of Evidence 0**

**Introduction**

# DOH Checklist to Amend the Public Health Advisory in Flushing Zone C3



## Zone C3 Checklist to Amend the Public Health Advisory initiated November 29, 2021 for Joint Base Pearl Harbor -Hickam Public Water System No. 360 HEER Incident Case No.: 20211128-1848

**Purpose:** This checklist identifies the documentation and review that the Hawaii Department of Health (DOH) conducted to **amend** the Public Health Advisory (Advisory) in each Zone under the *DOH's Guidance on the Approach to Amending the Drinking Water Health Advisory*, dated December 30, 2021. This review was conducted as an oversight role in addition to the review conducted as a part of the Interagency Drinking Water System Team (IDWST).

DOH's priority is to protect the public health and environment of the people of Hawaii. DOH will evaluate the "lines of evidence" that must be met before amending the health advisory and issuing notices that the water can be used for all purposes including drinking. The Navy must also commit to following the long-term monitoring (LTM) of system water quality for this incident under the IDWST Drinking Water Sampling Plan, as amended.

**Background:** A chemical release of petroleum, which is a hazardous substance, entered the Joint Base Pearl Harbor-Hickam (JBPHH) drinking water distribution system and the Red Hill Shaft. This release triggered an

emergency response and DOH issuance of an Advisory on November 29, 2021 for the entire JBPHH Public Water System No. 360. State and Federal Drinking Water (DW) Maximum Contaminant Levels (MCLs) under the Safe Drinking Water Act do not adequately address petroleum contamination of drinking water. DOH has established Environmental Action Levels (EALs) and Incident Specific Parameters (ISPs) to more comprehensively monitor and respond to petroleum contaminated drinking water. Any contaminants that exceed the State and Federal DW MCLs, EALs, or ISPs require additional action prior to amending the Advisory. Satisfaction of the lines of evidence will be achieved by evaluating the data generated during the investigation conducted by the IDWST. The data will be assessed for each Zone of the Drinking Water Distribution System Recovery Plan. All lines of evidence will require documentation.

**DOH Project Screening Levels:** State and Federal Drinking Water MCLs, specified State EALs, and ISPs are considered in development of Project Screening Levels. The actions for the thresholds for each contaminant are listed in *DOH's Guidance on the Approach to Amending the Drinking Water Health Advisory*.



## DOH Checklist to Amend the Public Health Advisory in Flushing Zone C3



### Objective 0 - Introduction to Lines of Evidence Under Evaluation / Document Summary

Reference	Status	Documentation
Tab 0	Complete	DOH Checklist to Amend the Drinking Water Health Advisory.
Tab 0.1	Complete	<ul style="list-style-type: none"> <li>Executive Summary Memo for Zone C3 Removal Action Report</li> <li>Signed statement by the Owner/Operator Representative of the Water System, that asserts that all lines of evidence have been met, including the following statement with a signature: "I certify under penalty of law that I have personally examined and am familiar with the information submitted and believe the submitted information is true, accurate, and complete."</li> </ul>

### Objective 1a – Line of Evidence: Reported sources of contamination are isolated and contained.

Incident Specific Criteria - Contamination from **Red Hill Shaft** is isolated from Navy's water distribution system.

Reference	Status	Documentation
Tab 1a.0	Complete	Executive Summary Memo.
Tab 1a.1	Complete	Memorandum for Record documenting that the Red Hill Shaft has been physically disconnected from the NAVFAC system.
Tab 1a.2	Complete	Memo for Record showing SCADA data that Waiawa Shaft is the single source of water for the NAVFAC system since 03 December 2021.
Tab 1a.3	Complete	Photograph of concrete blocking between air gapped isolation flanges.

### Objective 1b – Line of Evidence: The regulated public water system's water quality data is compliant.

Incident Specific Criteria - Data does not exceed Federal DW MCLs, specified State EALs, and ISPs for **Waiawa Shaft (only source of the drinking water)**.

Reference	Status	Documentation
Tab 1b.0	Complete	Executive Summary Memo.
Tab 1b.1	Complete	<ul style="list-style-type: none"> <li>Sample Results for Waiawa Shaft (the source) taken 1/13/2022 Level 4 Validated Laboratory Report for EPA Methods 8260 (VOCs), 8270 (SVOCs), 8015 (TPH-G, TPH-D, TPH-O) plus Tentatively Identified Compounds (TICs)</li> <li>Level 4 Validated Laboratory Report for EPA Methods 8260 (VOCs), 8270 (SVOCs), 8015 (TPH-G, TPH-D, TPH-O) plus Tentatively Identified Compounds (TICs)</li> <li>Sample Results of Waiawa Shaft Entry Point (after treatment) taken 1/11/2022 Level 4 Validated Laboratory Report for Sampling Plan Addendum 1, Table 3a: Distribution Sampling (Step 2b) Summary Drinking Water Analytical Methods, Analytes, Action Levels, and Method Detection Limits</li> <li>Level 4 Validated Laboratory Report for Sampling Plan Addendum 1, Table 3a: Distribution Sampling (Step 2b) Summary Drinking Water Analytical Methods, Analytes, Action Levels, and Method Detection Limits</li> </ul>

## DOH Checklist to Amend the Public Health Advisory in Flushing Zone C3



### Objective 1c – Line of Evidence: No additional contamination through the distribution system is occurring.

Incident Specific Criteria - Cross Connection Control investigation shows distribution system is protected, resulting in no additional sources of contamination.

Reference	Status	Documentation
Tab 1c.0	Complete	Executive Summary Memo.
Tab 1c.1	Complete	<p>Certificate Regarding Cross-Connection Control Review and Confirmation – Zone C3, verifying that building and service connections with petroleum activities are protected from backflow risks with the following documentation:</p> <ul style="list-style-type: none"> <li>A “gap analysis” of the petroleum related activities versus appropriate device inventory (i.e., inappropriate device, missing Cross-Connection Control protection, untested device, etc.).</li> <li>A map that includes: All facilities with petroleum activities; locations of existing backflow prevention devices; and Water system infrastructure.</li> <li>An inventory database: A list of petroleum-related activities and identified appropriate cross connection control (CCC) devices at these activities, as required, i.e., if there was human consumptive use and where cross connection potential or hazard was identified.</li> </ul>
Tab 1c.2	Complete	COMNAVREG HAWAII INSTRUCTION 11330.2D, dated 19 Sep 2016, Backflow Prevention and Cross-Connection Control Program

### Objective 2a – Line of Evidence: Water within the distribution system does not exceed State and Federal DW MCLs, specified State EALs, and

ISPs.

Incident Specific Criteria –

- Zone flushing plan demonstrates entire distribution system is flushed.
- Sample results show the water in distribution system does not exceed State and Federal DW MCLs, specified State EALs, and ISPs. (Guidance Table 2 and Table 3)
- Drinking water does not show sheen, olfactory evidence, or other qualitative methods of petroleum.

Reference	Status	Documentation
Tab 2a.0	Complete	Executive Summary Memo.
Tab 2a.1	Complete	<p>Memorandum for the Record of the Distribution System Recovery Plan Addendum – Zone C3 Analysis which includes:</p> <ul style="list-style-type: none"> <li>Hydraulic model that exhibits and flushing line map(s) and plan to show that the flushing approach will achieve directional flushing.</li> <li>A one-page high resolution zonal flushing map should be provided.</li> <li>Narrative of assumptions in the development of their flushing model inclusive of any simulations that they ran.</li> </ul>
Tab 2a.2	Complete	Summary with documentation from Dr. Whelton discussing flushing goals providing validity of volumetric exchange model.

## DOH Checklist to Amend the Public Health Advisory in Flushing Zone C3



### Objective 2a – Line of Evidence: Water within the distribution system does not exceed State and Federal DW MCLs, specified State EALs, and

#### ISPs.

##### Incident Specific Criteria –

- Zone flushing plan demonstrates entire distribution system is flushed.
- Sample results show the water in distribution system does not exceed State and Federal DW MCLs, specified State EALs, and ISPs. (Guidance Table 2 and Table 3)
- Drinking water does not show sheen, olfactory evidence, or other qualitative methods of petroleum.

Reference	Status	Documentation
Tab 2a.3	Complete	Identification of consecutive flushing zones and flushing phasing order. Time based contaminant slug model showing possible migration of contaminant from Red Hill Shaft used to identify zones requiring additional volumetric flushing (Hydraulic Model)
Tab 2a.4	Complete	Table showing volumetric goals and recorded flushing volumes that occurred in the field for the distribution system.
Tab 2a.5	Complete	Certification of Water Storage Facilities and Water Source for Zone C3 with Water Storage Tanks S1 and S2 Flushing Report.
Tab 2a.6	Complete	<ul style="list-style-type: none"> <li>• Distribution System Exceedance Investigation Summary and Results.</li> <li>• Drinking Water Distribution System Recovery Plan: Stage 2 Sampling Results for Zone C3, JBPHH.</li> </ul>

### Objective 2b – Line of Evidence: Water in premise plumbing of homes/buildings does not exceed State and Federal DW MCLs, specified State

#### EALs, and ISPs.

##### Incident Specific Criteria –

- Flushing Plan includes procedures to ensure no service connections will re-contaminate the distribution system.
- Sample Plan includes 72-hour stagnation to account for leaching of contaminants from premise plumbing.
- Sample results show water in premise plumbing of homes/buildings does not exceed State and Federal DW MCLs, specified State EALs, and ISPs.

Reference	Status	Documentation
Tab 2b.0	Complete	Executive Summary Memo.
Tab 2b.1	Complete	Records of Completed Residential and Non-Residential Flushing Zone C3 with: <ul style="list-style-type: none"> <li>• EDMS Residential Flushing Records Zone C3</li> <li>• EDMS Non-Residential Flushing Records Zone C3</li> <li>• NAVFAC SCADA Data Zone C3 28 Dec 2021 to 12 Jan 2022 (for the Distribution System pressure logs during flushing and confirmation that the 30 psi within the distribution system was maintained).</li> </ul>
Tab 2b.2	Complete	Sample Results, Level 2 and Level 4 Validated as required by Sampling Plan Section 6.0, report from EDMS.
Tab 2b.3	Complete	Exceedance Investigation Summary and Results Zone C3.
Tab 2b.4	Complete	Memorandum for Record showing that irrigation flushing is complete.

# DOH Checklist to Amend the Public Health Advisory in Flushing Zone C3



<b>Objective 2b – Line of Evidence: Water in premise plumbing of homes/buildings does not exceed State and Federal DW MCLs, specified State EALs, and ISPs.</b>		
Incident Specific Criteria –		
<ul style="list-style-type: none"> <li>Flushing Plan includes procedures to ensure no service connections will re-contaminate the distribution system.</li> <li>Sample Plan includes 72-hour stagnation to account for leaching of contaminants from premise plumbing.</li> <li>Sample results show water in premise plumbing of homes/buildings does not exceed State and Federal DW MCLs, specified State EALs, and ISPs.</li> </ul>		
Reference	Status	Documentation
Tab 2b.5	Complete	DOH Guidance for Active Irrigation Line Purging and Flushing

March 5, 2022

From: Naval Facilities Engineering Systems Command Representative, IDWS Team  
To: Interagency Drinking Water System Team

SUBJ: ZONE C3 REMOVAL ACTION REPORT

Ref: (a) Drinking Water Sampling Plan, December 2021  
(b) Drinking Water Distribution System Recovery Plan, December 2021  
(c) Single Family Home Flushing Plan Checklist and Standard Operating Procedures, December 23, 2021  
(d) Non-Residential Facility Flushing Plan Checklist and Standard Operating Procedures, January 4, 2022  
(e) DOH's Guidance on the Approach to Amending the Drinking Water Health Advisory, December 30, 2021; HEER Incident Case No.: 20211128-1848  
(f) DOH Checklist to Amend the Drinking Water Health Advisory

Encl: (1) Zone C3 Removal Action Report

1. The enclosed report documents completion of the requirements outlined in references (a) through (f). This is in response to HEER Incident Case No.: 20211128-1848 involving the Joint Base Pearl Harbor Hickam (JBPHH) Public Water System No. 360.

2. On the 20th of November, a spill of jet fuel, specifically JP-5 jet fuel, occurred at the Red Hill Bulk Fuel Storage Facility in an access tunnel that provides fire suppression and service lines for the facility. The fuel spill was cleaned up and, on the 23rd of November, Admiral Paparo, directed an independent investigation of the spill event, and ordered the investigating officer to also determine any connection between the 20 November event and the spill that occurred earlier this year, on the 6th of May. The results of the investigation are pending public release.

On the 27th of November, the Commander, Navy Region Hawaii, RDML Tim Kott, met with the Fleet Logistics Center Commander, who operates The Red Hill Fuel Storage Facility for the Navy, and they jointly made the decision to stop Red Hill Tank fuel transfer operations based on the ongoing investigation into the recent spills.

On Sunday, the 28th of November, the JBPHH HQs and Hawaii Department of Health (HDOH) began receiving phone calls from military residents reporting a chemical or petroleum taste and smell to the water on the Navy's drinking water system. As more calls were received, it became clear that the reports were clustered around neighborhoods fed by the Red Hill Shaft Well, so the Navy, on the evening of the 28th of November, shut down that well and stood up the Region's Emergency Operations Center to handle the issue. As more calls continued to come in of contaminated water over the next 24 hours, Admiral Paparo, as the senior Navy commander in Hawaii, ordered the establishment of a Joint Crisis Action Team on the 29th of November. The Navy immediately began flushing its potable water distribution system.

## SUBJ: ZONE C3 REMOVAL ACTION REPORT

On December 8, 2021, HDOH issued Directive One which provided requirements for flushing of the Navy Water System. The Navy began working with HDOH and the U.S. Environmental Protection Agency (EPA) to meet the requirements of this directive and resume flushing of the potable water system.

On December 17, 2021, HDOH, the U.S. Navy, the U.S. Army and EPA established an Interagency Drinking Water System (IDWS) Team to restore safe drinking water to affected JBPHH housing communities. The working group was established to ensure that the agencies were coordinated in actions to restore safe drinking water to Navy water system users and that they had a clear, coordinated source of information as work continued to restore safe drinking water. On the same day, the U.S. Navy, U.S. Army, HDOH, and the EPA jointly signed the Water Distribution System Recovery Plan agreement. The signing of this plan was the second work product of the IDWS Team, which is focused on efficiently and effectively restoring safe drinking water to JBPHH military housing communities. Earlier in that week, the team jointly signed the Drinking Water Sampling Plan.

The flushing of the water distribution lines resumed on December 20, 2021. Residence and non-residence facilities were flushed and sampled after the completion of flushing and testing of the distribution system of a specific Zone. This report specifically documents the requirements outlined in references (a) through (f) for Zone C3.

3. The removal action report (RAR) for Zone C3 documents two specific lines of evidence necessary to amend the drinking water health advisory for Zone C3 as provided by HDOH. The two lines of evidence under evaluation included:

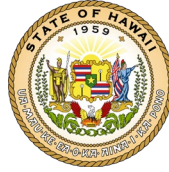
- i. Ensure no contamination is entering the water system.
- ii. Ensure no contamination remains in the system and water chemistry concerns are addressed.

Each line of evidence has several objectives with specific lines of evidence and incident specific criteria required to be met. Achievement of the criteria will be described and supported with documentation in the subsequent sections of the RAR.

4. I certify under penalty of law that I have personally examined and I am familiar with the information submitted and the submitted information is true, accurate, and complete.

MENO.MICHAEL.WA  
EL.WAYNE.JR. YNE.JR.1088310035  
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M. W. Meno  
Captain, U.S. Navy Civil Engineer Corps



Interagency Drinking Water System Team  
Zone C3 Removal Action Report  
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**Line of Evidence 1a**

**All Reported Sources of Contamination Are Isolated and Contained**

**Table 1: Lines of Evidence Under Evaluation – Ensure no contamination is entering the water system.**

**Objective 1a** - All reported sources of contamination are isolated and contained.

Incident Specific Criteria - Contamination from **Red Hill Shaft** is isolated from Navy's water distribution system.

Lines of Evidence	Completion Status	Outstanding Items
Navy confirmation that Red Hill Shaft is isolated from the Navy's water distribution system.	Complete.	<ul style="list-style-type: none"><li>• None.</li></ul>



February 19, 2022

From: Naval Facilities Engineering Systems Command Representative, IDWS Team  
To: Interagency Drinking Water System Team

SUBJ: SUMMARY OF LINE OF EVIDENCE OBJECTIVE 1A – ALL REPORTED  
SOURCES OF CONTAMINATION ARE ISOLATED AND CONTAINED

Encl: (1) 1a.1 Memorandum for Record with Isolation Date  
(2) 1a.2 Summary of Operator Logs and SCADA Data  
(3) 1a.3 Photograph of Concrete Blocking Between Air Gapped Isolation Flanges

1. Enclosures (1), (2), and (3) document completion of Line of Evidence objective 1a, all reported sources of contamination are isolated and contained. On the evening of November 28, 2021, the Red Hill Shaft was secured from operation and all pumping operations ceased. The Aiea/Halawa shaft briefly served as the secondary source starting on November 28, 2021, but it was shut down on December 3, 2021 to prevent potential westward contaminant migration in the aquifer and because there were concerns over high chloride concentrations caused by saltwater intrusion. Since December 3, 2021, the Waiawa Shaft has been the sole water source providing potable water to the distribution network. It is located 5.5 miles west of the Red Hill Fuel Facility, and testing has not detected any water quality issues at this source. The Red Hill Shaft discharge pipes were physically re-arranged and encased in concrete on December 24, 2021 as shown in Enclosure (1) and (3), thereby isolating the system as required by Line of Evidence 1a. The Supervisory Control and Data Acquisition (SCADA) data in Enclosure (2) shows the previous statement to be true. All reported sources of contamination are isolated and contained.

2. The Red Hill Shaft pumps are now being used to control the spread of contamination by creating a capture zone in the aquifer by pumping to a 5 million gallons/day Granular Activated Carbon (GAC) system which discharges into the Halawa Stream. The new piping from the pumps to the GAC treatment came from the 20" header where the 20x24 reducer was removed on 24 DEC 2021. A thrust block was poured at this location around the existing blinded wye fitting as shown in Enclosure (3).

3. I certify under penalty of law that I have personally examined and I am familiar with the information submitted and I believe the submitted information is true, accurate, and complete.

WETZEL.CHRISTOPHE  
R.JAMES.1540194862

Digitally signed by  
WETZEL.CHRISTOPHER.JAMES.15  
40194862  
Date: 2022.02.19 12:23:47 -08'00'

C. J. Wetzel  
LT, CEC, USN

04 JANUARY 2022

MEMORANDUM FOR RECORD

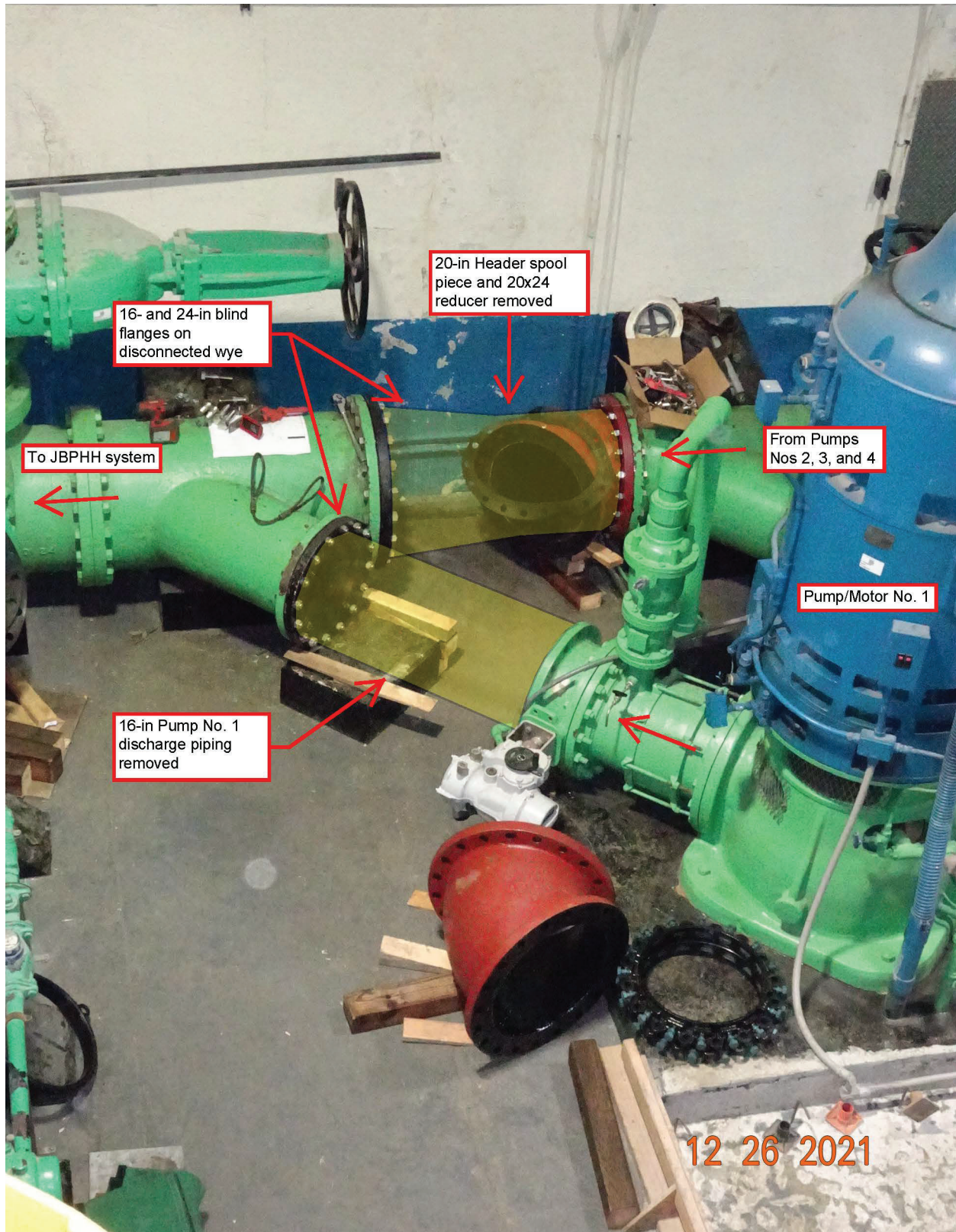
SUBJECT: Red Hill Potable Water Pumping Station

ENC: (1) Red Hill Pump Station Photographs, Post Pump Isolation dated 12/26/2021  
(2) JBPHH Potable Water LOTO Log

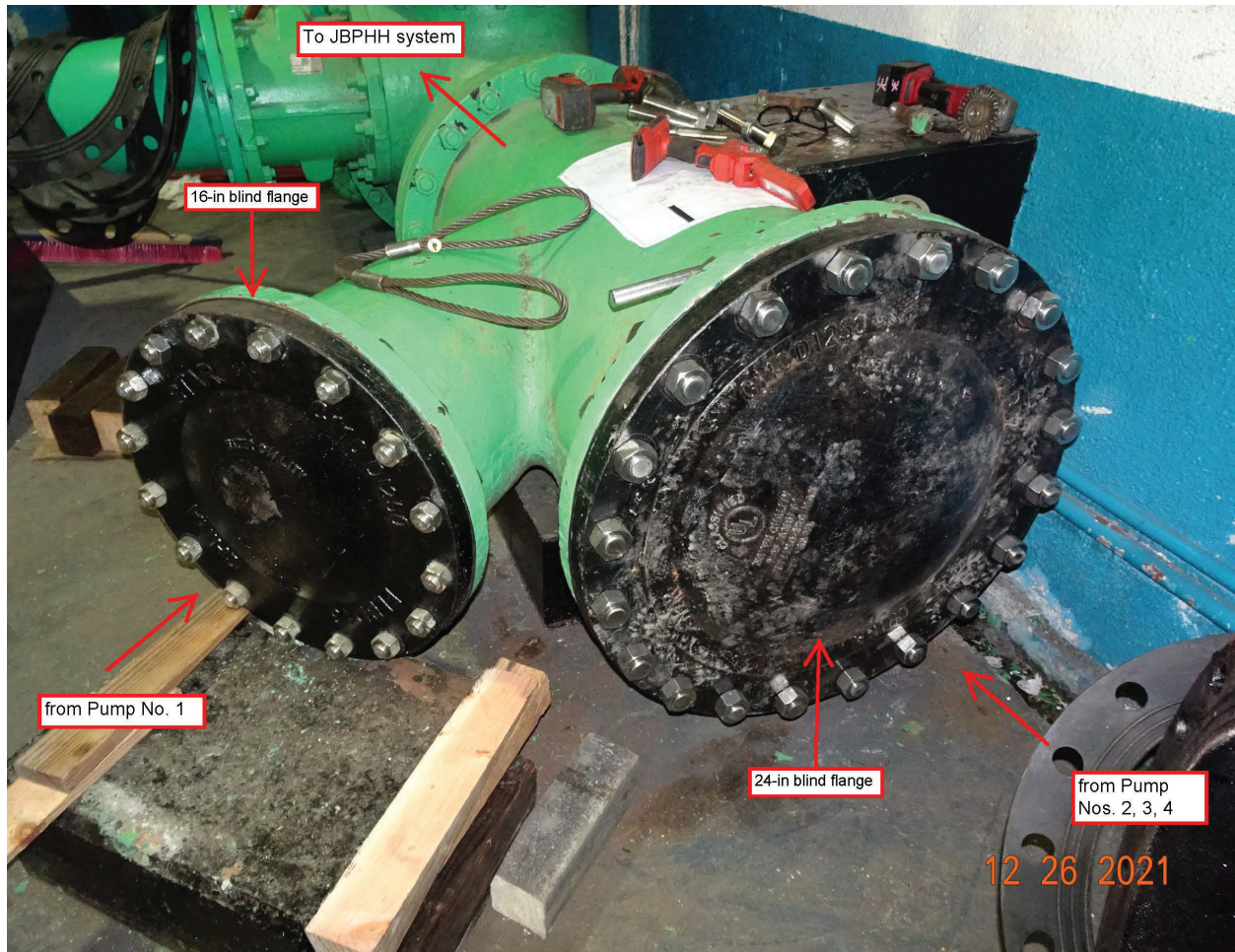
1. This Memorandum For Record (MFR) is to document the Red Hill Shaft pump status in relation to the Joint Base Pearl Harbor Hickam Potable Water System.
2. In response to fuel contaminants found in the Red Hill Shaft aquifer/development tunnel, the main Red Hill Pumping Station pumps were secured from the Potable Water system. On 3 December 2021, all four Red Hill pumps were electrically Locked Out, Tagged Out (LOTO), see Enclosure (2). (Note: Pump #1 was LOTO on 10 June 2020 due to an unrelated pump issue, and is still out of service, LOTO.) After initially being shut down operationally, and LOTO electrically, the Red Hill pumps were physically isolated from the Potable Water system on 24 December 2021.
3. Physical isolation was performed with in-house NAVFAC forces, with a completion date of 24 December 2021. This work was performed by isolating the system from the pumps at the "wye" fitting adjacent to Red Hill Pump #1. The wye fitting is shown on Enclosure (1). A blind flange was placed on the main header and the wye branch.
4. The 24" blind flange on the main header physically air-gapped and isolated Red Hill pumps #2, #3, and #4. The 16" blind flange in the wye branch physically air-gapped and isolated Red Hill pump #1. This work is shown on Enclosure 1.
5. The work the NAVFAC in-house forces performed removed any source or pathway from the Red Hill aquifer to the JBPHH Potable Water system.

MITCHELL.JEREMY.W.1395400700  
J. MITCHELL  
Deputy Public Works Officer  
Joint Base Pearl Harbor Hickam

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# NAVFAC Hawaii - Potable Water Utilities Lock Out Tag Out (LOTO) Form



Locked Out		Back in Service		Location	Circuit / Equipment being LOTO	Reason for LOTO	Lock No.	Tag No.	Authorized Employee
Date	Time	Date	Time						
18 MAR 20	0930			REDHILL	MP#1	Pump overhaul		010	Dykky
5 JUN 20		20 MAR 21	1200	WAIANUA	CD #20	FAULT IN OVERHAUL		1	
10 JUN 20	0900			REDHILL	PUMP CONTROL MP#1	PUMP OVERHAUL		011	Dykky
10 JUN 20	0900			REDHILL	NCC MP#1	PUMP OVERHAUL		012	Dykky
10 JUN 20	0945			WAIANUA	CD #40	FAULT-PUMP CONTROLS		2	AN
10 MAY 21				HALANUA	NCC#1	MOTOR FAULT		3	AN
2 JUN 21	0800			WAIANUA	CD#80	FAULT PUMP CONTROLS		5	AN
2 JUN 21	0800	30 JUN 21	2030	WAIANUA	CD#100	HECO OUTAGE		4	AN
2 JUN 21	0900			HALANUA	NCC#2	PUMP REMOVED		6	AN
30 JUN 21	2330	7 JUL 21	1900	WAIANUA	CD#10	FAIL TO CLOSE		8	AN
19 JUL 21	0745	19 JUL 21	0900	HALANUA	EXHAUST FAN	REPLACE OIL			DS
17 NOV 21	1230			HALANUA	PUMP #1	PUMP FAIL			AN
17 NOV 21	1230			WAIANUA	PUMP #2	MOTOR FAIL			AN
30 DEC 21	0925			REDHILL	NCC MP#2	COMPRESSOR INTERFERES WITH WORK IN WELL			AN



[illegible]

February 10, 2022

## SUMMARY OF OPERATOR LOGS AND SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) DATA

1. OBJECTIVE: Provide a description of water sources that supplied the Joint Base Pearl Harbor Hickam (JBPHH) potable water system (system) prior-to and after the fuel contamination incident that occurred in late November 2021.

### 2. BACKGROUND:

2.1. Portions of the Navy water distribution system serving JBPHH and surrounding areas were exposed to low levels of fuel contamination with initial indications in the form of smell reports occurring on or about 28 November 2021.

2.2. Prior to the aquifer contamination incident, water users connected to the Navy's system were supplied by three Navy owned water sources, Red Hill Shaft, Aiea/Halawa Shaft and Waiawa Shaft. In the time period prior to the incident, Waiawa Shaft was the main water source supplying water to the JBPHH system with at least one pump operating full time (100%). A single Red Hill Shaft pump was operated intermittently as a secondary source to the system. The Aiea/Halawa shaft was not being operated due to concerns over high chloride concentrations caused by saltwater intrusion into the aquifer.

2.3. On the evening of 28 November 2021, the Red Hill Shaft was secured and all pumping operations ceased. The Aiea/Halawa shaft briefly served as the secondary source starting on 28 November 2021 but was shut down on 03 December 2021 to prevent westward contaminant migration in the aquifer.

2.4. Since 03 December 2021, Waiawa Shaft has been the sole water source providing potable water to the distribution network. It is located 5.5 miles west of the Red Hill Fuel Facility and testing has not found any water quality issues at this source.

3. DATA INTERPERETATION: The Supervisory Control and Data Acquisition (SCADA) data provided in reference (a) includes tabular and graphical depictions of flow from the three source pump stations, aquifer water surface elevations above mean sea level (MSL) and the water level in the 6 million gallon (MG) S1 and S2 water storage tanks. The data was provided as a daily average (i.e. data was averaged over the 24 hours of each day from 00:00 to 23:59) and ranges from 01 November 2021 to 08 January 2022.

3.1 WAIAWA SHAFT/PUMP STATION: Prior to 28 November, The Waiawa Pump Station (PS) was supplying an average of 16.6 million gallons per day (MGD) of potable water to the system. After 28 November, demand reductions from turning off irrigation and smaller residential demand reduced the water supplied by the Waiawa PS to an average of 15.5 MGD. This was 76% of the 22 MGD total system demand prior to 28 November 2021.

There was an inverse correlation between the aquifer water surface elevation and water pumped out of the aquifer. When Waiawa PS was pumping between 16 and 18 MGD, the aquifer water surface elevation dropped to between 8.0 and 10.0 feet MSL. When pumping was reduced between 15 and 16 MGD, the aquifer water surface was raised to between 15.0 and 17.0 feet

above MSL. See Figure 1 below for a graphical depiction of the daily average aquifer water surface elevation and pumps flows from Waiawa Shaft.

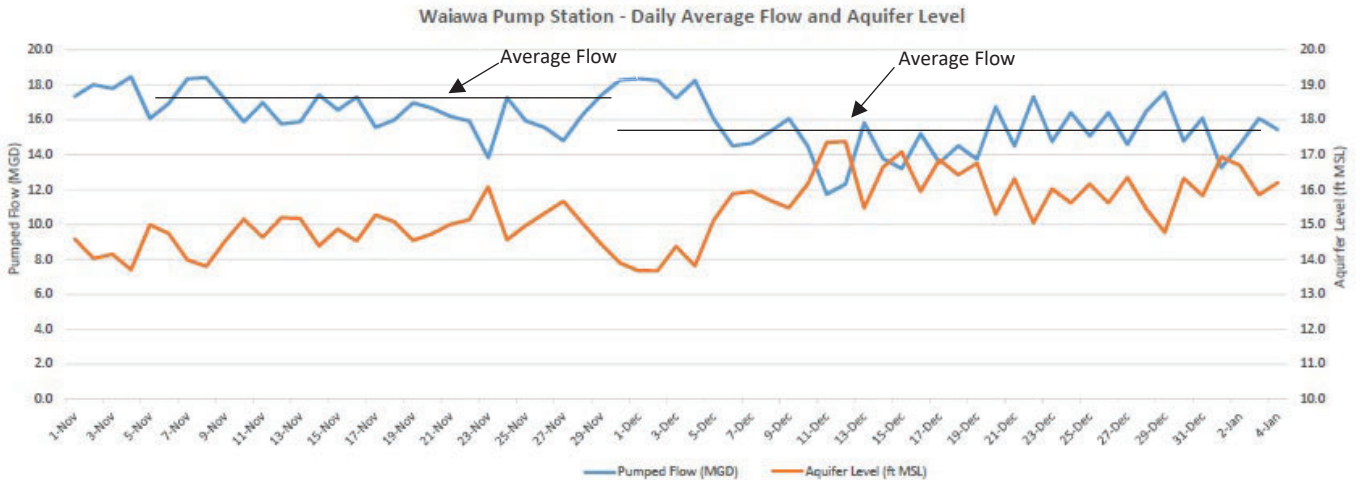


Figure 1. Waiawa Shaft Daily Average Flows and Aquifer Water Surface Elevation

**3.2 RED HILL SHAFT/PUMP STATION:** Prior to being shut down on 28 November 2021, the Red Hill PS was supplying an average of 5.3 MGD to the system. The represented 24% of the 22 MGD total system demand. As shown in Figure 2, the Red Hill Pump Station has not been operated since 28 November 2021.

Since pumping ceased, the aquifer water surface elevation has raised from approximately 2 ft MSL to almost 6 ft MSL

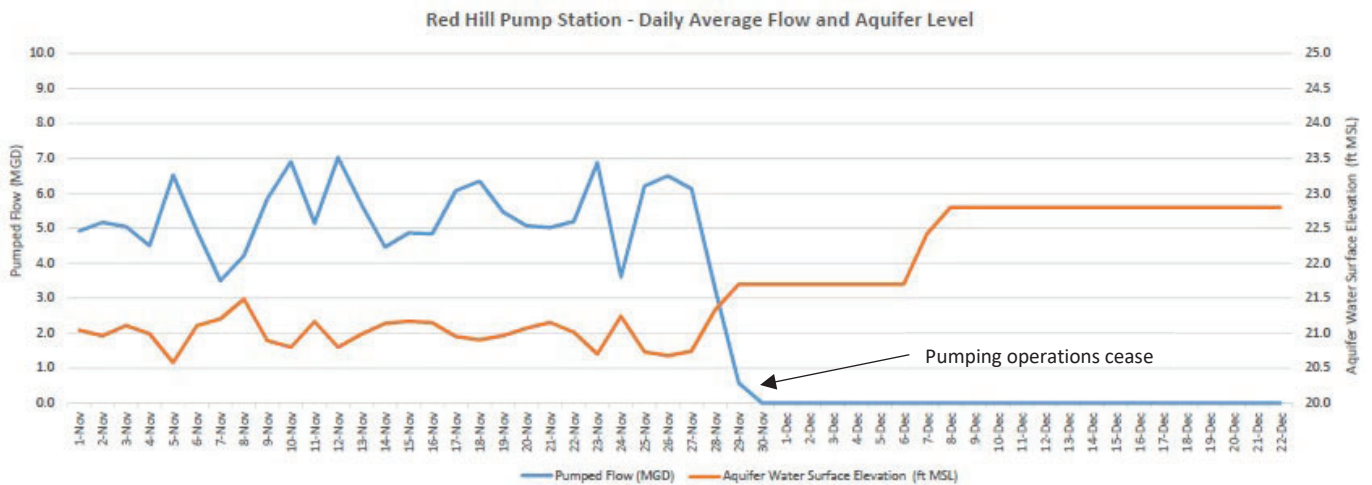


Figure 2. Red Hill Shaft Daily Average Flows and Aquifer Water Surface Elevation

**3.3 HALAWA/AIEA SHAFT/PUMP STATION:** Halawa Shaft was briefly operated from 28 November to 03 December 2021. The reasons for shutdown are as follows:

1. Demand reductions made it so that Waiawa Shaft could supply 100% of the water to the system,



2. there were concerns over westward plume migration from Red Hill if Halawa remained active,
3. water system operators had advised that high chloride concentrations in the Halawa/Aiea Shaft had caused water quality problems in the past.

The aquifer water surface elevation was around 12.0 ft MSL prior to turning the pumps on at the Halawa/Aiea PS. After the pumping ceased, the aquifer recovered to around 12.8 ft MSL.

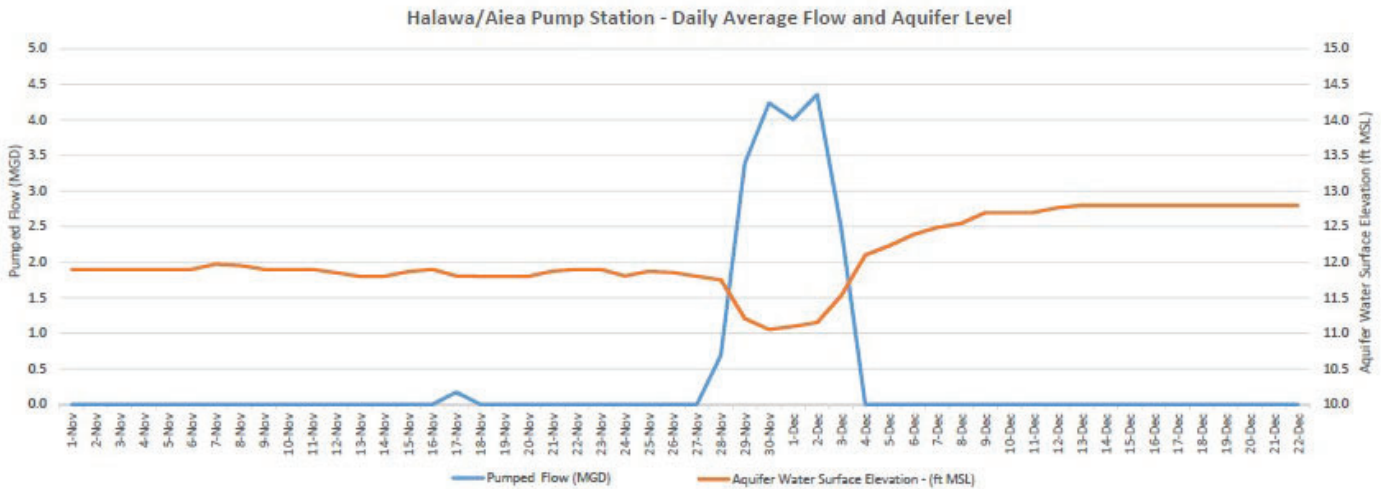


Figure 2. Halawa/Aiea Shaft Daily Average Flows and Aquifer Water Surface Elevation

**Photograph of Concrete Blocking Between  
Air Gapped Isolation Flange**





Interagency Drinking Water System Team  
Zone C3 Removal Action Report  
March 2022

**Line of Evidence 1b**

**Regulated Public Water System's Water Quality Data is  
Compliant**

**Table 1: Lines of Evidence Under Evaluation – Ensure no contamination is entering the water system.**

**Objective 1b** - The regulated public water system's water quality data is compliant.

Incident Specific Criteria - Data does not exceed Federal DW MCLs, specified State EALs, and ISPs for **Waiawa Shaft**.

Lines of Evidence	Completion Status	Outstanding Items
Date Sample Taken at Step 0 of the Sampling Plan Addendum 1	Complete	<ul style="list-style-type: none"><li>• None.</li></ul>
Date Sample Taken at Entry Point to Distribution	Complete	<ul style="list-style-type: none"><li>• None.</li></ul>

February 17, 2022

From: Naval Facilities Engineering Systems Command Representative, IDWS Team  
To: Interagency Drinking Water System Team

SUBJ: SUMMARY OF LINE OF EVIDENCE OBJECTIVE 1B – THE REGULATED PUBLIC WATER SYSTEM’S WATER QUALITY IS COMPLIANT

Encl: (1) 1b.1 Source Water and Entry Point of Distribution Sample

1. Enclosure (1) documents completion of Line of Evidence 1b, the regulated public water system’s water quality is compliant. On the evening of November 28, 2021, the Red Hill Shaft was secured from operation and all pumping operations ceased. The Aiea/Halawa shaft briefly served as the secondary source starting on November 28, 2021, but it was shut down on December 3, 2021 to prevent potential westward contaminant migration in the aquifer and because there were concerns over high chloride concentrations caused by saltwater intrusion. Since December 3, 2021, the Waiawa Shaft has been the sole water source providing potable water to the distribution network. It is located 5.5 miles west of the Red Hill Fuel Facility, and testing has not detected any water quality issues at this source.
2. On January 11, 2022, water from the Waiawa shaft was sampled at the entry point to the distribution system (EPD). The results of the analysis are presented in Enclosure (1), Field Sample ID 20111-WS-ZT01. On January 13, 2022, additional samples were taken at the Waiawa shaft source. The results of these samples are also presented in Enclosure (1), Field Sample IDs 220113-WS-ZT01 and 220113-WS-ZT03. This data shows that the water from the Waiawa shaft does not exceed State of Hawaii and Federal Drinking Water standards, Maximum Contaminate Levels, Environmental Action Levels and Incident Specific Parameters, and the regulated public water system’s water quality is complaint.
3. I certify under penalty of law that I have personally examined and I am familiar with the information submitted and I believe the submitted information is true, accurate, and complete.

RODRIGUEZ.ALBERTO  
.MAURICIO.13963161  
68  
A. M. Rodriguez  
LT, CEC, USN

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Date: 2022.02.19 17:19:01 -10'00'

1b.1 Source Water and Entry Point of Distribution Sample

Well Shaft Sampling

Chemistry Results

Drinking Water Sampling, JBPHH, Oahu Hawaii

Location ID:	I1-SHFTWAIA		I1-SHFTWAIA		I1-SHFTWAIA	
Location Type:	Well		Well		Well	
Residence:	Waiawa Shaft		Waiawa Shaft		Waiawa Shaft	
Field Sample ID:	220111-WS-ZT01		220113-WS-ZT01		220113-WS-ZT03	
Sample Date:	2022-01-11		2022-01-13		2022-01-13	
Sample Type:	N (PostChlorination Sample)		N (PreChlorination Sample)		N (PreChlorination Sample)	

GENCHEM (mg/L)	Incident Specific Parameters	Environmental		DOH Safe Drinking		Environmental	
		Action Levels	Water Branch (SDWB)	Water Branch (SDWB)	Protection Agency Maximum	Protection Agency Maximum	SDG:
		Groundwater	Regulatory	Regulatory	Contaminant Levels	Contaminant Levels	810121191
		Action Levels	Constituents	Constituents	Levels	Levels	
Total Organic Carbon	2	None	None	None	None	None	0.250 U

HC (µg/L)	Incident Specific Parameters	Environmental		DOH Safe Drinking		Environmental	
		Action Levels	Water Branch (SDWB)	Water Branch (SDWB)	Protection Agency Maximum	Protection Agency Maximum	SDG:
		Groundwater	Regulatory	Regulatory	Contaminant Levels	Contaminant Levels	5801092421
		Action Levels	Constituents	Constituents	Levels	Levels	5801092721
Petroleum Hydrocarbons (as Diesel)	200	400	None	None	None	None	92.0 U
Petroleum Hydrocarbons (as Gasoline)	200	300	None	None	31.0 U	31.0 U	31.0 U
Petroleum Hydrocarbons (as Motor Oil)	200	500	None	None	180 U	180 U	180 U

HERB (µg/L)	Incident Specific Parameters	Environmental		DOH Safe Drinking		Environmental	
		Action Levels	Water Branch (SDWB)	Water Branch (SDWB)	Protection Agency Maximum	Protection Agency Maximum	SDG:
		Groundwater	Regulatory	Regulatory	Contaminant Levels	Contaminant Levels	980559
		Action Levels	Constituents	Constituents	Levels	Levels	
Pentachlorophenol	None	None	None	None	None	None	0.0200 U

HG (µg/L)	Incident Specific Parameters	Environmental		DOH Safe Drinking		Environmental	
		Action Levels	Water Branch (SDWB)	Water Branch (SDWB)	Protection Agency Maximum	Protection Agency Maximum	SDG:
		Groundwater	Regulatory	Regulatory	Contaminant Levels	Contaminant Levels	2A12046
		Action Levels	Constituents	Constituents	Levels	Levels	
Mercury	0.025	0.025	2	2	0.0170 U	2	--

METAL (µg/L)	Incident Specific Parameters	Environmental		DOH Safe Drinking		Environmental	
		Action Levels	Water Branch (SDWB)	Water Branch (SDWB)	Protection Agency Maximum	Protection Agency Maximum	SDG:
		Groundwater	Regulatory	Regulatory	Contaminant Levels	Contaminant Levels	980559
		Action Levels	Constituents	Constituents	Levels	Levels	
Antimony	6	6	6	6	0.0915 J	6	0.110 U
Arsenic	10	10	10	10	0.207 J	10	0.210 U
Barium	220	220	2000	2000	1.72	2000	1.80 J
Beryllium	0.66	0.66	4	4	0.0624 U	4	0.0910 U
Cadmium	3	3	5	5	0.0416 U	5	0.0290 U
Chromium	11	11	100	100	1.46	100	1.50
Copper	2.9	2.9	1300	1300	21.2	1300	46.0
Lead	15	5.6	15	15	0.265	15	0.0630 J
Selenium	5	5	50	50	0.704	50	0.350 J
Thallium	2	2	2	2	0.0210 U	2	0.0410 U

SVOC (µg/L)	Incident Specific Parameters	Environmental		DOH Safe Drinking		Environmental	
		Action Levels	Water Branch (SDWB)	Water Branch (SDWB)	Protection Agency Maximum	Protection Agency Maximum	SDG:
		Groundwater	Regulatory	Regulatory	Contaminant Levels	Contaminant Levels	810121191
		Action Levels	Constituents	Constituents	Levels	Levels	

1b.1 Source Water and Entry Point of Distribution Sample

Well Shaft Sampling

Chemistry Results

Drinking Water Sampling, JBPHH, Oahu Hawaii

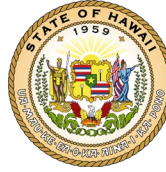
	70	70	70	70	70	EPD	Shaft	Shaft
1,2,4-Trichlorobenzene						--	0.0930 U	--
1,2-Dichlorobenzene	10	10	600	600		--	0.0520 U	--
1,3-Dichlorobenzene	None	None	None	None		--	0.0410 U	--
1,4-Dichlorobenzene	5	5	75	None	None	--	0.0410 U	--
1-Methylnaphthalene	2.1	10	None	None	0.00801 U	--		0.0190 U
2,4,5-Trichlorophenol	None	None	None	None	--	--	0.100 U	--
2,4,6-Trichlorophenol	None	None	None	None	--	--	0.100 U	--
2,4-Dichlorophenol	None	None	None	None	--	--	0.210 U	--
2,4-Dimethylphenol	None	None	None	None	--	--	0.170 U	--
2,4-Dinitrophenol	None	None	None	None	--	--	1.70 U	--
2,4-Dinitrotoluene	None	None	None	None	--	--	0.100 U	--
2,6-Dinitrotoluene	None	None	None	None	--	--	0.100 U	--
2-Chloronaphthalene	None	None	None	None	--	--	0.0720 U	--
2-Chlorophenol	None	None	None	None	--	--	0.0520 U	--
2-Ethylhexyl adipate	None	None	None	None	0.00962 U	--	--	--
2-Methylnaphthalene	4.7	10	None	None	0.00904 U	--	--	0.0190 U
2-Methylphenol (o-Cresol)	None	None	None	None	--	--	0.0520 U	--
2-Nitroaniline	None	None	None	None	--	--	0.100 U	--
3,3'-Dichlorobenzidine	None	None	None	None	--	--	0.270 U	--
3-Nitroaniline	None	None	None	None	--	--	0.170 U	--
4,6-Dinitro-2-methylphenol	None	None	None	None	--	--	0.570 U	--
4-Bromophenyl phenyl ether	None	None	None	None	--	--	0.0620 U	--
4-Chloro-3-methylphenol	None	None	None	None	--	--	0.130 U	--
4-Chloroaniline	None	None	None	None	--	--	0.610 U	--
4-Chlorophenyl phenyl ether	None	None	None	None	--	--	0.0520 U	--
4-Nitroaniline	None	None	None	None	--	--	0.220 U	--
4-Nitrophenol	None	None	None	None	--	--	1.80 U	--
Acenaphthene	None	None	None	None	--	--	0.0520 U	--
Acenaphthylene	None	None	None	None	--	--	0.0620 U	--
Alachlor	None	None	None	None	0.0110 U	--	--	0.0480 U
Anthracene	None	None	None	None	--	--	0.0520 U	--
Atrazine	None	None	None	None	0.00734 U	--	--	0.0290 U
Benzo(a)anthracene	None	None	None	None	--	--	0.0520 U	--
Benzo(a)pyrene	0.06	0.06	0.2	0.2	0.0117 UJ		0.0410 U	0.00960 U
Benzo(b)fluoranthene	None	None	None	None	--	--	0.0410 U	--
Benzo(g,h,i)perylene	None	None	None	None	--	--	0.0410 U	--
Benzo(k)fluoranthene	None	None	None	None	--	--	0.0520 U	--
Benzyl butyl phthalate	None	None	None	None	--	--	0.280 U	--
Bis(2-chloroethoxy)methane	None	None	None	None	--	--	0.0520 U	--
Bis(2-chloroethyl) ether (2-Chloroethyl ether)	None	None	None	None	--	--	0.0310 U	--
Bis(2-ethylhexyl)phthalate	3	3	6	6	0.437 U		0.770 U	0.580 U
Carbazole	None	None	None	None	--	--	0.100 U	--
Chlordane	None	None	None	None	0.0669 U		--	0.0320 U
Chrysene	None	None	None	None	--	--	0.0410 U	--











Interagency Drinking Water System Team  
Zone C3 Removal Action Report  
March 2022

**Line of Evidence 1c**

**No Additional Contamination through the Distribution  
System is Occurring**

**Table 1: Lines of Evidence Under Evaluation – Ensure no contamination is entering the water system.**

**Objective 1c** - No additional contamination through the distribution system is occurring.

Incident Specific Criteria - Cross Connection Control investigation shows distribution system is protected, resulting in no additional sources of contamination.

Lines of Evidence	Completion Status	Outstanding Items
No contamination of the distribution system is occurring from cross-connections with other petroleum sources during this incident	Complete	<ul style="list-style-type: none"><li>• None.</li></ul>
Cross Connection Control/Backflow Program-related documents	Complete	<ul style="list-style-type: none"><li>• None.</li></ul>

February 19, 2022

From: Naval Facilities Engineering Systems Command Representative, IDWS Team  
To: Interagency Drinking Water System Team

SUBJ: SUMMARY OF LINE OF EVIDENCE OBJECTIVE 1C – NO ADDITIONAL  
CONTAMINATION THROUGH THE DISTRIBUTION SYSTEM IS OCCURRING

Encl: (1) 1c.1 Certification of Inventory and Petroleum Facility Locations with Associated  
Backflow Preventers.  
(2) 1c.2 Backflow Prevention and Cross-Connection Control Program Instruction

1. Enclosures (1) and (2) document completion of Line of Evidence 1c, no additional contamination through the distribution system is occurring. On the evening of November 28, 2021, the Red Hill Shaft was secured from operation and all pumping operations ceased. The Aiea/Halawa shaft briefly served as the secondary source starting on November 28, 2021, but it was shut down on December 3, 2021 to prevent potential westward contaminant migration in the aquifer and because there were concerns over high chloride concentrations caused by saltwater intrusion. Since December 3, 2021, the Waiawa Shaft has been the sole water source providing potable water to the distribution network. It is located 5.5 miles west of the Red Hill Fuel Facility, and testing has not detected any water quality issues at this source.

2. Enclosure (1) identifies all water service connections where petroleum activities exist and documents adequate backflow prevention devices installed at those petroleum service activities. Enclosure (2) provides the governing instructions for backflow prevention devices referenced in Enclosure (1). This data shows that no additional contamination through the water distribution system is occurring.

3. I certify under penalty of law that I have personally examined and I am familiar with the information submitted and I believe the submitted information is true, accurate, and complete.

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-10'00' | Date: 2022.02.19 17:24:22

A. M. Rodriguez  
LT, CEC, USN



**DEPARTMENT OF THE NAVY**  
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND, HAWAII  
400 MARSHALL ROAD  
JBPHH, HAWAII 96860-3139

11000  
Ser PWO/0083  
March 10, 2022

Director of the State of Hawaii  
Department of Health (DOH)

Dear DOH Director:

**SUBJECT: CERTIFICATE REGARDING CROSS CONNECTION CONTROL REVIEW  
AND CONFIRMATION – ZONE C3**

Enclosure: [1] ZONE C3: POL Activities Backflow Prevention Devices  
[2] ZONE C3: POL Activities Map

On behalf of the United States Department of the Navy, operator of the Joint Base Pearl Harbor-Hickam Public Water System (PWS ID No. 360 Water System), and in connection with and pursuant to the removal action required by the DOH Hazard Evaluation and Emergency Response Office Incident Case No. 20211128-1848, the undersigned certifies that the Navy has made all necessary inquiry into their Water System and represents and warrants as set forth below.

All service connections where petroleum activities exist in the Water System, **Zone C3**, are identified in Enclosure [1], "Zone C3: POL Activities Backflow Prevention Devices." Petroleum activities include, but are not limited to, operating or having gas stations, fuel storage, facilities with aboveground or underground storage tanks (>100-gallon capacity), fuel transfer, motor pools, vehicle maintenance facilities, fuel recovery pits, waste oil collection facilities or systems.

All service connections where petroleum activities exist, as identified in Enclosure [1] have adequate backflow protection as recommended by and in accordance with COMNAVREGHIINST 11330.2D, BACKFLOW PREVENTION AND CROSS-CONNECTION CONTROL PROGRAM. Adequate backflow protection includes installation of devices appropriate to the identified hazard condition, correct design and installation of the device, timely testing by a certified tester, and regular maintenance/repair/replacement.

All facilities identified with adequate backflow protection have had their assemblies tested by a DOH-approved certified tester in the past year in accordance with Hawaii Administrative Rules, Title 11-21-8(b) Maintenance requirements.

The Navy has committed to the funding and performance in FY2022 of a comprehensive cross connection control survey of the entire JBPHH water system per the December 2021 AH Engineers & Scientists Water Quality CAT Memorandum.

**SUBJECT: CERTIFICATE REGARDING CROSS CONNECTION CONTROL REVIEW  
AND CONFIRMATION – ZONE C3**

Building 1456 and building 215 were identified as facilities that may contain petroleum activities. Information for both of these facilities are included in Enclosures [1] and [2]. Building 58 petroleum activities have been consolidated in Enclosure [1].

Additional information was requested regarding potential tanks near building 1376. NAVFAC field verified that no tanks are located near this building. The imagery on Google Earth is outdated. Additionally, information was requested regarding a lack of backflow prevention devices near the port in Zone C3. Fuel lines end at Bravo 22 in flushing Zone C2. Zone C3 has no fuel transfer activity, therefore dock outlet backflow prevention devices are not included in Enclosure [1].

The undersigned has due authority to delivery DOH this Certification on behalf of the Navy.

Sincerely,

HARMEYER.RANDALL.  
ERNEST.1186692663

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HARMEYER.RANDALL.ERNEST.118669266  
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Date: 2022.03.10 13:28:09 -10'00'

R. E. HARMEYER  
Captain, CEC, U.S. Navy  
Public Works Officer  
By Direction of the  
Commanding Officer

## Enclosure [1] - ZONE C3: POL Activities Backflow Prevention Devices

POL Activities Backflow Prevention Devices												Zone: C3	
ASSET NAME	Location (Bldg. #)	Reference Location	Description of petroleum -related activity	BFP Manufacturer	BFP Model	BFP Size	Serial # or VIN #	Installation Date or In Service Date	Changed (Replacement) Date	Last Tested Date	Last Repaired Date		
SA-FWV 1393	1393	SEWER LIFT STN	AST C-23 / 200 GAL DIESEL	WATTS	909	0.75	35552	1/1/2000	N/A	1/6/2021	N/A		
SA-FW 1195	149	POWER PLANT 2	AST D-4 / 50,000 GAL JP-5	FEBCO	880	4	9909091301	2/1/2002	N/A	2/4/2021	N/A		
NO BFP ASSETS, HOSE BIBS	297	NAVFAC SHOPS	AST D-1 / 2,000 GAL DIESEL	HOSE BIB W/ AVB	AVB	0.75	N/A	N/A	N/A	N/A	N/A		
SA-FW 3234	1577A	SEWER LIFT STN SY-07	AST FOR GENERATOR	WILKINS	975	1	988651	1/1/1991	N/A	2/4/2021	N/A		
NO BFP ASSETS, 1 HOSE BIB	1663	FORGE SHOP	ABOVEGROUND STORAGE TANKS / 200 GAL HYDRAULIC OIL	HOSE BIB W/ AVB	AVB	0.75	N/A	N/A	N/A	N/A	N/A		
SA-FW 2207	5777	MARINE RAILWAY #2 CRANE MAINTENANCE AREA	55 GAL DRUMS HYDRAULIC OIL 55 GAL DRUMS DIESEL 275 GAL TOTE	WATTS	909	2.5	241165	1/1/2000	N/A	2/5/2021	N/A		
SA-FW 66000	1663	RECYCLE OIL COLLECTION AND OIL DRUM STORAGE AREA	55 GAL DRUMS USED OIL	WATTS	909	2.5	89084	1/1/2010	N/A	2/3/2021	N/A		
NO BFP ASSETS, 1 HOSE BIB	8	BLDG (ABADONED) OIL EXTRACTION TRENCHES	500 GAL STORAGE TANK	HOSE BIB W/ AVB	AVB	0.75	N/A	N/A	N/A	N/A	N/A		
SA-FWV 394	1443	OUTSIDE OF BLDG FRONTING INGERSOLL AVE	ABOVE GROUND STORAGE TANK / 250 GAL PETROLEUM WASTE	CHAMPION	AVB	1.5	262	8/8/2016	N/A	1/27/2021	N/A		
SA-FWO 12175	167	INSIDE BLDG	AST FOR GENERATOR / 500 GAL ABOVE GROUND STORAGE DIESEL TANK	WILKINS	975	1.5	2125623	1/1/2008	N/A	2/2/2021	N/A		
SA-FW 2501	1671	SHOP 99 VACUUM TRUCKS	2,900 GAL CAP TANK	FEBCO	880	4	9705281309	1/1/1991	N/A	2/3/2021	N/A		
SA-FW 671	67	DRUM STORAGE AREA & TEST TANKS	55 GAL DRUMS NEW & USED OIL	WATTS	909	2	89048	1/1/2000	N/A	2/8/2021	N/A		
SA-FW 18602	214A	ELECTRONICS SHOP	PORTABLE STEAM CLEAN TANK / 1,965 GAL OILY WASTEWATER	WATTS	909	2	90151	1/1/2000	N/A	2/8/2021	N/A		
SA-FW 918P	5	BLDG 149 NEXT TO SMOKING SHELTER	TANKS, NON-PETROLEUM DI WATER, FLUSH, AND OIL FREE SEWAGE	WATTS	909	1.5	9883	8/14/2018	N/A	2/8/2021	N/A		
SA-FW 1456	1456	SHIPYARD PIPE SHOP	TANKS, NON-PETROLEUM DI WATER, FLUSH, AND OIL FREE SEWAGE	CHAMPION	AVB	2	UNK	1/1/2000	N/A	2/10/2021	N/A		
SA-FWV 11954	215	SHIYARD MACHINE SHOP	BACKUP GENERATOR / DIESEL TANK	WILKINS	975XL	1.5	1927607	1/1/2000	N/A	3/9/2021	N/A		
SA-FW 2501	58	LUBE OIL DRUM STORAGE AREA 2 OIL COLLECTION TRUCKS	55 GAL DRUM LUBE OIL 2 TRUCKS / 400 & 100 GAL TANK OIL	FEBCO	880	4	9702581309	1/1/1991	N/A	2/3/2021	N/A		
SA-FWV 47001	58	BLDG LAYDOWN AREA/DRUM STORAGE AREA	55 GAL DRUM LUBE OIL	WILKINS	375	3	11257	3/24/2018	N/A	1/22/2021	N/A		









## DEPARTMENT OF THE NAVY

COMMANDER  
NAVY REGION HAWAII  
850 TICONDEROGA ST STE 110  
JBPHH HI 96860-5101

COMNAVREGHIINST 11330.2D

N4

19 Sep 2016

### COMNAVREG HAWAII INSTRUCTION 11330.2D

From: Commander, Navy Region Hawaii

Subj: BACKFLOW PREVENTION AND CROSS-CONNECTION CONTROL PROGRAM

Ref: (a) Recommended Practice for Backflow Prevention and Cross-Connection Control, (AWWA Manual M14), American Water Works Association  
(b) MIL-HDBK-I 005/7, Military Handbook Water Supply Systems  
(c) State of Hawaii, Department of Health, Administrative Rules Title 11, Chapter 21, Cross-Connection and Backflow Control  
(d) NAVFACINST 11330.11E  
(e) Manual of Cross-Connection Control, Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California  
(f) NAVFAC MO-210, Maintenance and Operation of Water Supply, Treatment, and Distribution Systems

1. Purpose. To supplement current Navy directives pertaining to the protection of the Base potable water supply.

2. Cancellation. COMNAVREGHIINST 11330.2C.

3. Definitions. References (a) through (c) define technical terms used herein as follows:

a. Backflow. The reversal of the normal flow of water caused by either backpressure or back-siphonage.

b. Back-pressure. The flow of water or other liquids, mixtures or substances under pressure into the distribution pipes of a potable water supply system from any source or sources other than the intended source.

c. Back-siphonage. The flow of water or other liquids, mixtures or substances into the distribution pipes of a potable water supply system from any source other than its intended source caused by the sudden reduction of pressure in the potable water supply system.

d. Backflow Preventer. A device or means designated to prevent backflow. These include:

(1) Air Gap. The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood level rim of said vessel. An approved air-gap must be at least double the diameter of the supply pipe, measured vertically, above the top of the overflow rim of the vessel, and in no case less than six inches.

(2) Reduced Pressure Principle Device. An approved assembly of two independently acting approved check valves together with a hydraulically operating, mechanically independent pressure relief valve located between the check valves, as described in reference (b) and specified in reference (d).

(3) Double Check Valve Assembly. An approved assembly of two independently operating approved check valves with tightly closing shut-off valves on each end of the check valves, plus properly located test cocks for the testing of each check valve.

(4) Atmospheric Vacuum Breaker. A device designed to not subject to static line pressure and contains a check valve and an air-let valve.

(5) Pressure Vacuum Breaker. A device that is designed to operate under conditions of static line pressure and contains one or two independently operating, spring-loaded air-inlet valves located on the discharge side of the check valve (or valves), plus properly located test cocks, and tightly closing shut-off valves.

e. Certified Tester. A certified tester means three classes of certified testers:

(1) A limited tester - A person trained and qualified to perform periodic testing, inspection, and repairs on the specific devices contained within a specific plant or institution. This person is usually an employee of the plant or institution and assigned the duty of taking care of the backflow prevention equipment as part of his or her overall plant duties, and does not extend to backflow prevention devices that are not part of the specific plant or institution.

(2) A general tester - A person trained and qualified to perform the periodic testing, inspection, and repairs on all devices that are on the market. This person may be an employee of a water agency, an employee of a municipal agency, or an individual operating a backflow device testing service.

(3) A manufacturer's agent - A person who is an employee of a manufacturer of backflow prevention equipment and is thoroughly familiar with the backflow prevention devices produced by his/her employer. This person maybe familiar with other makes and models of backflow prevention devices but is restricted to only his/her employer's products. The Director of the Department of Health, State of Hawaii or his duly authorized representative, must approve all certified testers.

f. Cross-Connection. Any physical connection or arrangement of piping or fixtures between two otherwise separate piping systems, one of which contains potable water for human consumption and the other water for irrigation, fire protection, industrial and other uses, or non-potable water or industrial fluids of questionable safety, through which, or because of which, backflow may occur into the potable water system. This would include bypass arrangements, jumper connections, removable sections, swivel or changeover devices, and any other temporary or permanent devices through which, or because of which backflow could occur.



#### 4. Background

a. Reference (b) presents requirements for the design of water supply systems for naval shore activities. Reference (b) indicates the design requirements for protecting the potable system from contamination by cross-connections with non-potable supplies and units containing polluted water. Reference (b) further indicates the need to protect the potable system from contamination by irrigation systems.

b. Reference (d) sets forth criteria for specifying backflow preventers of the reduced pressure principle type. It requires that such devices have a current Certificate of Approval and provides a list of approved backflow prevention devices.

c. Reference (e) cites methods and devices by which hazards may be eliminated without interfering with the functions of plumbing or water supply distribution systems. It is a comprehensive reference, and covers all aspects of cross-connection control.

d. Reference (f) provides technical guidance for the operation and maintenance of water supply systems at naval shore activities. Chapter 8 of reference (f) describes how the water system becomes contaminated. Chapter 9 reference (f) further requires that approved backflow preventers be installed according to the degree of the hazard involved and indicates the need for periodic testing and inspection of the devices by certified personnel. It also suggests a time interval for inspection and indicates that all devices be tested according to the manufacturer's service instructions. It further points out the requirements for record keeping.

e. To assure the quality of the water at the customer's tap, both the customer and Navy Facilities Engineering Command, Hawaii (NAVFAC HI), the water supplier, must participate in a backflow prevention and cross-connection control program.

5. Policy. Protect the existing potable water system at all times from hazardous cross-connections by the installation, operation, and maintenance of approved backflow preventers. Backflow prevention and cross-connection control measures must be in accordance with the recommendations and requirements of references (a) through (f).

#### 6. Discussion

a. The objectives of the backflow prevention and cross-connection control program are to achieve the following:

- (1) Protection of the quality of the base water supply.
- (2) Elimination of existing hazards.
- (3) Prevention of future unprotected cross-connections.

b. The backflow prevention and cross-connection control program requires the following:

- (1) The survey all existing cross-connections to determine they are adequately protected.
- (2) The recording of data on all existing backflow preventers to enable up-to-date monitoring. The data must include at least the following information:
  - (a) Activity name.
  - (b) Building number (if appropriate).
  - (c) Sketch of approximate location of backflow preventer.
  - (d) Size, type, model number, and manufacturer of the backflow preventer.
  - (e) Date installed (if known).
  - (f) Type of Hazard.
- (3) Operate, maintained and repair all known existing backflow preventers to ensure their proper operation for the protection of the water system.
- (4) Inspect and test all existing backflow preventers at the minimum time intervals to determine their effectiveness as shown in the table. If successive tests on a backflow preventer indicate repeated failures, test preventer at more frequent interval to be determined by NAVFAC HI Utilities and Energy Management Department, Potable Water Division (OPC61). All testing must be performed in accordance with the manufacturer's instruction.

<u>METHOD OR DEVICE</u>	<u>3 MONTHS</u>	<u>6 MONTHS</u>	<u>12 MONTHS</u>
Pressure Type Vacuum Breaker			X
Double Check Valve Assembly			X
Reduce Pressure Principle devices used for shore-to ship connections	X		



<u>METHOD OR DEVICE</u>	<u>3 MONTHS</u>	<u>6 MONTHS</u>	<u>12 MONTHS</u>
Other Reduced Pressure Principle device		X	
Air Gap			X
Reduced Pressure Principle devices used to separate the Navy's potable water system from another agency's potable water system			X

(5) Review all plans and specifications or sketches and material description for new connections to NAVFAC HI Potable Water Systems by NAVFAC HI OPC61 to verify the safety of the cross-connections.

(6) Report all known or suspected accidental contamination immediately to NAVFAC HI OPC61 to enable corrective action, and avoid widespread contamination of the water system.

7. Implementation. Maintain the following provisions of the backflow prevention and cross-connection control program by the shore activities as indicated below:

a. All shore activities and other agencies who receive potable water from water systems owned and operated by NAVFAC HI must:

(1) Conduct a Cross-Connection Control and Backflow Prevention Survey of the areas under their jurisdiction including building plumbing, fire protection, exterior hose bibs, lawn irrigation systems, etc. The survey must include an inspection of the consumer's premises for hazards noted in references (a) and (e) and document any findings observed during the survey. The survey must also document all existing backflow preventers. The activity is responsible for funding the survey.

(2) Conduct follow-up surveys of the areas under their jurisdiction within 5 years after the initial survey to update the status of the initial findings and provide new information, findings, and recommendations as required. The activity funds the follow-up surveys as a lump sum amount or incremental amounts of the cost determined by NAVFAC HI OPC61.

(3) Take immediate action to eliminate hazards if the survey indicates that there are cross-connection hazards.

(4) Forward copy of all surveys to NAVFAC HI OPC61.

(5) The activity may submit a work request to have NAVFAC HI conduct the survey.

b. All shore activities and other agencies who have existing backflow preventers that do not conform to the requirements of reference (e) and the NAVFAC HI OPC61 and, who receive water from systems owned and operated by NAVFAC HI, must provide funding to have their backflow preventers tested and certified by certified testers from NAVFAC HI OPC61.

c. All shore activities and other agencies who have requirements for new backflow preventers and who receive water from systems owned and operated by NAVFAC HI must:

(1) Provide funding to have their backflow preventers installed, tested, and certified.

(2) Provide funding for the re-testing and re-certification of the backflow preventer should the backflow preventer fail the initial test.

(3) Ensure initial certification and all re-certification is performed by NAVFAC HI OPC61. Certification by other agencies is not accepted.

d. All shore activities and other agencies who have existing backflow preventers registered with NAVFAC HI OPC61 will have their devices inspected, maintained, and certified by NAVFAC HI funding for the inspection, maintenance, and certification must be provided by NAVFAC HI OPC61.

e. The activities who are responsible for the design of the connection to a NAVFAC HI Potable Water System must submit construction drawings and specifications for the connection to NAVFAC HI OPC61 for approval, prior to its construction.

f. NAVFAC HI job planners must obtain approval for the connection to the NAVFAC HI Potable Water System from NAVFAC HI OPC61, if NAVFAC HI is to perform the work and construction drawings are not required for the connection.

g. The activity who requires the connection to NAVFAC HI Potable Water System must obtain approval for the connection from NAVFAC HI OPC61 prior to construction of the connection.

h. All shore activities who install backflow preventers or administer contracts for their installation NAVFAC HI must ensure that all newly installed backflow preventers are tested and inspected by a certified tester from NAVFAC HI OPC61 at the same time that the water outage occurs for the connection to the water system. Backflow preventer must pass all tests prior to supplying potable water.



19 Sep 2016

i. All activities that suspect that the potable water system may have been contaminated must call NAVFAC HI OPC61 Steam/Air/Potable Water Division Manager, telephone number 473-0388. In addition, warn all personnel in the area of the possible contamination to stop drinking the water.


8. Responsibility

a. Commanding Officers and Officers-in-Charge of shore activities must ensure that hazards from cross-connections are eliminated and that new connections are approved.

b. Commanding Officers and Officers-in-Charge of shore activities in doubt as to the proper methods of backflow prevention and cross-connection control may request engineering and technical assistance from NAVFAC HI (Code 431), Long Range Maintenance Planning Branch, telephone number (808) 474-3700.

9. Records Management. Manage all records created by this instruction, regardless of media or format per SECNAV Manual 5210.1 of January 2012.

10. Review and Effective Date. Per OPNAVINST 5215.17A of 26 May 2016, the Facilities and Environmental (N4) will review this instruction annually on the anniversary of its issuance date to ensure applicability, currency, and consistency with Federal, DoD, SECNAV, and Navy policy and statutory authority using OPNAV 5215/40. This instruction will automatically expire 5 years after its issuance date unless reissued or canceled prior to the 5-year anniversary date, or an extension has been granted.



R. A. ESPINOSA  
Chief of Staff  
Acting

Distribution:

Electronic only, via CNRH Gateway

<https://g2.cnrc.navy.mil/CNRH/SitePages/Home.aspx>



Interagency Drinking Water System Team  
Zone C3 Removal Action Report  
March 2022

**Line of Evidence 2a**

**Water within the Distribution System does not exceed State and Federal Drinking Water MCLs, Specified State EALs, and ISPs**



**Table 1: Lines of Evidence Under Evaluation – Ensure no contamination remains in the system and water chemistry concerns are addressed.**

**Objective 2a** - Water within the distribution system does not exceed State and Federal DW MCLs, specified State EALs, and ISPs.

Incident Specific Criteria –

- Zone flushing plan demonstrates entire distribution system is flushed.
- Sample results show the water in distribution system does not exceed State and Federal DW MCLs, specified State EALs, and ISPs. (Guidance Table 2 and Table 3)
- Drinking water does not show sheen, olfactory evidence, or other qualitative methods of petroleum.

Lines of Evidence	Completion Status	Outstanding Items
JBPHH water system's approach to flushing and their metrics for success.	Complete	<ul style="list-style-type: none"> <li>• None.</li> </ul>
Validity of the volumetric exchange model	Complete	<ul style="list-style-type: none"> <li>• None.</li> </ul>
Verification that the entire distribution system is flushed volumetrically.	Complete	<ul style="list-style-type: none"> <li>• None.</li> </ul>
Residential Sampling Report for Flushing Zone (Risk Management Summary)	Complete	<ul style="list-style-type: none"> <li>• None.</li> </ul>

February 19, 2022

From: Naval Facilities Engineering Systems Command Representative, IDWS Team  
To: Interagency Drinking Water System Team

SUBJ: SUMMARY OF LINE OF EVIDENCE OBJECTIVE 2A – WATER WITHIN THE DISTRIBUTION SYSTEM DOES NOT EXCEED STATE AND FEDERAL DW MCLs, SPECIFIED STATE EALs, AND ISPs

Encl: (1) 2a.1 Memorandum for Record  
(2) 2a.2 Validity and Application of Volumetric Exchange Method  
(3) 2a.3 Hydraulic Model  
(4) 2a.4 Records of Completed Volumetric Exchanges  
(5) 2a.5 Water Source and Water Storage Facilities  
(6) 2a.6 Distribution System Exceedance Investigation Summary and Results

1. Enclosures (1) through (6) document completion of Line of Evidence 2a, that water within the Zone C3 distribution system does not exceed State of Hawaii and Federal Drinking Water standards, Maximum Contaminate Levels, Environmental Action Levels and Incident Specific Parameters. On the evening of November 28, 2021, the Red Hill Shaft was secured from operation and all pumping operations ceased. The Aiea/Halawa shaft briefly served as the secondary source starting on November 28, 2021, but it was shut down on December 3, 2021 to prevent potential westward contaminant migration in the aquifer and because there were concerns over high chloride concentrations caused by saltwater intrusion. Since December 3, 2021, the Waiawa Shaft has been the sole water source providing potable water to the Joint Base Pearl Harbor-Hickam (JBPHH) distribution network. Zone C3 is part of the JBPHH Drinking Water system that is operated and maintained by the United States Navy. Flushing operations for Zone C3 are summarized in Enclosure (1), signed by LCDR Carl Chase, team lead for the Drinking Water Distribution System Recovery Team.

2. Details on the drinking water system and flushing operations and protocols are provided in Enclosures (1), (3), and (5). The guidance provided by Dr. Whelton on the recommended volume exchanges to be flushed in the distribution system is provided in Enclosure (2).

3. The records of the distribution system volumetric exchanges flushed are provided in Enclosure (4). Level 2 sampling data collected after distribution flushing is summarized in Enclosure (6).

4. Sample results with analyte detections exceeding the prescribed MCL, EAL, or ISP are documented in Enclosure (6). The follow-on investigation summary and additional sampling results are also documented in Enclosure (6).

5. The information provided in Section 2a, including the flushing process followed and the subsequent sampling results, demonstrate that water within the Zone C3 distribution system does not exceed State of Hawaii and Federal Drinking Water standards, Maximum Contaminate Levels, Environmental Action Levels and Incident Specific Parameters.

6. I certify under penalty of law that I have personally examined and I am familiar with the information submitted and I believe the submitted information is true, accurate, and complete.

WETZEL.CHRISTOP  
HER.JAMES.154019  
4862

Digitally signed by  
WETZEL.CHRISTOPHER.JAMES.15  
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Date: 2022.02.19 19:37:51 -08'00'

C. J. Wetzel  
LT, CEC, USN

28 Jan 2022

## MEMORANDUM FOR THE RECORD

From: LCDR Carl Chase, JBPHH Drinking Water Distribution System Recovery Team  
To: Interagency Drinking Water System Team

Subj: DISTRIBUTION SYSTEM RECOVERY PLAN ADDENDUM – ZONE C3 ANALYSIS

Ref: (a) Memorandum for the Record from LCDR John Daly regarding the Distribution System Zone Flushing, December 28, 2021  
(b) State of Hawaii Department of Health, Directive One– Flushing Requirements Navy Water System Incident, Case No.: 20211128-1848 (HI Directive One, dated 08 December, 2021)  
(c) Drinking Water Distribution System Recovery Plan, 17 December 2021  
(d) Incident Specific Criteria to Meet Lines of Evidence Objectives 1c and 2a, dated 05 January 2022

1. OBJECTIVE: The Drinking Water Distribution System Recovery Plan (DWDSRP) was signed by the Interagency Working Group on 17 December 2021. This addendum provides additional technical information to document the system flushing methodology and engineering approach used to restore Flushing Zone C3 to service as requested by the State of Hawaii Department of Health (HI DoH) in reference (d).

### 2. BACKGROUND:

2.1. Portions of the Navy water distribution system serving JBPHH and surrounding areas were exposed to low levels of fuel contamination with initial indications in the form of smell reports occurring on or about 28 November 2021.

2.2. Prior to the aquifer contamination incident (incident), water users connected to the Navy's system were supplied by three Navy owned water sources, Red Hill Shaft, Aiea/Halawa Shaft and Waiawa Shaft. In the time period prior to the incident, Waiawa Shaft was the main water source supplying approximately 16 million gallons per day (MGD) to the JBPHH system with at least one pump operating full time (100%). A single Red Hill Shaft pump was operated intermittently as a secondary source to supply approximately 5.5 MGD to the system. The Aiea/Halawa shaft was not being operated due to concerns over high chloride concentrations caused by saltwater intrusion into the aquifer.

2.3. On the evening of 28 November 2021, the Red Hill Shaft was secured and all pumping operations ceased. The Aiea/Halawa shaft briefly served as the secondary source starting on 28 November 2021 but was shut down on 03 December 2021 to prevent westward contaminant migration in the aquifer.

2.4. Since 03 December 2021, Waiawa Shaft has been the sole water source providing potable water to the distribution network. It is located 5.5 miles west of the Red Hill Fuel Facility and testing has not found any water quality issues at this source.

3. ENGINEERING ANALYSIS AND TOOLS: DWDSRP development utilized engineering judgement informed by existing tools and data sources such as ArcGIS, Supervisory Control and Data Acquisition (SCADA) system historic/current data, hydraulic models, and input from water system infrastructure contamination subject matter experts (SMEs).

3.1. ArcGIS was the primary tool used for mapping, volumetric calculations, and spatial analysis of the JBPHH utility systems.

3.2. System flows were measured by meters at key points within the distribution system. Data was recorded and stored by the Navy's SCADA system historian. SCADA is also monitored 24/7 by water system operators.

3.3. A hydraulic model was developed in 2014 and calibrated to conditions at the time. It is a skeletonized model depicting major transmission lines to many areas of the base. It does not include all mainline pipes, the Hickam area, or laterals feeding residence and non-residence facilities. The model was considered to be of limited use in determining the effectiveness of system flushing. It was primarily used to determine areas that were most likely impacted by the contamination event. The results directly correlated with initial reporting from impacted residents.

3.4. Dr. Andrew Whelton, a Purdue University associate professor of civil, environmental, and ecological engineering and recognized for his expertise in disaster response and recovery, provided recommendations to the US Navy based on his research and experience. His work is often cited in EPA literature and he is a leading expert in the field of recovering contaminated drinking water plumbing. His recommendations were incorporated into the DWDSRP.

4. CONSTRAINTS: In addition to Section 1.3 of the DWDSRP, the following constraints were considered during development of the plan:

4.1. Waiawa Shaft pumps are capable of pumping 19 MGD with 2 pumps running at full speed. There are 4 pumps at Waiawa Shaft, 2 are operational, one is standby, and one is down for maintenance. Average daily demand at JBPHH since the incident has ranged from 11 to 14 MGD. Maximum potable water system flushing flows were limited to 5 MGD to avoid excessive drawdown of the S1/S2 tanks and stay within the capacity of Waiawa Shaft pumps.

4.2. The two 6 million gallon (each) tanks, S1 and S1 could not be drawn down below the 28-foot level. This constraint was imposed by the water system operators who wanted to avoid low water system pressures that would be caused by S1/S2 drawdown below 28-feet.

4.3. Discharge to the Navy's sanitary sewer system and the Fort Kamehameha Wastewater Treatment Plant (Ft. Kam WWTP) was limited to 1 MGD by wastewater operations staff. Much of the infrastructure Ft. Kam WWTP was considered to be in poor condition and some process elements do not have a backup unit. The direct discharge of too much potable water to the plant was also thought to pose the risk of "wash out" of the microbes that provide secondary treatment.

4.4. Discharges of potable water to land or storm sewers were required by HI Directive One to be treated prior to discharge. Treatment was provided through 1 MGD mobile granular activated carbon (GAC) units. The units had several constraints on their use including site access, adequate staging areas that were level with sufficient area for the units and support crews, impacts to the community, traffic control, and distance to discharge. Each GAC was kept in a single location for at least 24 hours due to labor and time required for unit setup and breakdown.

4.5. Water service was required be maintained to residents and JBPHH tenants. Many families have remained in their homes and mission essential Government activities require continuous water service.

4.6. JBPHH did not have an established unidirectional flushing plan developed prior to the incident. Unidirectional flushing typically involves inducing one-way flow through each pipe segment in a water distribution system by closing mainline isolation valves and opening hydrants for a short period of time. The number of hydrants required would be determined by the pipe size and the minimum water velocity required to flush sediments and other contaminants from the pipe segment. True unidirectional flushing of the system was determined not to be a feasible method for flushing the JBPHH potable water system for the following reasons:

4.6.1. Per section 1.2 of the DWDSRP, the distribution system was to be recovered with critical urgency. Additionally, SMEs advised that the longer contaminants remained in the system, the more likely it was that they would migrate into plastics, gaskets, sediments, etc. A unidirectional flushing program would take several months to develop and implement and the timeline was not considered feasible for a return to service.

4.6.2. Water system operators indicated that many mainline isolation valves would not properly close and could not be relied upon to isolate pipe segments.

4.7. Dr. Whelton recommended three volumetric turnovers for impacted pipe networks. Flushing zones with higher risk of contamination were identified and prioritized using water user complaint history, testing results, the hydraulic model, and the hydraulic proximity to Red Hill Shaft. A factor of safety was applied to the highest priority zones by specifying a minimum of five volumetric turnovers. Zones where the hydraulic modelling indicated that contamination may have travelled, were in close hydraulic proximity to Red Hill Shaft, and had few complaints were flushed with the recommended three volumetric turnovers. Low priority was given to zones where SCADA data indicated that water was fed solely from Waiawa Shaft before and after the incident. To reduce water waste, flush zones with lower risk of contamination were volumetrically turned over a minimum of once or twice.

5. Following Dr. Whelton's recommendation, the DWDSRP was designed with a directional flush of the distribution system starting from the clean water source and moving systematically through the entire system. The limited water source capacity at Waiawa Shaft and disposal constraints required that the system be broken down into smaller flush zones. 19 total zones were established that could be independently flushed without adverse hydraulic or water quality impacts to previously flushed zones. Section 2.4 of the DWDSRP depicts the network diagram and zone relationships.

## 6. FLUSH ZONE C3:

6.1. DESCRIPTION OF FLOW: Zone C3 is fed from the south through Zone C2 with several transmission main and distribution network pipes of various sizes. See Figure 1 for a schematic representation of the zone.

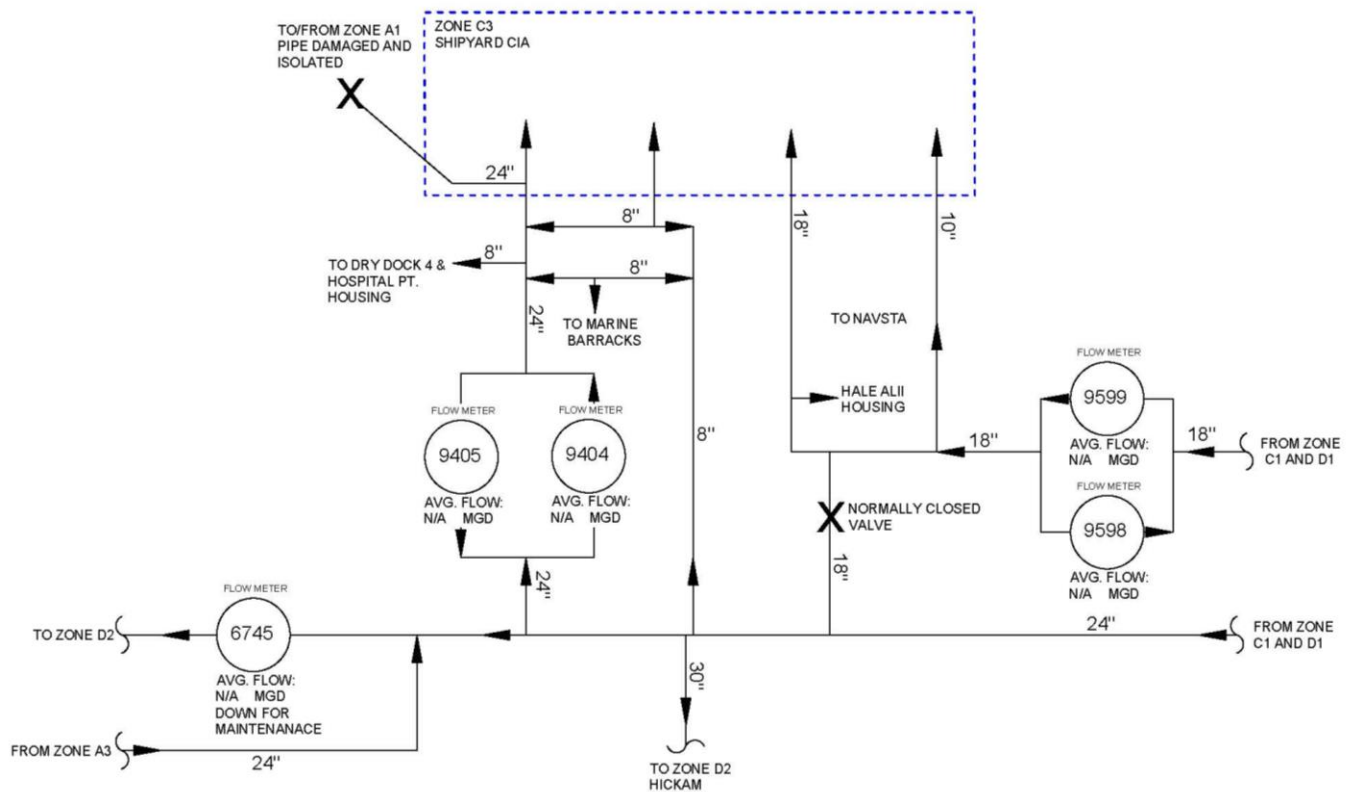


Figure 1. Zone C3 Schematic

6.1.1. Water sources to the zone include Waiawa Shaft, Red Hill Shaft and the S1/S2 tanks. Flow is generally from south to north through the zone. There are no zones downstream of this zone. The 24-inch submarine pipe connecting Zone C3 to Zone A2 was damaged in May 2021 and was isolated from the system using valves.

6.2. WATER USE/TENANTS: Water users in this zone include facilities associated with the shipyard complex. Facilities include warehouses, maintenance shops, dry docks, and administrative office buildings.

6.3. PIPE VOLUME: Per section 2.5.1.1. of the DWDSRP, Flush Zone C3 has a mainline pipe volume of 280 thousand gallons (KGal). With the exception of the 24-inch transmission pipeline, distribution pipes in the zone are 4 to 12-inches in diameter.

6.4. PRIORITY: It was possible that contamination entered the Zone C3 water distribution system from upstream zones. However, complaints in this zone were minimal and the hydraulic model indicated that Zone C3 may have received little to no contamination relative to other zones. Zone C3 was included in Phase #3 with two volumetric turnovers minimum.

6.5. HYDRANT SELECTION: Nine geographically and hydraulically dispersed flushing hydrants were selected to flush Zone C3. Hydrants were selected to be along the north edge of the zone so that water would be pulled from the transmission mains through the distribution network before being discharged.

6.6. DEAD-END LINES: It is possible that flushing was not induced in some small neighborhood loops or dead-end lines serving facilities or piers. To address this concern, additional distribution water line samples were taken in locations selected in a joint effort by the Navy, DoH, and EPA. These samples are representative of other dead-end lines within the zone.

6.7. FLUSHING ACTUALS: Water was simultaneously discharged through:

105	Shift			Flush Time			Documentation	
Date	Begin	End	Start	Stop	RunTime	Email Summary	UT Log	
7-Jan	8:00	20:00		17:57	2:03	20220107 0800-2000	N	
7-Jan	20:00	8:00		22:20	2:20	20220107 2000-0800	N	
TOTAL RUN @ FLOW of 275								
				TIME	4:23			
				VOLUME	72325 Gallons			

Inside Controlled Industrial Area							
128	Shift		Flush Time			Documentation	
Date	Begin	End	Start	Stop	RunTime	Email Summary	UT Log
7-Jan	8:00	20:00		17:15	2:45	20220107 2000-0800	N
7-Jan	20:00	8:00		21:00	1:00	20220107 2000-0800	N
TOTAL RUN @ FLOW of 275							
TIME				3:45			
VOLUME				61875 Gallons			

111	Shift			Flush Time			Documentation	
Date	Begin	End	Start	Stop	RunTime	Email Summary	UT Log	
6-Jan	8:00	20:00		19:20	0:40	20220106 0800-2000	Y	
6-Jan	20:00	8:00			12:00	20220106 2000-0800	N/A	
7-Jan	8:00	20:00		9:10	1:10	20220107 0800-2000	Y	
TOTAL RUN @ FLOW of 275								
				TIME	13:50			
				VOLUME	228250 Gallons			

Inside Controlled Industrial Area							
129	Shift		Flush Time			Documentation	
Date	Begin	End	Start	Stop	RunTime	Email Summary	UT Log
7-Jan	8:00	20:00		16:20	3:40	20220107 0800-2000	N
7-Jan	20:00	8:00		21:00	1:00	20220107 2000-0800	N
TOTAL RUN @ FLOW of 275							
				TIME	4:40		
				VOLUME	77000 Gallons		

Inside Controlled Industrial Area							
119	Shift		Flush Time			Documentation	
Date	Begin	End	Start	Stop	RunTime	Email Summary	UT Log
7-Jan	8:00	20:00		16:15	3:45	20220107 0800-2000	N
7-Jan	20:00	8:00		21:00	1:00	20220107 2000-0800	N
TOTAL RUN @ FLOW of 275							
				TIME	4:45		
				VOLUME	78375 Gallons		

Inside Controlled Industrial Area							
135	Shift		Flush Time			Documentation	
Date	Begin	End	Start	Stop	RunTime	Email Summary	UT Log
7-Jan	8:00	20:00		16:37	3:23	20220107 0800-2000	N
7-Jan	20:00	8:00		21:00	12:00	20220107 2000-0800	N
TOTAL RUN @ FLOW of 275							
TIME				15:23			
VOLUME				253825 Gallons			

179	Shift			Flush Time			Documentation	
Date	Begin	End	Start	Stop	RunTime	Email Summary	UT Log	
6-Jan	8:00	20:00		12:00	8:00	20220106 0800-2000	Y	
6-Jan	20:00	8:00			12:00	20220106 2000-0800	N/A	
7-Jan	8:00	20:00		12:07	4:07	20220107 0800-2000	Y	
TOTAL RUN @ FLOW of 275								
				TIME	24:07			
				VOLUME	397925 Gallons			

230	Shift			Flush Time			Documentation	
Date	Begin	End	Start	Stop	Run/Time	Email Summary	UT Log	
6-Jan	8:00	20:00		18:02		1:58 20220106 0800-2000	Y	
6-Jan	20:00	8:00				12:00 20220106 2000-0800	N/A	
7-Jan	8:00	20:00			10:21	2:21 20220107 0800-2000	Y	

TOTAL RUN @ FLOW of 275

TIME16:19

VOLUME269225 Gallons

236	Shift		Flush Time			Documentation	
Date	Begin	End	Start	Stop	RunTime	Email Summary	UT Log
6-Jan	8:00	20:00		18:30	1:30	20220106 0800-2000	N
6-Jan	20:00	8:00			12:00	20220106 2000-0800	N
7-Jan	8:00	20:00		10:15	2:15	20220107 0800-2000	Y
TOTAL RUN @ FLOW of 275							
				TIME	15:45		
				VOLUME	259875 Gallons		

Hydrant	Volume
105	72,325
111	228,250
119	78,375
128	61,875
129	77,000
135	253,825
179	397,925
230	269,225
236	259,875
TOTAL	1,698,675

6.7.3. The total volume flushed through the system was 1,699 KGal for 6 volumetric turnovers. Actual volumetric turnovers exceeded the minimum requirement.

6.8. SCADA DATA: SCADA was an effective tool when meters were located at both the entrance and exit of the zone. Due to the distribution network scale and lack of meters in this zone, information from SCADA provided limited use.



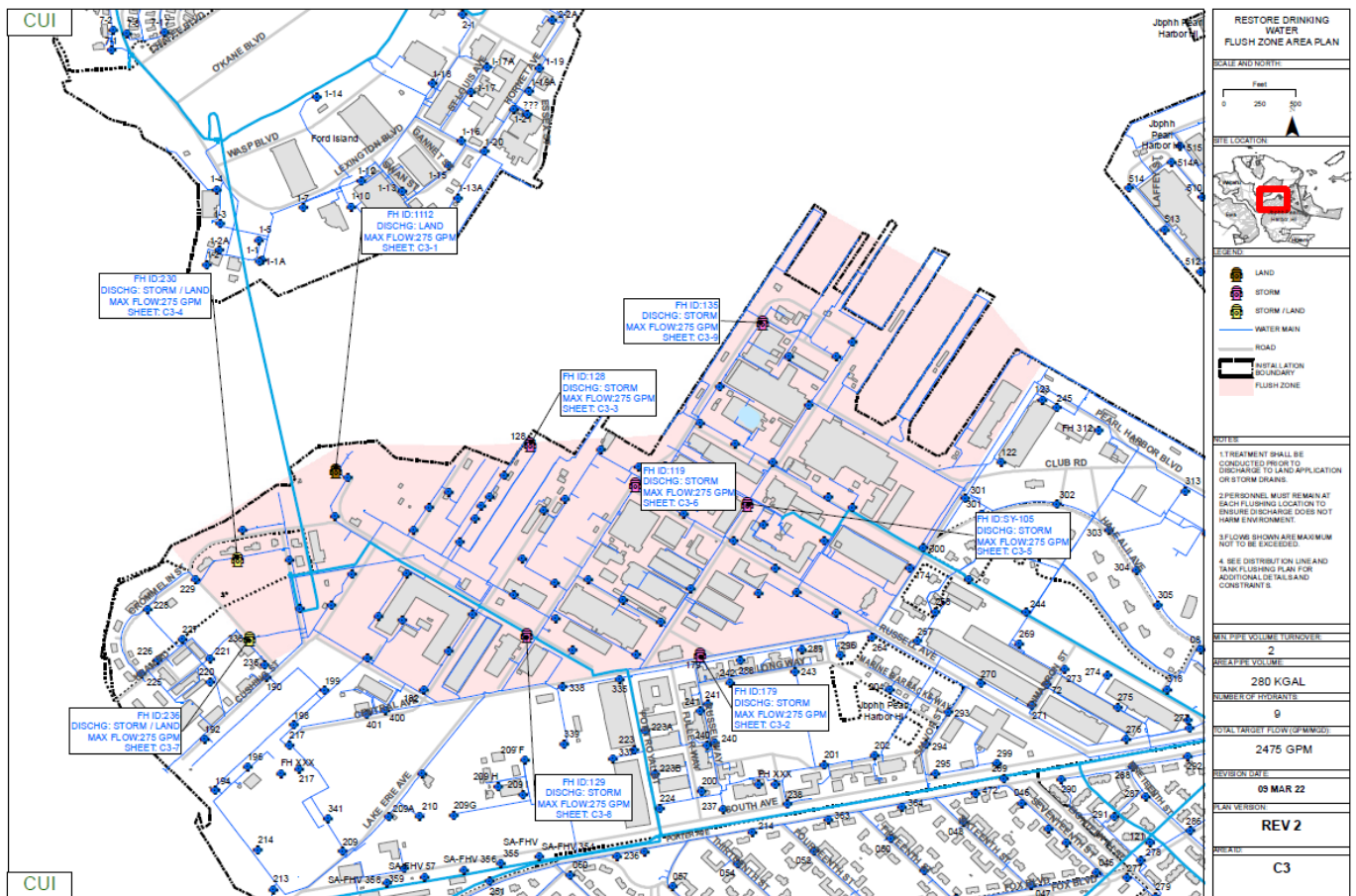


Figure 1: Flush Zone C3

*C.C. Chase*  
CLEAR, CUT, USE

C. C. CHASE

February 15, 2022

From: Naval Facilities Engineering Systems Command Representative, IDWS Team  
To: Interagency Drinking Water System Team

SUBJ: VALIDITY AND APPLICATION OF VOLUMETRIC EXCHANGE METHOD

Ref: (a) Drinking Water Distribution System Recovery Plan, December 2021

Encl: (1) Dr. Whelton email documenting volumetric exchange method dtd 08 JAN 22

1. This letter documents the basis of the volumetric exchange method used in the development of reference (a). The basis of the flushing method was based on two key recommendations from Dr. Whelton, who served as the Navy's consultant in the early stages of the incident. Enclosure (1) documents key recommendations from Dr. Whelton which included flushing from a clean source, systematically moving through the entire system, and flushing at least three times the pipe volume. Rules of three is what Dr. Whelton generally recommends.

2. Reference (a) incorporated the recommendations from Dr. Whelton by creating a flushing sequence that began with clean water from the Waiawa shaft and flushing systematically through the entire system. The volumetric exchanges for each zone and zone flushing sequence plan was developed by Navy engineers. This is outlined in table 2.4, Distribution System Recovery Plan Diagram, and section 2.5, Flushing Plan Phasing, of reference (a). A safety factor was applied to the rule of three to obtain five volumetric turnovers for the phase 1 zone areas. Phase 2 zone areas had three volumetric turnovers. Phase 3 zone area had two volumetric turnovers and phase 4 zone areas had one volumetric turnover. The phase 3 and phase 4 zone volumetric turnover determinations were made after considering the up-gradient zone flushing volumes and the non-potable use of water in the zones.

3. I certify under penalty of law that I have personally examined and I am familiar with the information submitted and the submitted information is true, accurate, and complete.

MENO.MICHAEL.WAYNE.JR. Digitally signed by  
MENO.MICHAEL.WAYNE.JR.  
1088310035 Date: 2022.02.15  
07:17:55 -10'00'

M. W. Meno  
Captain, U.S. Navy Civil Engineer Corps

**\*\*Phone numbers have been redacted\*\***

**From:** Whelton, Andrew J <[REDACTED]>  
**Sent:** Saturday, January 8, 2022 4:58 AM  
**To:** Lee, Andre K (NAVFAC HI BD) CIV USN NAVFAC HAWAII PEARL (USA) <[REDACTED]>  
**Cc:** Isaacson, Kristofer P <[REDACTED]>; Proctor, Caitlin Rose <[REDACTED]>  
**Subject:** [URL Verdict: Neutral][Non-DoD Source] RE: Cross Connection Control Plan and Flushing Plan documentation requirements for DoH

LCDR Daly,

I am free to talk later this afternoon today if you want. I'm Mountain Standard Time.  
Below is some information.

Andy  
[REDACTED]

#### FEEDBACK

1. You applied unidirectional flushing and if you opened hydrants fully you likely maximized velocity in the pipes you were flushing. The issue they seem to be getting at is scouring velocity which you identify. This is used for removing sediment (typical cleaning of water pipes) as you know. There is no SOP for water contamination response and recovery, so you applied standard water distribution system maintenance practice of unidirectional flushing. This is good. The state I think invoked water main disinfection standard which, to my knowledge isn't applicable here unless you conducted shock disinfection.
  - a. For perspective, per a Water Research Foundation study: Microbial Control Strategies for Main Breaks and Depressurization, Project 4307. Published 2014. Denver, Colorado.
    1. Scouring velocity helps removed sediment from water mains/pipes. To achieve 2.5 to 3 log removal of sand particles for 4-to-16-inch diameter PVC pipes, 3 ft/s is needed.
    2. In that report, to achieve this removal for a 6-inch diameter PVC pipe, Q was 308 GPM
    3. In that report, to achieve this removal for 4-inch diameter PVC pipe, Q was 137 GPM
  - b. We recommended starting flushing from the clean water source and moving systematically through the entire system in a unidirectional way. If you all did this, be sure to explain that. That helps minimize the change residual "old" water gets untouched, or is left in the system.
  - c. You could calculate scouring velocities in each of the areas. If any are lower than desired you can go back and just keep repeat flushing giving an added level of safely.
  - d. The state's interest in scouring velocity may be of concern that (JP-5?) free product adsorbed to sediment/scales and they want to be certain it got scoured out. If it didn't, it could dissolve it's constituents into water over time.
  - e. Dead-ends are really important. You need to specifically address how you will get that water out. In West Virginia, many weeks after the spill and utility had flushed out the black-licorice smelling contaminated water out someone in a distal part of the system complained about odor. To my recollection the utility thought it was psychological, but it turned out there was a dead-end they didn't flush. Somehow that contaminated water got drawn into a nearby home and someone was exposed.

- f. Question: How long was each hydrant open typically?
  - g. I think we mentioned flushing 3 times the pipe volume. Rules of three is what I often recommend. Flushing velocity is certainly important. I vaguely remember NAVFAC had contracted a consultant to create the flushing plan.
2. JP-5 isn't a single contaminant which we've talked about before. It's a mixture of 100s-1000s of individual chemicals. Even if JP-5 itself is hydrophobic and primarily found in emulsions or floating on the surface, some of these constituents will still diffuse into the water itself. The question they are likely after is how do you know you removed all parts of JP-5 that may have gotten entrained in the water system? This goes back to what chemicals are you testing for in the water distribution system. JP-5 constituents have different water solubility and octanol-water partitioning coefficients (Log Kow = How much they like to be in biofilm and plastics, not water). Additionally, the different materials (Metal vs PVC vs HDPE vs. gaskets) may be more prone to soaking up some JP-5 contaminants and not others depending on their characteristics. For example, PVC has been shown to be less susceptible to soaking up some crude oil-based contaminants than HDPE pipes (Huang et al. study with Whelton). Ultimately, the fate of the chemicals in the drinking water system will not be the same for all JP-5 constituents. Remember the drawing I drew on the whiteboard when meeting with CDR Chase, NAVFAC, COE, and Army? It showed different constituents may be in different parts of the water system. That's what DOH is likely after. Question to you: What wide screen testing have you done in the water distribution system since December 22? This can help you hunt down that the contaminants are present or gone.
  3. Escalation should be based on how much flushing you are okay with trying. If you want to remove and replace infrastructure (that has sometimes happened after other contamination events on the mainland and overseas), it's a viable but laborious option. As an extreme example, following the Camp Fire it was estimated it would take over a year of continuous flushing to return some contaminated pipes to safe use, so for some conditions they removed and replaced pipes. However, this flushing timeline will vary significantly depending on the water distribution systems and water testing results – AND chemicals or individual JP-5 constituents present. If I knew what the chemicals were still being found and what was done to try to get rid of them, I could give a more informed opinion. Food grade surfactants were used in Israel after a drinking water contamination incident...BUT using surfactants is not trivial and can cause all sorts of damage to water system components and leave residual. This probably isn't an email, but more discussion. Happy to talk. If you decide you want to go this way we should be more engaged technically in what this means. It's not likely an email response/effort, but more involved.
  4. Here's a paper where we reviewed petroleum (and other material) drinking water distribution and plumbing contamination incidents and flushing [Decontaminating chemically contaminated residential premise plumbing systems by flushing - Environmental Science: Water Research & Technology \(RSC Publishing\) DOI:10.1039/C5EW00118H](https://doi.org/10.1039/C5EW00118H). Unfortunately, when we went to

review the underlying evidence of each incident, often the utility and state didn't document much. Even incidents overseas had little documentation. It seems groups simply tried something, it did or didn't work, and they moved on. They also didn't sample much and rarely it an entire water distribution system that was affected.

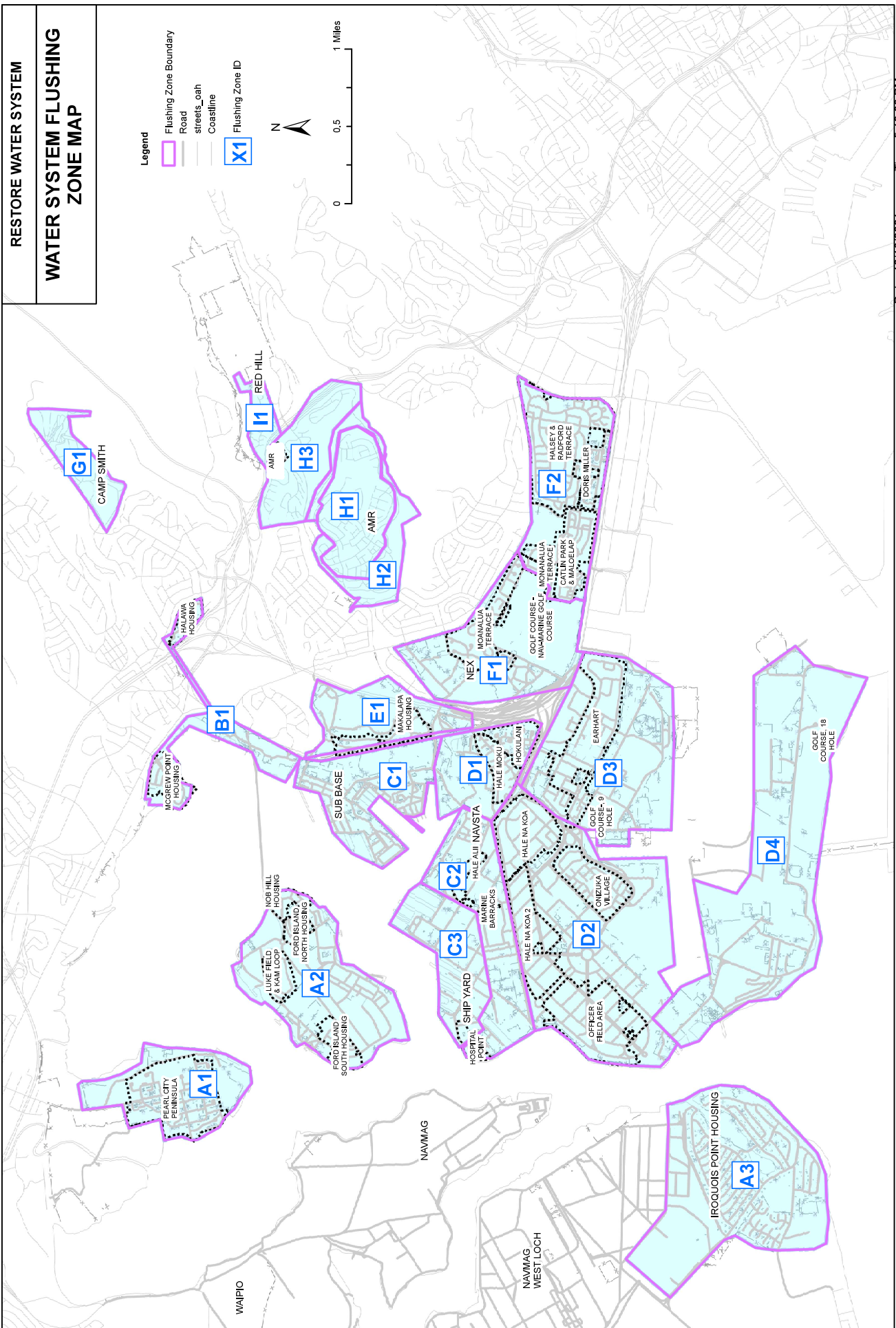
Again, I can get on a zoom call or phone this afternoon MST to connect. I was called into the Colorado wildfires to help the communities identify and design water sampling and recovery plans. We're getting data every day and meeting with state and federal agencies. This is the Marshall Fire and Middle Fork Fire. I apologize for the delayed response.

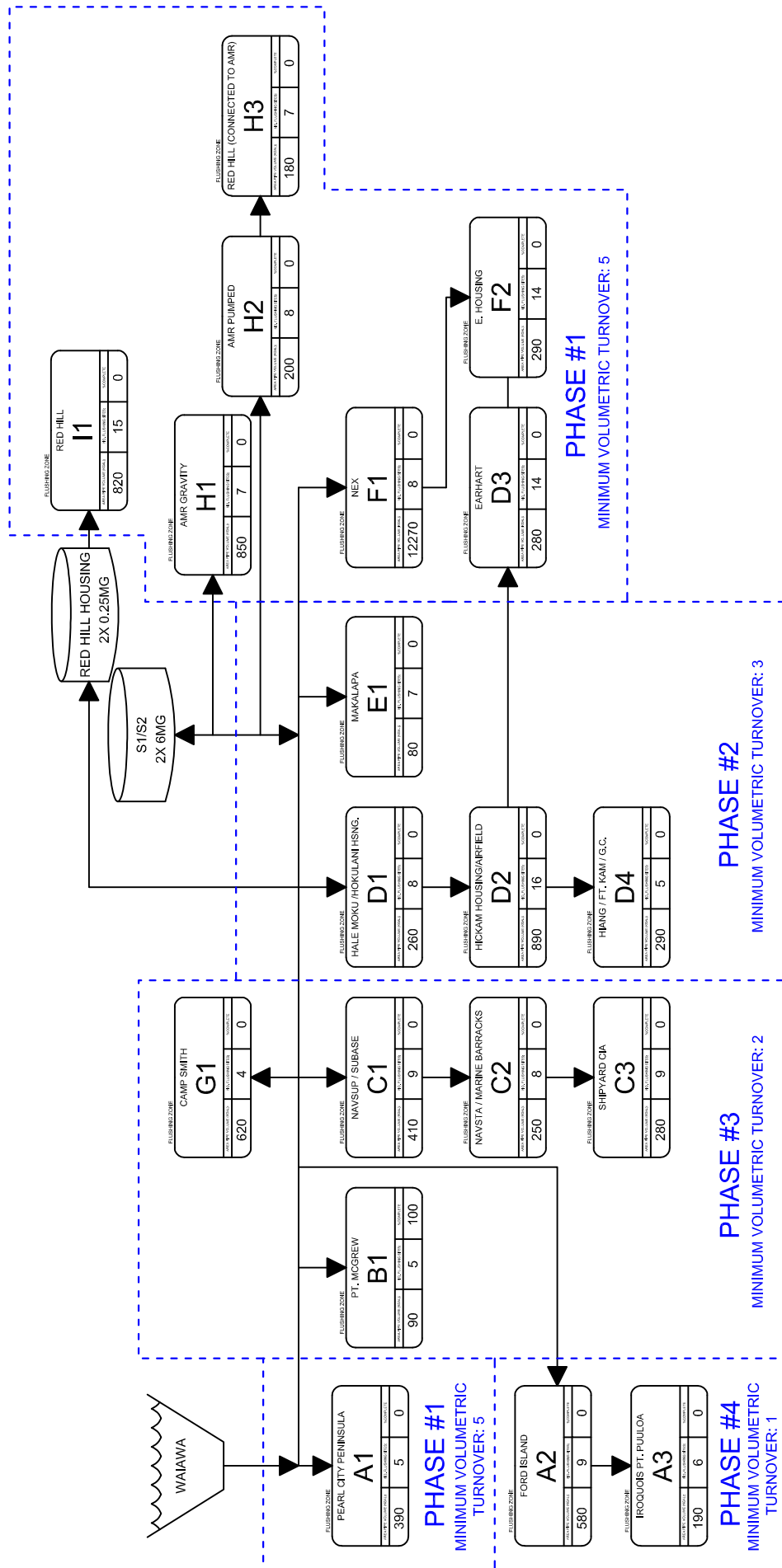
Andy

Cell/text: [REDACTED]

\*\*Link to Dr.Whelton's Paper: <https://pubs.rsc.org/en/content/articlelanding/2015/ew/c5ew00118h>







Section 2a.3 Hydraulic Model



# JBP HH Hydraulic Model

Interagency Drinking Water Supply Team

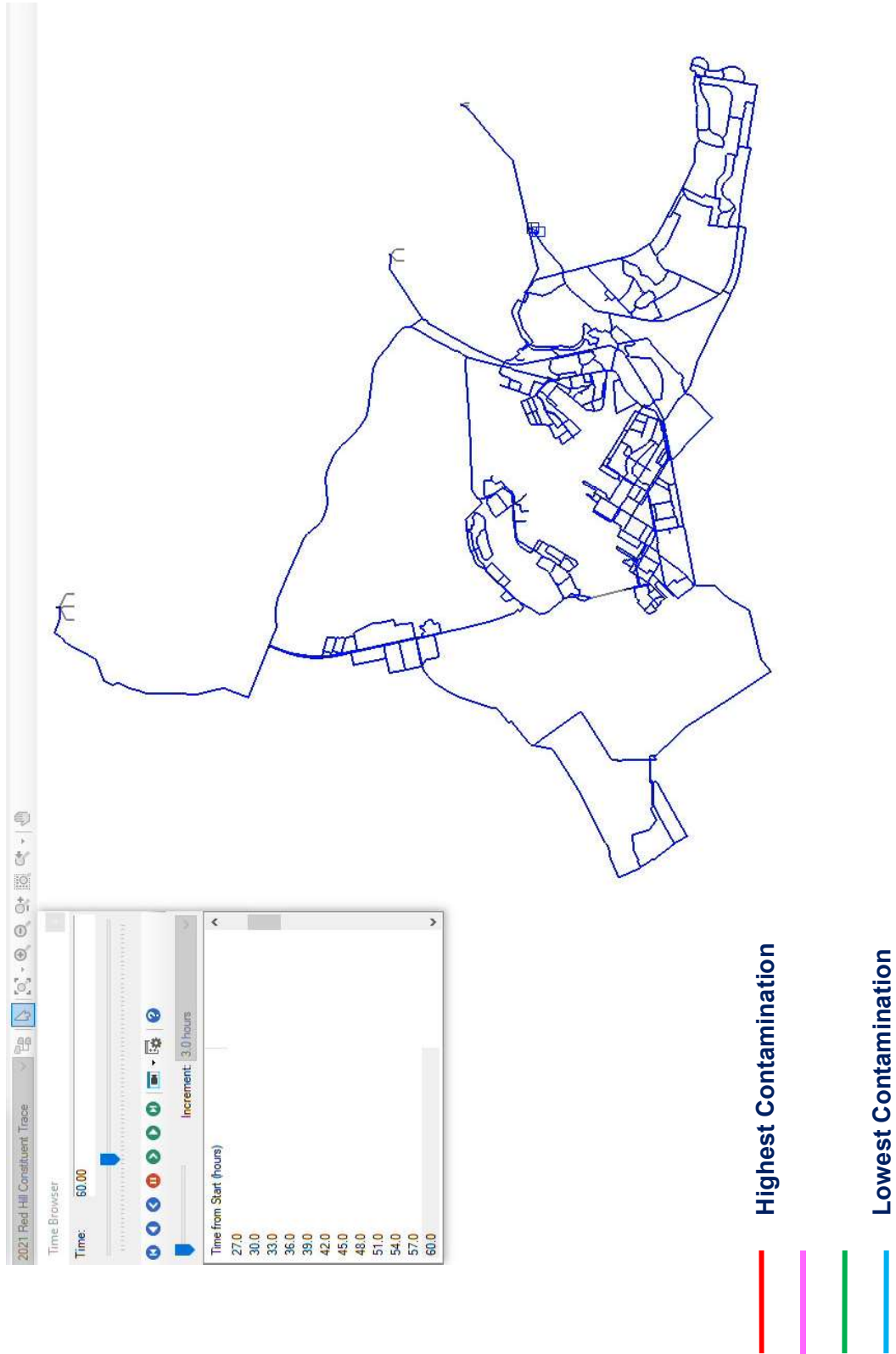
*18 January 2022*

CONTROLLED UNCLASSIFIED INFORMATION//CUI

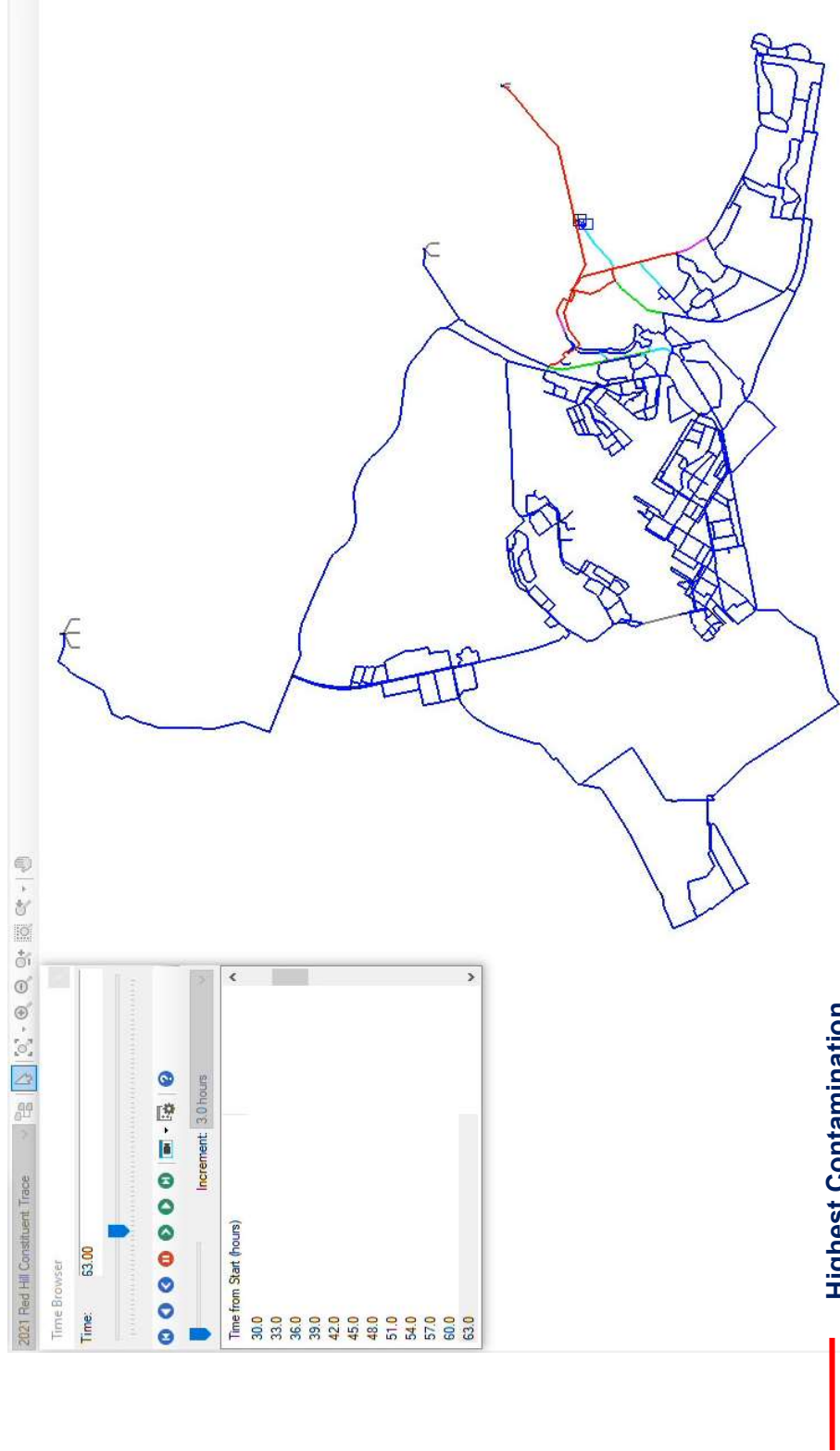




# JBP HH Hydraulic Model

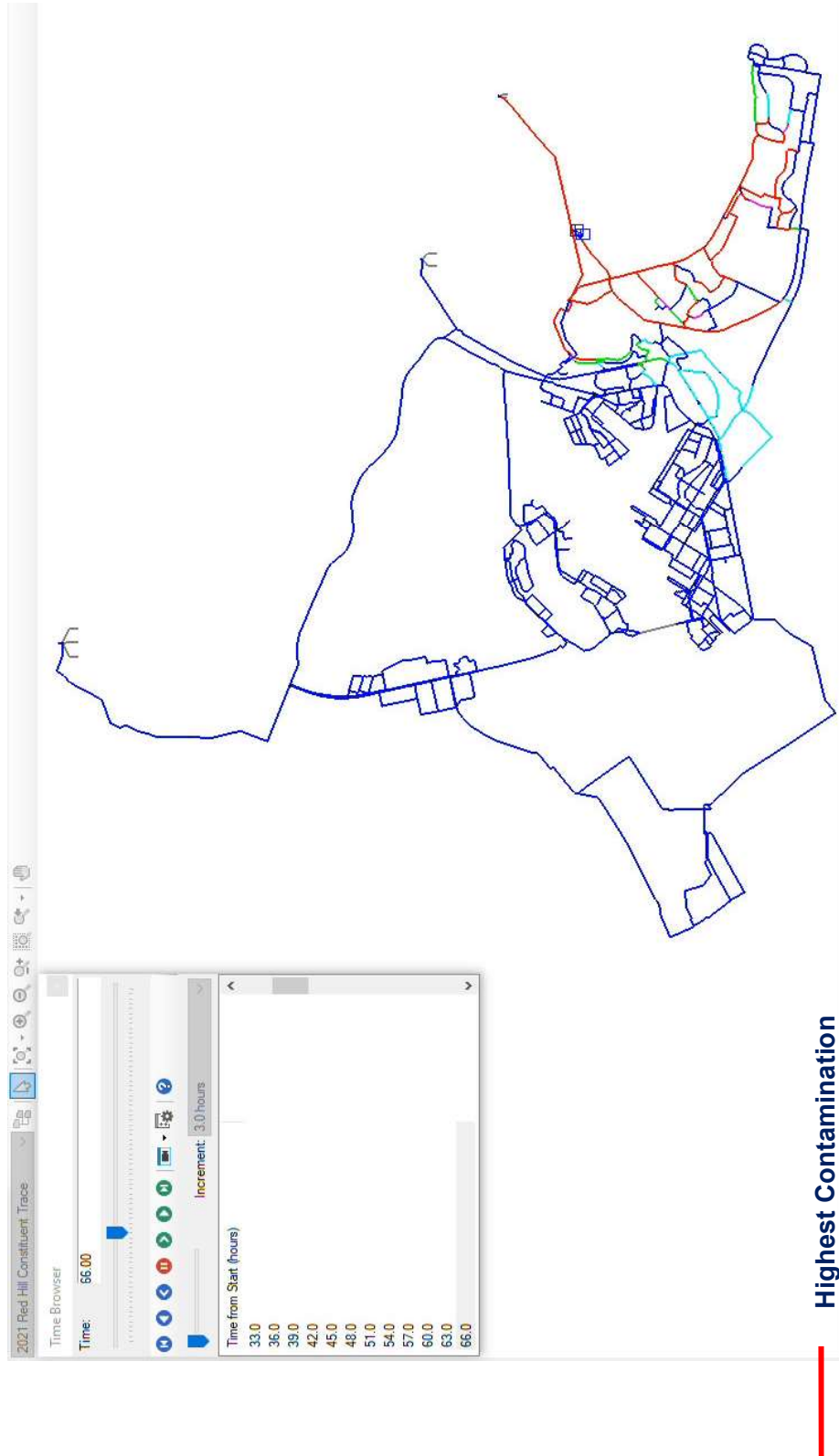


# JBP HH Hydraulic Model



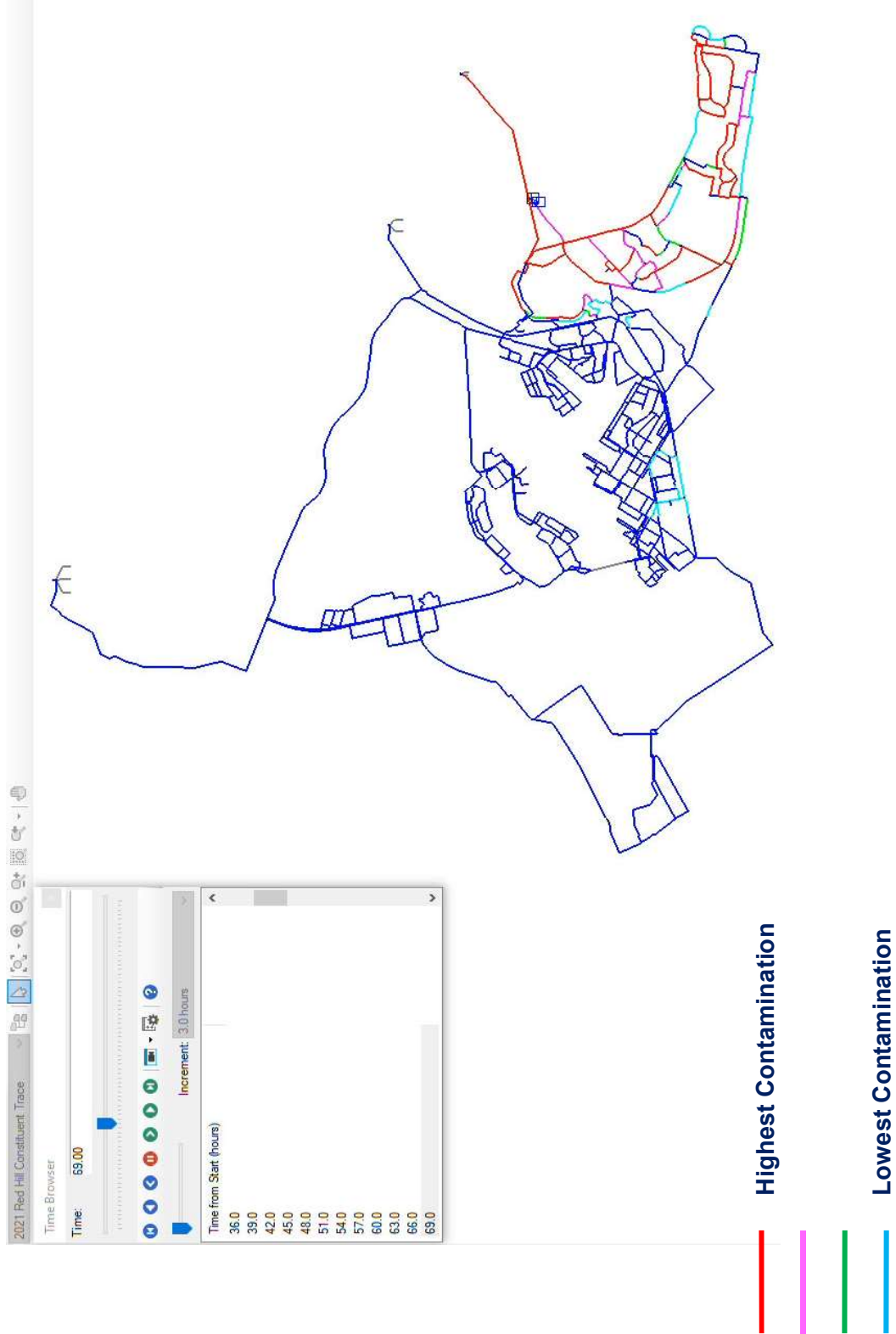


# JBP HH Hydraulic Model



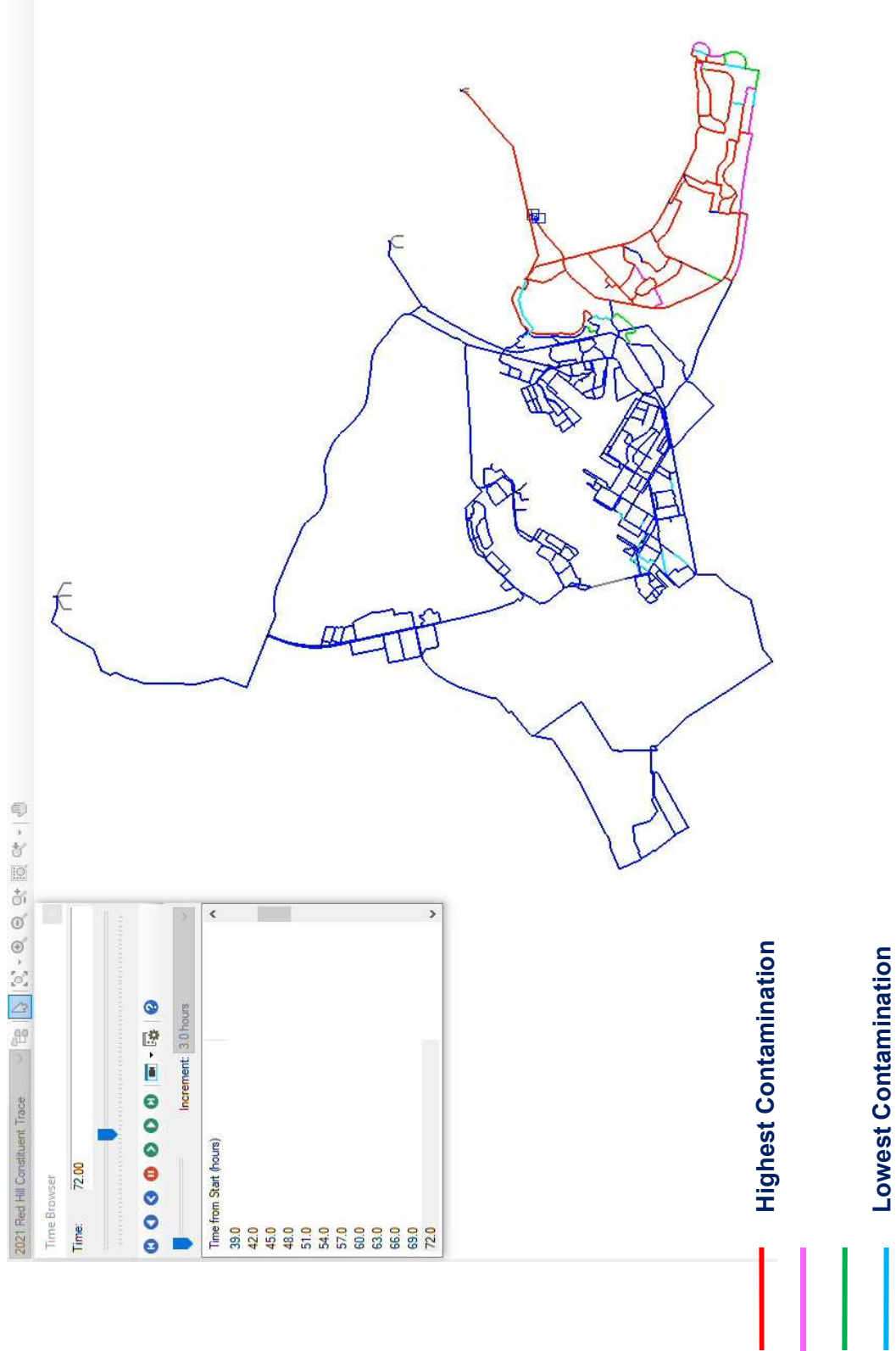


# JBP HH Hydraulic Model

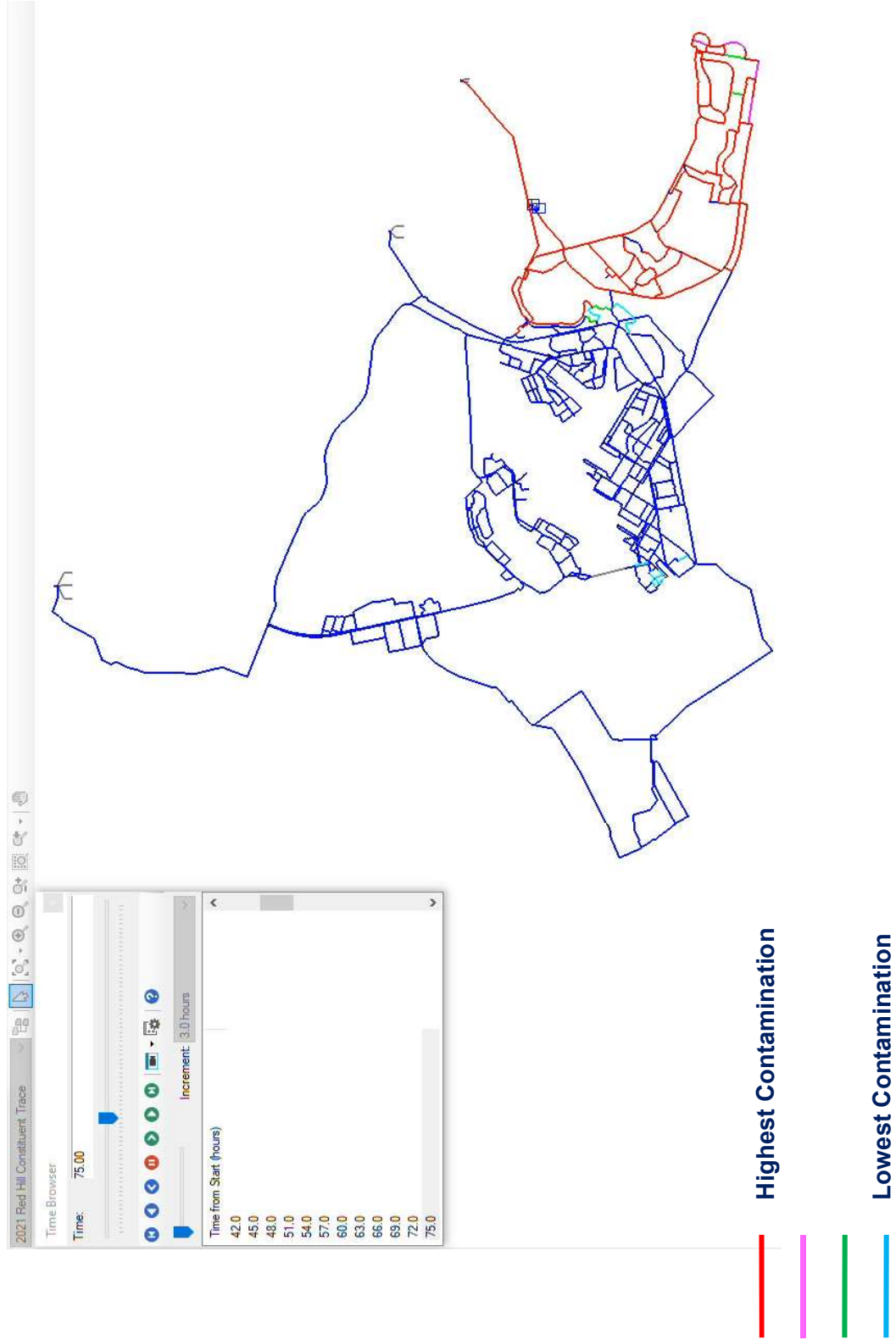




# JBP HH Hydraulic Model



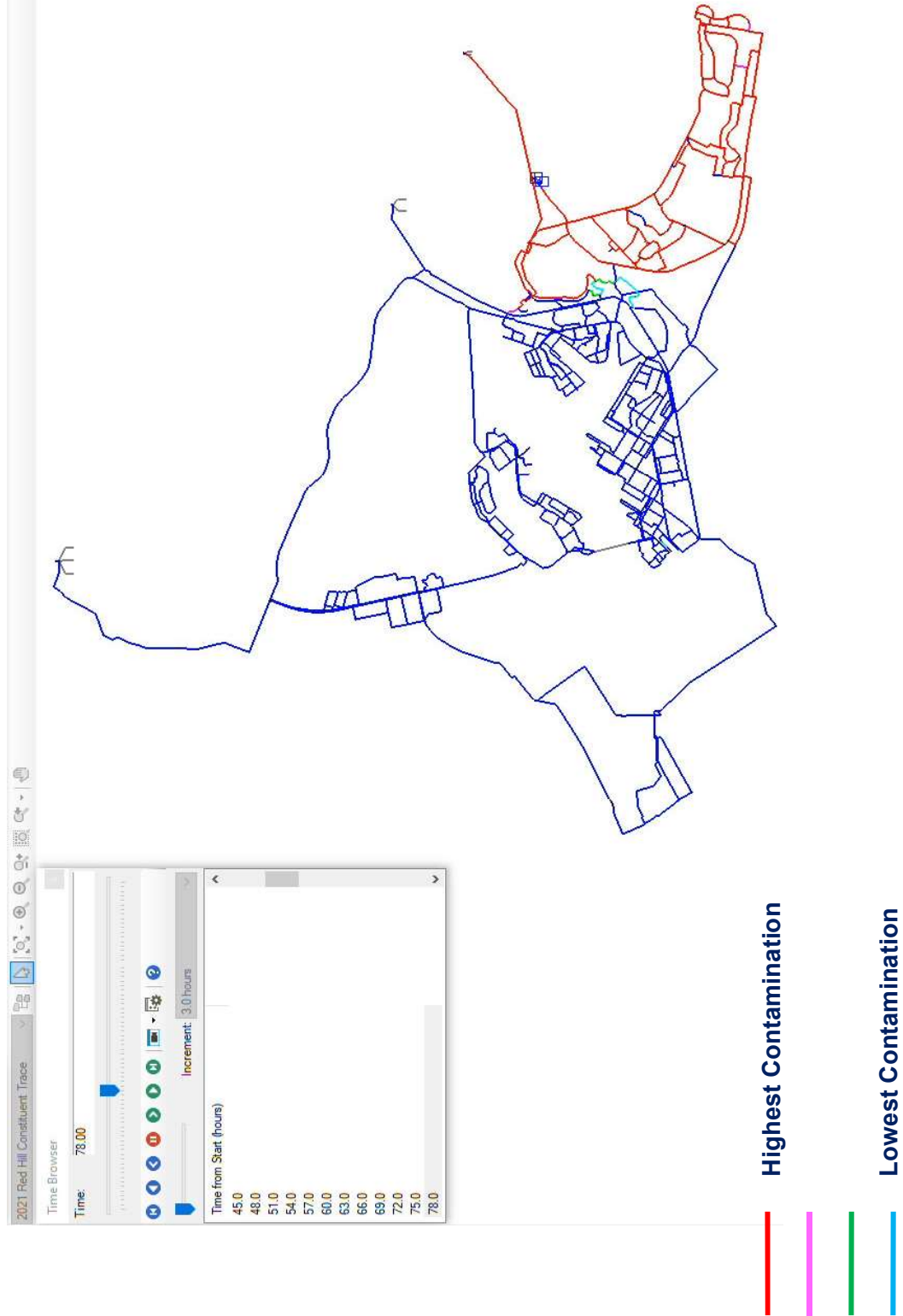
# JBP HH Hydraulic Model





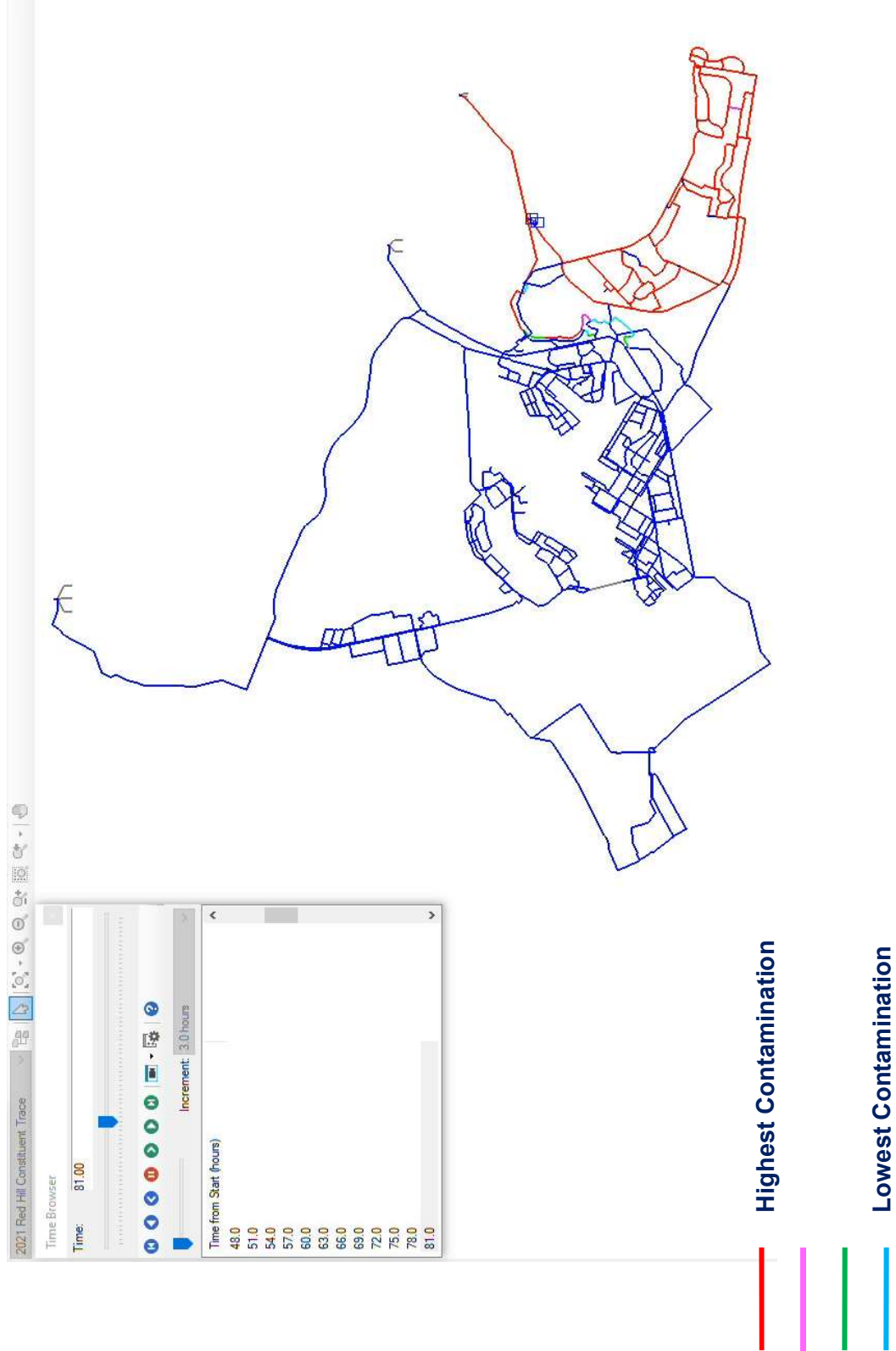


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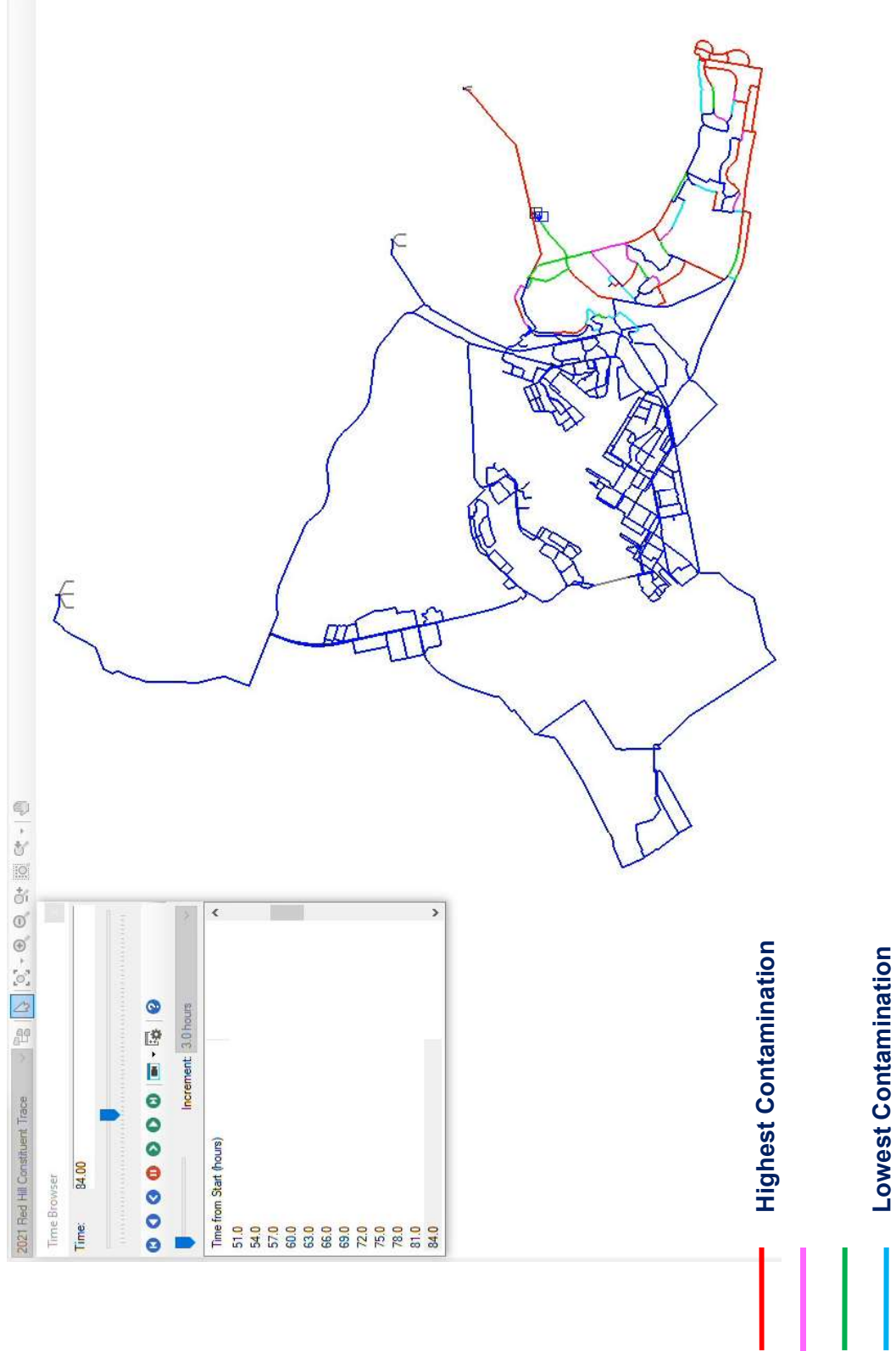


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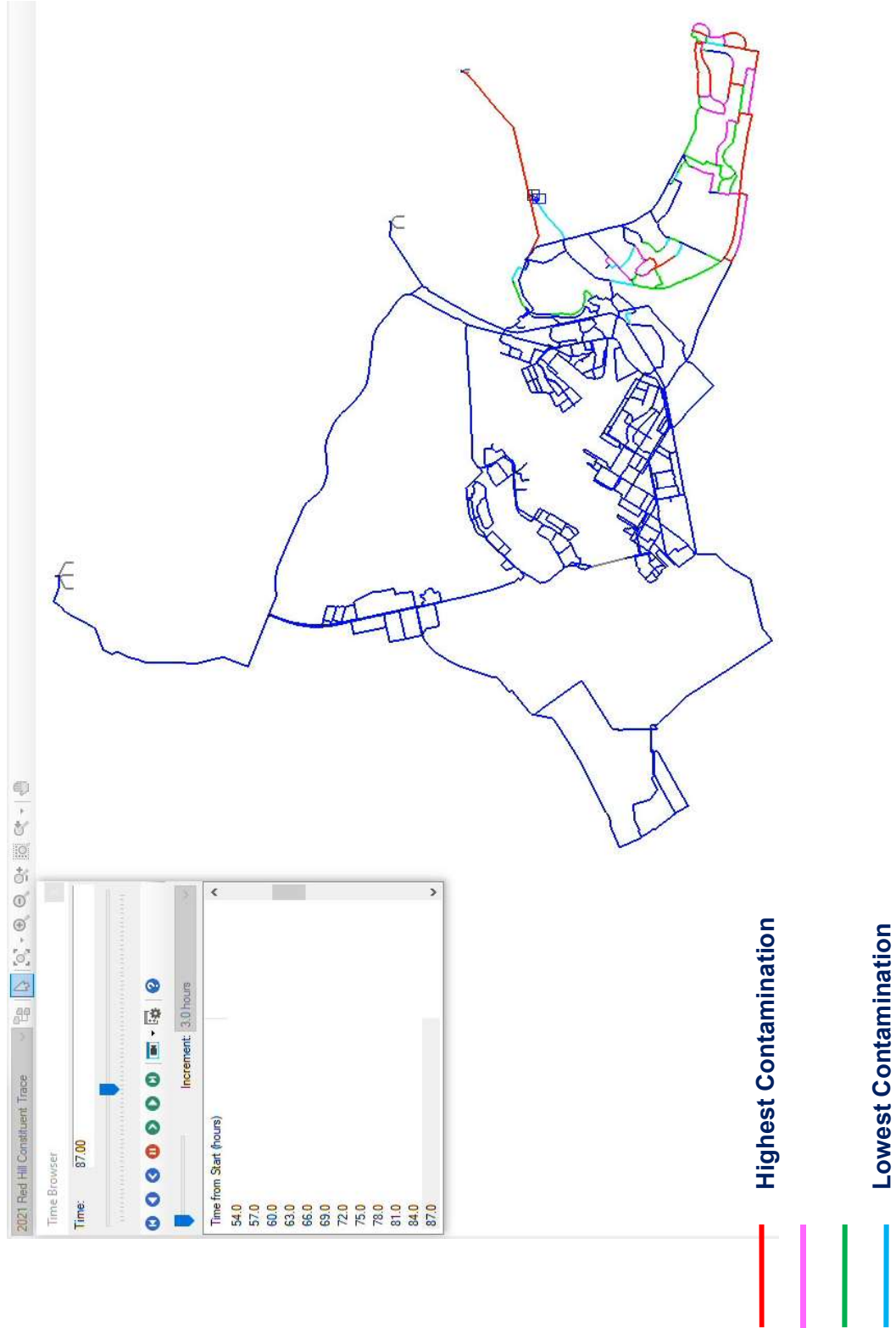


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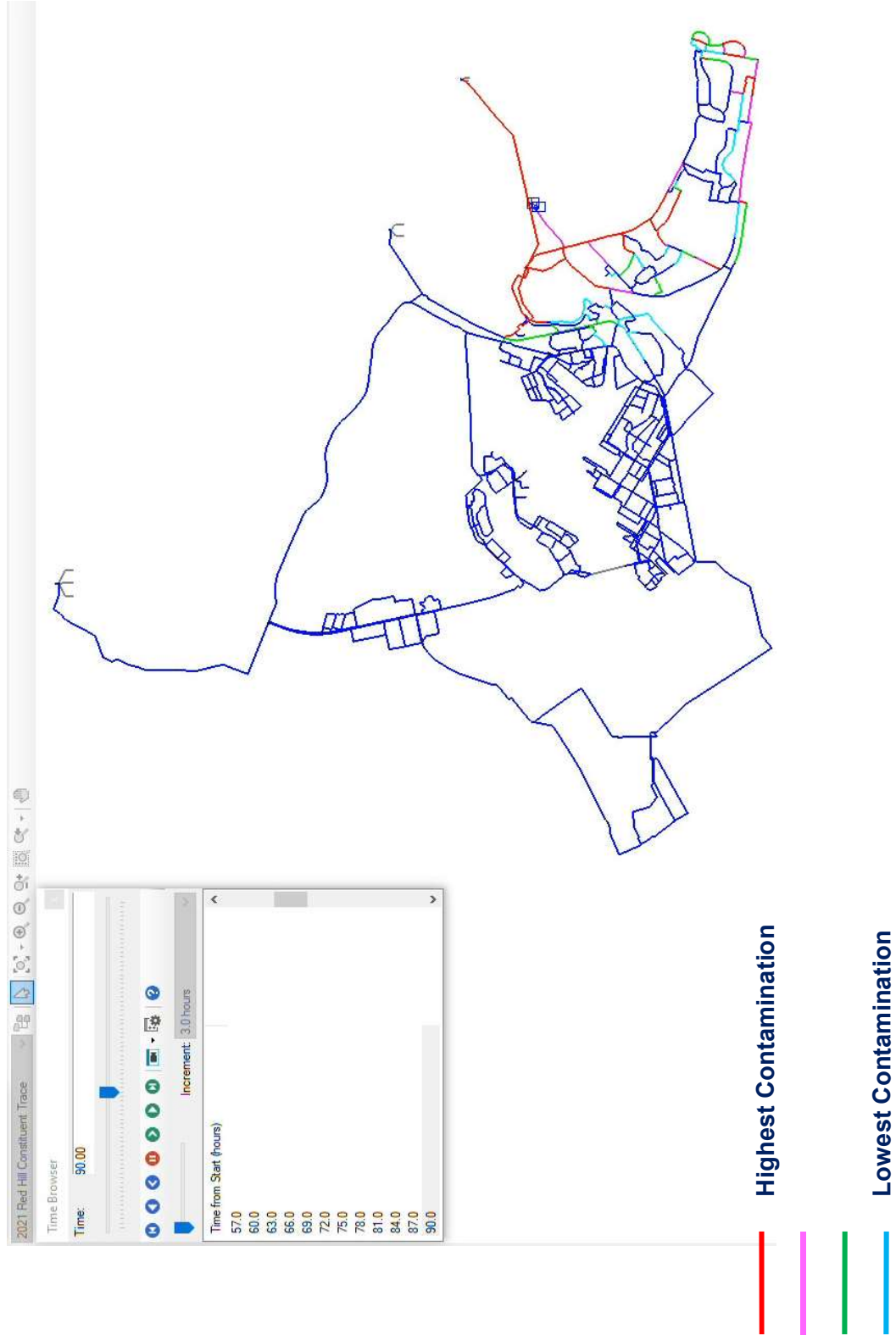


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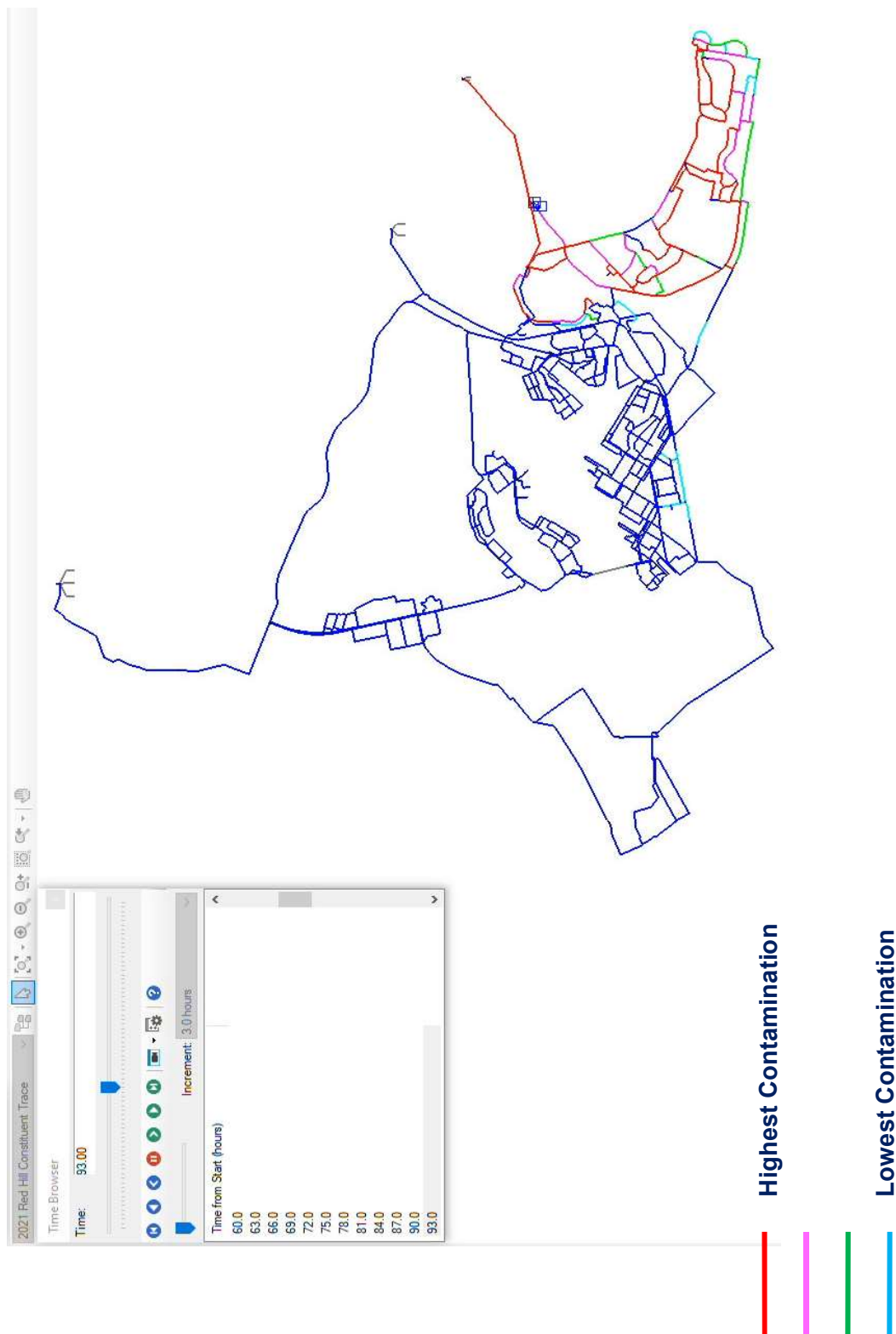


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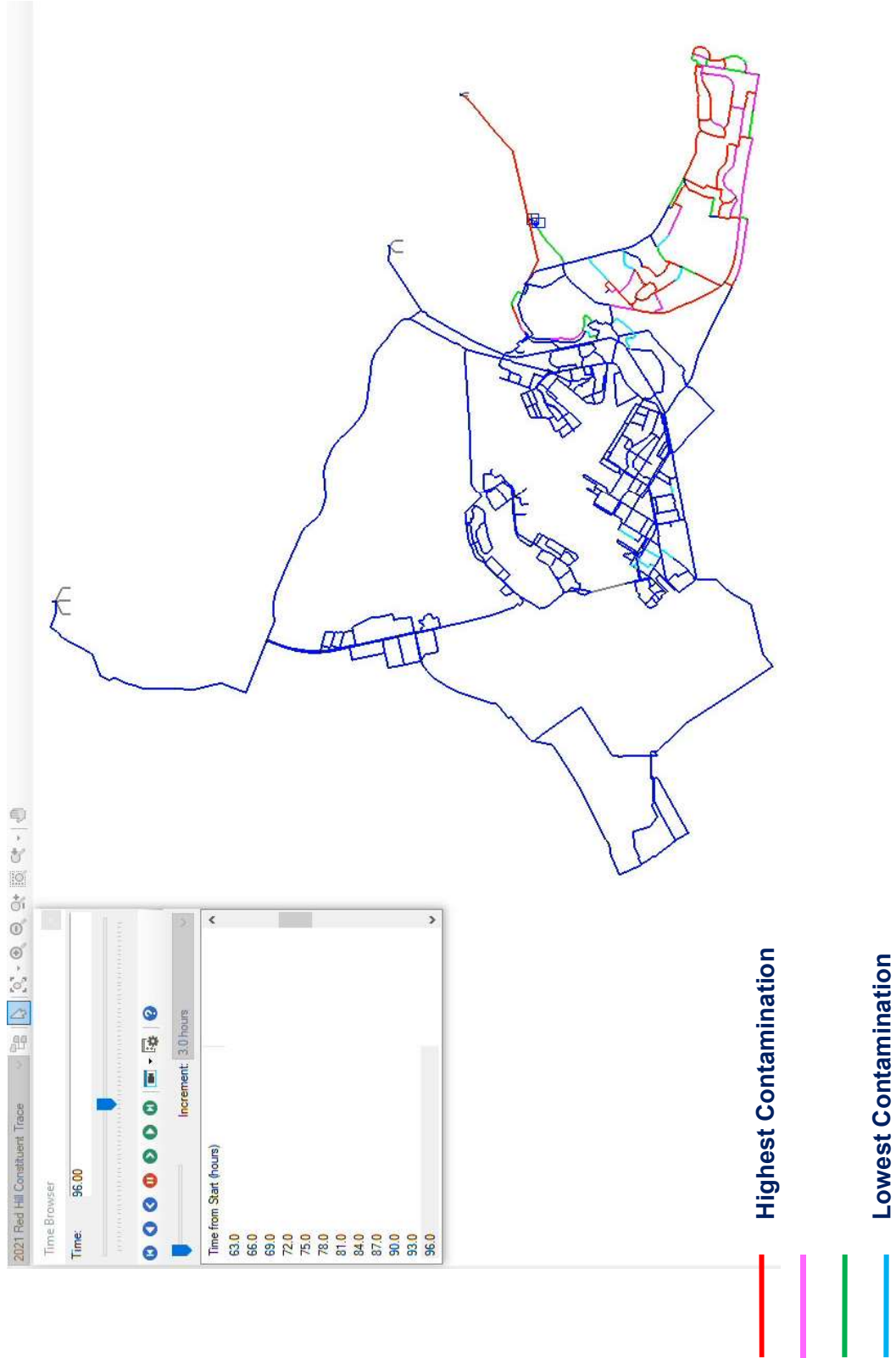
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# JBP HH Hydraulic Model



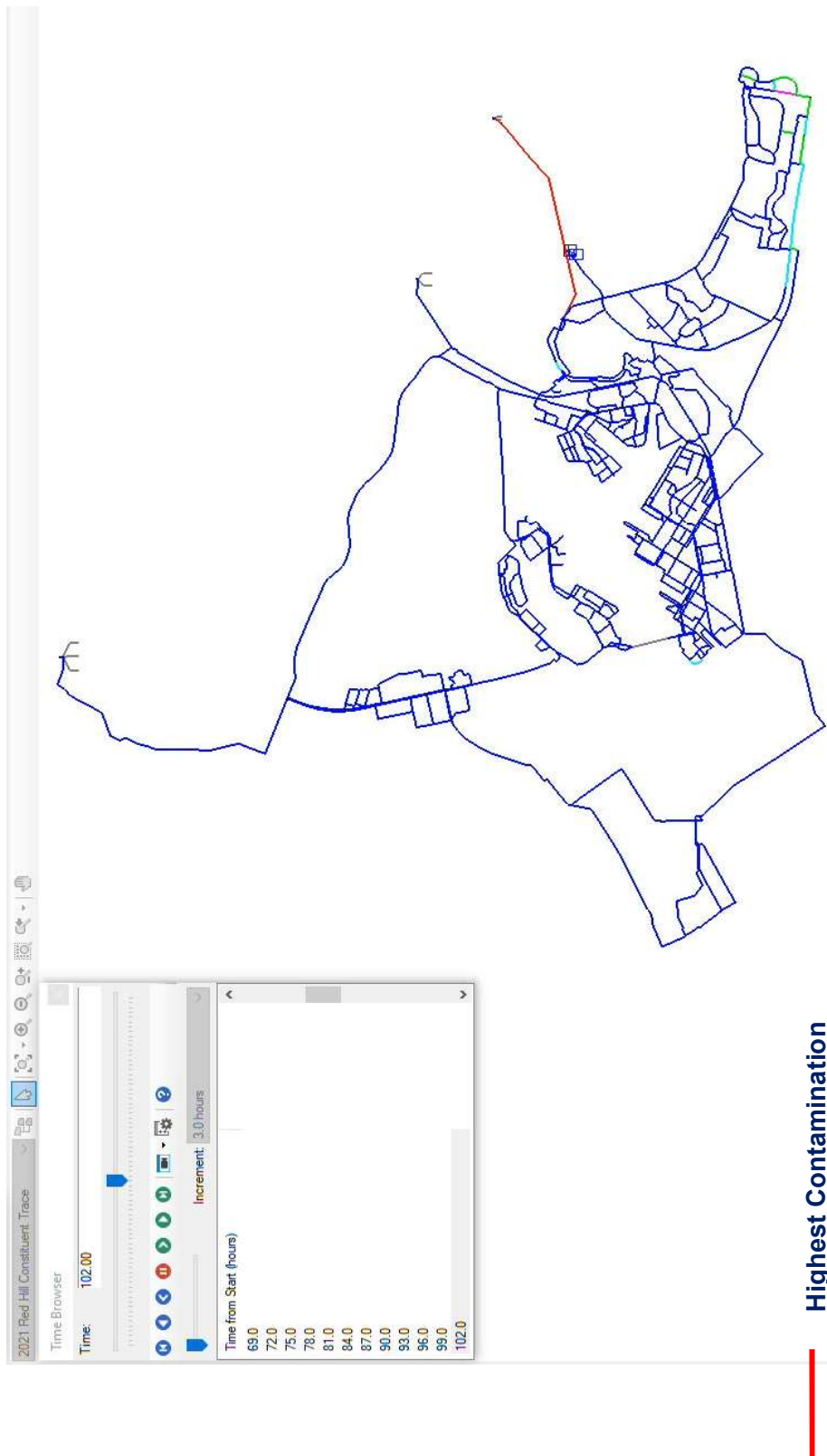


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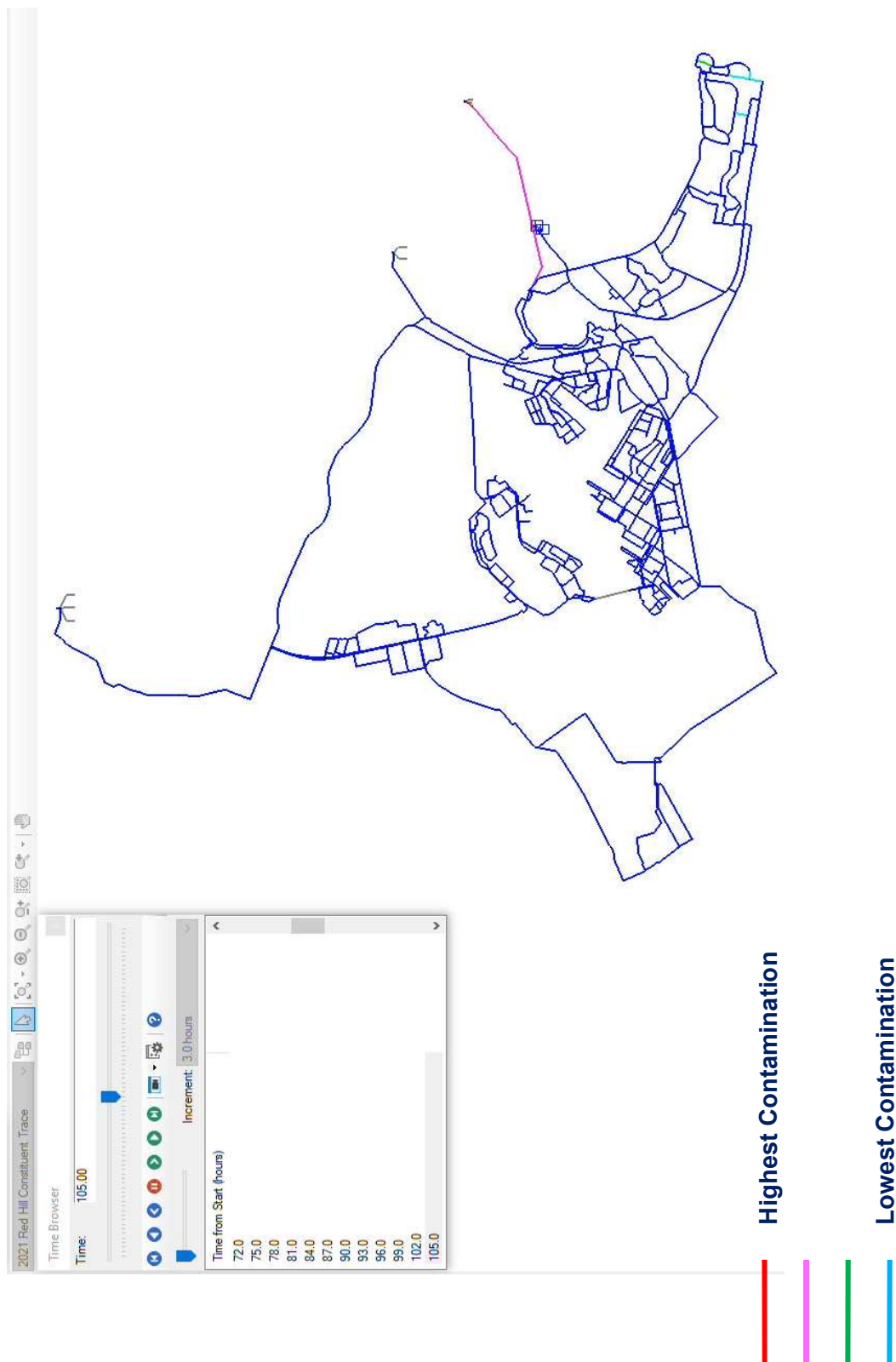


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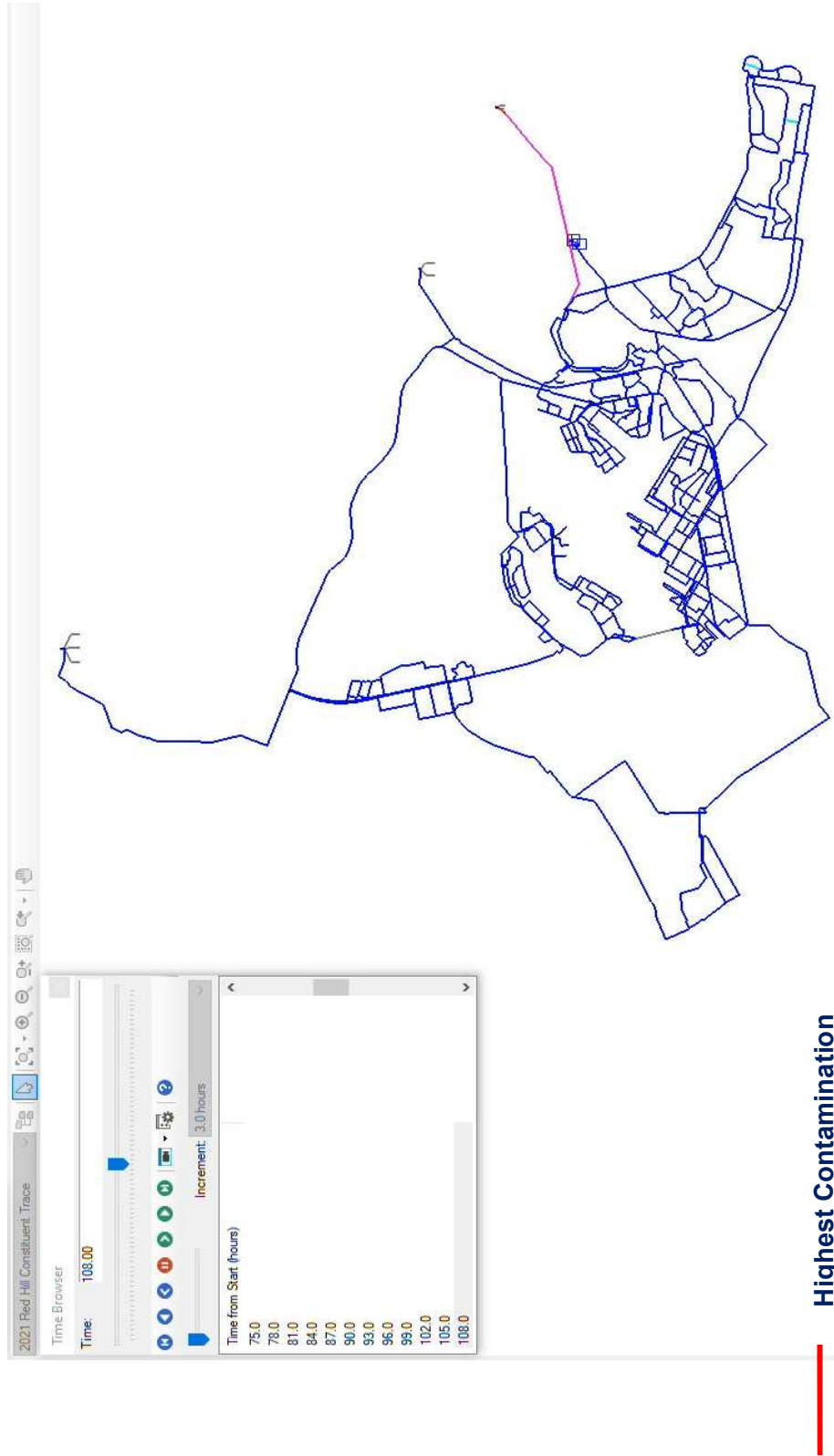


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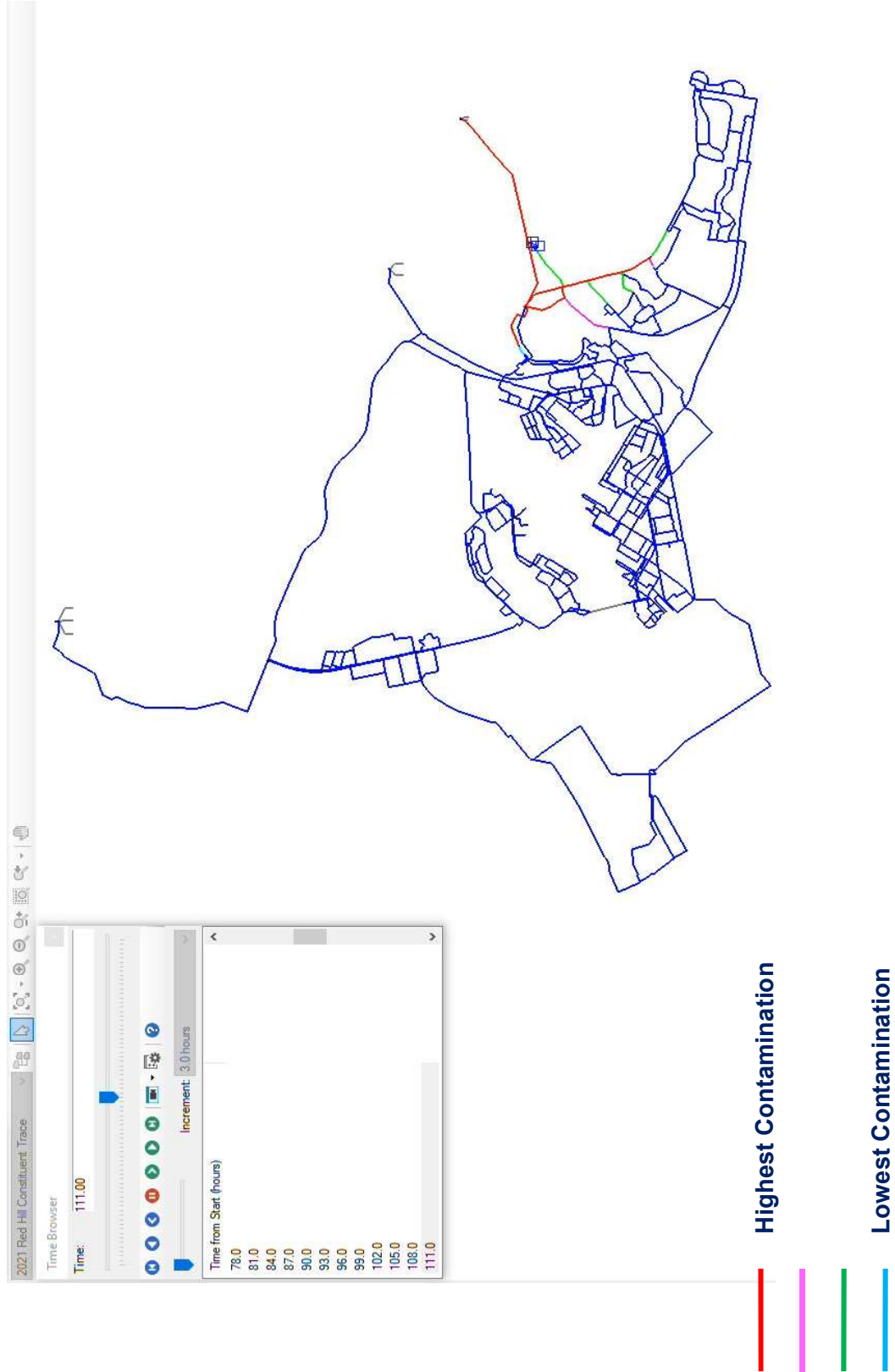


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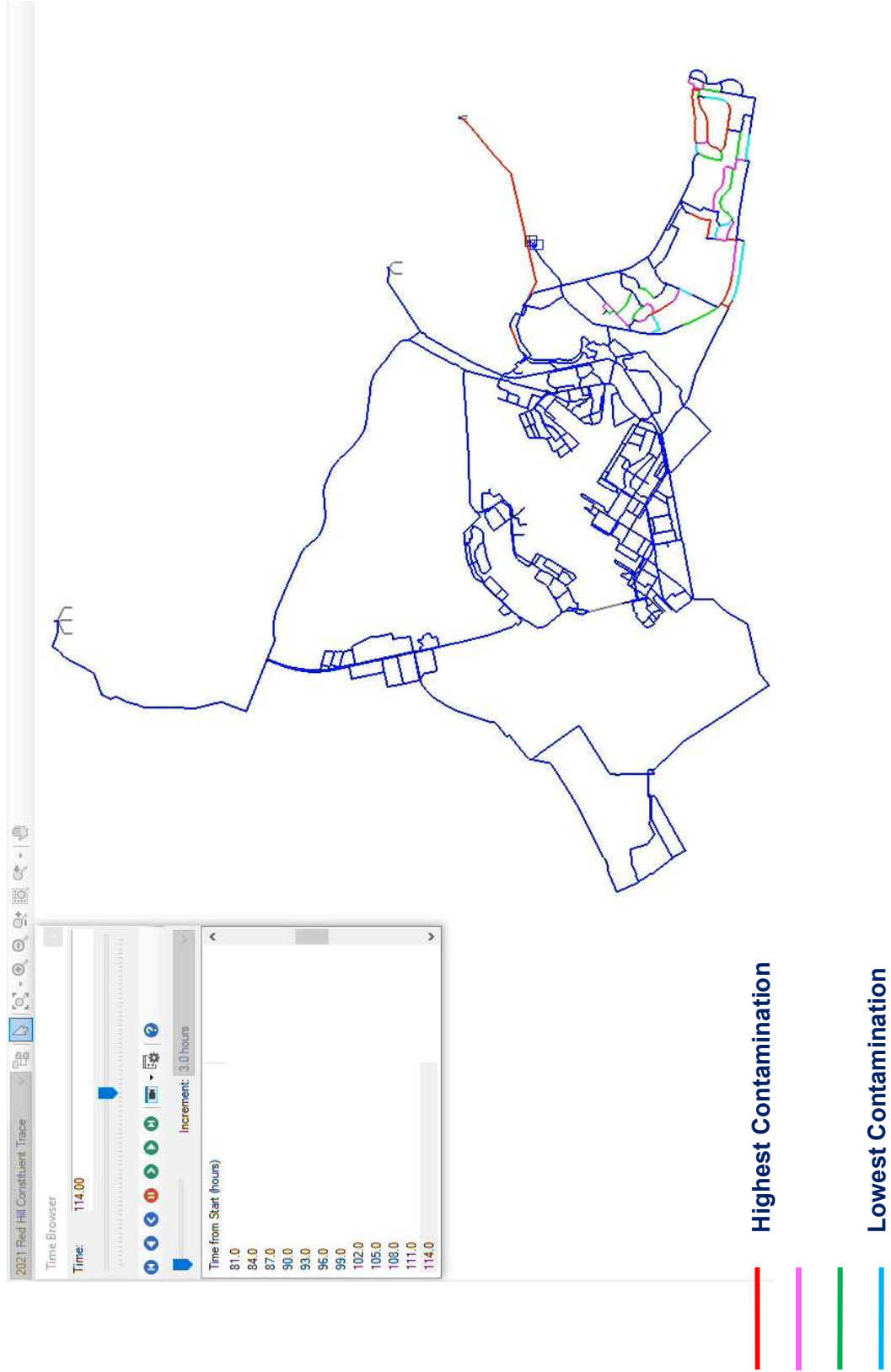




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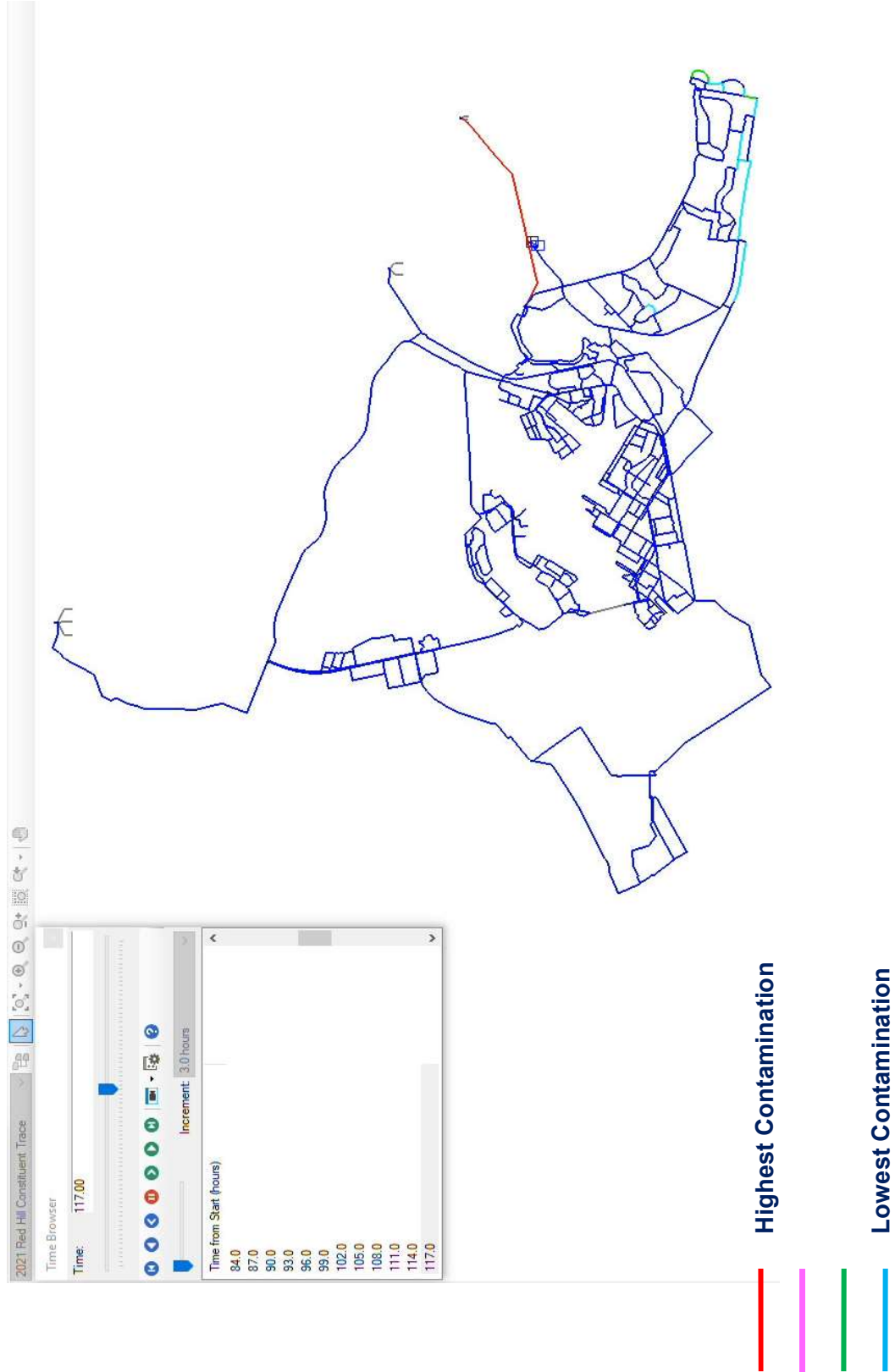


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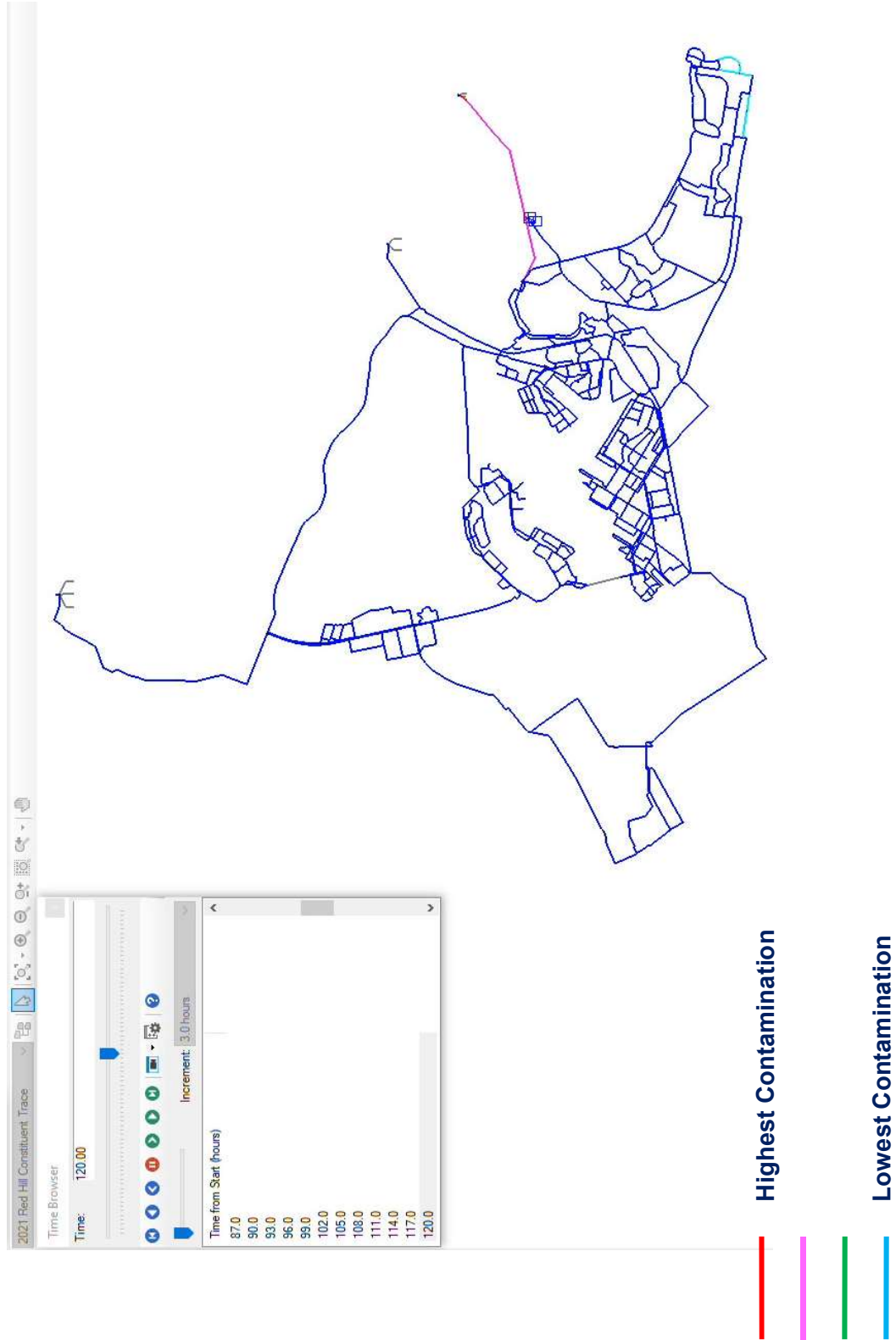


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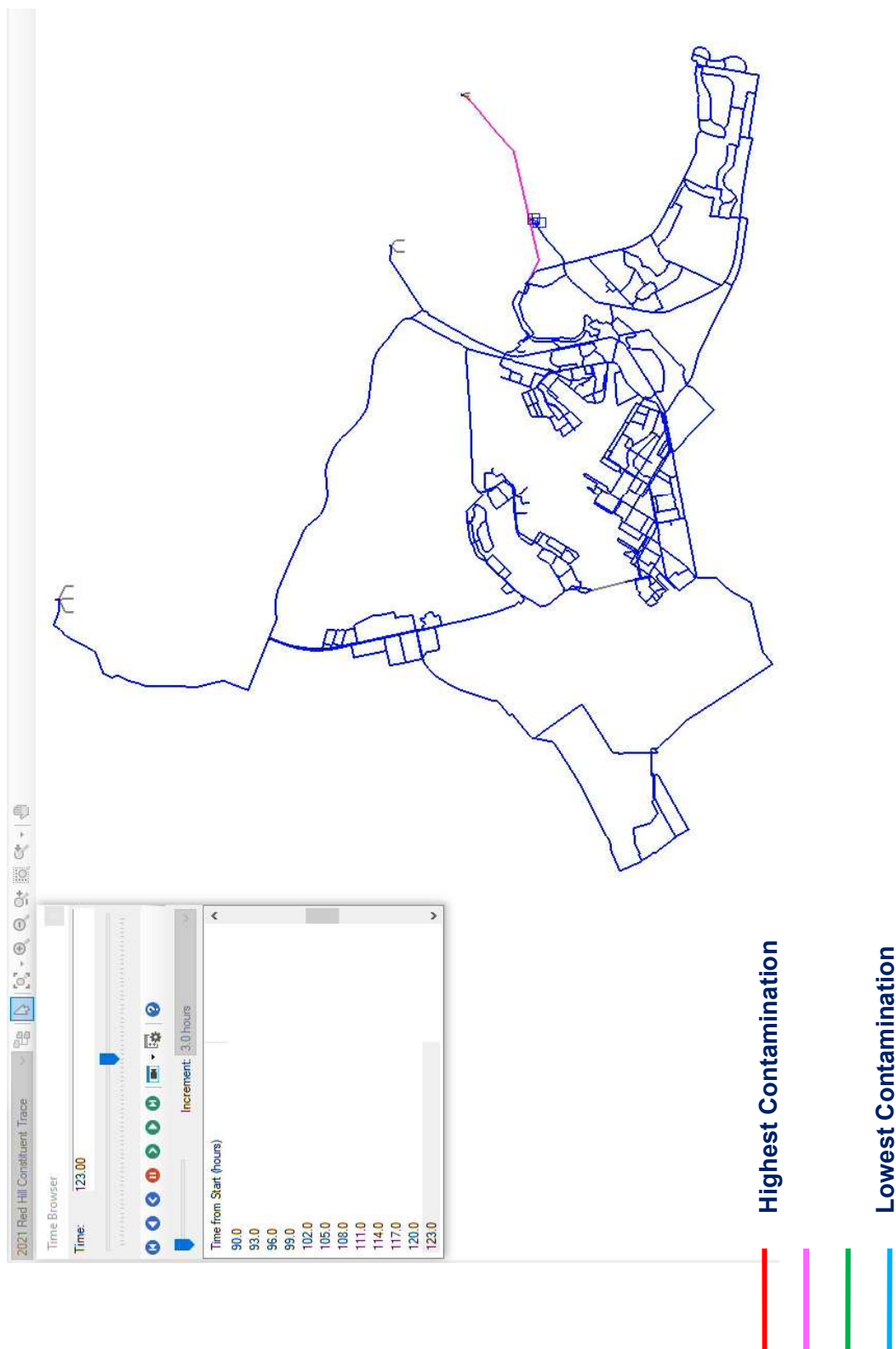


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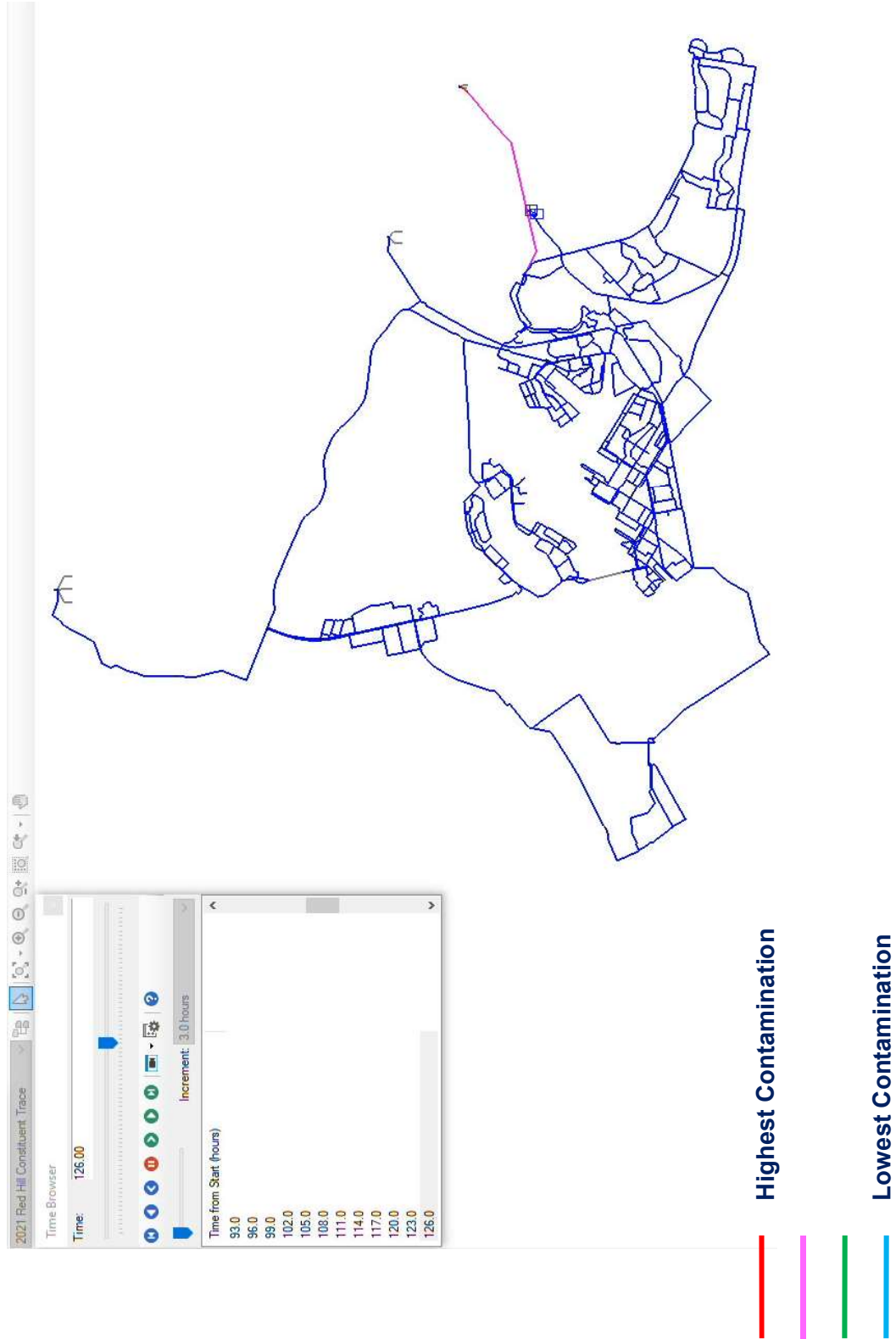


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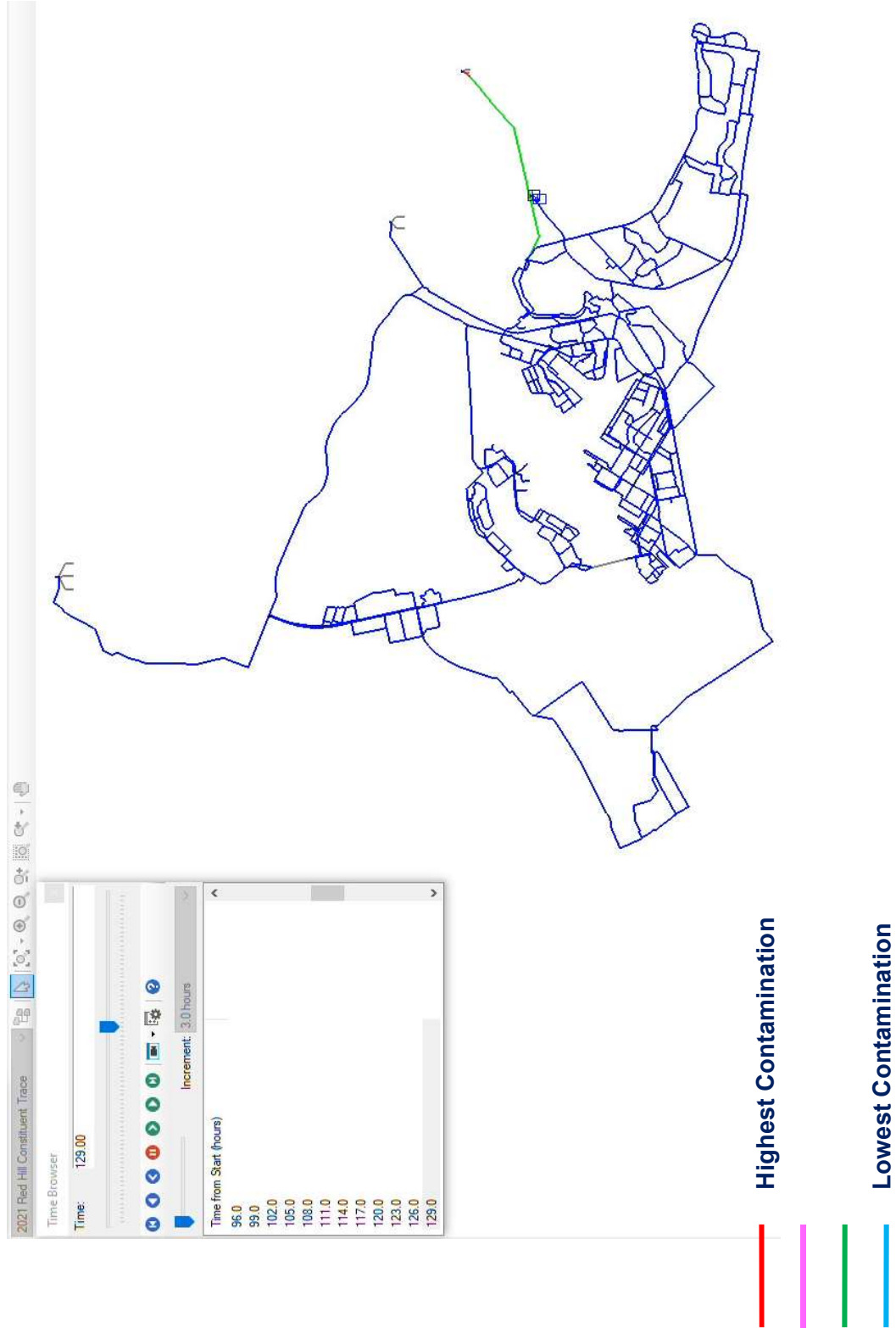


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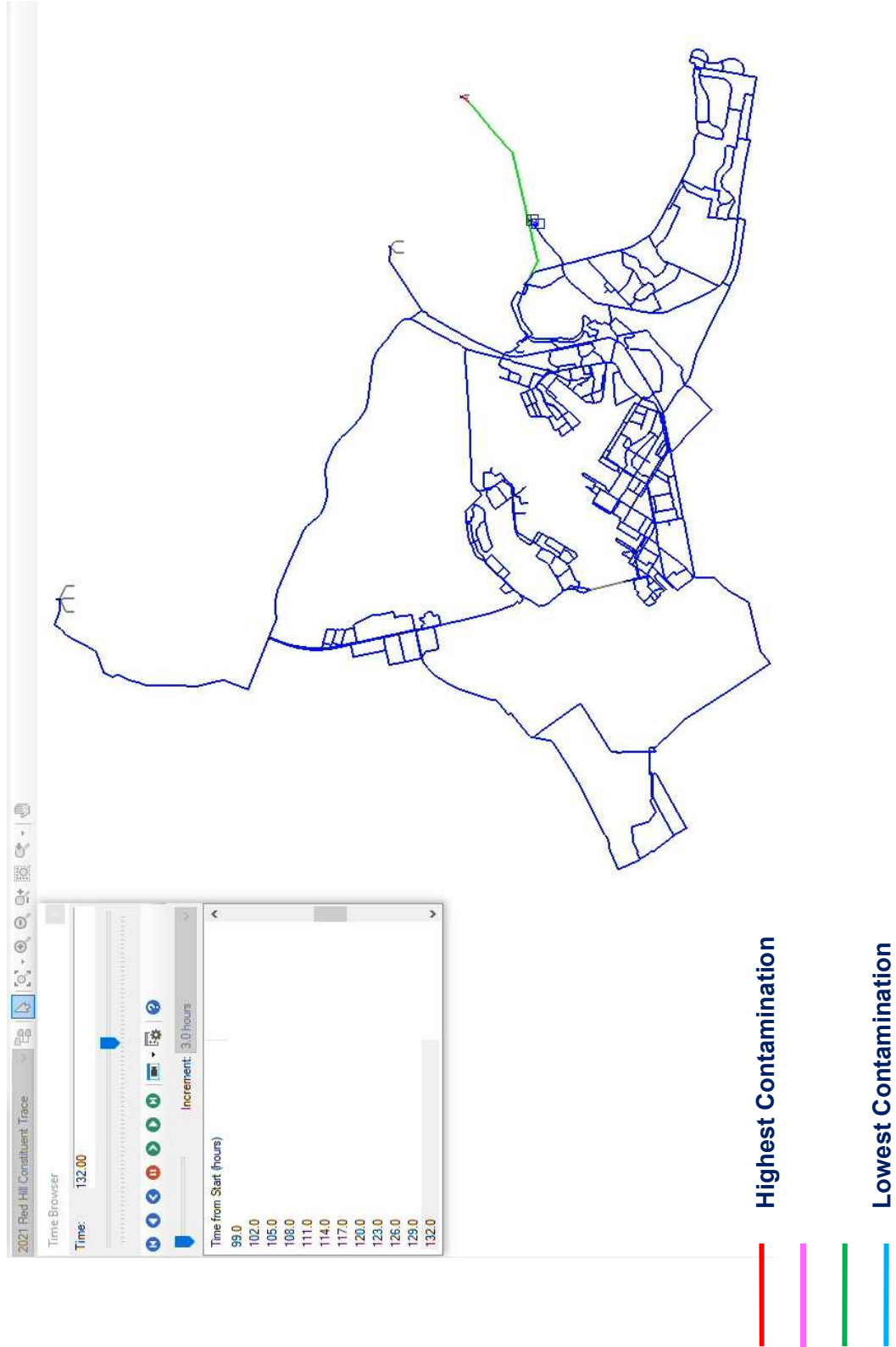




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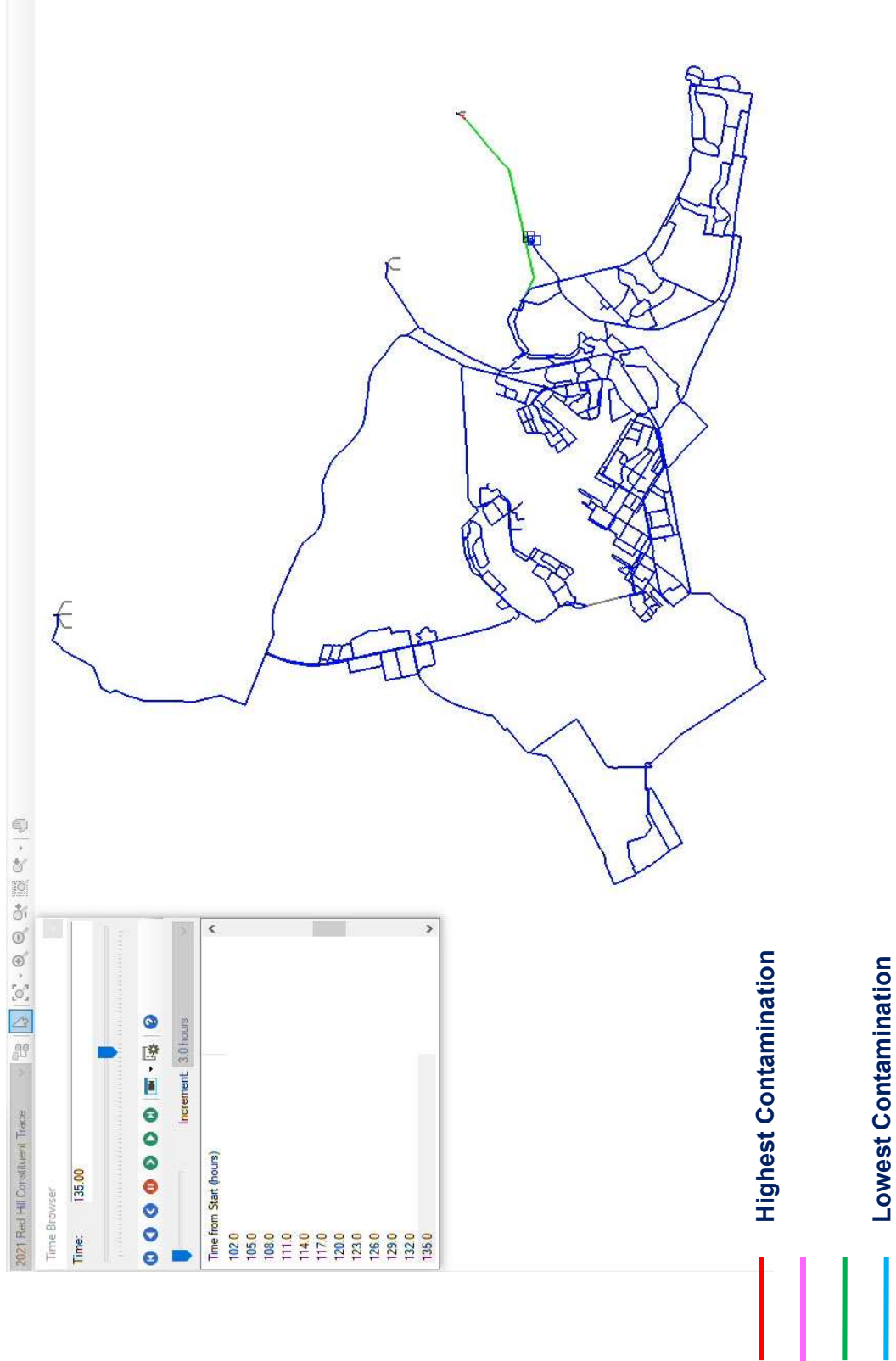


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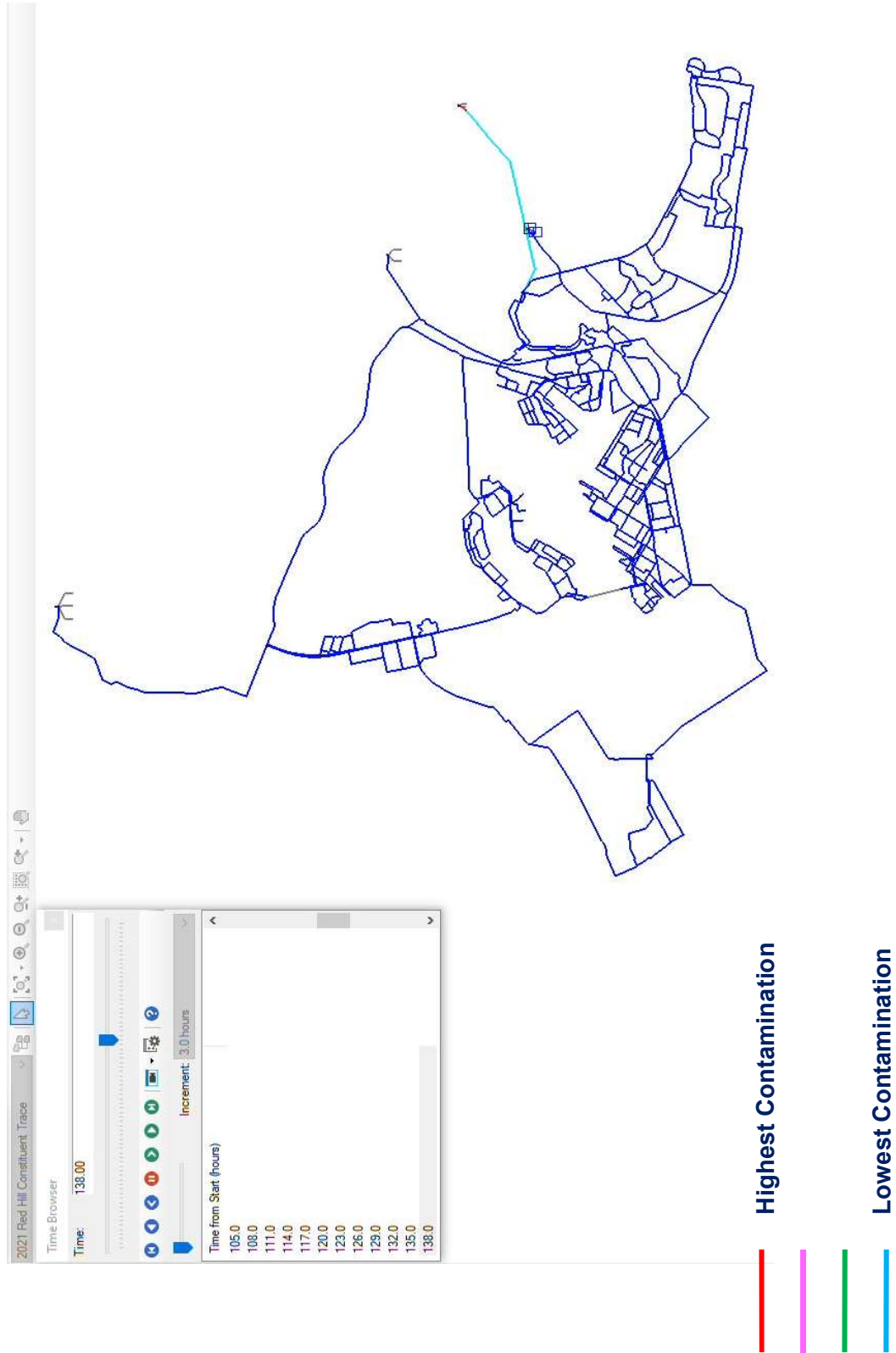


# JBP HH Hydraulic Model





# JBP HH Hydraulic Model





1 March 2022

MEMORANDUM

From: Naval Facilities Engineering Systems Command Representative, EWG Team

To: Interagency Drinking Water System Team

Subj: RECORDS OF COMPLETED DISTRIBUTION SYSTEM FLUSHING ZONE C3

Ref: (a) Drinking Water Distribution System Recovery Plan, December 2021

Encl: (1) Distribution System Flushing Records Zone C3

1. The completed records as shown in Enclosure (1), document the flushing of 9 hydrants in Zone C3 in accordance with Reference (a).

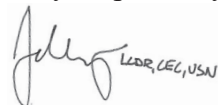
2. Field logs documenting the completion of the distribution flushing are summarized below demonstrate fulfillment of the criterion established in Reference (a):

Hydrant Location ID	Discharge Location Type	Flushed Volume (gallons)
105	Storm Drain	72,325
111	Land Application	228,250
119	Storm Drain	78,375
128	Storm Drain	61,875
129	Storm Drain	77,000
135	Storm Drain	253,825
179	Storm Drain	397,925
230	Storm Drain	269,225
236	Storm Drain	259,875

Total: 1,698,675 gallons

3. Zone C3 was required to flush 560,000 gallons per Reference (a), para 2.5.3.3, which was exceeded.

Very respectfully,



J. F. DALY III  
LCDR, CEC, USN

DALY.JOHN.FRANCIS.III.1  
365462468  
2022.03.01 11:04:08  
-10'00'

# TABLE OF CONTENTS

## **Section A - Utilitiesmen Flushing Log Roll-up**

Section A contains a summary of the information from the Utilitiesmen log books and a calculation of the volume of water flushed based on actual times.

## **Section B - Utilitiesmen Log During Volumetric Exchange**

Section B contains the scanned Navy log books that recorded location and time of flushing during distribution system flushing.

## **Section C – Officer in Charge of Flushing Daily Report**

Section C contains the Officer in Charge of Flushing's daily report to his chain of command summarizing information received from the field.

ENCL (1)

Section A Utilitiesmen Flushing Log Roll-up

105		Shift		Flush Time		Documentation	
Date		Begin	End	Start	Stop	RunTime	UT Log
7-Jan		8:00	20:00	17:57		2:03	20220107 0800-2000 N
7-Jan		20:00	8:00		22:20	2:20	20220107 2000-0800 N
TOTAL RUN @ FLOW of 275							
		TIME		4:23		72325 Gallons	
		VOLUME					

Inside Controlled Industrial Area							
128		Shift		Flush Time		Documentation	
Date		Begin	End	Start	Stop	RunTime	UT Log
7-Jan		8:00	20:00	17:15		2:45	20220107 0800-2000 N
7-Jan		20:00	8:00		21:00	1:00	20220107 2000-0800 N
TOTAL RUN @ FLOW of 275							
		TIME		3:45		61875 Gallons	
		VOLUME					

111		Shift		Flush Time		Documentation	
Date		Begin	End	Start	Stop	RunTime	UT Log
6-Jan		8:00	20:00	19:20		0:40	20220106 0800-2000 Y
6-Jan		20:00	8:00			12:00	20220106 2000-0800 N/A
7-Jan		8:00	20:00		9:10	1:10	20220107 0800-2000 Y
TOTAL RUN @ FLOW of 275							
		TIME		13:50		228250 Gallons	
		VOLUME					

Inside Controlled Industrial Area							
129		Shift		Flush Time		Documentation	
Date		Begin	End	Start	Stop	RunTime	UT Log
7-Jan		8:00	20:00	16:20		3:40	20220107 0800-2000 N
7-Jan		20:00	8:00		21:00	1:00	20220107 2000-0800 N
TOTAL RUN @ FLOW of 275							
		TIME		4:40		77000 Gallons	
		VOLUME					

Inside Controlled Industrial Area							
119		Shift		Flush Time		Documentation	
Date		Begin	End	Start	Stop	RunTime	UT Log
7-Jan		8:00	20:00	16:15		3:45	20220107 0800-2000 N
7-Jan		20:00	8:00		21:00	1:00	20220107 2000-0800 N
TOTAL RUN @ FLOW of 275							
		TIME		4:45		78375 Gallons	
		VOLUME					

Inside Controlled Industrial Area							
135		Shift		Flush Time		Documentation	
Date		Begin	End	Start	Stop	RunTime	UT Log
7-Jan		8:00	20:00	16:37		3:23	20220107 0800-2000 N
7-Jan		20:00	8:00		21:00	12:00	20220107 2000-0800 N
TOTAL RUN @ FLOW of 275							
		TIME		15:23		253825 Gallons	
		VOLUME					

179	Shift		Flush Time		Documentation	
	Date	Begin End	Start	Stop RunTime	Email Summary	UT Log
	6-Jan	8:00 20:00	12:00	8:00 20220106 0800-2000	Y	
	6-Jan	20:00 8:00		12:00 20220106 2000-0800	N/A	
	7-Jan	8:00 20:00	12:07	4:07 20220107 0800-2000	Y	
TOTAL RUN @ FLOW of 275						
TIME 24:07						
VOLUME 397925 Gallons						

230	Shift		Flush Time		Documentation	
	Date	Begin End	Start	Stop RunTime	Email Summary	UT Log
	6-Jan	8:00 20:00	18:02	1:58 20220106 0800-2000	Y	
	6-Jan	20:00 8:00		12:00 20220106 2000-0800	N/A	
	7-Jan	8:00 20:00	10:21	2:21 20220107 0800-2000	Y	
TOTAL RUN @ FLOW of 275						
TIME 16:19						
VOLUME 269225 Gallons						

236	Shift		Flush Time		Documentation	
	Date	Begin End	Start	Stop RunTime	Email Summary	UT Log
	6-Jan	8:00 20:00	18:30	1:30 20220106 0800-2000	N	
	6-Jan	20:00 8:00		12:00 20220106 2000-0800	N	
	7-Jan	8:00 20:00	10:15	2:15 20220107 0800-2000	Y	
TOTAL RUN @ FLOW of 275						
TIME 15:45						
VOLUME 259875 Gallons						

Hydrant	Volume
105	72,325
111	228,250
119	78,375
128	61,875
129	77,000
135	253,825
179	397,925
230	269,225
236	259,875
TOTAL	1,698,675

06 JAN 2022

0801	START OF NEW DAY.	1140	TURNED OFF 179 FOR FLOODING.
0845	START RENE.	1147	TRACED NEW STORM DRAINING PERIOD.
0937	WATER LEVEL 34' <sup>202</sup>		DISCHARGE.
0938		1204	TURNED ON 179.
0945	FH 168 CLOSED DUE TO LACK OF PERSONNEL WITH FLIGHTLINE ACCESS.	1201	931 REPORTED FLOODING.
0953	UCC NOTIFIED, LT CRUZ NOTIFIED.	1242	TURNED OFF 931.
0954	LOGBOOK SUBMITTED TO EOC.	1522	457 SHUTDOWN
0955	UT STIEFFERMANN RELIEVED BY UT RHINE	1215	TURNED ON 4 FOR TESTING.
0957	CHECKED IN AT UCC	1238	TURNED ON 4 FOR 2000 GPM.
0959	931 OPENED	1240	TURNED OFF 4 DUE TO WATER FLOOD FROM TOP OF GAC.
0959	924 SHUTDOWN	1250	243 ON.
0959	ARRIVED AT 931 TO WAIT FOR WATCH STANDARDS.	1400	TURNED ON 337. NO WATCHES ON SITE.
0959	ARMY ARRIVED AT 931	1420	WATCHES ARRIVE. DUTY UT DEPARTS.
0959	14 SHUT DOWN	1500	UT/DORMANSH ASSUMES DUTY UT. UT RHINE RELIEVED AS DUTY UT.
0959	5 SHUT DOWN	1540	FH-931 CLOSED. DUE TO FLOODING.
0957	924 SHUT DOWN	1600	FH-7 CLOSED.
0959	19 SHUT DOWN	1640	FH-25 CLOSED.
0959	33 SHUT DOWN	1712	FH-942 OPEN.
0959	318 SHUT DOWN	1725	FH-488 CONTACT INFO: MIKE-(789) 289-4118
0959	927 OPEN	1802	FH-2300 OPEN.
0959	214 OPENING. CALL VCC 220-2746 <sup>808</sup>	1806	FH-243 CLOSED. DUE TO FLOODING.
0959	FOR ACCESS	1840	FH-3 OPEN.
0959	315 SHUT DOWN	1920	FH-111 OPEN.
1104	TURNED ON 179 FOR TESTING	1950	FH-488 OPEN.
1145	TURNED ON 179 200 GPM.	2006	FH-225 OPEN.
		2245	FH-18 A2 OPEN.



06 JAN 2022

07 JAN 2022

1900	UT DOMANSKI RELIEVED BY UT STIEFERMANN	00041	START OF NEW DAY,
2059	END OF DAY.	00028	HYDRANT 26 CLOSED DUE TO FLOODING
		00303	WATCHSTANDER AT HYDRANT 26 REPORTS STILL FLOODING,
		00315	WATER LEVEL 36'
		00440	WATCHSTANDER REPORTED FLOODING STOPPED AT FH-26.
		00445	HYDRANT 488 CLOSED, SCHEDULED CLOSE.
		00522	FH-26 OPEN, ULL NOTIFIED.
		00530	LOGBOOK ENTRIES SUBMITTED TO DOC,
		00645	UT STIEFERMANN RELIEVED BY UT RUINE,
		07000	CHECKS IN AT ULL
		0830	214 SHUT DOWN
		0833	243 SHUT DOWN
		0901	337 SHUT DOWN
		0904	225 SHUT DOWN
		0910	111 SHUT DOWN
		0948	637 OPEN
		0956	933 SHUT DOWN
		0959	ARMY OPSITE 637 FOR WASH
		1015	236 SHUT DOWN
		1015	567 OPEN
		1021	230 SHUT DOWN
		1042	947 SHUT DOWN
		1043	637 OFF DUE TO TOO HIGH PH
		LE 755	26 SHUT DOWN

UT STIEFERMANN  
UT DOMANSKI  
UT STIEFERMANN

7 JAN 22

1109	✓ 3 SHUT DOWN	2359	END OF DAY.
1132	✓ 4 SHUT DOWN		
1142	✓ 18 SHUT DOWN		
1207	✓ 17 SHUT DOWN		
1400	✓ 946 OPEN		
1530	✓ 8 OPEN		
1613	✓ WATCH ON		
1734	✓ 86 OPEN		
1617	✓ 5 OPEN		
1711	✓ 34 OPEN		
1715	✓ 56 CLOSED		
1644	✓ 2 OPENED		
1700	✓ 959 OPENED		
N/A	✓ BETWEEN 1700-1830 129, 135, 128 AND 119 ON.		
1847	✓ 2 CLOSED 180PEN WHEN 200A WATCH GETS ON 2087#		
1900	✓ UTILITY ASSUMES DUTY UT. UT. MACHINE RELIEVED AS DUTY UT.		
2015	✓ FH-11 OPEN, (PM-2)		
2100	✓ FH-11 CLOSE (PM-2).		
2224	✓ FH-129, FH-109, FH-135, FH-108, FH-110		
2224	✓ FH-945 CLOSED.		
2225	✓ FH-5 CLOSED		
2255	✓ FH-8 CLOSED.		
2300	✓ FH-950 CLOSED.		
2300	✓ FH-567 CLOSED.		
2345	✓ FH-637 CLOSED.		
2358	✓ UTILITY ASSUMES DUTY UT. UT. MACHINE RELIEVED		

N.F.E.T.P.  
UTILITY

**Parada, John J LT USN NCG 1 (USA)**

**From:** SZCZEPANIK, BRITTANY A 2d Lt USAF AETC 71 STUS/STU [REDACTED]

**Sent:** Thursday, January 6, 2022 10:36 PM

**To:** Wiley, Scottie R Maj USAF 647 ABG (USA); Kelly, Austin A 1st Lt USAF 647 ABG (USA);  
 [REDACTED] Duarte, Israel A MSgt USAF (USA); [REDACTED]  
 [REDACTED] Williams, Malcolm J Capt USAF 647 ABG (USA);  
 [REDACTED] Gruber, Marjorie J LCDR  
 USN CBMU 303 (USA); [REDACTED] Asistio, Maria Angela Grace L 2d LT  
 USAF USN NAVFAC HAWAII PEARL (USA); Huang, Andy D CIV USN NAVFAC HAWAII  
 PEARL (USA); Spencer, Matthew A CIV USN COMNAVREG SW SAN CA (USA); Poche,  
 Brennan W LT USN NAVFAC HAWAII PEARL (USA); [REDACTED]  
 Donovan, Luke T Lt Col USAF 49 MSG (USA); Beattie, Aaron J MAJ USARMY USARPAC  
 (USA); 647 CES/UCC; Howard, Spencer L LT USN CBMU 303 (USA);  
 [REDACTED] Baranowski, Phillip J CPO USN  
 NAVFAC SE JAX FL (USA); [REDACTED] Hawkins, Brian A PO1 USN NAS KEY  
 WEST FL (USA); Barr, Justin A PO2 USN (USA); Harris, Jamel W PO2 USN (USA);  
 Johnson, Jamarita T PO2 USN (USA); [REDACTED] Lett, Julius J SMSgt  
 USAF (USA); [REDACTED] Asistio, Maria Angela  
 Grace L 2d LT USAF USN NAVFAC HAWAII PEARL (USA); EDWARDS, PHYLYSHA C SSgt  
 USAF PACAF 647 CES/CEOER; Pendleton, Cole R SrA USAF 647 ABG (USA); Mchenry,  
 Kevin G MSgt USAF 647 ABG (USA); Corum, Michael L II MSgt USAF 647 ABG (USA);  
 CORUM, MICHAEL L II MSgt USAF PACAF 647 CES/CEN  
**Cc:** 647 CES/UCC

**Subject:** INFO: 20220106 0800L - 2000L JBPHH DWDSRP Flush Report

**Attachments:** 20220106 0800L - 2000L JBPHH DWDSRP Flush Report.pdf

**Signed By:** [REDACTED]

Ladies & Gentlemen,

Attached is the flush report for Thursday, 06 Jan 22, 0800L – 2000L. Below is a summary of current distribution flushing.

Current Location Summary:

Zone	Hydrant / GAC	Latest Status	Time	Source
F2	FH 5 / 20	Flushing Complete	0854	UT Log
C2	FH 318 / 25	Flushing Complete	1000	UT Log
<b>C2</b>	<b>FH 300 / 23</b>	<b>Flushing Complete</b>		
C2	FH 315 / 10	Flushing Complete	1033	UT Log
F2	FH 19 / 12	Flushing Complete	0900	UT Log
F2	FH 33	Flushing Complete	0932	UT Log
F2	FH 14 / 17	Flushing Complete	0840	UT Log
F2	FH 7	Flushing Complete	1600	UT Log
F2	FH 25	Flushing Complete	1630	UT Log
D4	FH 457	Flushing Complete	1152	UT Log
<b>E1</b>	<b>FH 926</b>	<b>Flushing Complete</b>		
<b>G1</b>	<b>FH 26 / 4</b>	<b>Flushing</b>		



Section C Officer-in-Charge of Flushing Daily Report

E1	FH ID 927 / 19	Flushing	Time 0921	Source UT Log
E1	FH ID 931 / 18	Flushing	On 0729-Off 1202	UT Log
C3	FH 179 / 7	Flushing	1200	UT Log
B1	FH 4 / 22	Flushing	1033	UT Log
E1	FH 933 / 11	Flushing		
C2	FH 337 / 17	Flushing	1400	UT Log
F2	FH 214 / 8	Flushing Complete	1004	UT Log
C2	FH 225 / 5	Flushing	2006	UT Log
A3	FH 18 / 14	Flushing	2245	UT Log
C2	FH 243 / 6	Flushing	On 1250-Off 1806	UT Log
D4	FH 488 / 16	Flushing	1950	UT Log
C3	FH 230 / 23	Flushing	1802	UT Log
E1	FH 942 / 20	Flushing	1719	UT Log
C3	FH 111 / 10	Flushing	1920	UT Log
B1	FH 3 / 12	Flushing	1830	UT Log
C3	FH 236 / 25	Flushing		
D4	FH 168	Flushing Complete		
E1	FH 924	Flushing Complete		
			0450	UT Log
			0805	UT Log

Project Programmer/ICAF Engineer  
 NAVFAC HI, FMD JBPHH  
 647 CES/CEN  
 DSN: [REDACTED]

## **Cruz, Nicholas D LT USN NAVFAC SE JAX FL (USA)**

---

**From:** Poche, Brennan W LT USN NAVFAC HAWAII PEARL (USA)  
**Sent:** Thursday, January 6, 2022 3:08 PM  
**To:** Aytes, Casey Delane CWO-4 USN PHNSY & IMF (USA); Swinney, Michael D LTJG USN NAVFAC PAC PEARL HI (USA)  
**Cc:** Cruz, Nicholas D LT USN NAVFAC SE JAX FL (USA); Diaz, Richard LCDR USN NAVFAC HAWAII PEARL (USA); Chase, Carl C LCDR USN NAVFAC SW SAN CA (USA); Aderibigbe, Moronkeji S (Keji) LT USN NAVFAC HAWAII PEARL (USA)  
**Subject:** IMPORTANT: CIA GAC watchstanding  
**Attachments:** Enclosure 1 UDF Plan CUI C3.pdf  
**Signed By:** [REDACTED]

Good afternoon,

We have 5 GAC units that will be set up in the CIA tomorrow, requesting your support in roving from 0900-2000. Each one is anticipated to run for about 6 hours. All 5 hydrants will be discharging into storm drains. See attached map for locations.

Specific task: Visit each GAC on an hourly rotation and verify that the flushing is not overwhelming the storm drains that the GAC will be discharging into. If any issues are noticed, please call LT Nick Cruz @ [REDACTED] You can also reach out to me [REDACTED] if unable to reach LT Cruz.

Watch split:  
NAVFAC CDO - 1000-1500  
PHNSY CDO - 1600-2100

There is a Contractor that is setting up the GACs at the times specified below.

Hydrants to check on:

129 - Set up at 1000  
135 - Set up at 1100  
105 - Set up at 1200  
128 - Set up at 1300  
119 - Set up at 1400

Thanks for your support on this and let me know if you have any questions.

Very Respectfully,

Brennan Poché  
LT, CEC, USN  
Waterfront APWO  
Shipboarding Officer  
NAVFAC HI JBPHH PWD  
Mobile: [REDACTED]  
Shipboarding: [REDACTED]



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**Parada, John J LT USN NCG 1 (USA)**

**From:** SZCZEPANIK, BRITTANY A 2d Lt USAF AETC 71 STUS/STU [REDACTED]

**Sent:** Friday, January 7, 2022 10:18 PM

**To:** Wiley, Scottie R Maj USAF 647 ABG (USA); Kelly, Austin A 1st Lt USAF 647 ABG (USA);  
 [REDACTED] Duarte, Israel A MSgt USAF (USA); [REDACTED]  
 [REDACTED] Williams, Malcolm J Capt USAF 647 ABG (USA);  
 [REDACTED] Gruber, Marjorie J LCDR  
 USN CBMU 303 (USA); [REDACTED] Asistio, Maria Angela Grace L 2d LT  
 USAF USN NAVFAC HAWAII PEARL (USA); Huang, Andy D CIV USN NAVFAC HAWAII  
 PEARL (USA); Spencer, Matthew A CIV USN COMNAVREG SW SAN CA (USA); Poche,  
 Brennan W LT USN NAVFAC HAWAII PEARL (USA); [REDACTED]  
 Donovan, Luke T Lt Col USAF 49 MSG (USA); Beattie, Aaron J MAJ USARMY USARPAC  
 (USA); 647 CES/UCC; Howard, Spencer L LT USN CBMU 303 (USA);  
 [REDACTED] Baranowski, Phillip J CPO USN  
 NAVFAC SE JAX FL (USA); [REDACTED] Hawkins, Brian A PO1 USN NAS KEY  
 WEST FL (USA); Barr, Justin A PO2 USN (USA); Harris, Jamel W PO2 USN (USA);  
 Johnson, Jamaría T PO2 USN (USA); [REDACTED] Lett, Julius J SMSgt  
 USAF (USA); [REDACTED] Asistio, Maria Angela  
 Grace L 2d LT USAF USN NAVFAC HAWAII PEARL (USA); EDWARDS, PHYLYSHA C SSgt  
 USAF PACAF 647 CES/CEOER; Pendleton, Cole R SrA USAF 647 ABG (USA); Mchenry,  
 Kevin G MSgt USAF 647 ABG (USA); Corum, Michael L II MSgt USAF 647 ABG (USA);  
 CORUM, MICHAEL L II MSgt USAF PACAF 647 CES/CEN  
 647 CES/UCC

**Cc:** 647 CES/UCC

**Subject:** INFO: 20220106 2000L - 0800L JBPHH DWDSRP Flush Report

**Signed By:** [REDACTED]

Ladies & Gentlemen,

Attached is the flush report for Thursday/Friday, 06/07 Jan 22, 2000L – 0800L. Below is a summary of current distribution flushing.

## Current Location Summary:

2000 - 0800 6/7 Jan 2022		
E1	FH 926	Flushing Complete
G1	FH 26 / 4	Flushing Complete
E1	FH ID 927 / 19	Flushing Complete
E1	FH ID 931 / 18	Flushing Complete
C3	FH 179 / 7	Flushing Complete
B1	FH 4 / 22	Flushing Complete
E1	FH 933 / 11	Flushing Complete
C2	FH 337 / 17	Flushing Complete
C2	FH 214 / 8	Flushing Complete
C2	FH 225 / 5	Flushing Complete
A3	FH 18 / 14	Flushing Complete
C2	FH 243 / 6	Flushing Complete
D4	FH 488 / 16	Flushing Complete

Time  
 On 0522-Off 0854  
 On 0522-Off 0759  
 0745  
 0645  
 1207  
 1132  
 0956  
 0901  
 0830  
 0904  
 1142  
 0833  
 0445

Source  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log

Section C Officer-in-Charge of Flushing Daily Report

C3	FH 230 / 23	Flushing Complete
E1	FH 942 / 20	Flushing Complete
C3	FH 111 / 10	Flushing Complete
B1	FH 3 / 12	Flushing Complete
C3	FH 236 / 25	Flushing Complete

D4	FH 637	Flushing	Time	Source
B1	FH 3	Flushing Complete	1021	UT Log
E1	FH 946	Flushing Complete	1042	UT Log
B1	FH 8	Flushing Complete	0910	UT Log
A3	FH 56	Flushing Complete	1140	KTR Log
B1	FH 5	Flushing Complete	1015	UT Log
A3	FH 34	Flushing Complete	On 1814-Off 2345	UT & KTR Log
A3	LFH 2	Flushing Complete	1109	UT Log
E1	FH 950	Flushing Complete	On 1400-Off 2224	UT Log
C3	FH 119	Flushing Complete	On 1530-Off 2255	UT Log
C3	FH 128	Flushing Complete	On 1434-Off 1715	UT Log
C3	FH 129	Flushing Complete	On 1617-Off 2235	UT Log
C3	FH 135	Flushing Complete	On 1409-Off 2124	KTR Log
D4	FH 567	Flushing Complete	On 1644-Off 1847	UT Log
			On 1700-Off 2308	UT Log
			On 1615-Off 2100	EWG Log
			On 1715-Off 2100	EWG Log
			On 1620-Off 2100	EWG Log
			On 1637-Off 2100	EWG Log
			On 1015-Off 2330	UT Log

**Parada, John J LT USN NCG 1 (USA)**

**From:** SZCZEPANIK, BRITTANY A 2d Lt USAF AETC 71 STUS/STU [REDACTED]

**Sent:** Friday, January 7, 2022 10:18 PM

**To:** Wiley, Scottie R Maj USAF 647 ABG (USA); Kelly, Austin A 1st Lt USAF 647 ABG (USA);  
 [REDACTED] Duarte, Israel A MSgt USAF (USA); [REDACTED]  
 [REDACTED] Williams, Malcolm J Capt USAF 647 ABG (USA);  
 [REDACTED] Gruber, Marjorie J LCDR  
 USN CBMU 303 (USA); [REDACTED] Asistio, Maria Angela Grace L 2d LT  
 USAF USN NAVFAC HAWAII PEARL (USA); Huang, Andy D CIV USN NAVFAC HAWAII  
 PEARL (USA); Spencer, Matthew A CIV USN COMNAVREG SW SAN CA (USA); Poche,  
 Brennan W LT USN NAVFAC HAWAII PEARL (USA); [REDACTED]  
 Donovan, Luke T Lt Col USAF 49 MSG (USA); Beattie, Aaron J MAJ USARMY USARPAC  
 (USA); 647 CES/UCC; Howard, Spencer L LT USN CBMU 303 (USA);  
 [REDACTED]; Baranowski, Phillip J CPO USN  
 NAVFAC SE JAX FL (USA); [REDACTED]; Hawkins, Brian A PO1 USN NAS KEY  
 WEST FL (USA); Barr, Justin A PO2 USN (USA); Harris, Jamel W PO2 USN (USA);  
 Johnson, Jamaría T PO2 USN (USA); [REDACTED] Lett, Julius J SMSgt  
 USAF (USA); [REDACTED] Asistio, Maria Angela  
 Grace L 2d LT USAF USN NAVFAC HAWAII PEARL (USA); EDWARDS, PHYLYSHA C SSgt  
 USAF PACAF 647 CES/CEOER; Pendleton, Cole R SrA USAF 647 ABG (USA); Mchenry,  
 Kevin G MSgt USAF 647 ABG (USA); Corum, Michael L II MSgt USAF 647 ABG (USA);  
 CORUM, MICHAEL L II MSgt USAF PACAF 647 CES/CEN  
 647 CES/UCC

**Cc:** 647 CES/UCC

**Subject:** INFO: 20220106 2000L - 0800L JBPHH DWDSRP Flush Report

**Signed By:** [REDACTED]

Ladies & Gentlemen,

Attached is the flush report for Thursday/Friday, 06/07 Jan 22, 2000L – 0800L. Below is a summary of current distribution flushing.

## Current Location Summary:

2000 - 0800 6/7 Jan 2022		
E1	FH 926	Flushing Complete
G1	FH 26 / 4	Flushing Complete
E1	FH ID 927 / 19	Flushing Complete
E1	FH ID 931 / 18	Flushing Complete
C3	FH 179 / 7	Flushing Complete
B1	FH 4 / 22	Flushing Complete
E1	FH 933 / 11	Flushing Complete
C2	FH 337 / 17	Flushing Complete
F2	FH 214 / 8	Flushing Complete
C2	FH 225 / 5	Flushing Complete
A3	FH 18 / 14	Flushing Complete
C2	FH 243 / 6	Flushing Complete
D4	FH 488 / 16	Flushing Complete

Time  
 On 0522-Off 0854  
 On 0522-Off 0759  
 0745  
 0645  
 2000-0800  
 1132  
 0956  
 0901  
 0830  
 0904  
 1142  
 0833  
 0445

Source  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log  
 UT Log

Section C Officer-in-Charge of Flushing Daily Report

C3	FH 230 / 23	Flushing Complete
E1	FH 942 / 20	Flushing Complete
C3	FH 111 / 10	Flushing Complete
B1	FH 3 / 12	Flushing Complete
C3	FH 236 / 25	Flushing Complete

Time  
1021  
1042  
0910  
1140  
1015  
On 1814-Off 2345  
1109  
On 1400-Off 2224  
On 1530-Off 2255  
On 1434-Off 1715  
On 1617-Off 2235  
On 1409-Off 2124  
On 1644-Off 1847  
On 1700-Off 2308  
On 1615-Off 2100  
On 1715-Off 2100  
On 1620-Off 2100  
On 1637-Off 2100  
On 1015-Off 2330

Source  
UT Log  
UT Log  
UT Log  
KTR Log  
UT Log  
UT & KTR Log  
UT Log  
UT Log  
UT Log  
UT Log  
KTR Log  
UT Log  
UT Log  
EWG Log  
EWG Log  
EWG Log  
EWG Log  
UT Log

D4 FH 637 Flushing  
B1 FH 3 Flushing Complete  
E1 FH 946 Flushing Complete  
B1 FH 8 Flushing Complete  
A3 FH 56 Flushing Complete  
B1 FH 5 Flushing Complete  
A3 FH 34 Flushing Complete  
A3 LFH 2 Flushing Complete  
E1 FH 950 Flushing Complete  
C3 FH 119 Flushing Complete  
C3 FH 128 Flushing Complete  
C3 FH 129 Flushing Complete  
C3 FH 135 Flushing Complete  
D4 FH 567 Flushing Complete



**Cruz, Nicholas D LT USN NAVFAC SE JAX FL (USA)**

---

**From:** Poche, Brennan W LT USN NAVFAC HAWAII PEARL (USA)  
**Sent:** Friday, January 7, 2022 5:22 PM  
**To:** Lachat, Kevin C LT USN NAVFAC MIDLANT NOR (USA)  
**Cc:** Cruz, Nicholas D LT USN NAVFAC SE JAX FL (USA)  
**Subject:** C3 hydrants  
**Signed By:** [REDACTED]

Kevin,

The duty UT does not have access into the CIA so KTR is starting up the units and the Shipyard CDO is sending me the start times:

C3 Hydrant 119: Start time of 1617  
C3 Hydrant 129: Start time of 1620  
C3 Hydrant 135: Start time of 1637  
C3 Hydrant 128: Start time of 1714

Very Respectfully,

Brennan Poché  
LT, CEC, USN  
Waterfront APWO  
Shipboarding Officer  
NAVFAC HI JBPHH PWD  
Mobile: [REDACTED]  
Shipboarding: [REDACTED]

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**Cruz, Nicholas D LT USN NAVFAC SE JAX FL (USA)**

**From:** SZCZEPANIK, BRITTANY A 2d Lt USAF AETC 71 STUS/STU [REDACTED]

**Sent:** Friday, January 7, 2022 10:16 PM

**To:** Wiley, Scottie R Maj USAF 647 ABG (USA); Kelly, Austin A 1st Lt USAF 647 ABG (USA);  
 [REDACTED] Duarte, Israel A MSgt USAF (USA); [REDACTED]  
 [REDACTED] Williams, Malcolm J Capt USAF 647 ABG (USA);  
 [REDACTED] Gruber, Marjorie J LCDR  
 USN CBMU 303 (USA); [REDACTED] Asistio, Maria Angela Grace L 2d LT  
 USAF USN NAVFAC HAWAII PEARL (USA); Huang, Andy D CIV USN NAVFAC HAWAII  
 PEARL (USA); Spencer, Matthew A CIV USN COMNAVREG SW SAN CA (USA); Poche,  
 Brennan W LT USN NAVFAC HAWAII PEARL (USA); [REDACTED]  
 Donovan, Luke T Lt Col USAF 49 MSG (USA); Beattie, Aaron J MAJ USARMY USARPAC  
 (USA); 647 CES/UCC; Howard, Spencer L LT USN CBMU 303 (USA);  
 [REDACTED] Baranowski, Phillip J CPO USN  
 NAVFAC SE JAX FL (USA); [REDACTED]; Hawkins, Brian A PO1 USN NAS KEY  
 WEST FL (USA); Barr, Justin A PO2 USN (USA); Harris, Jamel W PO2 USN (USA);  
 Johnson, Jamaría T PO2 USN (USA); [REDACTED] Lett, Julius J SMSgt  
 USAF (USA); [REDACTED] Asistio, Maria Angela  
 Grace L 2d LT USAF USN NAVFAC HAWAII PEARL (USA); EDWARDS, PHYLYSHA C SSgt  
 USAF PACAF 647 CES/CEOER; Pendleton, Cole R SrA USAF 647 ABG (USA); Mchenry,  
 Kevin G MSgt USAF 647 ABG (USA); Corum, Michael L II MSgt USAF 647 ABG (USA);  
 CORUM, MICHAEL L II MSgt USAF PACAF 647 CES/CEN  
 647 CES/UCC

**Cc:** 647 CES/UCC

**Subject:** INFO: 20220106 0800L - 2000L JBPHH DWDSRP Flush Report

**Attachments:** 20220107 0800L - 2000L JBPHH DWDSRP Flush Report.pdf

**Signed By:** [REDACTED]

Ladies & Gentlemen,

Attached is the flush report for Friday, 07 Jan 22, 0800L – 2000L. Below is a summary of current distribution flushing.

## Current Location Summary:

0800-2000 7 Jan 2022				
A3	FH 2	Flushing	1644	UT LOG
A3	FH 34	Flushing Complete	1409	UT LOG
D4	FH 637	Flushing	on 0942. off 1043	UT LOG
D4	FH 567	Flushing	1015	UT LOG
A3	FH 56	Flushing Complete	on 1434, off 1715	UT LOG
<del>A3</del>	<del>FH 59</del>	<del>Flushing Complete</del>		
A3	SA LFH-2 / 17	Flushing Complete	1617	UT LOG
<del>B1</del>	<del>FH 2 / 22</del>	<del>Flushing Complete</del>		
B1	FH 5 / 7	Flushing	1617	UT LOG
B1	FH 8 / 5	Flushing	1530	UT LOG
E1	FH 950 / 19	Flushing	1700	UT LOG
E1	FH 946 / 11	Flushing	1400	UT LOG
C2	FH214	shut down	0830	UT

Section C Officer-in-Charge of Flushing Daily Report

C3	FH 105	Flushing	1757	KTR
C2	FH243	shut down	0833	UT LOG
C2	FH337	shut down	0901	UT
C2	FH225	shut down	0904	UT
C3	FH111	shut down	0910	UT
E1	FH933	shut down	0956	UT
C3	FH236	shut down	1015	UT
C3	FH230	shut down	1021	UT
E1	FH942	shut down	1042	UT
G1	FH26	shut down	0759	UT LOG
B1	FH3	shut down	1109	UT LOG
B1	FH4	shut down	1132	UT LOG
A3	FH18	shut down	1142	UT LOG
C3	FH179	shut down	1207	UT

**Cruz, Nicholas D LT USN NAVFAC SE JAX FL (USA)**

**From:** SZCZEPANIK, BRITTANY A 2d Lt USAF AETC 71 STUS/STU [REDACTED]

**Sent:** Friday, January 7, 2022 10:16 PM

**To:** Wiley, Scottie R Maj USAF 647 ABG (USA); Kelly, Austin A 1st Lt USAF 647 ABG (USA); [REDACTED]; Duarte, Israel A MSgt USAF (USA); [REDACTED]; Williams, Malcolm J Capt USAF 647 ABG (USA); [REDACTED]; Gruber, Marjorie J LCDR USN CBMU 303 (USA); [REDACTED]; Asistio, Maria Angela Grace L 2d LT USAF USN NAVFAC HAWAII PEARL (USA); Huang, Andy D CIV USN NAVFAC HAWAII PEARL (USA); Spencer, Matthew A CIV USN COMNAVREG SW SAN CA (USA); Poche, Brennan W LT USN NAVFAC HAWAII PEARL (USA); [REDACTED]; Donovan, Luke T Lt Col USAF 49 MSG (USA); Beattie, Aaron J MAJ USARMY USARPAC (USA); 647 CES/UCC; Howard, Spencer L LT USN CBMU 303 (USA); [REDACTED]; Baranowski, Phillip J CPO USN NAVFAC SE JAX FL (USA); [REDACTED]; Hawkins, Brian A PO1 USN NAS KEY WEST FL (USA); Barr, Justin A PO2 USN (USA); Harris, Jamel W PO2 USN (USA); Johnson, Jamaría T PO2 USN (USA); [REDACTED]; Lett, Julius J SMSgt USAF (USA); [REDACTED]; Asistio, Maria Angela Grace L 2d LT USAF USN NAVFAC HAWAII PEARL (USA); EDWARDS, PHYLYSHA C SSgt USAF PACAF 647 CES/CEOER; Pendleton, Cole R SrA USAF 647 ABG (USA); Mchenry, Kevin G MSgt USAF 647 ABG (USA); Corum, Michael L II MSgt USAF 647 ABG (USA); CORUM, MICHAEL L II MSgt USAF PACAF 647 CES/CEN 647 CES/UCC

**Cc:** INFO: 20220106 0800L - 2000L JBPHH DWDSRP Flush Report

**Subject:** 20220107 0800L - 2000L JBPHH DWDSRP Flush Report.pdf

**Attachments:**

**Signed By:** [REDACTED]

Ladies & Gentlemen,

Attached is the flush report for Friday, 07 Jan 22, 0800L – 2000L. Below is a summary of current distribution flushing.

## Current Location Summary:

0800-2000 7 Jan 2022				
A3	FH 2	Flushing	1644	UT LOG
A3	FH 34	Flushing Complete	1409	UT LOG
D4	FH 637	Flushing	on 0942, off 1043	UT LOG
D4	FH 567	Flushing	1015	UT LOG
A3	FH 56	Flushing Complete	on 1434, off 1715	UT LOG
<del>A3</del>	<del>FH 59</del>	<del>Flushing Complete</del>		
A3	SA LFH-2 / 17	Flushing Complete	1617	UT LOG
<del>B1</del>	<del>FH 2 / 22</del>	<del>Flushing Complete</del>		
B1	FH 5 / 7	Flushing	1617	UT LOG
B1	FH 8 / 5	Flushing	1530	UT LOG
E1	FH 950 / 19	Flushing	1700	UT LOG
E1	FH 946 / 11	Flushing	1400	UT LOG
C2	FH214	shut down	0830	UT

Section C Officer-in-Charge of Flushing Daily Report

C3	FH 105	Flushing	1757	KTR
C2	FH243	shut down	0833	UT LOG
C2	FH337	shut down	0901	UT
C2	FH225	shut down	0904	UT
C3	FH111	shut down	0910	UT
E1	FH933	shut down	0956	UT
C3	FH236	shut down	1015	UT
C3	FH230	shut down	1021	UT
E1	FH942	shut down	1042	UT
G1	FH26	shut down	0759	UT LOG
B1	FH3	shut down	1109	UT LOG
B1	FH4	shut down	1132	UT LOG
A3	FH18	shut down	1142	UT LOG
C3	FH179	shut down	1207	UT

C3	FH 119	Flushing	1615	EWG Log
C3	FH 128	Flushing	1715	EWG Log
C3	FH 129	Flushing	1620	EWG Log
C3	FH 135	Flushing	1637	EWG Log



**Parada, John J LT USN NCG 1 (USA)**


**From:** AhLeong, Peter A MSgt USAF 647 ABG (USA) [REDACTED]  
**Sent:** Saturday, January 8, 2022 3:04 AM  
**To:** Kelly, Austin A 1st Lt USAF 647 ABG (USA); Wiley, Scottie R Maj USAF 647 ABG (USA); Collins, Jason A CMSgt USAF USN NAVFAC HAWAII PEARL (USA); Duarte, Israel A MSgt USAF (USA); Gruber, Marjorie J LCDR USN CBMU 303 (USA); Mchenry, Kevin G MSgt USAF 647 ABG (USA); Credle, Gregory E III PO2 USN (USA); [REDACTED] Cope, Jimmy Lee CPO USN COMEXSTRKGRU TWO (USA); Hawkins, Brian A PO1 USN NAS KEY WEST FL (USA); Szczepanik, Brittany A 2d LT USAF (USA); Huang, Andy D CIV USN NAVFAC HAWAII PEARL (USA); [REDACTED] Baranowski, Phillip J CPO USN NAVFAC SE JAX FL (USA); Natsuhara, Brent T LT USN NAVFAC MARIANAS GU (USA); Asistio, Maria Angela Grace L 2d LT USAF USN NAVFAC HAWAII PEARL (USA); Spencer, Matthew A CIV USN COMNAVREG SW SAN CA (USA); Poche, Brennan W LT USN NAVFAC HAWAII PEARL (USA); Donovan, Luke T Lt Col USAF 49 MSG (USA); [REDACTED] Lett, Julius J SMSgt USAF (USA); Beattie, Aaron J MAJ USARMY USARPAC (USA); Huang, Andy D CIV USN NAVFAC HAWAII PEARL (USA); Barr, Justin A PO2 USN (USA); Diaz-Citan, Byron J CIV USN COMNAVFACENGCOM DC (USA); [REDACTED] Yoshimoto, Barbara-jean A (Bobbie) CIV USN NAVFAC HAWAII PEARL (USA)  
**Cc:** 647 CES/UCC  
**Subject:** INFO: 20220107 - 20220108 2000L - 0800L JBPHH DWDSRP Flush Report  
**Attachments:** 7 - 8 Jan 2022 2000L - 0800L JBPHH DWDSRP Flush Report.pdf  
**Signed By:** [REDACTED]

Ladies & Gentlemen,

Aloha, attached is the flush report for Friday, 07- 08 Jan 22, 2000L – 0800L. Below is a summary of current distribution flushing.

2000L - 0800L, 7 - 8 Jan 2022			
Zone	Hydrant / GAC	Latest Status	Time (stop)
A3	FH 2 / 20	Flushing Stopped (Complete)	1/8/2022 1:40
A3	FH 34 / 14	Flushing Stopped (Complete)	2105 7 Jan
D4	FH 637 / 21	Flushing Stopped (Complete)	2340 7 Jan
D4	FH 567 / 16	Flushing Stopped (Complete)	0009 8 Jan
A3	FH 59 / 23	Flushing Stopped (Complete)	0116 8 Jan
A3	SA LFH-2 / 17	Flushing Stopped (Complete)	2022 7 Jan
B1	FH 2 / 22	Flushing stopped (Complete)	2102 7 Jan
B1	FH 5 / 7	Flushing Stopped (Complete)	2235 7 Jan
B1	FH 8 / 5	Flushing Stopped (Complete)	2256 7 Jan
E1	FH 950 / 19	Flushing Stopped (Complete)	2312 7 Jan
E1	FH 946 / 11	Flushing Stopped (Complete)	2222 7 Jan
C3	FH 105 / 10	Flushing Stopped (Complete)	2221 7 Jan

C3	FH 119	Flushing Complete	On 1615-Off 2100	EWG Log
C3	FH 128	Flushing Complete	On 1715-Off 2100	EWG Log
C3	FH 129	Flushing Complete	On 1620-Off 2100	EWG Log
C3	FH 135	Flushing Complete	On 1637-Off 2100	EWG Log

MSgt Peter A. Ahleong  
Mechanical Services Element Superintendent  
Naval Facilities Engineering Systems Command, Hawaii  
647<sup>th</sup> Civil Engineer Squadron, JBPHH, HI  


February 26, 2022

From: Naval Facilities Engineering Systems Command Representative, IDWS Team  
To: Interagency Drinking Water System Team

SUBJ: WATER STORAGE FACILITIES AND WATER SOURCE FOR ZONES A1, A2, A3, B1, C1, C2, C3, D1, D2, D3, D4, G1, E1, F1, F2, H1, H2, H3, AND I1

Ref: (a) Drinking Water Sampling Plan, December 2021  
(b) Drinking Water Distribution System Recovery Plan, December 2021

Encl: (1) Joint Base Pearl Harbor Hickam Potable Water System Description  
(2) S1 and S2 Water Storage Tank Flushing Report Memo  
(3) Inspection, Maintenance, and Cleaning of Potable Water Tanks Memo  
(4) Ford Island/Shipyard Water Transmission Line Status  
(5) JBPHH/Iroquois Point Water Transmission Line Status  
(6) Board of Water Supply Interconnection Status

1. This letter and associated enclosures describes and documents the flushing of the water storage facilities that serve the Joint Base Pearl Harbor Hickam (JBPHH) public water system (PWS No. 360). The flushing of the JBPHH water storage facilities and distribution system was completed in accordance with reference (a) and (b). Enclosure (1) describes the JBPHH public water system and storage tanks associated with the system. Page 8 of reference (a) has the flushing zones and water storage facilities located in each zone. The flushing of each zone identified in phase 1 of reference (a) included five volumetric turnovers. The volumetric turnover requirement included the water tank storage and distribution system volume for each zone. The water testing of the distribution system after flushing a zone's water storage tank and distribution system was the confirmation that contamination was removed from the system and that the water tanks was not a source of contamination. Enclosure (2) documents the Hawaii Department of Health's approved change from reference (a) for the flushing of Halawa S-1 and Halawa S-2.

2. Zones A1, A2, A3, B1, C1, C2, C3, D1, D2, D3, D4, G1, E1, F1, F2, H1, H2, H3 and I1 are currently fed by the Waiawa Shaft water supply source. The pumps from the shafts generally run continuous and range from 6,000 to 14,000 gallons per minute based on the demand of the JBPHH potable water system. The pressure throughout the JBPHH distribution system is aided by the two Halawa water storage tanks. The Halawa S-1 tank is currently in service and the Halawa S-2 tank has been taken offline for maintenance as documented in enclosure (2). Enclosure (3) documents the planned timeline associated with the inspection, maintenance and cleaning of the Navy owned water storage tanks. The planned work is scheduled to be completed before the end of this calendar year. The inspection of the water storage tanks will be conducted in accordance with American Water Works Association (AWWA) Standard for Inspecting and Repairing Steel Water Tanks, Standpipes, Reservoirs, and Elevated Tanks by personnel with the requisite qualifications outlined in this AWWA standard. Zone I1 (Red Hill) is served by Navy owned water storage tanks. The Army operates the consecutive Aliamanu public water system (PWS No. 337) which receives its water from the JBPHH public water

SUBJ: WATER STORAGE FACILITIES AND WATER SOURCE FOR ZONES A1, A2, A3, B1, C1, C2, C3, D1, D2, D3, D4, G1, E1, F1, F2, H1, H2, H3, AND I1

system. The Army's public water system serves the Aliamanu Military Reservation (AMR). The AMR area was subdivided into three flushing zones which included Zones H1, H2, and H3. The planned timeline associated with the inspection, maintenance, and cleaning of the Army owned water storage tanks will be submitted as part of the removal action reports for Zones H1, H2, H3.

3. At this time, there are two water transmission lines that are not in operation. The water transmission line between Ford Island and the Shipyard was offline at the time of the incident as described in Enclosure (3) and is currently going through repairs. The valves at each end of the underwater water transmission line between JBPHH and Iroquois Point were closed on December 5, 2021 and the valves have remained closed since that date as documented in Enclosure (4). Enclosure (5) documents the method for reopening the underwater water transmission line between JBPHH and Iroquois Point to prevent potential contamination and adverse water quality issues. The Navy will notify the Hawaii Department of Health prior to reopening the underwater water transmission line the between JBPHH and Iroquois Point. Additional interconnections with Board of Water Supply (BWS) are described in Enclosure (6). Water being distributed in the system and being stored in water storage tanks that maintain pressure in Zones A1, A2, A3, B1, C1, C2, C3, D1, D2, D3, D4, G1, E1, F1, and F2 have been flushed in accordance with reference (b) and the distribution system tested in accordance with reference (a). The removal action reports for Zones H1, H2, H3, and I1 document the flushing of the water storage tanks that specifically serve those zones.

4. I certify under penalty of law that I have personally examined and I am familiar with the information submitted and the submitted information is true, accurate, and complete.

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## **Joint Base Pearl Harbor Hickam (JBPHH) Potable Water Description**

### **Major components of the JBPHH potable water system include:**

- Supply sources
  - Waiawa Shaft/Pumping Station
  - Red Hill Shaft/Pumping Station
  - Halawa Shaft/Pumping Station
  - Emergency Interconnections (2 locations)
- Water storage facilities
- 2-6,000,000 gallon steel storage tanks at Halawa
  - 2-200,000 gallon concrete storage tanks at Camp Smith
  - 1-250,000 gallon glass-fused steel storage tank at Camp Smith with a usable storage capacity of 140,000 gallons
  - 2-250,000 gallon glass-fused steel storage tank at Red Hill
- Distribution system
  - Camp Smith Booster Pump (to convey water to the Camp Smith water system)
  - Red Hill Booster Pumps (to convey water to the storage tank)
  - Moanalua Terrace Booster Pumps (to pressurize the water system serving the Moanalua Terrace Housing area)
  - Boneyard Booster Pumps (to pressurize the water system serving the upper elevation of Moanalua Terrace Housing area)
  - Manana Booster Pumps (to pressurize the water system serving the Manana Housing area)
  - A network of pipes, meters, valves, and hydrants for distribution and fire protection

### **Water Storage Facilities:**

Fresh water storage facilities store water for normal, fire, and maximum demand use, and serve to maintain relatively constant pressure in the water system. The JBPHH water system is equipped with two welded steel tanks, each with a storage capacity of six million gallons. These tanks are identified as the Halawa storage tanks S-1 and S-2. Both of these tanks are located adjacent to the Aliamanu Military Reservation at a ground elevation of 140 feet. The diameter of the tanks are 164 feet each, with a nominal height of 48 feet. The spillway elevations of the S-1 and S-2 tanks are 178.5 feet. The tanks are interconnected by a 10-inch line. Water from each of the tanks discharges through separate 24-inch mains and combines to a single 30-inch transmission main.

Other water storage tanks in the JBPHH system include the three tanks at Camp Smith, a storage tank serving the Red Hill Housing area, and three storage tanks serving the Army's Aliamanu Housing area. The Red Hill and Aliamanu tanks are supplied by separate booster pump stations located at the Red Hill Water Pumping Station and the Halawa Storage Tanks, respectively. These tanks are dedicated to serving these two non-Navy housing areas.



February 11, 2022

From: Naval Facilities Engineering Systems Command Representative, IDWS Team  
To: Interagency Drinking Water System Team

SUBJ: S1 AND S2 WATER STORAGE TANK FLUSHING REPORT

Ref: (a) Drinking Water Distribution System Recovery Plan, December 2021

1. This letter documents the current status of the S1 and S2 water storage tanks. In accordance with reference (a), the S1 and S2 water storage tanks were part of the Zone F1 flushing plan. The flushing plan for Zone F1 included both water storage tanks in the five volumetric turnover calculations. The calculated turnover volume was 61.35 million gallons of water. The S1 tank was flushed by cycling the water tank for five volumetric flushes. In order to conserve the amount of water being used in the flushing of Zone F1, the S2 water storage tank was taken out of service and remains out of service to date. This decision resulted in the conservation of approximately 25 million gallons of water. The Hawaii Department of Health (HDOH) was notified of the Navy's modified flushing plan and provided concurrence. The S2 water storage tank is being scheduled for cleaning and maintenance. The Navy will provide details to HDOH on the method and procedures for cleaning and maintenance of the S2 water storage tank prior to the start of work. The Navy will notify the HDOH upon completion of the work and the tank being placed back into service.

2. I certify under penalty of law that I have personally examined and I am familiar with the information submitted and the submitted information is true, accurate, and complete.

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M. W. Meno  
Captain, U.S. Navy Civil Engineer Corps

ENCL(2)

25 February 2022

MEMORANDUM FOR RECORD

SUBJECT: Inspection, Maintenance, and Cleaning of Potable Water Tanks

1. This Memorandum for Record (MFR) is to document the summary processes for inspection, maintaining, and cleaning storage tanks within the Joint Base Pearl Harbor-Hickam potable water system. There are seven potable water storage tanks. Each tank holds water that is consistently in flux – rising and falling according to the dynamic demands for water under certain pressures at specific times. As such, the tanks are continually cycling fresh water recently pumped from the well and chlorinated at the treatment plant. JBPH-H does not drain and clean the tanks per a schedule, however the following records indicate recent cleaning. Tank cleaning follows AWWA M42 - Steel Water Storage Tanks.
  - a. S1 tank inspected and cleaned in 2010, cleaned by in-house EV remediation shop, mainly to remove sediment from the tank floor.
  - b. S2 tank inspected and cleaned 2007, cleaned by in-house remediation shop, mainly to remove sediment from the tank floor.
  - c. Red Hill tank No. 685 was inspected in 2013, via remote camera vehicle
  - d. Red Hill tank No. 316 was installed in 2017 and has not yet been inspected
  - e. Camp Smith tanks (3) were inspected and cleaned in 2013.
2. As the seven tanks have not been inspected a group for several years, the Public Works Department shall funds and contract a complete inspection and cleaning for all tanks in accordance with AWWA standards by then end CY 2022.
3. Tanks are monitored and operated using a Supervisory Control and Data Acquisition (SCADA) system to ensure that they are at the right levels and pumps and valves are operating at prescribed times and speeds, overseen by Utilities staff 24/7. Our field team is regularly physically engaged with these tanks to ensure functionality, condition, and security of the tanks. There are frequent field actions near and connected to the tanks – they are routinely inspected per the requirements to manage the system.
4. As the tank hardware ages and requires repair and replacement, a tank may be isolated, drained and taken out of service to conduct this work. At these times, when work involved the interior of the tank, a full cleaning and refilling is conducted. This is typically done with a contract.
5. The S2 tank, a 6 MG tank that, with the S1 tank, provides the ability to keep pressurized water in the system for firefighting while serving the domestic demand, has been secured from the rest of the system since December 22, 2021. The water in the tank has been sampled and the results have shown a non-detect for TPH. Public work will make repairs and clean this tank within the next 90 days. The process to flush, clean and return the tank to the system is as follows:
  - a. Repair S1/S2 overflow 24" drain line with Cured-in-Place Pipe
  - b. Drain S2 tank via existing drain line, leading to the city storm drainage system
  - c. Clean and Disinfect S2 tank (Following ANSI/AWWA C652-02: Disinfection of Water-Storage Facilities)
  - d. Perform bacteriological and TPH sampling and testing
  - e. Return S2 tank to service

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CAPT R. Harmeyer  
Public Works Officer  
Joint Base Pearl Harbor Hickam

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22 February 2022

MEMORANDUM FOR RECORD

SUBJECT: Ford Island/Shipyard Water Transmission Line Status

1. This Memorandum for Record (MFR) is to document the status of the underwater crossing water transmission line (pipe) that connects the Ford Island and Shipyard areas of the Joint Base Pearl Harbor-Hickam Potable Water System.
2. As part of the P-209 Dry Dock 3 Replacement design effort, a contractor was performing soil borings at Hospital Point near the Shipyard. The contractor damaged the 24-inch underwater crossing during one of their borings on 15 June 21, by drilling through the casing and pipe.
3. JBPHH has begun plans for repairing or replacing this damaged line. A Design consultant is scheduled to start the design on the repairs in March of 2022. Construction funds for the repair are allocated for Fiscal Year 2023.
4. The water transmission line was secured from the JBPHH system via an isolation valve on the Ford Island side, and physical pipe removal on the Shipyard side. Enclosure [1] is a picture taken on 22 January 2022 of the physical pipe removal at Hospital Point.
5. The Ford Island isolation valve is less than 5 years old, and PWD personnel have verified in the field that there are no indications of leak-by, via audible tests and noting the lack of vibrations.
6. a pitot-style flow meter that has been sending false readings is located in the currently isolated section is, as there is no water flow in this not-in-service piping. Isolation was performed with in-house NAVFAC forces on 5 Dec 2021. PWD has not explored the root cause of the false reading, as the piping is isolated, and the meter is not used for any other purposes. Possible cause of the flow readings may be air trapped in the lines that shows pressure differentials as tide changes.

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CAPT R. Harmeyer  
Public Works Officer  
Joint Base Pearl Harbor Hickam





25 February 2022

MEMORANDUM FOR RECORD

SUBJECT: Joint Base Pearl Harbor-Hickam – Iroquois Point Water Connection

ENCL.: (1) Interconnection line drainage schematic

1. This Memorandum for Record (MFR) is to document the process to reopen and flush the 24" potable water system interconnection line between Iroquois Point and Bishop Point on Joint Base Pearl Harbor-Hickam.
2. Like most looped systems, the water in this interconnection flows in both directions depending on demand. On work days, when residents are typically not on Iroquois Point and the Joint Base is operating, water typically flows from west to east. On nights and weekends, the water may flow from east to west, depending on if the Kapilina Homes in Iroquois Point is operating the irrigation system, and similarly, what the demand is on the Joint Base proper from housing communities near Bishop Point. The long-term closure of the line is possible because each zone has multiple feeds. The presence of these looped interconnections allows redundancy – if one feed goes off-line for maintenance or unexpectedly, the area has a redundant feed to continue service.
3. The interconnection was secured on 05 Dec. 2021 by closing the gate valve on each end (shore) of the interconnection. The water between these valves has not moved since then. When we bring this section back online, the process will be as follows, and according to the diagram in Enclosure (1).
  - a. Secure two additional valves (126 and 130 at West Loch). See Enclosure (1).
  - b. Open valve 128 (currently shut) at West Loch
  - c. Open valve at Hickam that is currently shut
  - d. Open and flush from hydrant no. 64 at West Loch, located between valves 126 and 128.
  - e. Flush transmission line for 6-8 hours to the sanitary sewer.
  - f. Flushing, chlorination and testing of the transmission main will follow ANSI/AWWA C651-05: Disinfecting Water Mains.
  - g. Collect first sample for bacteriological testing after flushing.
  - h. Collect second sample (at least 24 hours after first sample) for bacteriological testing.
  - i. Open valves 126 and 130 and valves on Bishop Point, completing the loop.

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CAPT R. Harmeyer  
Public Works Officer  
Joint Base Pearl Harbor Hickam

ENCL(5)



The diagram is a hand-drawn schematic of a water distribution system. It features several key components and annotations:

- Top Section:** A horizontal line represents a main water line. A blue arrow points down to it from the top of the page. Below this line, handwritten text reads "INST. 1953" and "20\" B.W. ACROSS CHANNEL FROM HICKAM".
- Left Side:** A vertical line is labeled "DEWATERING". To its left, a red box contains the text "Flush from fire hydrant 64 inside EOD Compound". A red arrow points from this box to a circled valve labeled "64".
- Central Area:** A diagonal line runs from the top left towards the bottom right. Along this line, there are several valves labeled "128", "127", "126", and "130". A blue box with the text "Valve 128 currently shut, will need to open to flush through hydrant 64" has a blue arrow pointing to valve 128.
- Bottom Left:** A circular feature is labeled "METER". Below it, a blue box contains the text "Will need to shut valves 130 and 126 (currently open)". A blue arrow points from this box to valve 126.
- Bottom Right:** A dashed line is labeled "FW 2\" PVC". A building footprint is sketched in the lower right corner.
- Other Labels:** "0391" and "0345" are written near the top left. "PLUG" is written near the bottom center. "ENCLOSURE 1" is written in the bottom right corner.

22 February 2022

MEMORANDUM FOR RECORD

SUBJECT: Board of Water Supply Interconnection Status

Ref: [1] Management Inquiry Into Manana Booster/BWS dtd 29 Dec 2021

1. This Memorandum for Record (MFR) is to document the status of the Board of Water Supply (BWS) interconnections with the Joint Base Pearl Harbor Hickam Potable Water System. The JBPHH system has four interconnection points with BWS: (1) Puuloa Road, (2) Halawa Heights Road, (3) Manana Housing, and (4) Red Hill.
2. BWS physically removed the meters from two of the interconnections, creating an “air gap” between the BWS system and the Navy system at both the Puuloa Road location and the Halawa Heights Road location. BWS performed that work on or around 10 December 2021. PWD personnel confirmed that the meters were removed on 14 December 2021.
3. Red Hill and Manana Housing BWS interconnections are still physically connected. The Red Hill interconnection is isolated on both the BWS side and Navy side of the connection. Manana interconnection was opened on 16 November 2021, and is feeding Manana housing. Isolation valves have been secured from the Navy supply to Manana, to isolate Manana Housing from the JBPHH System (Reference [1]).
4. Prior to December 2017, there was a fifth BWS interconnection with the JBPHH system, located at Geiger Road. The Kalaeloa area of the JBPHH water system was transferred from Navy to the Kalaeloa Water Company in December 2017. The BWS interconnection was included in the transfer. Shortly after the transfer, PWD Utilities personnel physically removed the connection from West Loch to Geiger Road piping, “air gapping” the KWC system and the JBPHH system.

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CAPT R. Harmeyer  
Public Works Officer  
Joint Base Pearl Harbor Hickam

ENCL(6)

March 4, 2022

From: Naval Facilities Engineering Systems Command Representative, IDWS Team  
To: Interagency Drinking Water System Team

SUBJ: ZONE C3 DISTRIBUTION SYSTEM EXCEEDANCE INVESTIGATION SUMMARY  
AND RESULTS

Encl: (1) Zone C3 Stage 2 Distribution Sampling Report  
(2) Zone C3 Distribution System Sampling Report  
(3) DoH's Guidance on the Approach to Amending the Public Health Advisory,  
Addendum 1 dtd 12 FEB 2022  
(4) DoH SVOC Sample Results for Zone C3  
(5) DoH TPH Sample Results for Zone C3

1. The Zone C3 Distribution System sampling results are listed in enclosures (1) and (2). Enclosure (1) contains the initial distribution system sample results for Zone C3. Enclosure (2) documents additional distribution samples that were taken in Zone C3. The samples of the distribution system were taken at the hydrants. The categories of the results are broken down into non-detect, detect below limit levels, and exceedance. A non-detect occurs when the laboratory does not detect a measurable amount of an analyte. A detect below limit levels occurs when the laboratory detects a measurable amount of an analyte below Incident Specific Parameters (ISPs), Department of Health (DoH) Environmental Action Levels (EALs) or Maximum Contaminant Levels (MCLs), or Environmental Protection Agency (EPA) MCLs. An exceedance occurs when the laboratory detects a chemical and the amount detected is higher than established acceptable thresholds. All chemical and metal detections are shown in enclosures (1) and (2). The various agency limits are listed for reference and the result along with the location of the exceedance sample is listed in tabular form. Results highlighted in yellow exceed the ISP. Results in purple font also exceed the EAL. Results in green font also exceed the DOH MCL. Results in blue font also exceed the EPA MCL.

2. Enclosure (3) sets the DOH project screening level for copper at the action level of 1,300 parts per billion (ppb). Enclosure (4) and enclosure (5) are the test results for samples taken by DoH. There were no exceedances above the MCL and no exceedances of ISPs that required further action as documented in enclosures (1), (2), (4), and (5). Based on all of the information presented above, no further action was required regarding the distribution system for Zone C3. The laboratory reports will be made publically available at <https://jbphh-safewaters.org/> upon amendment of the health advisory for Zone C3.

3. I certify under penalty of law that I have personally examined and I am familiar with the information submitted and the submitted information is true, accurate, and complete.

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## Interagency Drinking Water System Team

### Drinking Water Distribution System Recovery Plan: *Stage 2 Sampling* *Results for Zone C3*

Joint Base Pearl Harbor-Hickam (JBPHH)

29 January 2022



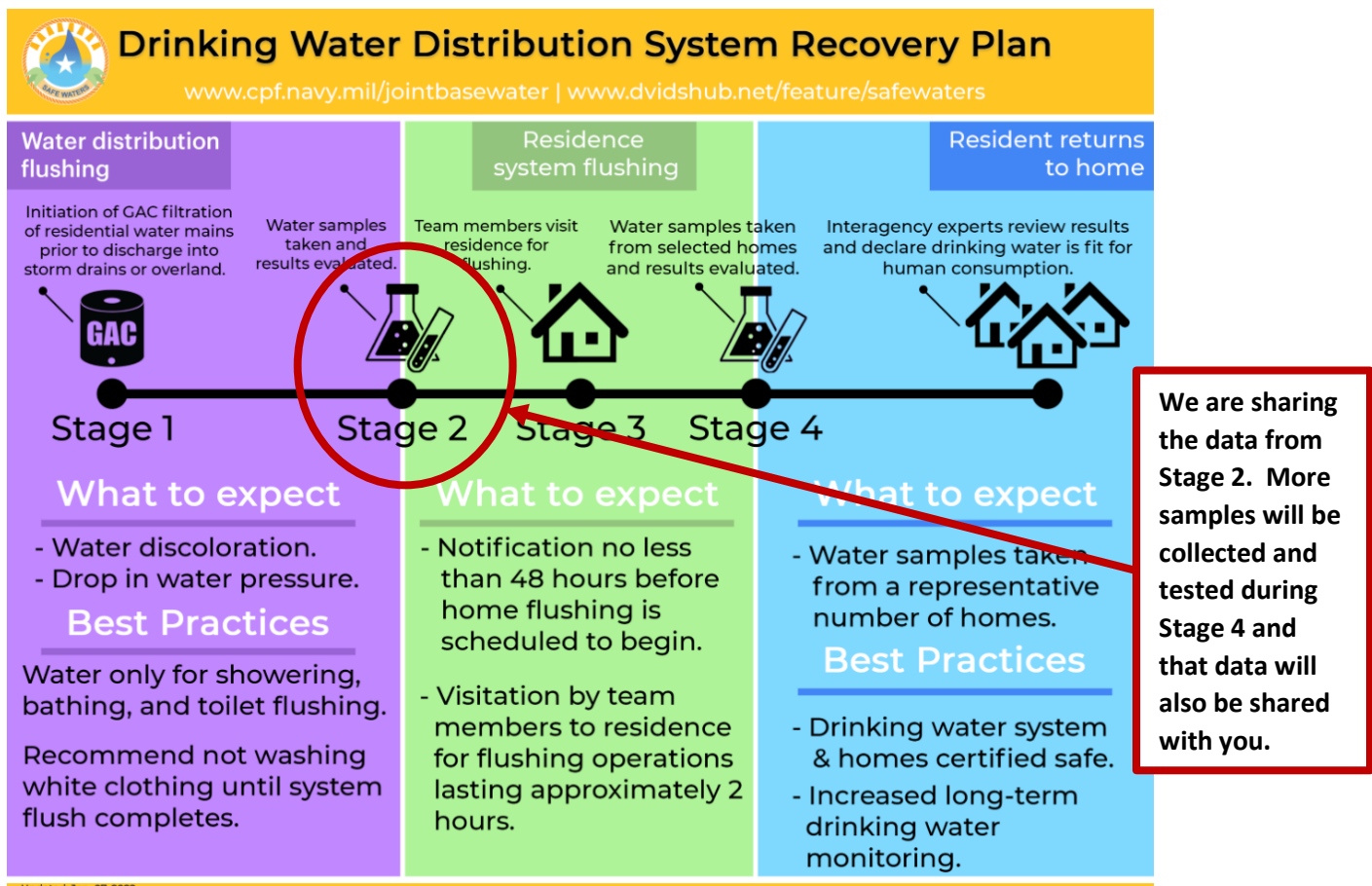
*Neighborhoods included in Zone C3: Shipyard and Hospital Point (see also C2)*

## EXECUTIVE SUMMARY FOR ZONE C3

The State of Hawaii Department of Health's (DOH) November 29, 2021 [Public Health Advisory for the JPBHH Public Water System](#) for Zone C3 remains in effect. DOH recommends all Navy water system users should avoid using the water for drinking, cooking, or oral hygiene. This includes consumption by pets. Navy water system users who detect a fuel-like odor from their water should also avoid using the water for bathing, dishwashing or laundry.

We have thoroughly flushed, sampled, and tested the water distribution system lines (Water Mains) in Zone C3. This Zone has moved to Stage 3–Building Flushing/Stage 4–Building Sampling, in the Drinking Water Distribution System Recovery Plan (see the Figure below). Based on the samples collected and tested, to date, this water meets all U.S. Environmental Protection Agency (EPA) and State of Hawaii Department of Health (DOH) standards that are applicable to the Navy Water System Incident.

No final conclusions or recommendations can be made at this time for the drinking water in your zone because more drinking water samples are being collected and tested from Water Mains, residences, buildings, schools, and child development centers (after they have been flushed). We are sharing this information to keep you updated on our progress towards restoring the water supply being provided to your community.



For additional information, please visit: <https://www.cpf.navy.mil/JBPHH-Water-Updates/>.





Table 1. Contaminants Detected in Drinking Water Samples Collected from Water Mains in Zone C3

Contaminant	Sampling Date	Units	DOH Project Screening Level	Basis of DOH Screening Level <sup>2</sup>	Highest Level Detected	Meets DOH Screening Level? (Yes / No)	Typical Source of Contaminant
<b>Contaminants of Concern<sup>1</sup></b>							
Benzene	1/09/2022	ppb	5	MCL	ND	Yes	Discharge from factories; Leaching from gas storage tanks and landfills
Ethylbenzene	1/09/2022	ppb	700	MCL	ND	Yes	Discharge from petroleum refineries
Toluene	1/09/2022	ppb	1000	MCL	ND	Yes	Discharge from petroleum factories
m,p-Xylenes	1/09/2022	ppb	10000	MCL	ND	Yes	Discharge from petroleum factories; Discharge from chemical factories
o-Xylenes	1/09/2022	ppb	10000	MCL	ND	Yes	
1-Methylnaphthalene	1/09/2022	ppb	2.1	ISP	ND	Yes	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
2-Methylnaphthalene	1/09/2022	ppb	4.7	ISP	0.0105	Yes	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
Naphthalene	1/09/2022	ppb	12	ISP	ND	Yes	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
Lead	1/09/2022	ppb	15	ISP	0.94	Yes	Corrosion of household plumbing systems; Erosion of natural deposits
Total Petroleum Hydrocarbons (TPH)-Gasoline (C6-C12)	1/09/2022	ppb	200	ISP	ND	Yes	Gasoline is a petroleum product that can contaminate drinking water through spills and other releases into the environment
TPH-Diesel (C9-C25)	1/09/2022	ppb	200	ISP	ND	Yes	Diesel is a petroleum product that can contaminate drinking water through spills and other releases into the environment
TPH-Oil (C24-C40)	1/09/2022	ppb	200	ISP	ND	Yes	Oil is a petroleum product that can contaminate drinking water through spills and other releases into the environment
Total Organic Carbon (TOC)	1/09/2022	ppb	2000	ISP	261	Yes	Naturally present in the environment, but also can be an indicator of contamination, including petroleum or other sources

**Notes:**

1. These contaminants are listed whether detected or non-detected (ND) because these are incident specific. All other contaminants are only listed if detected.
2. 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. Acronyms and explanation of terms used in this table are presented on the following pages. For assistance in understanding and interpreting information in this table, refer to FACT SHEET, Understanding You Water Quality Summary Table, available online at: <https://www.cpf.navy.mil/JBPPH-Water-Updates/>.
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](https://health.hawaii.gov/about/files/2021/12/21.12.16_What-Are-Petroleum-Hydrocarbons.pdf).



## **Drinking Water Distribution System Recovery Plan: Stage 2 Sampling Results for Zone C3**

### **What is the purpose of this Stage 2 Sampling Results Report?**

This is a progress report and presents the testing results from drinking water distribution system samples that have been collected, to date, from the water distribution system lines (Water Mains) in your Zone. These samples were collected after extensive flushing of the distribution system was performed using clean water from the Navy Waiawa Shaft. This is Stage 2 of the 4-Stage process described in the [Drinking Water Distribution System Recovery Plan](#).

No final conclusions or recommendations can be made at this time for the drinking water in your zone because more drinking water samples are being collected and tested from Water Mains, residences, buildings, schools, and child development centers. We are sharing this information to keep you updated on our progress towards restoring the water supply being provided to your community.

### **What was found?**

The table presented above (Table 1) presents all contaminants that were detected in drinking water samples that have been collected, to date, from the Water Mains in your Zone during Stage 2. Hawaii 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).

Based on these data, this Zone moved to Stage 3–Building/Home Flushing, in the [Drinking Water Distribution System Recovery Plan](#).

### **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 regulate the amount of certain contaminants in water provided by public water systems. 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), Total Organic Carbon (TOC) chlorine and pH. 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 are



presented in the laboratory reports are located at: <https://www.cpf.navy.mil/JBPHH-Water-Updates/>.

### **What happened leading up to Public Health Advisory being issued?**

After receiving reports of a fuel-like smell or visual sheen in the drinking water from residents of Joint Base Pearl Harbor – Hickam (JBPHH) on November 28, 2021, the Navy immediately stopped using water from the Red Hill Shaft. Out of abundance of caution, the Navy also stopped using water from the Navy Aiea Halawa Shaft. The Navy's water system provides drinking water to JBPHH, including the Army, Air Force, Marine Corps, and Hawaii residents in some neighborhoods close to JBPHH. The Hawaii DOH issued a [Public Health Advisory on November 29, 2021](#). The Hawaii DOH, the United States Environmental Protection Agency (EPA), Navy, and Marine Corps Public Health Center, 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?**

No. Please continue to follow the Public Health Advisory for Navy Water System users and only use your drinking water for non-consumptive purposes as long as your water does not have a visible sheen and remains odor free. Your service may have provided more restrictive guidance. As stated above, we are at Stage 2 of the 4-Stage process described in the Drinking Water System Recovery Plan and the Public Health Advisory will be re-evaluated by Hawaii DOH after Stage 4 in the process.

### **Where does our water come from?**

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

### **What is the IDWST doing to clean the drinking water distribution system?**

The IDWST evaluated multiple options for cleaning the Navy drinking water distribution system and 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, followed by extensive testing to confirm that flushing worked, would restore safe drinking water to all Navy Water System users.

### **When was Water Main flushing conducted in Zone C3?**

The final round of distribution water main flushing in Zone C3 was completed on January 07, 2022.



## How much water was flushed through the water distribution system in Zone C3?

From January 06 – 07, 2022, a total of 0.6 million gallons was flushed through Zone C3.

## 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

See the FACT SHEET, Understanding Your Water Quality Summary Table, available online at: <https://www.cpf.navy.mil/JBPHH-Water-Updates/>.

## Acronyms used in the Table

AL	Action Level (for Lead and Copper)
DOH	Hawaii Department of Health
EAL	Environmental Action Level
EPA	U.S. Environmental Protection Agency
ISP	Incident Specific Parameter
MCL	Maximum Contaminant Level
ND	Non-Detect
ppb	parts per billion (or ug/L)
SDWA	Safe Drinking Water Act
SOCs	Synthetic Organic Compounds (also known as SVOCs)
SVOCs	Semi-Volatile Organic Compounds (same as SOC)
TPH	Total Petroleum Hydrocarbons
TOC	Total Organic Carbon
ug/L	micrograms per liter (or ppb)
VOCs	Volatile Organic Compounds

## Explanation of Terms 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 like pH or temperature.





**Incident Specific Parameters (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 ISP is 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 chemicals that 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.

**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.

**Tier 1 Environmental Action Level (EAL).** Tier 1 Environmental Action Levels (Tier 1 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 the Tier 1 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 grouped by 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.

**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 million	ppm*	milligrams per Liter	mg/L
parts per billion	ppb*	micrograms per Liter	ug/L

\*One (1) part per million (ppm) is 1,000 parts per billion (ppb).

**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.

C3 Zone Distribution Sampling  
Chemistry Results  
Drinking Water Sampling, JBPHH, Oahu Hawaii

Location ID:	C3-HYD1026				C3-HYD1026	C3-HYD1026	C3-HYD2298	C3-HYD2298
Location Type:	Hydrant				Hydrant	Hydrant	Hydrant	Hydrant
Residence:	FH ID: 230				FH ID: 230	FH ID: 230	C2-FH177	C2-FH177
Field Sample ID:	20220108-C3-ZT02				20220109-C3-ZT-01	220109-C3-ZT-01	220116-C3-WT04	220116-C3-WT05
Sample Date:	2022-01-08				2022-01-09	2022-01-09	2022-01-16	2022-01-16
Sample Type:	N				N	N	N	N

GENCHEM (mg/L)	Incident Specific Parameters	2	DOH		Environmental Protection Agency		Environmental Protection Agency	
			DOH Environmental Action Levels Table D-1A Groundwater	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Maximum Contaminant Levels	DOH Environmental Action Levels Table D-1A Groundwater	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Maximum Contaminant Levels
Total Organic Carbon			None	None	None	--	0.261 J	0.200 U
								1.96

HC (µg/L)	Incident Specific Parameters	200	DOH		Environmental Protection Agency		Environmental Protection Agency	
			DOH Environmental Action Levels Table D-1A Groundwater	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Maximum Contaminant Levels	DOH Environmental Action Levels Table D-1A Groundwater	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Maximum Contaminant Levels
Petroleum Hydrocarbons (as Diesel)			400	None	None	45.0 U	85.0 U	86.0 U
Petroleum Hydrocarbons (as Gasoline)			300	None	None	--	31.0 U	31.0 U
Petroleum Hydrocarbons (as Motor Oil)			500	None	None	90.0 U	170 U	170 U

HG (µg/L)	Incident Specific Parameters	0.025	DOH		Environmental Protection Agency		Environmental Protection Agency	
			DOH Environmental Action Levels Table D-1A Groundwater	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Maximum Contaminant Levels	DOH Environmental Action Levels Table D-1A Groundwater	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Maximum Contaminant Levels
Mercury			0.025	2	2	--	0.0170 U	0.0170 U

METAL (µg/L)	Incident Specific Parameters	6	DOH		Environmental Protection Agency		Environmental Protection Agency	
			DOH Environmental Action Levels Table D-1A Groundwater	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Maximum Contaminant Levels	DOH Environmental Action Levels Table D-1A Groundwater	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Maximum Contaminant Levels
Antimony			6	6	6	--	0.0889 U	0.0889 U
Arsenic			10	10	10	--	0.0741 U	0.216 J
Barium			220	2000	2000	--	2.07	4.19
Beryllium			0.66	4	4	--	0.0624 U	0.0624 U
Cadmium			3	5	5	--	0.0416 U	0.0416 U
Chromium			11	100	100	--	1.06	1.36
Copper			2.9	1300	1300	--	4.72	0.725
Lead			15	15	15	--	0.940	0.146 J
Selenium			5	50	50	--	0.183 J	0.683
Thallium			2	2	2	--	0.0210 U	0.0210 U

SVOC (µg/L)	Incident Specific Parameters	70	DOH		Environmental Protection Agency		Environmental Protection Agency	
			DOH Environmental Action Levels Table D-1A Groundwater	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Maximum Contaminant Levels	DOH Environmental Action Levels Table D-1A Groundwater	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Maximum Contaminant Levels
1,2,4-Trichlorobenzene			70	70	70	0.0850 U	--	--
1,2-Dichlorobenzene			10	600	600	0.0470 U	--	--
1,3-Dichlorobenzene			None	None	None	0.0380 U	--	--

C3 Zone Distribution Sampling  
Chemistry Results  
Drinking Water Sampling, JBP HH, Oahu Hawaii

Location ID:	C3-HYD1026	C3-HYD1026	C3-HYD1026	C3-HYD1026	C3-HYD2298	C3-HYD2298
Location Type:	Hydrant	Hydrant	Hydrant	Hydrant	Hydrant	Hydrant
Residence:	FH ID: 230	FH ID: 230	FH ID: 230	FH ID: 230	C2-FH177	C2-FH177
Field Sample ID:	20220108-C3-ZT02	20220109-C3-ZT-01	220109-C3-ZT-01	220109-C3-ZT-01	220116-C3-WT04	220116-C3-WT05
Sample Date:	2022-01-08	2022-01-09	2022-01-09	2022-01-09	2022-01-16	2022-01-16
Sample Type:	N	N	N	N	N	N

Incident Specific Parameters		DOH Environmental Action Levels Table D-1A	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: 5801091176	SDG: 2A10034	SDG: 2A17048	SDG: 2A17048
SVOC (µg/L)	5	5	75	None	0.0380 U	--	--	--
1,4-Dichlorobenzene								
1-Methylnaphthalene	2.1	10	None	None	--	0.00801 U	--	0.00830 J
2,4-Dinitrotoluene	None	None	None	None	0.0940 U	--	--	--
2,6-Dinitrotoluene	None	None	None	None	0.0940 U	--	--	--
2-Chloronaphthalene	None	None	None	None	0.0660 U	--	--	--
2-Ethylhexyl adipate	None	None	None	None	--	0.00962 UJ	--	5.00 U
2-Methylnaphthalene	4.7	10	None	None	--	0.0500 U	--	0.0500 U
2-Nitroaniline	None	None	None	None	0.0940 U	--	--	--
3,3'-Dichlorobenzidine	None	None	None	None	0.250 U	--	--	--
3-Nitroaniline	None	None	None	None	0.150 U	--	--	--
4-Bromophenyl phenyl ether	None	None	None	None	0.0570 U	--	--	--
4-Chloroaniline	None	None	None	None	0.560 U	--	--	--
4-Chlorophenyl phenyl ether	None	None	None	None	0.0470 U	--	--	--
4-Nitroaniline	None	None	None	None	0.200 U	--	--	--
Acenaphthene	None	None	None	None	0.0470 U	--	--	--
Acenaphthylene	None	None	None	None	0.0570 U	--	--	--
Alachlor	None	None	None	None	--	0.0110 U	0.0110 U	0.0110 U
Anthracene	None	None	None	None	0.0470 U	--	--	--
Atrazine	None	None	None	None	--	0.00734 U	0.00734 U	0.00734 U
Benzo(a)anthracene	None	None	None	None	0.0470 U	--	--	--
Benzo(a)pyrene	0.06	0.06	0.2	0.2	0.0380 U	0.0117 UJ	0.0117 UJ	0.0117 UJ
Benzo(b)fluoranthene	None	None	None	None	0.0380 U	--	--	--
Benzo(g,h,i)perylene	None	None	None	None	0.0380 U	--	--	--
Benzo(k)fluoranthene	None	None	None	None	0.0470 U	--	--	--
Benzyl butyl phthalate	None	None	None	None	0.250 U	--	--	--
Bis(2-chloroethoxy)methane	None	None	None	None	0.0470 U	--	--	--
Bis(2-chloroethyl) ether (2-Chloroethyl ether)	None	None	None	None	0.0280 U	--	--	--
Bis(2-ethylhexyl)phthalate	3	3	6	6	0.700 U	0.437 UJ	0.437 UJ	0.437 UJ
Carbazole	None	None	None	None	0.0940 U	--	--	--
Chlordane	None	None	None	None	--	0.0669 U	0.0669 U	0.0669 U
Chrysene	None	None	None	None	0.0380 U	--	--	--
Dibenz(a,h)anthracene	None	None	None	None	0.0660 U	--	--	--
Dibenzofuran	None	None	None	None	0.0940 U	--	--	--
Diethyl phthalate	None	None	None	None	0.140 U	--	--	--

C3 Zone Distribution Sampling  
Chemistry Results  
Drinking Water Sampling, JBPHH, Oahu Hawaii

Location ID:	C3-HYD1026	C3-HYD1026	C3-HYD1026	C3-HYD1026	C3-HYD2298	C3-HYD2298
Location Type:	Hydrant	Hydrant	Hydrant	Hydrant	Hydrant	Hydrant
Residence:	FH ID: 230	FH ID: 230	FH ID: 230	FH ID: 230	C2-FH177	C2-FH177
Field Sample ID:	20220108-C3-ZT02	20220109-C3-ZT-01	220109-C3-ZT-01	220116-C3-WT04	220116-C3-WT05	
Sample Date:	2022-01-08	2022-01-09	2022-01-09	2022-01-16	2022-01-16	
Sample Type:	N	N	N	N	N	N
DOH Environmental Protection Agency Maximum Contaminant Levels						
SVOC (µg/L)	Incident Specific Parameters	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: 5801091176	SDG: 2A17048
Dimethyl phthalate	None	None	None	None	0.0570 U	--
Di-n-butyl phthalate	None	None	None	None	0.180 U	--
di-n-Octyl phthalate	None	None	None	None	0.120 U	--
Endrin	None	None	None	None	--	0.00991 U
Fluoranthene	None	None	None	None	0.0570 U	--
Fluorene	None	None	None	None	0.0470 U	--
gamma-BHC (Lindane)	None	None	None	None	--	0.00633 U
Heptachlor	None	None	None	None	--	0.00965 U
Heptachlor epoxide	None	None	None	None	0.0122 U	0.0122 U
Hexachlorobenzene	0.0003	0.0003	1	1	0.0380 U	0.0980 U
Hexachlorobutadiene	None	None	None	None	0.0570 U	--
Hexachlorocyclopentadiene	50	None	50	50	0.130 UJ	0.00594 U
Hexachloroethane	None	None	None	None	0.0470 U	--
Indeno(1,2,3-c,d)pyrene	None	None	None	None	0.120 U	--
Isophorone	None	None	None	None	0.0940 U	--
Methoxychlor	None	None	None	None	--	0.00863 U
Naphthalene	12	17	None	None	0.150 U	0.0103 U
Nitrobenzene	None	None	None	None	0.0380 U	--
N-Nitrosodi-n-propylamine	None	None	None	None	0.0570 U	--
N-Nitrosodiphenylamine	None	None	None	None	0.0660 U	--
PCB, Total	None	None	None	None	--	0.0940 U
PCB-1016 (Aroclor 1016)	None	None	None	None	0.100 U	0.100 U
PCB-1221 (Aroclor 1221)	None	None	None	None	0.100 U	0.100 U
PCB-1232 (Aroclor 1232)	None	None	None	None	0.100 U	0.100 U
PCB-1242 (Aroclor 1242)	None	None	None	None	0.100 U	0.100 U
PCB-1248 (Aroclor 1248)	None	None	None	None	0.100 U	0.100 U
PCB-1254 (Aroclor 1254)	None	None	None	None	0.100 U	0.100 U
PCB-1260 (Aroclor 1260)	None	None	None	None	0.100 U	0.100 U
Pentachlorophenol	None	None	None	None	0.0242 U	0.0242 U
Phenanthrene	None	None	None	None	0.110 U	--
Pyrene	None	None	None	None	0.0380 U	--
Simazine	None	None	None	None	0.00734 U	0.00734 U

C3 Zone Distribution Sampling  
Chemistry Results  
Drinking Water Sampling, JBPHH, Oahu Hawaii

Location ID:	C3-HYD1026	C3-HYD1026	C3-HYD1026	C3-HYD1026	C3-HYD2298	C3-HYD2298
Location Type:	Hydrant	Hydrant	Hydrant	Hydrant	Hydrant	Hydrant
Residence:	FH ID: 230	FH ID: 230	FH ID: 230	FH ID: 230	C2-FH177	C2-FH177
Field Sample ID:	20220108-C3-ZT02	20220109-C3-ZT-01	220109-C3-ZT-01	220116-C3-WT04	220116-C3-WT05	
Sample Date:	2022-01-08	2022-01-09	2022-01-09	2022-01-16	2022-01-16	
Sample Type:	N	N	N	N	N	N

Incident Specific Parameters		DOH Environmental Action Levels Table D-1A Groundwater Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: 2A10034		SDG: 2A17048		SDG: 2A17048	
VOC (µg/L)	11	11	200	200	--	0.256 U	--	0.256 U	--	0.256 U
1,1,1-Trichloroethane	5	5	3	5	--	0.190 U	--	0.190 U	--	0.190 U
1,1,2-Trichloroethane	7	7	7	7	--	0.160 U	--	0.160 U	--	0.160 U
1,2,4-Trichlorobenzene	70	70	70	70	--	0.170 U	--	0.170 U	--	0.170 U
1,2-Dichlorobenzene	10	10	600	600	--	0.190 U	--	0.190 U	--	0.190 U
1,2-Dichloroethane	5	5	5	5	--	0.243 U	--	0.243 U	--	0.243 U
1,2-Dichloropropane	5	5	5	5	--	0.130 U	--	0.130 U	--	0.130 U
1,4-Dichlorobenzene	5	5	75	None	--	0.180 U	--	0.180 U	--	0.180 U
Benzene	5	5	5	5	--	0.150 U	--	0.150 U	--	0.150 U
Carbon Tetrachloride	5	5	5	5	--	0.270 U	--	0.270 U	--	0.270 U
Chlorobenzene	25	25	100	100	--	0.150 U	--	0.150 U	--	0.150 U
cis-1,2-Dichloroethene	70	70	70	70	--	0.250 U	--	0.250 U	--	0.250 U
Ethylbenzene	700	7.3	700	700	--	0.210 U	--	0.210 U	--	0.210 U
m,p-Xylene	10000	13	None	None	--	0.330 U	--	0.330 U	--	0.330 U
Methylene chloride	5	5	5	5	--	0.303 U	--	0.303 U	--	0.303 U
o-Xylene	10000	13	None	None	--	0.200 U	--	0.200 U	--	0.200 U
Styrene	10	10	100	100	--	0.190 U	--	0.190 U	--	0.190 U
Tetrachloroethene (PCE)	5	5	5	5	--	0.180 U	--	0.180 U	--	0.180 U
Toluene	1000	9.8	1000	1000	--	0.294 U	--	0.294 U	--	0.294 U
trans-1,2-Dichloroethene	100	100	100	100	--	0.259 U	--	0.259 U	--	0.259 U
Trichloroethene (TCE)	5	5	5	5	--	0.180 U	--	0.180 U	--	0.180 U
Vinyl chloride	2	2	2	2	--	0.180 U	--	0.180 U	--	0.180 U

**Notes:**

-- indicates that the sample was Not Analyzed for the analyte

Results highlighted yellow exceed the ISP  
Results in purple font also exceed the EALs  
Results in green font also exceed the DOH MCL  
Results in blue font also exceed the EPA MCL

µg/L = Micrograms per Liter





*Kathleen Ho*

02/12/2022

KATHLEEN S. HO

Deputy Director of Environmental Health

DATE

## DOH's Guidance on the Approach to Amending the Public Health Advisory, Addendum 1

Public Health Advisory initiated November 29, 2021

Joint Base Pearl Harbor-Hickam Public Water System No. 360

HEER Incident Case No.: 20211128-1848

**Purpose:** This guidance provides the criteria that the Hawaii Department of Health (DOH) will be using to **amend** the Public Health Advisory (Advisory) issued on November 29, 2021.

DOH's priority is to protect the public health of the people of Hawaii. The guidance is based on "lines of evidence" (Table 1) that must be met before DOH will amend the health advisory and issue notices that the water can be used for drinking. The Navy must also commit to following the long-term monitoring (LTM) of system water quality for this incident under the IDWST Drinking Water Sampling Plan, as amended.

**Background:** A chemical release of petroleum, which is a hazardous substance, entered the Joint Base Pearl Harbor-Hickam (JBPHH) drinking water distribution system and the Red Hill Shaft. This release triggered an emergency response and DOH issuance of an Advisory on November 29, 2021. State and Federal Drinking Water (DW) Maximum Contaminant Levels (MCLs) under the Safe Drinking Water Act do not adequately address petroleum contamination of drinking water. DOH has established Environmental Action Levels (EALs) and Incident Specific Parameters (ISPs) to more comprehensively monitor and respond to petroleum contaminated drinking water. Any contaminants that exceed the State and Federal DW MCLs, EALs, or ISPs require additional action prior to amending the Advisory. Lines of evidence will be achieved by evaluating the data generated during the investigation conducted by the Interagency Drinking Water System Team (IDWST). The data will be assessed for each Flushing Zone of the Drinking Water Distribution System Recovery Plan. All lines of evidence will require documentation.

**DOH Project Screening Levels:** State and Federal Drinking Water MCLs, specified State EALs, and ISPs are considered in development of Project Screening Levels. The actions for the thresholds for each contaminant are listed in Tables 2 and 3.

**Table 1: Lines of Evidence Under Evaluation**

<b>1. Ensure no contamination is entering the water system.</b>		
<b>Objective</b>	<b>Lines of Evidence</b>	<b>Incident Specific Criteria</b>
1a	All reported sources of contamination are isolated and contained.	Contamination from Red Hill Shaft is isolated from Navy's water distribution system.
1b	The regulated public water system's water quality data is compliant.	Data meets Federal DW MCLs, specified State EALs, and ISPs.
1c	No additional contamination through the distribution system is occurring.	Cross Connection Control investigation shows distribution system is protected, resulting in no additional sources of contamination.
<b>2. Ensure no contamination remains in the system and water chemistry concerns are addressed.</b>		
<b>Objective</b>	<b>Lines of Evidence</b>	<b>Incident Specific Criteria</b>
2a	Water within the distribution system meets State and Federal DW MCLs, specified State EALs, and ISPs.	<ul style="list-style-type: none"> <li>• Zone flushing plan demonstrates entire distribution system is flushed.</li> <li>• Certification of Water Storage Tank(s) Flushing.</li> <li>• Sample results show the water in distribution system meets State and Federal DW MCLs, specified State EALs, and ISPs.</li> <li>• Drinking water does not show sheen, olfactory evidence, or other qualitative methods of petroleum.</li> </ul>
2b	Water in premise plumbing of homes/buildings meets State and Federal DW MCLs, specified State EALs, and ISPs.	<ul style="list-style-type: none"> <li>• Flushing Plan includes procedures to ensure no service connections will re-contaminate the distribution system.</li> <li>• Certification of Completed Irrigation Line Flushing.</li> <li>• Sample Plan includes 72-hour stagnation to account for leaching of contaminants from premise plumbing.</li> <li>• Sample results show water in homes/buildings meets State and Federal DW MCLs, specified State EALs, and ISPs.</li> </ul>

**Table 2: Threshold Determinations that Drinking Water is NOT Fit For Human Consumption**

*If the DOH MCLs or DOH Project Screening Levels are exceeded, the Drinking Water Health Advisory shall NOT be amended and the drinking water is considered NOT fit for human consumption.*

Table 2 Contaminant	DOH MCL (ug/L)	DOH Project Screening Level (ug/L)	Basis	Notes
Benzene	5	5	DOH MCL <sup>1</sup>	
Toluene	1,000	1,000		
Ethylbenzene	700	700		
Xylenes (total)	10,000	10,000		
JP-5 as Combined Total Petroleum Hydrocarbons (TPH)-Gasoline, Diesel, and Oil Ranges [Incident Specific Parameter]	Not Applicable	211	Release of fresh fuel and potential direct release.	The 211 ug/L screening level is based on risk-based action levels for TPH associated with JP-5 jet fuel described in a HIDOH Technical Memorandum dated January 27, 2022, revised February 12, 2022 (HIDOH 2022). The action (screening) level conservatively assumes that TPH detected in the water is associated with non-degraded, dissolved-phase, fuel in the drinking water system. The memorandum serves as an addendum to the <i>HIDOH 2017 EAL Guidance</i> <sup>2</sup> .
1,1,1-Trichloroethane	200	200	DOH MCL <sup>1</sup>	
1,1,2-Trichloroethane	5	5		
1,1-Dichloroethylene	7	7		
1,2,4-Trichlorobenzene	70	70		
1,2-Dichlorobenzene	600	600		
1,2-Dichloroethane (EDC)	5	5		
1,2-Dichloropropane (DCP)	5	5		
1,4-Dichlorobenzene	75	75		
Carbon tetrachloride (CTC)	5	5		
Chlorobenzene	100	100		
cis-1,2-Dichloroethylene	70	70		
Dichloromethane	5	5		
Styrene	100	100		
Tetrachloroethylene	5	5		
trans-1,2-Dichloroethylene	100	100		
Trichloroethylene (TCE)	5	5		
Vinyl Chloride	2	2		
Benzo[a]pyrene	0.2	0.2		
Di(2-ethylhexyl)phthalate	6	6		
Antimony	6	6		
Arsenic	10	10		

Table 2 Contaminant	DOH MCL (ug/L)	DOH Project Screening Level (ug/L)	Basis	Notes
Barium	2000	2000	DOH MCL <sup>1</sup>	
Beryllium	4	4		
Cadmium	5	5		
Chromium	100	100	DOH AL <sup>1</sup>	
Copper <sup>3</sup>	1300	1300		
Lead <sup>3</sup>	15	15		
Mercury	2	2	DOH MCL <sup>1</sup>	
Selenium	50	50		
Thallium	2	2		
Dichloroethylene, 1,2- (Mixed Isomers)	70	70		
Total trihalomethanes (TTHM) (sum of chloroform, bromoform, bromodichloromethane, and dibromochloromethane).	80	80		
Total Haloacetic acids (five) (HAA5) (sum of mono-, di-, trichloroacetic acids and mono- and dibromoacetic acids).	60	60		
Bromate	10	10		
Chlorite	1000	1000		
Notes: <sup>1</sup> CONTAMINANTS REGULATED BY THE SAFE DRINKING WATER BRANCH (updated 7/10/14) at <a href="https://health.hawaii.gov/sdwb/files/2014/07/MCL-Fct-2014-07-10.pdf">https://health.hawaii.gov/sdwb/files/2014/07/MCL-Fct-2014-07-10.pdf</a> <sup>2</sup> HDOH, 2017, Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater – Hawaii Edition (Fall 2017): Hawai'i Department of Health, Office of Hazard Evaluation and Emergency Response. <a href="https://health.hawaii.gov/heer/guidance/lehe-and-eals/">https://health.hawaii.gov/heer/guidance/lehe-and-eals/</a> . HDOH, 2022, Recommended Risk-Based Drinking Water Action Levels for Total Petroleum Hydrocarbons (TPH) Associated with Releases of JP-5 Jet Fuel: Hawaii Department of Health, Hazard Evaluation and Emergency Response Office, January 27, 2022, revised February 12, 2022. <sup>3</sup> Action Levels.				

**Table 3: Threshold Concentrations to Trigger Investigation(s)**

*If the DOH Project Screening Level is exceeded, the Navy shall investigate the source(s) of the contamination under direction of the DOH.*

Table 3 Contaminant	DOH MCL (ug/L)	DOH Project Screening Level (ug/L)	Basis	Notes
1-methylnaphthalene	None	10	HIDOH EALS Table D-1a <sup>1</sup>	<p>HIDOH 2017<sup>2</sup> (lowest of drinking water toxicity and taste and odor action levels). If the Project Screening Level for the listed contaminants are exceeded, the Navy shall:</p> <ol style="list-style-type: none"> <li>1. Notify the DOH within 24 hours of receipt of the preliminary analytical results;</li> <li>2. Start the investigation of the source of the contamination pursuant to the DOH <i>Technical Guidance Manual</i><sup>3</sup>;</li> <li>3. Submit a draft Corrective Action Plan to the DOH for approval within 72 hours of receipt of the preliminary analytical results; and</li> <li>4. Comply with interim actions as identified by DOH.</li> </ol>
2-methylnaphthalene	None	10		
Naphthalene	None	17		
Total Organic Carbon (TOC) [Incident Specific Parameter]	None	2000	Additional surrogate for TPH	<p>TOC used as an additional surrogate for TPH to increase confidence in representativeness of sample data.</p> <ul style="list-style-type: none"> <li>• While most Oahu ground water sources are closer to 1000 ug/l or below, the proposed EAL acknowledges that distribution system conditions and operational changes may cause a temporary increase in baseline TOC fluctuations.</li> <li>• The proposed EAL can be supported by all current EPA approved drinking water methods utilized for compliance with 40 CFR 141.132(d)(3) as revised: <a href="https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100WDD1L.txt">https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100WDD1L.txt</a></li> </ul> <p>Results with Detection Limits up to 1500 ug/L may be used to meet the criteria for amending the health advisory.</p>
Fuel-like Odor in the Water or Obvious Petroleum Sheen, or Dermal Irritation due to water [Incident Specific Parameter]	N/A	Present	Public Health Advisory	<p>Within 12 hours of field observations by Navy or DOH or EPA or within 24 hours of receipt of a complaint by the Navy or DOH, the Navy shall follow the <i>JBPHH Water Response Resident Resources</i> or the Water Rapid Response Team process and notify DOH of the status of the response.</p> <p>This continues to be a trigger under the Long Term Monitoring Plan.</p>

<sup>1</sup> HIDOH EALS Table D-1a. Groundwater Action Levels. <https://health.hawaii.gov/heer/files/2019/11/HDOH-EAL-Surfer-Fall-2017.xlsx>

<sup>2</sup> HIDOH, 2017. Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater – Hawaii Edition (Fall 2017): Hawaii Department of Health, Office of Hazard Evaluation and Emergency Response. <https://health.hawaii.gov/heer/guidance/ehe-and-eals/>

<sup>3</sup> HIDOH, 2017, DOH *Technical Guidance Manual*, <https://health.hawaii.gov/heer/igm/>.



DOH SVOCs-Results  
Navy Water System Incident  
Red Hill, Post-Flushing, Flushing Area C3

Date Collected	Location Name	Street Name	Closest Cross Street	Analyte	Results	Lab Qualifier	Validator Qualifier	Results Unit	Zone	Feature Type
1/9/2022	010922-21-03	Hospital Way	Cushing St	2,4-DDD	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	2,4-DDE	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	2,4-DDT	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	2,4-Dinitrotoluene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	2,6-Dinitrotoluene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	4,4-DDD	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	4,4-DDE	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	4,4-DDT	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Acenaphthene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Acenaphthylene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Acetochlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Alachlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Alpha-BHC	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	alpha-Chlordane	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Anthracene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Atrazine	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Benz(a)Anthracene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Benzo(a)pyrene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Benzo(b)Fluoranthene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Benzo(g,h,i)Perylene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Benzo(k)Fluoranthene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Beta-BHC	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Bromacil	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Butachlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Butylbenzylphthalate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Caffeine by method 525mod	ND	U(R7)	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Chlorobenzilate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Chloroneb	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Chlorothalonil(Draconil,Bravo)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Chlorpyrifos (Dursban)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Chrysene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Delta-BHC	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Di-(2-Ethylhexyl)adipate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Di(2-Ethylhexyl)phthalate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Diazinon (Qualitative)	ND	U	UJ	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Dibenz(a,h)Anthracene	ND	U	U	ug/L	C3	Distribution

DOH SVOCs-Results  
Navy Water System Incident  
Red Hill, Post-Flushing, Flushing Area C3

Date Collected	Location Name	Street Name	Closest Cross Street	Analyte	Results	Lab Qualifier	Validator Qualifier	Results Unit	Zone	Feature Type
1/9/2022	010922-21-03	Hospital Way	Cushing St	Dichlorvos (DDVP)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Dieldrin	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Diethylphthalate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Dimethoate	ND	U(LE)	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Dimethylphthalate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Di-n-Butylphthalate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Di-N-octylphthalate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Endosulfan I (Alpha)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Endosulfan II (Beta)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Endosulfan Sulfate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Endrin	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Endrin Aldehyde	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	EPTC	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Fluoranthene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Fluorene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	gamma-Chlordane	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Heptachlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Heptachlor Epoxide (isomer B)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Hexachlorobenzene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Hexachlorocyclopentadiene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Indeno(1,2,3,c,d)Pyrene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Isophorone	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Lindane	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Malathion	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Methoxychlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Metolachlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Metribuzin	ND	U(LE)	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Molinate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Naphthalene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Parathion	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Pendimethalin	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Permethrin (mixed isomers)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Phenanthrene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Propachlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Pyrene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Simazine	ND	U	U	ug/L	C3	Distribution

DOH SVOCs-Results  
Navy Water System Incident  
Red Hill, Post-Flushing, Flushing Area C3

Date Collected	Location Name	Street Name	Closest Cross Street	Analyte	Results	Lab Qualifier	Validator Qualifier	Results Unit	Zone	Feature Type
1/9/2022	010922-21-03	Hospital Way	Cushing St	Terbacil	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Terbutylazine	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Thiobencarb (ELAP)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	trans-Nonachlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Trifluralin	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	1-Methylnaphthalene	NI			ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	2-Methylnaphthalene	NI			ug/L	C3	Distribution

Exceeds the ISP

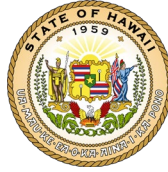
**Bold= Detected**

DOH TPH-Results  
Navy Water System Incident  
Red Hill, Post-Flushing, Flushing Area C3

Date Collected	Location Name	Street Name	Closest Cross Street	Analyte	Results	Lab Qualifier	Validator Qualifier	Results Unit	Results Category	Zone	Feature Type	Sheen Present	Odor
1/9/2022	010922-21-03	Hospital Way	Cushing St	C8-C44	<b>110</b>		J	ug/L	Detected	C3	Distribution	No	NO ODOR
1/9/2022	010922-21-03	Hospital Way	Cushing St	Diesel Range Organics (DRO)-C10-C28	<b>36</b>	J	J	ug/L	Detected	C3	Distribution	No	NO ODOR
1/9/2022	010922-21-03	Hospital Way	Cushing St	Gas Range Organics C8-C10	ND	U	UJ	ug/L	Not Detected	C3	Distribution	No	NO ODOR
1/9/2022	010922-21-03	Hospital Way	Cushing St	Oil Range Organics (C28-C40)	<b>40</b>	J	J	ug/L	Detected	C3	Distribution	No	NO ODOR
1/9/2022	010922-21-03	Hospital Way	Cushing St	TPH-g	ND	U	U	ug/L	Not Detected	C3	Distribution	No	NO ODOR

Exceeds the ISP

**Bold= Detected**



Interagency Drinking Water System Team  
Zone C3 Removal Action Report  
March 2022

**Line of Evidence 2b**

**Water in Premise Plumbing of Homes/Buildings does not exceed State and Federal Drinking Water MCLs, specified State EALs, and ISPs**



**Table 1: Lines of Evidence Under Evaluation – Ensure no contamination remains in the system and water chemistry concerns are addressed.**

**Objective 2b** - Water in premise plumbing of homes/buildings does not exceed State and Federal DW MCLs, specified State EALs, and ISPs.

Incident Specific Criteria –

- Flushing Plan includes procedures to ensure no service connections will re-contaminate the distribution system.
- Sample Plan includes 72-hour stagnation to account for leaching of contaminants from premise plumbing.
- Sample results show water in homes/buildings does not exceed State and Federal DW MCLs, specified State EALs, and ISPs.

Lines of Evidence	Completion Status	Outstanding Items
Flushing Plan includes procedures to ensure no service connections will re-contaminate the distribution system.	Complete	<ul style="list-style-type: none"> <li>• None.</li> </ul>

February 20, 2022

From: Naval Facilities Engineering Systems Command Representative, IDWS Team  
To: Interagency Drinking Water System Team

SUBJ: SUMMARY OF LINE OF EVIDENCE OBJECTIVE 2B – WATER IN PREMISE OF PLUMBING OF HOMES/BUILDINGS DOES NOT EXCEED STATE AND FEDERAL DW MCLs, SPECIFIED STATE EALs, AND ISPs

Encl: (1) 2b.1 Flushing Records and Distribution System Pressure Logs During Residential Flushing  
(2) 2b.2 Residential Sampling Report for Flushing Zone  
(3) 2b.3 Exceedance Investigation Summary and Results  
(4) 2b.4 Certification of Completed Irrigation Flushing  
(5) 2b.5 DOH Guidance for Active Irrigation Line Purging and Flushing

1. Enclosures (1) through (5) document completion of Line of Evidence 2b, that water in premise of plumbing of homes/buildings does not exceed State of Hawaii and Federal Drinking Water standards, Maximum Contaminate Levels, Environmental Action Levels and Incident Specific Parameters. On the evening of November 28, 2021, the Red Hill Shaft was secured from operation and all pumping operations ceased. The Aiea/Halawa shaft briefly served as the secondary source starting on November 28, 2021, but it was shut down on December 3, 2021 to prevent potential westward contaminant migration in the aquifer and because there were concerns over high chloride concentrations caused by saltwater intrusion. Since December 3, 2021, the Waiawa Shaft has been the sole water source providing potable water to the Joint Base Pearl Harbor-Hickam (JBPHH) distribution network. Zone C3 is part of the JBPHH Drinking Water system that is operated and maintained by the United States Navy. Flushing operations are summarized in Enclosure (1), signed by CDR Trevor Bingham, team lead for the Drinking Water Residential and Non-residential Recovery Team.

2. Enclosure (1) documents the flushing records for all facilities within Zone C3, as well as pressure logs for the distribution system during facility flushing operations. The completion of irrigation flushing in Zone C3, described in Enclosure (5), is documented in Enclosure (4). Sampling data collected after flushing is summarized in Enclosure (2).

3. Sample results with analyte detections exceeding the prescribed Maximum Contaminant Level (MCL), Environmental Action Level (EAL), or Incident Specific Parameter (ISP) are documented in Enclosure (3). The follow-on investigation summary and additional sampling results are also documented in Enclosure (3).

4. This information documents completion of Line of Evidence 2b, that water in premise of plumbing of homes/buildings does not exceed State of Hawaii and Federal Drinking Water standards, MCLs, EALs, or ISPs.

5. I certify under penalty of law that I have personally examined and I am familiar with the information submitted and I believe the submitted information is true, accurate, and complete.

WETZEL.CHRISTOPHE  
R.JAMES.1540194862  
C. J. Wetzel  
LT, CEC, USN

Digitally signed by  
WETZEL.CHRISTOPHER.JAMES.1  
540194862  
Date: 2022.02.20 13:54:53 -08'00'

1 March 2022

MEMORANDUM

From: Naval Facilities Engineering Systems Command Representative, EWG Team  
To: Interagency Drinking Water System Team

Subj: RECORDS OF COMPLETED RESIDENTIAL AND NON-RESIDENTIAL FLUSHING  
ZONE C3

Ref: (a) Single Family Home Flushing Plan Checklist and Standard Operating Procedures,  
December 2021  
(b) Non-Residential Flushing Plan, January 2022

Encl: (1) EDMS Residential Flushing Records Zone C3  
(2) EDMS Non-Residential Flushing Records Zone C3  
(3) JBPHH System Pressure SCADA Data

1. This memo documents the completion of residential and non-residential flushing in Zone C3. The completed records of residential flushing, as shown in Enclosure (1), document the flushing of 6/6 homes in EDMS. The completed records of non-residential flushing, as shown in Enclosure (2), document the flushing of all 144 facilities in EDMS.

2. Meter 6780, located on Porter Avenue, is the nearest meter to Zone C3. Meter readings for this meter document that the distribution system maintained a pressure of at least 30 pounds per square inch (psi) for the duration of residential and non-residential flushing, as shown in Enclosure (3).

4. I certify under penalty of law that I have personally examined and I am familiar with the information submitted, and the submitted information is true, accurate, and complete.

Very respectfully,

BINGHAM.TREVOR.A  
MMON.1131940048  
T. A. BINGHAM  
CDR, CEC, USN

Digitally signed by  
BINGHAM.TREVOR.AMMON.113  
1940048  
Date: 2022.03.01 16:12:26 -10'00'

EDMS Residential Flushing Records Zone C3

Flushing Zone C3			
No Dates Selected			
Total Homes	Percent Complete	No Access	Flushed on Selected Dates
6	100.0 %	0	6

Zone	Address	Arrive Date	Start Time	Finish Time	Certified	Summary General Notes	Unable To Access	Access Reason
Flushing Zone C3	4935 Crommelin Street (C3-CROM4935)	22-Jan-22	08:15	14:22	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	4943 Crommelin Street (C3-CROM4943)	22-Jan-22	10:30	14:17	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	4945 Crommelin Street (C3-CROM4945)	22-Jan-22	11:55	13:08	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	2158 Ford Island Way (C3-FORD2158)	22-Jan-22	09:26	12:22	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	2160 Ford Island Way (C3-FORD2160)	22-Jan-22	09:22	10:12	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	2166 Ford Island Way (C3-FORD2166)	22-Jan-22	09:26	10:13	<input checked="" type="checkbox"/>		<input type="checkbox"/>	

Key

Not Started

No Access

In Progress

Complete



Flushing Zone C3

2022-01-20 - 2022-01-27

Total Facilities	Total	Percent Complete	No	Flushed on Selected Dates
144	144	100.0 %	0	144

Zone	Address	Arrive Date	Start Time	Finish Time	Certified	Summary General Notes	Unable To Access	Access Reason
Flushing Zone C3	Building 11,RADIOLOGICAL CONTROL	25-Jan-22	09:00	09:36	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1167,BOILER HOUSE (C3-	21-Jan-22	09:00	15:08	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1170,SCRAP MTL PKGING FAC	24-Jan-22	00:00	13:32	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 12,WOODSHOP (X68) (C3-	24-Jan-22	00:00	09:38	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1228,CABLE HUT N-	26-Jan-22	09:00	14:20	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1229,DRYDOCK PUMPHOUSE #3	26-Jan-22	08:00	10:52	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 128,MATERIAL ENVELOPE 5 (C3-	26-Jan-22	07:00	14:10	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 129,RADIOACTIVE WASTE	25-Jan-22	08:00	09:41	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 13,EQUIPMENT MAINTENANCE	26-Jan-22	13:00	10:18	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1302,SNACK BAR SHELTER (C3-	26-Jan-22	10:00	14:21	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1305,BRAVO 19 GUARDSHACK	26-Jan-22	10:00	14:22	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 134,PUBLIC TOILET (C3-	27-Jan-22	08:00	14:12	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 135,PUBLIC TOILET (C3-	26-Jan-22	08:00	14:13	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 136,PUBLIC TOILET (C3-	26-Jan-22	08:00	14:14	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1360,BLAST / PAINT ROOM NO.	25-Jan-22	08:00	08:56	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1364,GENERAL STORAGE SHED	25-Jan-22	00:00	09:43	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1376,XFMR F15 & F15ADDN	24-Jan-22	08:00	11:09	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 139,WATERFRONT SUPPORT	25-Jan-22	13:00	09:46	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1392,WATERFRONT SUPPORT	26-Jan-22	08:00	14:15	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1393,SEWAGE PMP BLDG STA 7	26-Jan-22	09:00	14:16	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 143,SPECIAL PROJECTS SHOP	24-Jan-22	09:00	15:16	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 140,ENVIRONMENTL	21-Jan-22	09:00	08:34	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 141,PUBLIC TOILET (C3-	24-Jan-22	00:00	13:35	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1410,GATE 38 SENTRY HOUSE	24-Jan-22	12:00	13:47	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1411,GATE 59 SENTRY HOUSE	24-Jan-22	12:00	13:49	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1412,GATE 31 SENTRY HOUSE	24-Jan-22	12:00	13:51	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1414,GATE 19 SENTRY HOUSE	24-Jan-22	12:00	13:53	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1443,QUALITY ASSURANCE	24-Jan-22	11:00	10:20	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1445,LUBRICANT STORAGE (C3-	26-Jan-22	09:00	14:17	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1447,TRANSDUCER REPAIR	25-Jan-22	08:00	10:21	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1454,RADCON TRAINING BLDG	26-Jan-22	00:00	13:36	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1456,PIPE SHOP (X56) (C3-	26-Jan-22	00:00	13:37	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1464,MATERIAL STORAGE &	25-Jan-22	08:00	10:23	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1475,SWITCH STATION E-1 &A	24-Jan-22	11:00	10:30	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 149,PP#2 - DEMINERALIZED	20-Jan-22	10:00	10:31	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 149A,INTAKE SALT WATER/PP#2	20-Jan-22	09:00	15:24	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 15,DYDOCK MATL STORAGE	25-Jan-22	09:00	15:18	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 151,WAITING ROOM-LATRINE-	25-Jan-22	14:43	14:43	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1515,SUBSTATION	24-Jan-22	10:00	10:32	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1516,SUBSTATION	24-Jan-22	10:00	10:34	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 154,SAWMILL (X64) (C3-	24-Jan-22	07:00	15:22	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 155,STRUCTURAL &	24-Jan-22	23:00	09:48	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1555,Crane MAINT STRG (C3-	26-Jan-22	09:00	14:19	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 155A,SHIPITTERS (X11) (C3-	24-Jan-22	00:00	09:49	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1670,SERVICE SHOPS GROUP	26-Jan-22	00:00	13:39	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1671,TEMP SERVICES SHOP	25-Jan-22	12:00	10:26	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1678,PUBLIC TOILET (C3-	24-Jan-22	00:00	13:40	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 167A,VH/UHF	25-Jan-22	09:00	10:59	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 170,DRYDOCK #2 PUMPHOUSE	25-Jan-22	13:00	10:51	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1700,PERSONNEL SUPPORT	26-Jan-22	07:00	11:00	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1701,MULTI MEDIA BUILDING	26-Jan-22	07:00	11:01	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1702,POWDER COAT BLDG (C3-	26-Jan-22	07:00	11:02	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1703,PAINT SPRAY BLDG (C3-	26-Jan-22	08:00	11:03	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1704,ABRASIVE BLAST BLDG (C3-	26-Jan-22	00:00	11:04	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 171,PUBLIC TOILET (C3-	24-Jan-22	00:00	13:41	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 174,DC2 FACILITY (C3-	21-Jan-22	13:00	14:40	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 178,ENGINEERING TRAINING	24-Jan-22	00:00	09:29	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Flushing Zone C3	Building 1916,SHIP SERVICES SUPPORT	25-Jan-22	13:00	11:05	<input checked="" type="checkbox"/>		<input type="checkbox"/>	

Section 2b.1 Flushing Records and Distribution System Pressure Logs During Residential Flushing

EDMS Non-Residential Flushing Records Zone C3

Flushing Zone C3

2022-01-20 - 2022-01-27

Flushing Zone C3	Building 19A PUBLIC TOILET (C3-	26-Jan-22	10:00	14:26	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 207 PHNSY PASS AND ID OFFICE	25-Jan-22	08:00	09:53	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 208 PRODUCTION MEETING	24-Jan-22	00:00	13:42	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 214 ELECTRICAL/ELECTRONIC	25-Jan-22	08:00	10:28	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 215 OUTSIDE MACHINE SHOP	25-Jan-22	08:00	10:30	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2192 PRODUCTION SUPPORT	24-Jan-22	12:00	13:56	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2193 PRODUCTION SUPPORT	24-Jan-22	12:00	13:58	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2194 LAN BUILDING (C3-	26-Jan-22	10:00	14:24	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2197 EMERGENCY GENERATOR	26-Jan-22	10:00	14:25	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2198 REFUELING EQUIP STRG	24-Jan-22	10:00	13:51	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2199 WATERFRONT SUPT	25-Jan-22	00:00	13:44	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2205 SHIP FORCES WORK AREA	25-Jan-22	13:00	10:00	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2207 CODE 730 VISION TOWER	26-Jan-22	11:00	14:27	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2252 LOX/CHEMTANE STRG (C3-	24-Jan-22	20:00	09:56	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2254 ADMIN OFFICE (C3-	26-Jan-22	11:00	14:28	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2257 UEM SHOP SHED (C3-	26-Jan-22	11:00	14:30	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2258 UTILITY PLANT STORAGE	26-Jan-22	11:00	14:31	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2261 VISION TOWER (C3-	26-Jan-22	12:00	14:32	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2262 MAINTENANCE STORAGE	26-Jan-22	12:00	14:33	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 2263 SUBST A/MR#2 MACHINERY	25-Jan-22	13:00	09:58	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 242 AIR FILTER BUILDING/PP#2	26-Jan-22	12:00	14:34	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 247 DRYDOCK MATL STORAGE	24-Jan-22	12:00	09:32	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 29 CIVILIAN CAFETERIA (C3-	26-Jan-22	09:00	11:10	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 297 PP#2 - UEM FW/SW SHOPS	20-Jan-22	10:00	15:21	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 315 INDUSTRIAL X-RAY LAB (C3-	25-Jan-22	00:00	10:32	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 366 PUBLIC TOILET (C3-	25-Jan-22	09:00	13:53	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 385 MAINT S/S STORAGE-SHOP	24-Jan-22	08:00	15:13	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 391 A LABORATORY-OFF	26-Jan-22	12:00	14:35	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 392 WELDING SCHOOL (X26)	26-Jan-22	12:00	14:36	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 3A PIPEFITTING SHOP (C3-	25-Jan-22	07:00	10:02	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 38 TOOL SHOP (C3-BDGO0038)	24-Jan-22	10:00	09:34	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 44A SHIP REPAIR PROJECT TEAM	25-Jan-22	06:00	10:04	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 45 PP #2 UEM SHOP (C3-	20-Jan-22	09:00	15:17	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 47 SWITCH STATION	24-Jan-22	07:00	11:03	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 5 FORGE/HEAT TREAT (C3-	24-Jan-22	00:00	13:48	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 52 CAFETERIA STORAGE -	26-Jan-22	09:00	11:09	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 548 NN SHOP 56 TEST	25-Jan-22	00:00	10:06	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 56 PEARL HAWAII FEDERAL	26-Jan-22	13:00	14:38	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 58 CRANE & MATL HANDLING	25-Jan-22	07:00	10:07	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 5A FORGE/HEAT TREAT (C3-	25-Jan-22	00:00	13:49	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 64 STOREHOUSE GENERAL (C3-	26-Jan-22	09:00	08:47	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 64A STORAGE/SHOE STORE (C3-	26-Jan-22	09:00	09:56	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 66 SHIPS SPARE STORAGE	26-Jan-22	08:00	08:59	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 67 INSIDE MACHINE SHOP (X31)	26-Jan-22	07:00	10:33	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 67A INSIDE MACHINE SHOP	26-Jan-22	07:00	10:34	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 67B SHOP ADMIN (C3-	26-Jan-22	07:00	10:35	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 7 WOODWORKING SHOP (X64)	24-Jan-22	00:00	09:39	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 71 SHIPYARD CHILL WATER	24-Jan-22	00:00	13:51	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 72 SHEETMETAL SHOP (X17)	C3: 24-Jan-22	00:00	13:52	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 74 PUBLIC TOILET (C3-	21-Jan-22	00:00	10:06	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 8 POWER PLANT NO 1	24-Jan-22	00:00	13:53	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 9 NUCLEAR REPAIR SHOP (C3-	26-Jan-22	06:00	10:40	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 90 NAVAL REACTOR	25-Jan-22	12:00	10:43	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 92 TRADE & WELDING SCHOOL	25-Jan-22	00:00	13:54	<input checked="" type="checkbox"/>
Flushing Zone C3	Building 9A NUCLEAR REPAIR (C3-	25-Jan-22	07:00	10:15	<input checked="" type="checkbox"/>
Flushing Zone C3	Building S100 SUBSTATION F-3	24-Jan-22	10:00	10:35	<input checked="" type="checkbox"/>
Flushing Zone C3	Building S1084 TRANSFORMER E-18	24-Jan-22	00:00	10:36	<input checked="" type="checkbox"/>
Flushing Zone C3	Building S1087 TRANSFORMER B-18	24-Jan-22	11:00	10:37	<input checked="" type="checkbox"/>
Flushing Zone C3	Building S1104 SUBSTATION B-1	24-Jan-22	14:00	11:09	<input checked="" type="checkbox"/>
Flushing Zone C3	Building S1111 TRANSF STATION F-4	24-Jan-22	11:00	10:38	<input checked="" type="checkbox"/>
Flushing Zone C3	Building S1115 PERSONNEL PROTECTIVE	25-Jan-22	09:00	13:55	<input checked="" type="checkbox"/>
Flushing Zone C3	Building S1133 SHIPFITTING SHOP STRG	26-Jan-22	13:00	14:40	<input checked="" type="checkbox"/>
Flushing Zone C3	Building S1166 TRANSFORMER F14A	24-Jan-22	14:00	10:39	<input checked="" type="checkbox"/>

Section 2b.1 Flushing Records and Distribution System Pressure Logs During Residential Flushing

EDMS Non-Residential Flushing Records Zone C3

Flushing Zone C3					2022-01-20 - 2022-01-27				
Flushing Zone C3	Building S1167 TRANSFORMER F14 BLDG	24-Jan-22	13:00	10:40	<input checked="" type="checkbox"/>				
Flushing Zone C3	Building S1172 SUBSTA B-7A BLDG/SHVD	24-Jan-22	12:00	10:41	<input checked="" type="checkbox"/>				
Flushing Zone C3	Building S1173 SUBSTA B-20A	24-Jan-22	11:00	10:41	<input checked="" type="checkbox"/>				
Flushing Zone C3	Building S1182 SUBSTATION BUILDING	24-Jan-22	14:00	10:42	<input checked="" type="checkbox"/>				
Flushing Zone C3	Building S132XRMSTAS	24-Jan-22	14:00	10:43	<input checked="" type="checkbox"/>				
Flushing Zone C3	Building S133 SUBSTA F9-T1/T2/T3 BLDG	24-Jan-22	10:00	10:44	<input checked="" type="checkbox"/>				
Flushing Zone C3	Building S169B SUBSTA B5 & B5B BLDG	24-Jan-22	10:00	10:43	<input checked="" type="checkbox"/>				
Flushing Zone C3	Building S17B DRYDOCK PUMP	25-Jan-22	12:00	10:49	<input checked="" type="checkbox"/>				
Flushing Zone C3	Building S340 SUBSTATION B-19	24-Jan-22	17:00	10:44	<input checked="" type="checkbox"/>				
Flushing Zone C3	Building S53 SUBSTA E11 1500KVA BLDG	24-Jan-22	17:00	10:45	<input checked="" type="checkbox"/>				
Flushing Zone C3	Building S786 STA B5A ELEC	24-Jan-22	13:00	10:46	<input checked="" type="checkbox"/>				
Flushing Zone C3	Building S833 STORAGE LOCKER (C3-	26-Jan-22	13:00	14:39	<input checked="" type="checkbox"/>				
Flushing Zone C3	MULTI MEDIA BUILDING (C3-RUSS4756)	26-Jan-22	07:00	08:35	<input checked="" type="checkbox"/>				
Flushing Zone C3	PRODUCTION SUPPORT BLDG EAST (C3-	24-Jan-22	12:00	08:37	<input checked="" type="checkbox"/>				
Flushing Zone C3	PUBLIC TOILET (C3-CUSH0658)	24-Jan-22	08:00	08:40	<input checked="" type="checkbox"/>				
Flushing Zone C3	PUBLIC TOILET (C3-LEFT0618)	27-Jan-22	08:00	08:43	<input checked="" type="checkbox"/>				
Flushing Zone C3	QUALITY ASSURANCE OFFICE (C3-	24-Jan-22	11:00	08:45	<input checked="" type="checkbox"/>				
Flushing Zone C3	SERVICE SHOPS GROUP (C3-FLET4753)	26-Jan-22	09:00	08:47	<input checked="" type="checkbox"/>				
Flushing Zone C3	SHIP FORCES WORK AREA (C3-	25-Jan-22	13:00	08:49	<input checked="" type="checkbox"/>				
Flushing Zone C3	SHIP SERVICES SUPPORT BUILDING (C3-	25-Jan-22	13:00	08:51	<input checked="" type="checkbox"/>				
Flushing Zone C3	SPECIAL PROJECTS SHOP (X55) (C3-	24-Jan-22	09:00	08:53	<input checked="" type="checkbox"/>				
Flushing Zone C3	STRUCTURAL & FABRICATION (C3-	24-Jan-22	23:00	09:00	<input checked="" type="checkbox"/>				
Flushing Zone C3	TRADE & WELDING SCHOOL (X26) (C3-	26-Jan-22	12:00	09:03	<input checked="" type="checkbox"/>				

Key

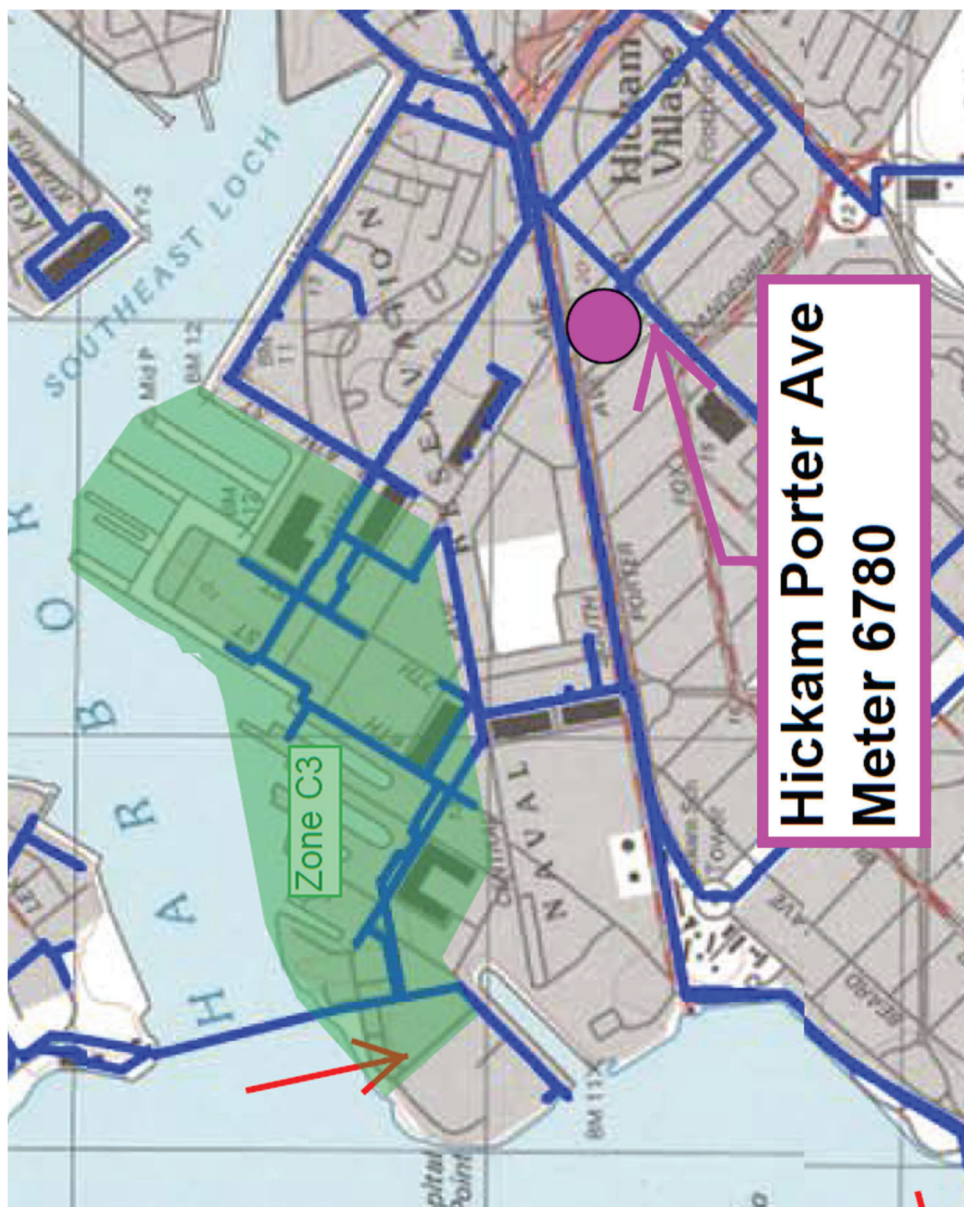
Not Started

No Access

In Progress

Complete

Section 2b.1 Flushing Records and Distribution System Pressure Logs During Residential Flushing



## C3 Pressure Readings (psi)

Date	Time	Date/Time	4787	4127	4710	5004	5002	9050	7158	6780	2550	1846	1485
20-Jan-22	0:30:00	20-Jan-2200:30	67.8	33.8	79.8	77.0	77.6	72.6	75.0	65.7	37.8	63.1	65.7
20-Jan-22	1:00:00	20-Jan-2201:00	62.4	34.2	73.0	71.9	74.2	70.0	72.6	64.0	36.0	61.9	64.0
20-Jan-22	1:30:00	20-Jan-2201:30	62.4	33.6	73.0	70.0	70.6	70.0	71.9	64.0	36.0	62.0	64.0
20-Jan-22	2:00:00	20-Jan-2202:00	62.4	31.9	73.0	70.0	70.0	70.0	71.0	64.0	36.0	61.6	64.0
20-Jan-22	2:30:00	20-Jan-2202:30	62.4	31.9	73.0	70.0	70.0	70.0	71.0	63.4	36.0	61.8	64.0
20-Jan-22	3:00:00	20-Jan-2203:00	62.4	33.7	73.0	70.0	70.0	70.0	71.0	63.3	36.0	61.3	63.7
20-Jan-22	3:30:00	20-Jan-2203:30	60.6	33.9	73.0	69.7	70.1	69.7	71.0	63.5	35.7	61.0	63.6
20-Jan-22	4:00:00	20-Jan-2204:00	60.4	34.8	72.8	70.0	70.2	69.2	71.0	63.0	35.1	61.0	63.0
20-Jan-22	4:30:00	20-Jan-2204:30	60.4	34.8	72.3	69.3	69.9	69.0	70.5	63.0	35.0	61.0	63.0
20-Jan-22	5:00:00	20-Jan-2205:00	60.4	34.8	72.0	69.0	69.3	68.4	70.0	62.1	34.7	60.3	62.7
20-Jan-22	5:30:00	20-Jan-2205:30	60.4	35.7	72.0	69.0	69.0	68.3	70.0	62.0	34.5	60.0	62.5
20-Jan-22	6:00:00	20-Jan-2206:00	69.1	34.9	77.6	74.6	74.3	70.2	71.8	63.4	35.3	61.5	63.3
20-Jan-22	6:30:00	20-Jan-2206:30	69.7	34.8	78.0	75.0	75.4	70.3	73.0	64.0	36.0	62.0	64.0
20-Jan-22	7:00:00	20-Jan-2207:00	69.7	35.4	78.3	75.3	75.5	70.6	73.0	64.3	36.0	62.0	64.0
20-Jan-22	7:30:00	20-Jan-2207:30	69.7	36.1	78.8	75.3	76.3	70.7	73.0	64.0	36.0	62.0	64.0
20-Jan-22	8:00:00	20-Jan-2208:00	69.6	36.0	79.0	75.3	75.7	71.0	73.3	64.0	36.0	62.0	64.0
20-Jan-22	8:30:00	20-Jan-2208:30	69.5	35.7	78.5	75.4	75.3	70.9	73.2	64.0	36.0	61.2	64.3
20-Jan-22	9:00:00	20-Jan-2209:00	69.6	34.8	79.3	75.7	75.6	70.5	73.1	64.4	36.3	63.4	63.5
20-Jan-22	9:30:00	20-Jan-2209:30	70.0	34.8	79.3	75.4	75.7	70.7	73.3	64.7	36.0	62.0	65.0
20-Jan-22	10:00:00	20-Jan-2210:00	70.0	34.1	79.0	75.4	75.7	71.0	73.3	65.0	36.9	62.7	65.0
20-Jan-22	10:30:00	20-Jan-2210:30	70.0	34.2	79.0	76.0	75.7	71.1	73.7	65.0	37.0	63.0	65.0
20-Jan-22	11:00:00	20-Jan-2211:00	70.0	35.4	79.6	76.3	76.3	72.0	74.0	65.0	37.0	63.0	65.1
20-Jan-22	11:30:00	20-Jan-2211:30	60.8	35.3	75.0	71.4	72.0	70.1	71.8	63.4	35.8	61.8	63.7
20-Jan-22	12:00:00	20-Jan-2212:00	60.5	35.7	73.0	69.5	70.0	69.0	71.0	63.0	35.3	61.0	63.3
20-Jan-22	12:30:00	20-Jan-2212:30	60.5	35.7	72.4	69.1	69.6	69.0	71.0	63.0	35.0	61.0	63.0
20-Jan-22	13:00:00	20-Jan-2213:00	60.5	35.7	72.5	69.6	69.8	69.0	70.4	63.0	34.7	61.0	63.0
20-Jan-22	13:30:00	20-Jan-2213:30	68.8	35.7	74.4	73.3	73.2	69.8	72.7	64.2	35.7	62.1	64.4
20-Jan-22	14:00:00	20-Jan-2214:00	70.2	35.7	79.0	76.0	76.0	70.5	74.0	65.0	36.6	62.7	65.0
20-Jan-22	14:30:00	20-Jan-2214:30	70.1	35.6	79.0	76.0	75.7	71.0	73.7	65.1	37.0	63.2	65.0
20-Jan-22	15:00:00	20-Jan-2215:00	70.3	33.4	79.0	76.0	76.0	71.0	74.0	65.2	37.0	62.9	65.0
20-Jan-22	15:30:00	20-Jan-2215:30	70.3	32.8	79.3	76.3	76.3	71.8	74.0	65.7	37.0	63.0	65.1
20-Jan-22	16:00:00	20-Jan-2216:00	70.3	32.8	79.7	76.0	76.3	72.0	74.0	66.0	37.0	63.0	65.7
20-Jan-22	16:30:00	20-Jan-2216:30	65.4	33.5	77.2	73.9	74.2	71.2	73.2	65.5	36.5	62.4	63.6
20-Jan-22	17:00:00	20-Jan-2217:00	61.7	33.8	73.0	69.7	70.0	69.5	71.0	63.4	36.0	61.3	63.4
20-Jan-22	17:30:00	20-Jan-2217:30	61.7	33.8	72.7	69.4	69.7	69.3	71.0	63.0	35.0	61.0	63.0
20-Jan-22	18:00:00	20-Jan-2218:00	61.7	33.8	72.0	68.9	69.1	69.0	70.5	63.0	35.0	61.0	63.0

20-Jan-22	18:30:00	20-Jan-2218:30	61.7	33.8	72.0	68.8	68.5	68.7	70.0	62.7	35.0	60.6	63.0
20-Jan-22	19:00:00	20-Jan-2219:00	60.1	33.8	71.9	68.4	68.3	68.1	70.0	62.0	34.0	60.0	62.3
20-Jan-22	19:30:00	20-Jan-2219:30	59.7	33.8	71.0	68.0	68.2	68.0	69.2	61.7	34.0	59.7	62.0
20-Jan-22	20:00:00	20-Jan-2220:00	59.7	33.8	71.0	68.0	68.1	68.0	69.3	61.6	34.0	60.0	62.0
20-Jan-22	20:30:00	20-Jan-2220:30	61.8	34.5	71.8	68.8	68.7	68.2	69.0	61.3	34.0	59.5	62.0
20-Jan-22	21:00:00	20-Jan-2221:00	68.4	31.9	77.8	74.5	75.0	70.0	72.6	63.0	35.8	62.0	63.9
20-Jan-22	21:30:00	20-Jan-2221:30	68.4	31.8	78.6	75.6	75.7	70.6	73.0	64.0	36.0	62.0	64.0
20-Jan-22	22:00:00	20-Jan-2222:00	68.4	32.3	78.7	75.3	76.0	71.0	73.0	64.9	36.0	62.0	64.6
20-Jan-22	22:30:00	20-Jan-2222:30	68.8	33.4	79.0	75.7	76.4	71.0	73.7	65.0	36.4	62.6	65.0
20-Jan-22	23:00:00	20-Jan-2223:00	70.4	33.8	79.0	76.0	76.2	71.2	73.7	65.0	37.0	63.0	65.0
20-Jan-22	23:30:00	20-Jan-2223:30	70.4	34.7	79.0	76.0	76.3	71.7	74.0	65.0	37.0	63.0	65.0
21-Jan-22	0:00:00	21-Jan-2200:00	70.4	33.8	79.0	76.0	76.0	71.4	74.0	65.0	37.0	63.0	65.0
21-Jan-22	0:30:00	21-Jan-2200:30	70.4	33.8	79.9	76.9	76.9	72.0	74.4	65.7	37.4	63.2	65.4
21-Jan-22	1:00:00	21-Jan-2201:00	70.4	34.7	80.0	77.0	77.0	72.3	74.4	66.0	37.7	63.1	66.0
21-Jan-22	1:30:00	21-Jan-2201:30	68.5	35.7	80.3	77.0	77.3	72.5	75.0	66.4	37.9	63.0	65.9
21-Jan-22	2:00:00	21-Jan-2202:00	62.4	34.7	76.3	70.7	70.9	70.2	72.0	64.0	36.0	61.5	64.0
21-Jan-22	2:30:00	21-Jan-2202:30	62.4	33.8	73.2	70.0	70.8	70.0	72.0	64.0	36.0	62.0	64.0
21-Jan-22	3:00:00	21-Jan-2203:00	62.4	34.8	73.0	70.0	70.4	70.0	71.3	64.0	36.0	62.0	64.0
21-Jan-22	3:30:00	21-Jan-2203:30	62.4	35.7	73.0	70.0	70.5	70.0	71.0	64.0	36.0	62.0	64.0
21-Jan-22	4:00:00	21-Jan-2204:00	62.0	35.7	73.0	69.7	70.0	69.7	71.0	63.3	35.9	61.2	63.6
21-Jan-22	4:30:00	21-Jan-2204:30	60.4	35.7	73.0	70.0	70.3	69.0	71.0	63.0	35.0	61.0	63.0
21-Jan-22	5:00:00	21-Jan-2205:00	60.4	35.7	72.2	68.9	69.7	68.2	70.4	62.3	34.7	60.1	62.3
21-Jan-22	5:30:00	21-Jan-2205:30	60.4	35.7	71.0	68.0	68.3	67.7	69.3	61.0	33.3	58.4	61.0
21-Jan-22	6:00:00	21-Jan-2206:00	64.7	34.8	72.4	74.5	70.9	69.3	70.1	61.1	33.6	59.1	61.6
21-Jan-22	6:30:00	21-Jan-2206:30	68.2	34.7	77.7	74.1	74.4	69.3	72.0	63.0	35.0	60.0	63.0
21-Jan-22	7:00:00	21-Jan-2207:00	68.2	34.7	77.0	74.0	74.6	69.3	72.0	63.0	35.0	60.0	63.0
21-Jan-22	7:30:00	21-Jan-2207:30	68.2	34.7	77.1	74.4	74.1	69.8	72.5	63.0	35.0	60.0	63.0
21-Jan-22	8:00:00	21-Jan-2208:00	68.2	34.3	77.4	74.2	74.5	69.8	72.0	63.0	34.7	60.0	63.0
21-Jan-22	8:30:00	21-Jan-2208:30	68.2	34.7	77.7	74.4	74.1	69.6	72.0	63.0	34.7	60.0	63.0
21-Jan-22	9:00:00	21-Jan-2209:00	68.2	34.7	78.0	74.3	74.8	69.3	72.0	63.0	34.7	60.0	63.0
21-Jan-22	9:30:00	21-Jan-2209:30	68.1	34.6	77.9	74.6	74.6	69.9	72.0	63.5	35.0	60.0	63.0
21-Jan-22	10:00:00	21-Jan-2210:00	67.9	33.8	77.8	74.5	74.5	70.0	72.3	63.3	34.4	60.0	63.0
21-Jan-22	10:30:00	21-Jan-2210:30	67.9	33.8	78.0	74.1	74.7	69.7	72.0	63.4	34.6	60.0	63.0
21-Jan-22	11:00:00	21-Jan-2211:00	68.7	34.2	77.4	74.7	73.8	69.4	72.8	64.0	34.8	60.0	63.0
21-Jan-22	11:30:00	21-Jan-2211:30	70.1	35.7	78.0	75.0	75.0	69.7	73.0	64.0	35.0	60.0	63.0
21-Jan-22	12:00:00	21-Jan-2212:00	70.1	35.7	78.0	74.7	74.6	70.0	73.0	64.0	35.0	60.0	63.5
21-Jan-22	12:30:00	21-Jan-2212:30	70.1	35.7	78.5	75.8	75.6	70.8	73.0	64.7	35.6	61.5	64.3
21-Jan-22	13:00:00	21-Jan-2213:00	70.1	35.7	79.0	76.0	75.7	71.0	73.7	65.0	36.0	62.0	65.0



21-Jan-22	13:30:00	21-Jan-2213:30	70.1	35.7	79.0	76.0	76.2	71.0	74.0	65.0	36.6	62.4	65.0
21-Jan-22	14:00:00	21-Jan-2214:00	70.1	35.7	78.9	75.9	76.4	71.0	74.0	65.0	37.0	63.0	65.0
21-Jan-22	14:30:00	21-Jan-2214:30	70.1	35.7	78.8	75.3	75.7	71.3	73.4	65.0	37.0	62.4	65.0
21-Jan-22	15:00:00	21-Jan-2215:00	70.1	35.7	79.0	75.8	76.0	71.8	73.9	66.0	37.0	63.0	65.0
21-Jan-22	15:30:00	21-Jan-2215:30	65.3	36.5	77.5	74.5	74.8	71.4	73.2	65.3	36.3	62.6	64.8
21-Jan-22	16:00:00	21-Jan-2216:00	61.1	36.5	73.0	69.3	69.6	69.3	71.0	63.0	35.0	61.0	63.0
21-Jan-22	16:30:00	21-Jan-2216:30	61.1	33.8	72.4	69.6	69.6	69.0	71.0	63.0	35.0	61.0	63.0
21-Jan-22	17:00:00	21-Jan-2217:00	61.1	33.8	72.0	69.0	69.1	69.0	70.7	63.0	35.0	60.7	63.0
21-Jan-22	17:30:00	21-Jan-2217:30	61.1	32.8	72.0	69.0	69.2	69.0	70.1	63.0	35.0	60.6	62.9
21-Jan-22	18:00:00	21-Jan-2218:00	59.5	32.8	71.9	68.3	68.3	68.1	70.0	62.2	34.6	60.0	62.0
21-Jan-22	18:30:00	21-Jan-2218:30	59.2	33.4	71.0	67.7	67.8	68.0	69.5	62.0	34.0	60.0	62.0
21-Jan-22	19:00:00	21-Jan-2219:00	59.2	35.0	71.0	67.7	68.0	67.4	69.0	61.3	33.6	59.5	61.3
21-Jan-22	19:30:00	21-Jan-2219:30	68.0	35.7	74.2	72.1	72.8	69.2	71.4	64.7	34.6	60.3	63.5
21-Jan-22	20:00:00	21-Jan-2220:00	68.6	35.7	78.0	74.9	74.9	70.0	72.9	64.0	35.7	61.2	64.0
21-Jan-22	20:30:00	21-Jan-2220:30	68.6	35.9	78.0	75.0	75.0	70.0	73.0	64.0	36.0	61.7	64.0
21-Jan-22	21:00:00	21-Jan-2221:00	68.6	35.8	78.0	75.0	75.3	70.3	73.0	64.0	36.0	62.0	64.1
21-Jan-22	21:30:00	21-Jan-2221:30	68.6	35.7	78.7	75.4	75.7	71.0	73.0	64.5	36.2	62.1	64.7
21-Jan-22	22:00:00	21-Jan-2222:00	68.7	34.9	79.0	76.0	76.0	71.0	73.9	65.0	36.7	62.7	65.0
21-Jan-22	22:30:00	21-Jan-2222:30	70.5	34.7	79.3	76.0	76.4	71.9	74.0	65.0	37.0	63.0	65.0
21-Jan-22	23:00:00	21-Jan-2223:00	70.5	34.7	79.2	76.0	76.8	71.4	74.0	65.6	37.0	63.0	65.3
21-Jan-22	23:30:00	21-Jan-2223:30	70.5	34.7	80.0	76.6	76.7	72.0	74.1	66.0	37.1	63.0	66.0
22-Jan-22	0:00:00	22-Jan-2200:00	70.5	34.7	80.0	77.0	76.8	72.0	74.1	66.0	37.4	63.3	66.0
22-Jan-22	0:30:00	22-Jan-2200:30	69.6	34.6	80.0	77.0	76.9	72.6	75.0	66.0	38.0	63.5	66.0
22-Jan-22	1:00:00	22-Jan-2201:00	61.1	33.7	74.7	71.4	71.6	70.7	72.1	64.2	36.3	61.7	64.2
22-Jan-22	1:30:00	22-Jan-2201:30	61.0	35.7	73.0	70.0	70.3	70.0	72.0	64.0	36.0	62.0	64.0
22-Jan-22	2:00:00	22-Jan-2202:00	61.0	35.7	73.0	70.0	70.0	70.0	71.8	64.0	36.0	62.0	64.0
22-Jan-22	2:30:00	22-Jan-2202:30	61.0	35.7	73.0	70.0	70.0	70.0	71.0	64.0	36.0	62.0	64.0
22-Jan-22	3:00:00	22-Jan-2203:00	61.0	35.7	73.0	70.0	70.0	70.0	71.0	64.0	36.0	61.9	64.0
22-Jan-22	3:30:00	22-Jan-2203:30	61.0	35.7	72.1	69.1	69.7	69.4	70.6	62.8	35.6	60.5	63.4
22-Jan-22	4:00:00	22-Jan-2204:00	61.0	35.7	72.0	69.0	69.0	68.3	70.0	62.0	34.2	60.0	62.0
22-Jan-22	4:30:00	22-Jan-2204:30	61.0	35.7	72.0	69.0	69.0	68.0	70.0	62.0	34.0	59.5	62.0
22-Jan-22	5:00:00	22-Jan-2205:00	62.6	36.5	72.7	69.6	69.8	68.2	69.5	61.5	34.0	59.1	61.7
22-Jan-22	5:30:00	22-Jan-2205:30	69.1	36.7	78.5	75.4	75.8	70.2	72.6	63.0	35.2	61.0	63.9
22-Jan-22	6:00:00	22-Jan-2206:00	69.1	36.7	78.7	75.7	76.0	71.0	73.0	64.0	36.0	61.0	64.0
22-Jan-22	6:30:00	22-Jan-2206:30	69.1	36.7	78.2	75.4	76.0	70.4	73.3	64.4	36.0	61.9	64.4
22-Jan-22	7:00:00	22-Jan-2207:00	69.1	35.8	78.7	76.0	76.0	71.3	74.0	65.0	37.0	62.7	65.0
22-Jan-22	7:30:00	22-Jan-2207:30	69.1	35.7	79.0	76.0	76.0	71.0	73.4	65.0	36.7	62.6	65.0
22-Jan-22	8:00:00	22-Jan-2208:00	69.1	35.3	79.0	75.4	75.4	71.0	74.0	65.0	36.0	62.0	65.0

22-Jan-22	8:30:00	22-Jan-2208:30	69.1	34.7	79.0	75.7	71.0	74.0	65.0	36.3	62.6	65.0
22-Jan-22	9:00:00	22-Jan-2209:00	69.1	26.6	79.0	75.7	71.0	74.0	65.0	36.4	62.6	65.0
22-Jan-22	9:30:00	22-Jan-2209:30	69.1	29.9	79.0	76.0	71.0	74.0	65.3	37.0	63.0	65.0
22-Jan-22	10:00:00	22-Jan-2210:00	69.1	27.0	79.3	76.0	71.6	74.0	65.0	37.0	63.0	65.0
22-Jan-22	10:30:00	22-Jan-2210:30	60.8	25.6	74.2	70.9	69.9	71.4	63.0	34.9	60.5	62.8
22-Jan-22	11:00:00	22-Jan-2211:00	60.1	30.4	71.7	68.4	68.2	70.0	62.4	33.9	60.0	62.5
22-Jan-22	11:30:00	22-Jan-2211:30	59.9	32.7	72.0	68.7	68.6	70.0	62.5	34.0	60.0	62.0
22-Jan-22	12:00:00	22-Jan-2212:00	63.2	34.4	73.5	70.2	68.5	70.1	62.2	34.1	60.4	62.2
22-Jan-22	12:30:00	22-Jan-2212:30	69.0	34.9	79.0	75.4	70.1	73.0	64.6	36.0	62.0	64.3
22-Jan-22	13:00:00	22-Jan-2213:00	69.0	29.0	79.0	75.4	71.0	73.0	64.6	36.0	61.7	64.0
22-Jan-22	13:30:00	22-Jan-2213:30	69.0	32.7	78.7	75.1	71.0	73.0	65.0	36.0	62.0	64.1
22-Jan-22	14:00:00	22-Jan-2214:00	69.0	35.8	79.0	75.7	71.0	73.2	65.0	36.0	62.1	65.0
22-Jan-22	14:30:00	22-Jan-2214:30	69.0	36.1	79.0	76.0	71.9	74.0	65.7	37.0	63.0	65.0
22-Jan-22	15:00:00	22-Jan-2215:00	69.0	35.3	79.0	76.4	71.7	74.0	66.0	37.0	63.0	65.0
22-Jan-22	15:30:00	22-Jan-2215:30	69.3	35.1	79.6	76.2	72.0	74.0	66.0	37.0	63.0	66.0
22-Jan-22	16:00:00	22-Jan-2216:00	67.7	35.1	79.2	75.6	71.8	74.0	66.0	36.8	63.3	65.3
22-Jan-22	16:30:00	22-Jan-2216:30	61.4	35.1	73.0	70.0	69.5	71.0	63.4	36.0	62.1	63.4
22-Jan-22	17:00:00	22-Jan-2217:00	61.4	35.1	72.1	69.7	69.3	71.0	63.0	35.0	61.0	63.3
22-Jan-22	17:30:00	22-Jan-2217:30	61.4	35.1	72.5	69.0	69.0	71.0	63.0	35.0	61.0	63.0
22-Jan-22	18:00:00	22-Jan-2218:00	61.4	35.1	72.0	68.9	69.0	70.0	62.8	35.0	60.4	63.0
22-Jan-22	18:30:00	22-Jan-2218:30	61.4	35.1	72.0	68.3	68.8	70.0	62.0	34.7	60.0	63.0
22-Jan-22	19:00:00	22-Jan-2219:00	62.2	35.1	71.7	68.3	68.0	70.4	62.0	34.0	60.0	62.0
22-Jan-22	19:30:00	22-Jan-2219:30	68.8	35.1	78.0	75.0	70.7	73.6	63.7	35.6	61.9	63.9
22-Jan-22	20:00:00	22-Jan-2220:00	68.8	35.1	78.0	75.0	70.4	73.0	64.0	36.0	62.0	64.0
22-Jan-22	20:30:00	22-Jan-2220:30	68.8	35.1	78.3	75.1	71.0	73.0	64.2	36.0	62.0	64.5
22-Jan-22	21:00:00	22-Jan-2221:00	68.8	35.1	78.8	75.2	71.0	73.0	65.0	36.0	62.0	65.0
22-Jan-22	21:30:00	22-Jan-2221:30	68.8	35.1	79.0	76.0	71.0	73.4	65.0	36.4	62.6	65.0
22-Jan-22	22:00:00	22-Jan-2222:00	70.7	35.1	79.0	76.0	71.8	74.0	65.0	37.0	63.0	65.3
22-Jan-22	22:30:00	22-Jan-2222:30	70.8	35.1	80.0	76.3	72.0	74.0	65.8	37.0	63.0	65.0
22-Jan-22	23:00:00	22-Jan-2223:00	70.8	35.1	80.0	76.3	72.0	74.0	66.0	37.0	63.1	65.9
22-Jan-22	23:30:00	22-Jan-2223:30	70.8	35.1	80.0	76.9	72.6	74.7	66.0	38.0	64.0	66.0
23-Jan-22	0:00:00	23-Jan-2200:00	64.6	33.6	76.6	73.7	71.9	73.1	64.8	36.9	63.2	64.8
23-Jan-22	0:30:00	23-Jan-2200:30	62.4	32.2	73.0	70.0	70.0	71.3	64.0	36.0	62.0	64.0
23-Jan-22	1:00:00	23-Jan-2201:00	62.4	32.2	73.0	70.0	70.0	71.0	63.7	36.0	61.9	64.0
23-Jan-22	1:30:00	23-Jan-2201:30	62.4	33.7	73.0	70.0	70.0	71.0	63.0	36.0	61.5	64.0
23-Jan-22	2:00:00	23-Jan-2202:00	62.4	34.2	73.0	69.4	69.7	71.0	63.0	35.7	61.6	63.4
23-Jan-22	2:30:00	23-Jan-2202:30	62.4	34.2	73.0	70.0	69.7	71.0	63.0	35.6	61.0	63.0
23-Jan-22	3:00:00	23-Jan-2203:00	60.3	34.2	73.0	69.7	69.3	71.0	63.0	35.0	61.0	63.0

23-Jan-22	3:30:00	23-Jan-2203:30	60.3	34.6	72.2	69.2	69.7	69.0	70.7	63.0	35.0	61.0	63.0
23-Jan-22	4:00:00	23-Jan-2204:00	60.3	35.1	72.0	69.0	69.1	69.0	70.0	62.8	34.8	60.9	62.8
23-Jan-22	4:30:00	23-Jan-2204:30	60.3	36.0	71.7	68.5	69.2	68.2	70.0	62.0	34.0	59.0	62.0
23-Jan-22	5:00:00	23-Jan-2205:00	61.2	37.1	71.0	68.3	68.6	67.6	69.2	61.2	33.2	59.0	61.2
23-Jan-22	5:30:00	23-Jan-2205:30	68.8	37.1	77.2	74.1	74.2	69.5	72.6	63.9	34.8	60.8	63.8
23-Jan-22	6:00:00	23-Jan-2206:00	68.8	36.5	79.0	75.7	76.0	70.7	73.0	64.0	35.0	61.0	64.0
23-Jan-22	6:30:00	23-Jan-2206:30	68.8	35.0	79.0	76.0	76.0	70.7	73.3	64.3	35.6	61.0	64.0
23-Jan-22	7:00:00	23-Jan-2207:00	69.8	34.2	79.0	75.7	75.7	71.1	74.0	64.2	36.2	61.6	64.2
23-Jan-22	7:30:00	23-Jan-2207:30	70.8	34.2	79.0	76.0	76.0	71.4	74.0	65.0	36.7	63.0	65.0
23-Jan-22	8:00:00	23-Jan-2208:00	70.8	32.5	79.0	76.0	76.0	72.0	74.0	65.0	37.0	62.7	65.0
23-Jan-22	8:30:00	23-Jan-2208:30	70.8	33.7	79.0	75.7	75.8	71.2	74.0	65.0	37.0	63.0	65.0
23-Jan-22	9:00:00	23-Jan-2209:00	70.8	34.2	79.0	75.9	75.7	71.3	74.0	65.0	37.0	63.0	65.0
23-Jan-22	9:30:00	23-Jan-2209:30	70.8	35.1	79.0	75.8	76.0	71.0	74.0	65.0	37.0	62.8	65.0
23-Jan-22	10:00:00	23-Jan-2210:00	70.8	35.5	79.0	75.7	76.0	71.0	74.0	65.0	36.2	62.0	65.0
23-Jan-22	10:30:00	23-Jan-2210:30	68.6	36.1	79.0	76.0	76.0	71.6	74.0	64.9	37.0	62.6	64.9
23-Jan-22	11:00:00	23-Jan-2211:00	61.5	36.1	72.5	69.5	69.4	69.2	71.0	62.8	35.0	60.3	62.8
23-Jan-22	11:30:00	23-Jan-2211:30	60.2	36.1	71.8	68.2	68.5	68.1	69.6	61.7	33.6	59.2	61.4
23-Jan-22	12:00:00	23-Jan-2212:00	59.5	36.1	71.0	68.0	68.0	67.0	69.0	61.0	33.0	58.0	61.0
23-Jan-22	12:30:00	23-Jan-2212:30	62.9	36.4	71.0	69.3	68.9	67.5	70.0	61.4	33.3	58.2	61.0
23-Jan-22	13:00:00	23-Jan-2213:00	68.3	37.1	77.3	75.0	75.2	70.0	73.0	64.0	35.0	60.5	63.7
23-Jan-22	13:30:00	23-Jan-2213:30	68.3	37.1	78.0	75.0	74.7	70.0	73.0	64.0	35.0	61.0	64.0
23-Jan-22	14:00:00	23-Jan-2214:00	69.7	34.6	78.6	75.3	75.6	70.5	73.3	65.0	35.7	61.5	64.7
23-Jan-22	14:30:00	23-Jan-2214:30	70.3	34.2	79.0	76.0	76.0	71.0	74.0	65.0	37.0	62.9	65.0
23-Jan-22	15:00:00	23-Jan-2215:00	70.3	33.3	79.0	76.0	76.0	71.2	74.0	65.0	37.0	63.0	65.0
23-Jan-22	15:30:00	23-Jan-2215:30	70.3	33.0	79.0	76.0	76.0	71.7	74.0	65.8	37.0	63.0	65.0
23-Jan-22	16:00:00	23-Jan-2216:00	70.3	33.2	79.2	76.0	76.3	72.0	74.0	66.0	37.0	63.0	65.0
23-Jan-22	16:30:00	23-Jan-2216:30	70.3	33.2	79.7	76.3	76.0	72.0	74.0	66.0	37.1	63.3	66.0
23-Jan-22	17:00:00	23-Jan-2217:00	65.2	33.2	76.8	73.5	73.8	71.0	72.7	65.1	36.7	63.0	65.4
23-Jan-22	17:30:00	23-Jan-2217:30	61.5	33.2	73.0	69.1	69.4	69.0	71.0	63.0	35.0	61.4	63.3
23-Jan-22	18:00:00	23-Jan-2218:00	61.5	33.2	72.0	68.6	68.5	69.0	70.5	62.7	35.0	60.6	63.0
23-Jan-22	18:30:00	23-Jan-2218:30	61.5	33.2	72.0	68.3	68.6	68.5	70.0	62.6	34.9	60.3	62.6
23-Jan-22	19:00:00	23-Jan-2219:00	60.1	33.2	71.6	68.0	69.0	68.0	70.0	62.0	34.0	60.0	62.0
23-Jan-22	19:30:00	23-Jan-2219:30	59.5	33.2	71.0	68.0	68.2	68.0	69.4	61.9	34.0	59.5	62.0
23-Jan-22	20:00:00	23-Jan-2220:00	59.5	33.2	71.0	68.0	68.0	67.7	69.2	61.0	34.0	59.6	62.0
23-Jan-22	20:30:00	23-Jan-2220:30	65.6	33.2	74.8	71.7	71.8	69.1	72.0	62.2	34.4	60.3	62.4
23-Jan-22	21:00:00	23-Jan-2221:00	68.6	33.2	78.0	74.7	75.0	70.0	72.5	64.0	35.7	61.1	64.0
23-Jan-22	21:30:00	23-Jan-2221:30	68.6	33.2	78.2	75.2	75.3	70.2	73.0	64.0	36.0	62.0	64.0
23-Jan-22	22:00:00	23-Jan-2222:00	68.6	33.2	79.0	75.1	75.7	71.0	73.0	64.0	36.0	62.0	64.0

23-Jan-22	22:30:00	23-Jan-2222:30	68.6	33.2	79.0	75.7	76.0	71.0	73.3	64.1	36.0	62.0	64.6
23-Jan-22	23:00:00	23-Jan-2223:00	69.1	33.2	79.0	76.0	76.0	71.0	73.7	65.0	36.2	62.0	65.0
23-Jan-22	23:30:00	23-Jan-2223:30	70.6	33.2	79.2	76.0	76.2	71.8	74.0	65.0	37.0	63.0	65.3
24-Jan-22	0:00:00	24-Jan-2200:00	70.6	33.2	79.1	76.0	76.1	71.4	74.0	65.0	37.0	63.0	65.2
24-Jan-22	0:30:00	24-Jan-2200:30	70.6	33.7	79.8	76.5	77.0	72.0	74.0	65.9	37.0	63.4	65.9
24-Jan-22	1:00:00	24-Jan-2201:00	70.6	34.0	79.4	76.7	77.0	72.0	74.7	66.0	37.6	63.1	66.0
24-Jan-22	1:30:00	24-Jan-2201:30	65.0	31.4	78.5	73.6	73.7	71.1	72.5	65.3	35.6	62.9	65.4
24-Jan-22	2:00:00	24-Jan-2202:00	62.0	31.2	73.0	69.7	70.1	69.4	71.3	63.4	36.0	61.2	63.4
24-Jan-22	2:30:00	24-Jan-2202:30	62.0	33.4	73.0	70.0	70.0	70.0	71.0	64.0	36.0	61.9	64.0
24-Jan-22	3:00:00	24-Jan-2203:00	62.0	34.2	73.0	70.0	70.6	70.0	71.0	63.3	36.0	61.2	64.0
24-Jan-22	3:30:00	24-Jan-2203:30	62.0	34.2	73.0	70.0	70.0	69.7	71.0	63.0	35.4	61.3	63.4
24-Jan-22	4:00:00	24-Jan-2204:00	61.0	35.1	72.7	69.4	70.0	69.4	71.0	63.0	35.0	61.0	63.0
24-Jan-22	4:30:00	24-Jan-2204:30	60.0	34.4	72.2	69.3	69.5	68.8	70.2	62.7	35.0	60.9	63.0
24-Jan-22	5:00:00	24-Jan-2205:00	60.0	34.6	71.9	68.7	69.0	68.0	70.0	62.0	34.0	60.0	62.0
24-Jan-22	5:30:00	24-Jan-2205:30	62.6	35.1	72.2	69.2	69.7	67.9	70.3	61.2	33.7	59.4	62.9
24-Jan-22	6:00:00	24-Jan-2206:00	67.9	34.4	78.0	74.9	74.7	69.0	72.0	63.0	34.7	60.0	63.0
24-Jan-22	6:30:00	24-Jan-2206:30	67.9	34.0	78.0	74.8	74.5	69.3	72.0	63.0	35.0	60.0	63.0
24-Jan-22	7:00:00	24-Jan-2207:00	67.9	33.2	78.0	74.7	74.3	69.3	72.0	63.5	35.0	60.8	63.0
24-Jan-22	7:30:00	24-Jan-2207:30	67.9	33.2	78.0	74.7	75.3	70.0	72.8	64.0	35.0	60.4	63.6
24-Jan-22	8:00:00	24-Jan-2208:00	67.9	33.4	78.0	74.7	75.0	70.0	72.6	63.7	35.0	61.0	63.6
24-Jan-22	8:30:00	24-Jan-2208:30	67.9	34.8	78.0	74.5	75.0	70.0	72.8	64.0	35.0	61.0	63.3
24-Jan-22	9:00:00	24-Jan-2209:00	67.9	36.8	78.0	75.0	74.7	70.0	72.7	64.0	35.0	61.0	64.0
24-Jan-22	9:30:00	24-Jan-2209:30	69.8	37.1	78.0	74.7	75.0	70.6	73.0	64.0	35.2	61.0	64.0
24-Jan-22	10:00:00	24-Jan-2210:00	70.1	35.8	78.0	75.0	75.5	70.0	73.0	64.0	35.1	61.0	64.0
24-Jan-22	10:30:00	24-Jan-2210:30	70.2	35.1	78.3	75.0	75.0	70.0	73.0	64.0	35.0	61.0	64.0
24-Jan-22	11:00:00	24-Jan-2211:00	70.2	34.1	78.0	75.0	74.7	70.0	73.0	64.0	35.0	61.0	64.0
24-Jan-22	11:30:00	24-Jan-2211:30	70.2	32.2	78.3	75.0	75.3	70.0	73.0	64.0	35.3	61.0	64.0
24-Jan-22	12:00:00	24-Jan-2212:00	69.6	31.9	78.0	74.8	74.2	70.0	73.0	64.0	35.0	61.0	64.0
24-Jan-22	12:30:00	24-Jan-2212:30	68.7	32.6	78.1	74.6	74.9	70.0	73.0	64.0	35.7	61.0	64.0
24-Jan-22	13:00:00	24-Jan-2213:00	68.8	33.3	78.5	75.5	74.7	70.3	73.0	64.6	36.0	61.0	64.0
24-Jan-22	13:30:00	24-Jan-2213:30	68.8	33.8	78.0	74.9	74.7	70.6	73.0	64.5	36.0	61.0	64.0
24-Jan-22	14:00:00	24-Jan-2214:00	68.7	35.0	78.5	75.6	74.9	71.0	73.0	64.6	36.0	61.4	64.0
24-Jan-22	14:30:00	24-Jan-2214:30	68.5	35.1	79.0	76.0	75.7	71.0	73.0	65.0	36.0	62.0	64.5
24-Jan-22	15:00:00	24-Jan-2215:00	68.5	34.6	79.0	75.2	75.7	71.0	73.0	65.0	36.0	62.0	64.7
24-Jan-22	15:30:00	24-Jan-2215:30	68.5	34.2	79.0	75.3	75.4	71.0	73.0	65.0	36.0	61.7	64.7
24-Jan-22	16:00:00	24-Jan-2216:00	68.5	34.2	78.7	75.0	75.0	71.0	73.2	65.0	36.0	62.0	64.7
24-Jan-22	16:30:00	24-Jan-2216:30	68.5	34.2	78.4	75.0	75.6	71.0	74.0	65.0	36.0	62.0	65.0
24-Jan-22	17:00:00	24-Jan-2217:00	68.5	34.2	78.6	75.3	75.0	71.0	73.7	65.0	36.0	62.0	64.7

24-Jan-22	17:30:00	24-Jan-2217:30	68.5	34.2	78.9	75.0	75.0	71.0	73.4	65.0	36.0	62.0	64.7
24-Jan-22	18:00:00	24-Jan-2218:00	68.5	34.2	78.3	74.9	74.6	71.0	73.0	65.0	36.0	62.0	64.5
24-Jan-22	18:30:00	24-Jan-2218:30	63.2	34.2	76.3	71.2	71.1	69.5	70.3	63.2	33.6	60.4	63.2
24-Jan-22	19:00:00	24-Jan-2219:00	60.1	34.2	71.0	67.7	67.6	67.1	69.0	61.0	33.0	58.4	60.7
24-Jan-22	19:30:00	24-Jan-2219:30	60.4	34.2	71.0	67.0	67.5	67.0	69.0	61.0	33.0	58.0	61.0
24-Jan-22	20:00:00	24-Jan-2220:00	59.1	33.9	70.9	67.0	67.3	67.0	69.0	60.5	33.0	58.0	60.3
24-Jan-22	20:30:00	24-Jan-2220:30	58.4	33.2	70.0	66.7	67.0	66.5	68.4	60.0	32.2	58.0	60.3
24-Jan-22	21:00:00	24-Jan-2221:00	63.7	33.2	72.5	69.5	69.6	67.3	70.3	63.4	33.2	58.6	61.6
24-Jan-22	21:30:00	24-Jan-2221:30	67.8	33.6	77.8	74.5	74.0	69.8	72.0	63.4	34.9	60.0	63.0
24-Jan-22	22:00:00	24-Jan-2222:00	67.8	34.2	78.0	75.0	74.9	70.0	72.1	63.8	35.0	60.0	63.0
24-Jan-22	22:30:00	24-Jan-2222:30	67.8	34.1	78.0	75.0	75.0	70.0	73.0	63.9	35.0	61.0	63.6
24-Jan-22	23:00:00	24-Jan-2223:00	67.8	32.3	78.0	75.0	75.0	70.0	72.4	64.0	35.0	61.0	64.0
24-Jan-22	23:30:00	24-Jan-2223:30	67.8	32.2	78.0	75.0	75.0	70.5	73.0	64.0	35.6	61.0	64.0
25-Jan-22	0:00:00	25-Jan-2200:00	67.8	32.4	78.0	75.0	75.4	70.1	73.0	64.0	35.1	61.0	64.0
25-Jan-22	0:30:00	25-Jan-2200:30	69.4	34.1	78.5	75.5	76.0	71.0	73.0	64.3	36.0	61.1	64.0
25-Jan-22	1:00:00	25-Jan-2201:00	69.9	34.2	78.7	75.7	76.0	71.0	73.0	65.0	36.0	61.7	64.0
25-Jan-22	1:30:00	25-Jan-2201:30	69.9	34.7	79.0	76.0	76.0	71.0	73.3	65.0	36.0	62.0	64.9
25-Jan-22	2:00:00	25-Jan-2202:00	69.9	34.3	79.0	76.0	76.0	71.0	74.0	65.0	36.0	62.0	65.0
25-Jan-22	2:30:00	25-Jan-2202:30	69.9	34.2	79.0	76.0	76.0	71.0	74.0	65.0	36.0	62.0	65.0
25-Jan-22	3:00:00	25-Jan-2203:00	69.9	34.2	79.0	76.0	76.6	71.9	73.7	65.0	36.0	62.0	65.0
25-Jan-22	3:30:00	25-Jan-2203:30	69.9	34.2	80.0	76.6	77.0	72.0	74.0	65.0	36.8	62.0	65.0
25-Jan-22	4:00:00	25-Jan-2204:00	69.9	34.2	79.4	76.0	76.1	71.2	74.0	65.0	36.7	62.0	65.0
25-Jan-22	4:30:00	25-Jan-2204:30	64.1	34.2	76.5	73.3	73.7	70.2	72.3	63.6	35.8	59.6	63.7
25-Jan-22	5:00:00	25-Jan-2205:00	60.3	34.2	72.0	69.0	69.0	68.2	70.1	62.1	34.1	60.0	62.1
25-Jan-22	5:30:00	25-Jan-2205:30	60.9	34.2	72.0	69.0	69.4	69.0	70.2	62.1	35.0	61.0	63.0
25-Jan-22	6:00:00	25-Jan-2206:00	59.9	33.4	72.0	68.7	68.5	68.1	70.0	62.3	34.3	60.2	62.3
25-Jan-22	6:30:00	25-Jan-2206:30	59.9	34.2	71.5	68.3	68.8	68.0	70.0	61.7	34.0	60.0	62.0
25-Jan-22	7:00:00	25-Jan-2207:00	59.9	34.2	71.0	68.0	68.3	68.0	70.0	62.0	34.0	60.0	62.0
25-Jan-22	7:30:00	25-Jan-2207:30	59.9	34.2	71.0	68.0	68.3	67.9	69.8	62.0	34.0	60.0	62.0
25-Jan-22	8:00:00	25-Jan-2208:00	59.9	34.2	71.0	67.7	68.0	67.6	69.0	61.6	33.9	59.5	61.9
25-Jan-22	8:30:00	25-Jan-2208:30	59.9	33.3	70.3	67.0	67.0	67.0	69.0	61.0	33.3	59.0	61.0
25-Jan-22	9:00:00	25-Jan-2209:00	63.6	33.5	70.9	69.4	69.5	67.6	70.4	61.3	34.7	59.5	61.2
25-Jan-22	9:30:00	25-Jan-2209:30	67.5	34.2	77.0	74.0	73.3	69.4	72.0	63.3	35.0	61.0	63.0
25-Jan-22	10:00:00	25-Jan-2210:00	68.4	34.2	77.0	73.2	74.7	69.7	72.3	63.0	35.0	61.0	63.3
25-Jan-22	10:30:00	25-Jan-2210:30	69.4	34.2	77.3	74.2	74.3	70.0	72.0	64.0	35.0	61.0	63.7
25-Jan-22	11:00:00	25-Jan-2211:00	69.3	34.5	78.0	74.6	74.1	70.0	72.6	64.0	35.8	61.7	63.4
25-Jan-22	11:30:00	25-Jan-2211:30	69.3	33.9	77.9	74.8	74.7	70.2	72.6	64.0	35.7	62.0	64.3
25-Jan-22	12:00:00	25-Jan-2212:00	69.3	31.5	78.1	74.8	74.8	70.7	73.0	64.6	36.0	62.0	64.0

25-Jan-22	12:30:00	25-Jan-2212:30	69.3	31.4	78.8	75.3	75.0	71.0	73.0	64.9	36.0	62.0	64.9
25-Jan-22	13:00:00	25-Jan-2213:00	69.3	33.2	78.9	75.9	75.5	71.0	73.9	65.0	37.0	62.3	65.0
25-Jan-22	13:30:00	25-Jan-2213:30	69.3	33.2	79.0	76.0	76.0	71.3	73.3	65.0	36.4	62.7	65.0
25-Jan-22	14:00:00	25-Jan-2214:00	69.3	33.2	79.0	76.0	76.0	71.6	74.0	65.3	37.0	63.0	65.0
25-Jan-22	14:30:00	25-Jan-2214:30	69.3	32.3	79.2	76.0	76.2	72.0	74.0	65.9	37.0	63.1	65.0
25-Jan-22	15:00:00	25-Jan-2215:00	69.3	32.4	80.0	76.0	76.1	72.0	74.3	66.0	37.0	63.2	66.0
25-Jan-22	15:30:00	25-Jan-2215:30	69.3	32.2	79.3	76.0	76.0	72.0	74.0	65.7	37.0	63.0	65.5
25-Jan-22	16:00:00	25-Jan-2216:00	63.6	32.8	75.8	72.3	72.2	70.6	72.3	65.6	36.6	62.0	62.9
25-Jan-22	16:30:00	25-Jan-2216:30	61.9	33.2	72.8	69.0	69.6	69.6	71.0	63.3	35.5	61.0	63.7
25-Jan-22	17:00:00	25-Jan-2217:00	61.9	33.2	72.0	69.0	69.0	69.0	71.0	63.0	35.0	61.0	63.0
25-Jan-22	17:30:00	25-Jan-2217:30	61.0	33.2	72.0	68.6	69.0	68.9	70.2	63.0	35.0	60.7	63.0
25-Jan-22	18:00:00	25-Jan-2218:00	59.9	33.2	72.0	68.0	68.2	68.0	70.0	62.0	34.4	60.0	62.4
25-Jan-22	18:30:00	25-Jan-2218:30	59.9	33.2	71.1	68.0	68.0	68.0	69.3	62.0	34.0	60.0	62.0
25-Jan-22	19:00:00	25-Jan-2219:00	59.9	33.2	71.0	67.5	67.2	68.0	69.0	61.1	33.7	59.6	61.7
25-Jan-22	19:30:00	25-Jan-2219:30	64.9	33.2	73.0	69.3	69.3	68.0	70.2	62.4	33.8	59.8	62.0
25-Jan-22	20:00:00	25-Jan-2220:00	68.3	33.6	78.0	74.0	74.3	70.0	72.0	64.0	35.3	61.0	64.0
25-Jan-22	20:30:00	25-Jan-2220:30	68.3	34.2	78.0	74.6	74.9	70.0	72.6	64.0	36.0	61.8	64.0
25-Jan-22	21:00:00	25-Jan-2221:00	68.3	33.3	78.0	75.0	75.0	70.9	73.0	64.0	36.0	62.0	64.0
25-Jan-22	21:30:00	25-Jan-2221:30	68.3	33.2	78.4	75.1	75.1	71.0	73.2	64.6	36.0	62.0	64.8
25-Jan-22	22:00:00	25-Jan-2222:00	68.5	33.5	79.0	75.4	76.0	71.0	73.7	65.0	36.6	63.0	65.0
25-Jan-22	22:30:00	25-Jan-2222:30	70.3	33.2	79.0	76.0	76.1	71.4	74.0	65.0	37.0	63.0	65.0
25-Jan-22	23:00:00	25-Jan-2223:00	70.3	33.2	79.0	76.0	76.7	72.0	74.0	65.3	37.0	63.0	65.0
25-Jan-22	23:30:00	25-Jan-2223:30	70.3	33.6	79.9	76.3	77.0	72.0	74.1	65.8	37.0	63.0	66.0
26-Jan-22	0:00:00	26-Jan-2200:00	70.3	34.2	80.0	76.3	76.4	72.0	74.2	66.0	37.0	63.0	66.0
26-Jan-22	0:30:00	26-Jan-2200:30	70.3	34.2	80.0	76.9	77.0	72.3	74.9	66.0	37.7	63.5	66.0
26-Jan-22	1:00:00	26-Jan-2201:00	66.7	33.3	79.0	76.0	76.0	72.0	74.4	65.4	37.6	61.8	65.5
26-Jan-22	1:30:00	26-Jan-2201:30	62.2	33.4	73.3	70.3	70.6	70.0	71.7	64.0	36.0	62.0	64.0
26-Jan-22	2:00:00	26-Jan-2202:00	62.2	34.7	73.0	70.0	70.6	70.0	71.2	64.0	36.0	62.0	64.0
26-Jan-22	2:30:00	26-Jan-2202:30	62.2	36.1	73.0	70.0	70.0	70.0	71.0	64.0	36.0	62.0	64.0
26-Jan-22	3:00:00	26-Jan-2203:00	62.2	36.1	73.0	70.0	70.3	70.0	71.0	64.0	36.0	61.7	64.0
26-Jan-22	3:30:00	26-Jan-2203:30	61.5	36.0	73.0	70.0	70.0	70.0	71.0	63.7	35.7	61.2	64.0
26-Jan-22	4:00:00	26-Jan-2204:00	60.2	33.3	72.7	69.7	70.0	69.3	71.0	63.2	35.2	61.1	63.2
26-Jan-22	4:30:00	26-Jan-2204:30	60.2	33.2	72.5	69.5	70.0	69.0	70.7	63.0	35.0	60.8	63.0
26-Jan-22	5:00:00	26-Jan-2205:00	60.2	33.6	71.6	68.6	68.6	68.3	69.5	61.6	34.3	59.9	61.7
26-Jan-22	5:30:00	26-Jan-2205:30	60.2	36.1	71.0	67.4	67.7	67.2	69.0	61.0	33.0	58.3	61.0
26-Jan-22	6:00:00	26-Jan-2206:00	66.6	35.1	74.5	69.1	65.9	68.4	70.8	62.1	33.8	59.2	62.6
26-Jan-22	6:30:00	26-Jan-2206:30	67.2	34.1	75.5	69.5	64.7	69.0	71.0	63.0	34.3	60.3	62.7
26-Jan-22	7:00:00	26-Jan-2207:00	67.2	33.5	75.4	69.1	64.4	69.0	71.5	63.0	34.0	60.0	63.0



26-Jan-22	7:30:00	26-Jan-2207:30	67.2	34.2	76.0	70.0	65.0	69.0	71.1	63.0	34.3	60.0	63.0
26-Jan-22	8:00:00	26-Jan-2208:00	67.2	33.3	75.6	69.6	65.0	69.0	71.3	63.0	34.6	60.0	63.0
26-Jan-22	8:30:00	26-Jan-2208:30	68.5	33.2	76.5	70.8	70.3	69.5	72.1	63.3	34.9	60.3	63.0
26-Jan-22	9:00:00	26-Jan-2209:00	69.4	32.6	78.0	75.0	75.1	70.0	72.9	64.0	35.0	60.9	63.3
26-Jan-22	9:30:00	26-Jan-2209:30	69.4	33.2	78.0	74.4	74.7	69.4	72.5	63.7	35.0	61.0	63.0
26-Jan-22	10:00:00	26-Jan-2210:00	69.4	33.8	78.0	74.4	75.0	70.0	73.0	64.0	35.0	61.0	63.7
26-Jan-22	10:30:00	26-Jan-2210:30	69.4	34.2	78.1	75.1	75.0	70.0	73.0	64.0	35.0	61.0	64.0
26-Jan-22	11:00:00	26-Jan-2211:00	69.4	34.8	77.9	74.7	74.0	69.8	73.0	64.0	35.4	61.0	64.0
26-Jan-22	11:30:00	26-Jan-2211:30	69.4	35.1	78.4	74.7	72.6	70.3	73.0	64.0	35.7	61.6	64.0
26-Jan-22	12:00:00	26-Jan-2212:00	69.4	32.7	79.0	76.2	75.6	71.2	73.9	64.0	36.9	62.4	64.9
26-Jan-22	12:30:00	26-Jan-2212:30	69.5	32.2	79.0	76.4	76.3	71.4	74.0	64.0	37.0	63.0	65.0
26-Jan-22	13:00:00	26-Jan-2213:00	71.5	33.1	79.7	76.4	77.0	72.0	74.0	64.0	37.0	63.0	65.4
26-Jan-22	13:30:00	26-Jan-2213:30	71.5	34.2	80.0	76.9	77.0	71.7	74.1	64.0	37.0	63.0	65.5
26-Jan-22	14:00:00	26-Jan-2214:00	70.1	34.2	80.0	77.0	77.0	72.0	74.8	64.0	37.2	63.9	66.0
26-Jan-22	14:30:00	26-Jan-2214:30	60.5	34.2	74.2	71.3	71.2	70.4	71.3	64.0	35.9	62.3	64.1
26-Jan-22	15:00:00	26-Jan-2215:00	60.5	34.2	72.7	69.7	69.7	69.4	71.0	64.0	35.0	61.2	63.2
26-Jan-22	15:30:00	26-Jan-2215:30	60.5	34.2	72.0	69.0	69.7	69.0	71.0	64.0	35.0	61.0	63.2
26-Jan-22	16:00:00	26-Jan-2216:00	60.5	34.2	72.0	69.0	69.2	69.0	70.1	64.0	35.0	61.0	63.0
26-Jan-22	16:30:00	26-Jan-2216:30	60.5	34.2	72.0	68.7	69.0	69.0	70.0	64.0	35.0	60.4	63.0
26-Jan-22	17:00:00	26-Jan-2217:00	60.5	34.2	71.2	68.2	68.7	68.5	70.0	64.0	34.4	60.0	62.4
26-Jan-22	17:30:00	26-Jan-2217:30	60.5	34.2	71.6	68.0	68.6	68.0	69.9	64.0	34.0	60.0	62.0
26-Jan-22	18:00:00	26-Jan-2218:00	68.1	34.2	76.1	72.5	72.6	69.6	72.4	64.0	35.8	61.5	63.8
26-Jan-22	18:30:00	26-Jan-2218:30	69.4	34.2	77.6	74.6	74.6	70.0	72.6	64.0	36.0	62.0	64.0
26-Jan-22	19:00:00	26-Jan-2219:00	69.8	34.2	78.0	74.4	74.7	70.0	72.3	64.0	36.0	61.7	63.7
26-Jan-22	19:30:00	26-Jan-2219:30	69.8	34.2	78.0	75.3	75.1	70.6	72.7	64.0	36.0	62.0	64.0
26-Jan-22	20:00:00	26-Jan-2220:00	69.8	34.2	78.0	75.0	75.5	70.3	73.0	64.0	36.0	62.0	64.0
26-Jan-22	20:30:00	26-Jan-2220:30	69.8	34.2	78.3	75.0	75.6	70.6	73.0	64.0	36.0	62.0	64.2
26-Jan-22	21:00:00	26-Jan-2221:00	69.8	33.4	79.0	75.7	76.0	71.0	73.0	64.0	36.3	62.0	65.0
26-Jan-22	21:30:00	26-Jan-2221:30	69.8	33.2	79.0	76.0	76.0	71.3	74.0	64.0	36.1	62.5	65.0
26-Jan-22	22:00:00	26-Jan-2222:00	69.8	32.0	80.0	76.5	77.0	72.0	74.0	64.0	37.0	63.0	65.3
26-Jan-22	22:30:00	26-Jan-2222:30	69.8	31.9	80.0	76.7	77.0	72.0	74.1	64.0	37.1	63.5	66.0
26-Jan-22	23:00:00	26-Jan-2223:00	69.8	32.9	80.0	77.3	77.2	72.4	75.0	64.0	38.0	64.0	66.0
26-Jan-22	23:30:00	26-Jan-2223:30	69.8	33.7	80.0	77.0	77.3	73.0	75.0	64.0	38.0	64.0	66.0
27-Jan-22	0:00:00	27-Jan-2200:00	61.1	34.2	74.9	71.9	72.4	70.9	72.6	64.0	36.4	60.7	64.3
27-Jan-22	0:30:00	27-Jan-2200:30	61.1	34.6	73.0	70.0	70.9	70.0	71.4	64.0	36.0	62.0	64.0
27-Jan-22	1:00:00	27-Jan-2201:00	61.1	35.1	73.0	70.0	70.5	70.0	71.0	64.0	36.0	62.0	64.0
27-Jan-22	1:30:00	27-Jan-2201:30	61.1	34.7	73.0	70.0	70.6	70.0	71.0	64.0	36.0	61.7	64.0
27-Jan-22	2:00:00	27-Jan-2202:00	61.1	33.2	73.0	70.0	70.0	70.0	71.0	64.0	36.0	61.1	63.8

27-Jan-22	2:30:00	27-Jan-2202:30	61.1	33.2	73.0	69.7	70.0	71.0	64.0	36.0	61.0	63.9
27-Jan-22	3:00:00	27-Jan-2203:00	61.1	33.9	73.0	70.0	70.6	71.0	64.0	35.0	61.0	63.0
27-Jan-22	3:30:00	27-Jan-2203:30	61.1	35.6	73.0	70.0	70.0	71.0	64.0	35.0	61.0	63.0
27-Jan-22	4:00:00	27-Jan-2204:00	61.1	35.1	72.4	69.4	70.0	70.6	64.0	35.0	60.8	63.0
27-Jan-22	4:30:00	27-Jan-2204:30	61.1	35.1	72.0	69.3	69.7	70.0	64.0	35.0	60.6	62.7
27-Jan-22	5:00:00	27-Jan-2205:00	60.0	35.1	72.0	68.7	68.8	69.6	64.0	33.9	58.9	61.6
27-Jan-22	5:30:00	27-Jan-2205:30	62.4	35.1	72.1	68.8	69.2	69.7	64.0	33.2	58.2	62.3
27-Jan-22	6:00:00	27-Jan-2206:00	69.1	34.2	77.7	75.0	74.7	72.0	64.0	35.0	60.0	63.1
27-Jan-22	6:30:00	27-Jan-2206:30	69.1	34.2	77.6	74.8	74.8	72.0	64.0	35.0	60.0	63.0
27-Jan-22	7:00:00	27-Jan-2207:00	69.1	34.3	77.0	74.6	74.6	72.0	64.0	35.0	60.5	63.1
27-Jan-22	7:30:00	27-Jan-2207:30	69.1	35.1	78.0	75.0	75.0	72.3	64.0	35.0	60.7	63.5
27-Jan-22	8:00:00	27-Jan-2208:00	69.1	35.1	78.0	75.0	75.0	72.6	64.0	35.0	61.0	64.0
27-Jan-22	8:30:00	27-Jan-2208:30	69.1	34.5	78.0	75.0	75.6	73.0	64.0	35.0	61.0	64.0
27-Jan-22	9:00:00	27-Jan-2209:00	69.1	34.2	78.0	75.0	75.0	73.0	64.0	35.0	61.0	64.0
27-Jan-22	9:30:00	27-Jan-2209:30	69.1	34.2	78.0	74.4	73.6	72.6	64.0	35.2	61.0	63.8
27-Jan-22	10:00:00	27-Jan-2210:00	69.2	34.4	79.0	75.4	76.2	73.6	64.0	35.9	62.0	64.4
27-Jan-22	10:30:00	27-Jan-2210:30	69.2	35.1	79.0	76.0	76.0	73.7	64.0	36.9	63.0	65.0
27-Jan-22	11:00:00	27-Jan-2211:00	70.1	35.1	79.6	76.0	76.3	73.4	64.0	36.4	62.7	65.0
27-Jan-22	11:30:00	27-Jan-2211:30	71.3	35.1	79.3	76.0	76.0	74.0	64.0	37.0	63.0	65.0
27-Jan-22	12:00:00	27-Jan-2212:00	71.3	34.6	79.9	76.3	76.9	74.0	64.0	37.0	63.0	65.8
27-Jan-22	12:30:00	27-Jan-2212:30	71.3	32.3	79.8	76.8	76.8	74.0	64.0	37.0	63.3	66.0
27-Jan-22	13:00:00	27-Jan-2213:00	68.9	33.2	79.6	76.6	77.0	74.3	64.0	37.3	63.5	65.0
27-Jan-22	13:30:00	27-Jan-2213:30	61.7	35.1	73.0	70.0	71.6	71.6	64.0	36.2	61.1	63.4
27-Jan-22	14:00:00	27-Jan-2214:00	61.7	35.1	72.7	69.4	70.0	70.9	64.0	35.6	61.0	63.8
27-Jan-22	14:30:00	27-Jan-2214:30	61.6	35.1	72.6	69.9	70.0	70.6	64.0	35.0	60.7	62.8
27-Jan-22	15:00:00	27-Jan-2215:00	61.7	34.4	72.0	69.0	69.4	70.0	64.0	35.0	60.7	63.0
27-Jan-22	15:30:00	27-Jan-2215:30	63.4	34.2	72.8	69.4	70.3	70.7	64.0	35.4	62.5	63.5
27-Jan-22	16:00:00	27-Jan-2216:00	68.7	34.2	78.7	75.6	75.6	73.1	64.0	36.1	62.5	65.0
27-Jan-22	16:30:00	27-Jan-2216:30	68.7	34.2	78.4	75.3	75.3	73.0	64.0	36.2	62.0	65.0
27-Jan-22	17:00:00	27-Jan-2217:00	68.7	34.2	78.2	75.0	75.5	73.0	64.0	36.1	62.2	65.0
27-Jan-22	17:30:00	27-Jan-2217:30	68.7	34.2	79.0	75.6	76.0	73.0	64.0	37.0	62.9	65.0
27-Jan-22	18:00:00	27-Jan-2218:00	68.7	34.2	78.7	75.2	75.4	73.3	64.0	37.0	62.0	65.0
27-Jan-22	18:30:00	27-Jan-2218:30	68.7	34.2	78.7	75.6	75.4	73.9	64.0	37.0	62.8	65.0
27-Jan-22	19:00:00	27-Jan-2219:00	68.7	34.2	79.0	75.4	75.3	74.0	64.0	37.0	63.0	65.0
27-Jan-22	19:30:00	27-Jan-2219:30	68.7	34.2	79.0	76.0	75.8	74.0	64.0	37.0	63.0	65.0
27-Jan-22	20:00:00	27-Jan-2220:00	64.0	34.2	76.8	73.5	74.1	72.7	64.0	36.7	61.5	64.4
27-Jan-22	20:30:00	27-Jan-2220:30	61.0	34.2	73.0	69.0	69.7	71.0	64.0	35.0	61.0	63.0
27-Jan-22	21:00:00	27-Jan-2221:00	61.0	34.2	72.7	69.0	69.7	71.0	64.0	35.0	61.0	63.0

27-Jan-22	21:30:00	27-Jan-2221:30	61.0	34.2	72.4	69.0	69.4	69.0	71.0	64.0	35.0	61.0	63.0
27-Jan-22	22:00:00	27-Jan-2222:00	61.0	31.9	72.4	69.0	70.0	69.0	70.4	64.0	35.0	61.0	63.0
27-Jan-22	22:30:00	27-Jan-2222:30	61.0	32.2	72.0	69.0	69.8	69.0	70.0	64.0	35.0	61.0	63.0
27-Jan-22	23:00:00	27-Jan-2223:00	61.0	32.6	72.0	68.7	69.3	69.0	70.0	64.0	35.0	61.0	63.0
27-Jan-22	23:30:00	27-Jan-2223:30	61.0	33.7	72.0	69.0	69.2	69.0	70.0	64.0	35.0	60.6	62.7

Residential Sampling Report for Flushing Zone  
C3 Zone Residential DW Sampling  
Chemistry Results  
Drinking Water Sampling, JBPHH, Oahu Hawaii

Location ID:										
Location Type:	C3-BLDG0014	C3-BLDG0134	C3-BLDG0155	C3-BLDG0214	C3-BLDG0366	C3-BLDG0392	C3-BLDG067B	C3-BLDG067B	C3-BLDG067B	
Residence:	Non-Residence Building 14,SPECIAL PROJECTS SHOP (X55)	Non-Residence Building 134,PUBLIC TOILET	Non-Residence Building 155,STRUCTURAL & FABRICATION	Non-Residence Building 214,ELECTRICAL/ELE CTRONIC SHOPS	Non-Residence Building 366,PUBLIC TOILET	Non-Residence Building 392,WELDING SCHOOL (X26)	Non-Residence Building 67B,SHOP ADMIN	Non-Residence Building 67B,SHOP ADMIN	Non-Residence Building 67B,SHOP ADMIN	
Field Sample ID:	220131C3FT01	220131C3ET03	220131C3FT04	220131C3GT04	220131C3ET01	220131C3FT05	220131C3FT02	220131C3FT02	220131C3FT03	
Sample Date:	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	
Sample Type:	N	N	N	N	N	N	N	N	N	

GENCHEM (mg/L)	Incident Specific Parameters	Action Levels	Groundwater Table D-1A	Environmental Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	DOH Protection Agency Maximum Contaminant Levels	Environmental Protection Agency Maximum Contaminant Levels	SDG: C22B005	SDG: DA41416	SDG: C22B005	SDG: DA41416	SDG: C22B005	SDG: C22B005	SDG: C22B005	SDG: C22B005
Total Organic Carbon	2	None	None	None	None	None	None	0.200 UJ	0.550	2.18 J	6.50 J	0.500	6.37 J	1.71 J	0.200 UJ

HC (µg/L)	Incident Specific Parameters	Action Levels	Groundwater Table D-1A	Environmental Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	DOH Protection Agency Maximum Contaminant Levels	Environmental Protection Agency Maximum Contaminant Levels	SDG: 5801098641	SDG: DA41416	SDG: 5801098641	SDG: 5801098641	SDG: DA41416	SDG: 5801098641	SDG: 5801098641	SDG: 5801098641
Petroleum Hydrocarbons (as Diesel)	200	400	None	None	None	None	None	91.0 U	190 U	110	94.0 U	190 U	93.0 U	91.0 U	93.0 U
Petroleum Hydrocarbons (as Gasoline)	200	300	None	None	None	None	None	31.0 U	40.0 U	31.0 U	31.0 U	40.0 U	31.0 U	31.0 U	31.0 U
Petroleum Hydrocarbons (as Motor Oil)	200	500	None	None	None	None	None	180 U	190 U	180 U	190 U	190 U	190 U	180 U	190 U
Total Petroleum Hydrocarbons	211	--	--	--	110	--	--	--	--	--	--	--	--	--	--

HG (µg/L)	Incident Specific Parameters	Action Levels	Groundwater Table D-1A	Environmental Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	DOH Protection Agency Maximum Contaminant Levels	Environmental Protection Agency Maximum Contaminant Levels	SDG: 35693852	SDG: DA41416	SDG: 35693851	SDG: 35693857	SDG: DA41416	SDG: 35693851	SDG: 35693852	SDG: 35693851
Mercury	0.025	0.025	2	2	0.0900 U	0.0250 U	0.0900 U	0.0900 U	0.0250 U	0.0900 U	0.0900 U	0.0250 U	0.0900 U	0.0900 U	0.0900 U

METAL (µg/L)	Incident Specific Parameters	Action Levels	Groundwater Table D-1A	Environmental Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	DOH Protection Agency Maximum Contaminant Levels	Environmental Protection Agency Maximum Contaminant Levels	SDG: 35693852	SDG: DA41416	SDG: 35693851	SDG: 35693857	SDG: DA41416	SDG: 35693851	SDG: 35693852	SDG: 35693851
Antimony	6	6	6	6	6	6	6	0.210 UJ	0.100 U	0.210 U	0.210 U	0.100 U	0.210 U	0.210 UJ	0.210 U
Arsenic	10	10	10	10	10	10	10	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Barium	220	220	220	2000	2000	2000	2000	2.00	2.20	2.00	2.00	2.20	2.00	2.00	2.20
Beryllium	0.66	0.66	4	4	4	4	4	0.0700 U	0.150 U	0.0700 U	0.0700 U	0.150 U	0.0700 U	0.0700 U	0.0700 U
Cadmium	3	3	5	5	5	5	5	0.120 U	0.0500 UJ	0.120 U	0.120 U	0.0500 UJ	0.120 U	0.120 U	0.120 U
Chromium	11	11	100	100	100	100	100	1.50 J	1.30 J	1.50 J	1.40 J	1.20 J	1.50 J	1.40 J	1.60 J
Copper	2.9	2.9	1300	1300	1300	1300	1300	35.2	46.5	277	125	96.6	16.3	56.5	36.4
Lead	15	5.6	15	15	15	15	15	0.830 J	8.20	0.710 J	1.90	0.310 J	0.220 U	0.300 J	0.220 U
Selenium	5	5	50	50	50	50	50	0.830 U	0.300 U	0.830 U	0.830 U	0.300 U	0.830 U	0.830 U	0.830 U
Thallium	2	2	2	2	2	2	2	0.500 U	0.110 J	0.500 U	0.500 U	0.100 J	0.500 U	0.500 U	0.500 U

SVOC (µg/L)	Incident Specific Parameters	Action Levels	Groundwater Table D-1A	Environmental Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	DOH Protection Agency Maximum Contaminant Levels	Environmental Protection Agency Maximum Contaminant Levels	SDG: 35693852	SDG: DA41416	SDG: 35693851	SDG: 35693857	SDG: DA41416R	SDG: 35693851	SDG: 35693852	SDG: 35693851
1-Methylnaphthalene	2.1	10	None	None	None	None	None	0.180 U	0.240 U	0.170 U	0.180 U	0.240 U	0.180 U	0.180 U	0.180 U

Residential Sampling Report for Flushing Zone  
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Location ID:		C3-BLDG1443		C3-BLDG1670		C3-BLDG1670		C3-BLDG1678		C3-BLDG1701		C3-BLDG2192		C3-CROM4935	
Location Type:		Non-Residence		Non-Residence		Non-Residence		Non-Residence		Non-Residence		Non-Residence		Residence	
Residence:		Building 1443,QUALITY ASSURANCE OFFICE		Building 1670,SERVICE SHOPS GROUP		Building 1670,SERVICE SHOPS GROUP		Building 1678,PUBLIC TOILET		Building 1701,MULTI MEDIA BUILDING		Building 1916,SHIP SERVICES SUPPORT BUILDING		4935 Crommelin Street	
Field Sample ID:		220131C3GT05		220131C3GT07		220131C3GT08		220131C3ET02		220131C3ET05		220131C3ET04		220126C3GT02	
Sample Date:		2022-01-31		2022-01-31		2022-01-31		2022-01-31		2022-01-31		2022-01-31		2022-01-26	
Sample Type:		N		N		FD		N		N		N		N	

GENCHEM (mg/L)	Incident Specific Parameters	Groundwater Action Levels	Regulatory Constituents	Contaminant Levels	SDG:	SDG:	SDG:	SDG:	SDG:	SDG:
					C22B005	C22B005	DA41416	DA41474	C22B005	DA41474
2					6.41 J	1.55 J	0.490 J	0.480 J	7.13 J	0.540
Total Organic Carbon										

HC (µg/L)	Incident Specific Parameters	DOH		Environmental Protection Agency Maximum Contaminant Levels		DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents		Environmental Protection Agency Maximum Contaminant Levels		SDG: 5801098641	SDG: DA41416	SDG: DA41474	SDG: 5801098641	SDG: DA41474	SDG: DA41304
		Environmental Action Levels Table D-1A	Groundwater Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels								
Petroleum Hydrocarbons (as Diesel)	200		400		None	None	None	94.0 U	92.0 U	92.0 U	190 U	190 U	92.0 U	190 U	190 U
Petroleum Hydrocarbons (as Gasoline)	200		300		None	None	None	31.0 U	31.0 U	31.0 U	40.0 U	40.0 U	31.0 U	40.0 U	40.0 U
Petroleum Hydrocarbons (as Motor Oil)	200		500		None	None	None	190 U	180 U	180 U	190 U	190 U	180 U	190 U	190 U
Total Petroleum Hydrocarbons	211			--	--	--	--	--	--	--	--	--	--	--	--

HG (µg/L)	Incident Specific Parameters	Environmental Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: 35693857	SDG: 35693857	SDG: DA41416	SDG: DA41474	SDG: 35693857	SDG: DA41474	SDG: DA41304
	0.025	0.025	2	2	0.0900 U	0.0900 U	0.0250 U	0.0250 U	0.0900 U	0.0250 U	0.0250 UJ
Mercury											

METAL (µg/L)	Incident Specific Parameters		DOH Environmental Action Levels		DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents		Environmental Protection Agency Maximum Contaminant Levels		SDG: 35693857		SDG: DA41474		SDG: DA41304	
	6	6	6	6	6	6	6	6	SDG: 35693857	SDG: DA41416	SDG: DA41474	SDG: 35693857	SDG: DA41474	SDG: DA41304
Antimony	10	6	10	6	10	6	10	6	0.210 U	0.100 U	0.100 U	0.210 U	0.100 U	0.100 U
Arsenic	220	220	10	220	10	220	10	2000	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Barium	0.66	0.66	0.66	0.66	4	0.66	4	4	0.0700 U	0.150 U	0.150 U	0.0700 U	0.150 U	0.150 U
Beryllium	3	3	3	3	5	3	5	5	0.120 U	0.0500 UJ	0.0500 UJ	0.120 U	0.0500 UJ	0.0500 U
Cadmium	11	11	11	11	100	11	100	100	1.50 J	1.40 J	1.60 J	1.40 J	1.50 J	1.50 J
Chromium	2.9	2.9	2.9	2.9	1300	2.9	1300	1300	31.3	28.5	128	44.5	174	14.2
Copper	15	15	5.6	15	15	5.6	15	15	0.220 U	0.360 J	0.490 J	0.230 J	0.160 J	0.980
Lead	5	5	5	5	50	5	50	50	0.830 U	0.300 U	0.300 U	0.830 U	0.300 U	0.300 U
Selenium	2	2	2	2	2	2	2	2	0.500 U	0.0500 U	0.0500 U	0.500 U	0.0500 U	0.0500 U
Thallium														

SVOC (µg/L)	Incident Specific Parameters	Groundwater Action Levels	Environmental Action Levels Table D-1A	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: 35693857	SDG: 35693857	SDG: DA41416	SDG: DA41474	SDG: 35693857	SDG: DA41474	SDG: DA41304
2.1	10	None	None	None	None	0.180 U	0.170 U	0.240 U	0.240 U	0.180 U	0.240 U	0.240 U
1-Methylnaphthalene												

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Location ID: C3-CROM4943 C3-CROM4945 C3-CROM4953 C3-CROM4953 C3-FORD2158 C3-FORD2160 C3-FORD2166  
Location Type: Residence Residence Residence Residence Residence Residence  
Residence: 4943 Crommelin Street 4945 Crommelin Street 4953 Crommelin Street 4953 Crommelin Street 2158 Ford Island Way 2160 Ford Island Way 2166 Ford Island Way

Field Sample ID: 220126C3GT10 220126C2BT10 220126C3GT01 220126C3GT06 220126C3KT05 220126C3KT04 220126C3KT03  
Sample Date: 2022-01-26 2022-01-26 2022-01-26 2022-01-26 2022-01-26 2022-01-26 2022-01-26  
Sample Type: N N N N N N N

DOH		Environmental Protection Agency		Environmental Protection Agency	
Incident Specific Parameters		DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents		Maximum Contaminant Levels	
GENCHEM (mg/L)	2	None	None	SDG: DA41345	SDG: 810132911
Total Organic Carbon				0.510	0.250 U

DOH		DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents		Environmental Protection Agency Maximum Contaminant Levels	
Incident Specific Parameters		None		SDG: DA41304	
HC (µg/L)	200	400	None	SDG: DA41347	SDG: 5801097271
Petroleum Hydrocarbons (as Diesel)				190 U	93.0 U
Petroleum Hydrocarbons (as Gasoline)	200	300	None	40.0 U	100 U
Petroleum Hydrocarbons (as Motor Oil)	200	500	None	190 UJ	190 U
Total Petroleum Hydrocarbons	211		--	--	--

DOH		DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents		Environmental Protection Agency Maximum Contaminant Levels	
Incident Specific Parameters		2		SDG: DA41304	
HG (µg/L)	0.025	0.025	0.0250 UJ	SDG: DA41347	SDG: 810132911
Mercury			0.0250 U	0.0590 J	0.0560 UJ

DOH		DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents		Environmental Protection Agency Maximum Contaminant Levels	
Incident Specific Parameters		6		SDG: DA41304	
METAL (µg/L)	6	6	0.100 U	SDG: DA41347	SDG: 810132911
Antimony			0.100 U	0.0570 U	0.0570 U
Arsenic	10	10	0.500 UJ	0.500 U	0.890 U
Barium	220	2000	1.80 J	2.10	2.10
Beryllium	0.66	4	0.150 U	0.150 U	0.0830 U
Cadmium	3	5	0.0500 UJ	0.0500 U	0.140 U
Chromium	11	100	1.20 J	1.50 J	1.70
Copper	2.9	1300	30.6	13.2	11.0
Lead	15	15	0.130 U	0.770	0.170 J
Selenium	5	50	0.300 U	0.300 U	1.60 U
Thallium	2	2	0.0500 U	0.0790 J	0.160 U

DOH		DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents		Environmental Protection Agency Maximum Contaminant Levels	
Incident Specific Parameters		None		SDG: DA41304	
SVOC (µg/L)	2.1	10	0.240 U	SDG: DA41347	SDG: 810132911
1-Methylnaphthalene			0.240 U	0.0200 U	0.0190 U



Residential Sampling Report for Flushing Zone  
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Location ID:		C3-BLDG0014	C3-BLDG0134	C3-BLDG0155	C3-BLDG0214	C3-BLDG0366	C3-BLDG0392	C3-BLDG067B	C3-BLDG067B
Location Type:		Non-Residence	Non-Residence	Non-Residence	Non-Residence	Non-Residence	Non-Residence	Non-Residence	Non-Residence
Residence:		Building 14,SPECIAL PROJECTS SHOP (X55)	Building 134,PUBLIC TOILET	Building 155,STRUCTURAL & FABRICATION	Building 214,ELECTRICAL/ELE CTRONIC SHOPS	Building 366,PUBLIC TOILET	Building 392,WELDING SCHOOL (X26)	Building 67B,SHOP ADMIN	Building 67B,SHOP ADMIN
Field Sample ID:		220131C3FT01	220131C3ET03	220131C3FT04	220131C3GT04	220131C3ET01	220131C3FT05	220131C3FT02	220131C3FT03
Sample Date:		2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31
Sample Type:		N	N	N	N	N	N	N	N

SVOC (µg/L)	Incident Specific Parameters	Groundwater Action Levels	DOH		DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: 35693852	SDG: DA41416	SDG: 35693851	SDG: 35693857	SDG: DA41416R	SDG: 35693851	SDG: 35693852	SDG: 35693851
			10	0.06	None	None	0.180 U	0.240 U	0.180 U	0.190 U	0.240 U	0.190 U	0.190 U	0.190 U
2-Methylnaphthalene	4.7													
Benzo(a)pyrene	0.06				0.2	0.2	0.0190 U	0.00950 U	0.0190 U	0.0200 U	0.00960 U	0.0200 U	0.0200 U	0.0200 U
Bis(2-ethylhexyl)phthalate	3		3		6	6	0.470 U	1.20 U	0.470 U	0.470 U	26.4 J	0.470 U	0.470 U	0.470 U
Naphthalene	12		17		None	None	0.180 U	0.240 U	0.170 U	0.180 U	0.240 U	0.180 U	0.180 U	0.180 U

VOC (µg/L)	Incident Specific Parameters	Groundwater Action Levels	DOH		DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: C22B005	SDG: DA41416	SDG: C22B005	SDG: C22B005	SDG: DA41416	SDG: C22B005	SDG: C22B005	SDG: C22B005
			11	5	200	200	0.119 U	0.500 U	0.119 U	0.288 U	0.500 U	0.119 U	0.288 U	0.119 U
1,1,1-Trichloroethane	11													
1,1,2-Trichloroethane	5		5		3	5	0.288 U	0.500 U	0.288 U	0.288 U	0.500 U	0.288 U	0.288 U	0.288 U
1,1-Dichloroethene	7		7		7	7	0.128 U	0.500 U	0.128 U	0.128 U	0.500 U	0.128 U	0.128 U	0.128 U
1,2,4-Trichlorobenzene	70		70		70	70	0.318 U	0.500 U	0.318 U	0.318 U	0.500 U	0.318 U	0.318 U	0.318 U
1,2-Dichlorobenzene	10		10		600	600	0.272 U	0.500 U	0.272 U	0.272 U	0.500 U	0.272 U	0.272 U	0.272 U
1,2-Dichloroethane	5		5		5	5	0.0884 U	0.500 U	0.0884 U	0.0884 U	0.500 U	0.0884 U	0.0884 U	0.0884 U
1,2-Dichloropropane	5		5		5	5	0.129 U	0.500 U	0.129 U	0.129 U	0.500 U	0.129 U	0.129 U	0.129 U
1,4-Dichlorobenzene	5		5		75	None	0.245 U	0.500 U	0.245 U	0.245 U	0.500 U	0.245 U	0.245 U	0.245 U
Benzene	5		5		5	5	0.0846 U	0.500 U	0.0846 U	0.0846 U	0.500 U	0.0846 U	0.0846 U	0.0846 U
Carbon Tetrachloride	5		5		5	5	0.165 U	0.500 U	0.165 U	0.165 U	0.500 U	0.165 U	0.165 U	0.165 U
Chlorobenzene	25		25		100	100	0.146 U	0.500 U	0.146 U	0.146 U	0.500 U	0.146 U	0.146 U	0.146 U
cis-1,2-Dichloroethene	70		70		70	70	0.0570 U	0.500 U	0.0570 U	0.0570 U	0.500 U	0.0570 U	0.0570 U	0.0570 U
Ethylbenzene	700		7.3		700	700	0.141 U	0.500 U	0.141 U	0.141 U	0.500 U	0.141 U	0.141 U	0.141 U
m,p-Xylene	10000		13		None	None	0.317 U	0.500 U	0.317 U	0.317 U	0.500 U	0.317 U	0.317 U	0.317 U
Methylene chloride	5		5		5	5	2.15 U	0.500 U	2.15 U	2.15 U	0.500 U	2.15 U	2.15 U	2.15 U
o-Xylene	10000		13		None	None	0.157 U	0.500 U	0.157 U	0.157 U	0.500 U	0.157 U	0.157 U	0.157 U
Styrene	10		10		100	100	0.224 U	0.500 U	0.224 U	0.224 U	0.500 U	0.224 U	0.224 U	0.224 U
Tetrachloroethene (PCE)	5		5		5	5	0.125 U	0.500 U	0.125 U	0.125 U	0.500 U	0.125 U	0.125 U	0.125 U
Toluene	1000		9.8		1000	1000	0.120 U	0.500 U	0.120 U	0.120 U	0.500 U	0.120 U	0.120 U	0.120 U
trans-1,2-Dichloroethene	100		100		100	100	0.0958 U	0.500 U	0.0958 U	0.0958 U	0.500 U	0.0958 U	0.0958 U	0.0958 U
Trichloroethene (TCE)	5		5		5	5	0.0574 U	0.500 U	0.0574 U	0.0574 U	0.500 U	0.0574 U	0.0574 U	0.0574 U
Vinyl chloride	2		2		2	2	0.611 U	0.500 U	0.611 U	0.611 U	0.500 U	0.611 U	0.611 U	0.611 U
Xylenes, Total	10000		13		10000	10000	--	0.500 U	--	--	0.500 U	--	--	--

Residential Sampling Report for Flushing Zone  
C3 Zone Residential DW Sampling  
Chemistry Results  
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Location ID:		C3-BLDG1443	C3-BLDG1670	C3-BLDG1670	C3-BLDG1678	C3-BLDG1701	C3-BLDG1916	C3-BLDG2192	C3-CROM4935
Location Type:		Non-Residence	Non-Residence	Non-Residence	Non-Residence	Non-Residence	Non-Residence	Non-Residence	Residence
Residence:		Building 1443,QUALITY ASSURANCE OFFICE	Building 1670,SERVICE SHOPS GROUP	Building 1670,SERVICE SHOPS GROUP	Building 1678,PUBLIC TOILET	Building 1701,MULTI MEDIA BUILDING	Building 1916,SHIP SERVICES SUPPORT BUILDING	Building 2192,PRODUCTION SUPPORT BLDG EAST	4935 Crommelin Street
Field Sample ID:		220131C3GT05	220131C3GT07	220131C3GT08	220131C3ET02	220131C3ET05	220131C3GT06	220131C3ET04	220126C3GT02
Sample Date:		2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-26
Sample Type:		N	N	FD	N	N	N	N	N

SVOC (µg/L)	Incident Specific Parameters	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Contaminant Levels	SDG: 35693857	SDG: 35693857	SDG: DA41416	SDG: DA41474	SDG: 35693857	SDG: DA41474	SDG: DA41304
2-Methylnaphthalene	4.7	10	None	None	0.190 U	0.190 U	0.180 U	0.240 U	0.190 U	0.240 U	0.240 U
Benzo(a)pyrene	0.06	0.06	0.2	0.2	0.0200 U	0.0200 U	0.0190 U	0.00970 U	0.0190 U	0.00950 U	0.00960 U
Bis(2-ethylhexyl)phthalate	3	3	6	6	0.470 U	0.470 U	0.460 U	0.390 U	0.470 U	0.380 U	0.380 U
Naphthalene	12	17	None	None	0.180 U	0.180 U	0.170 U	0.240 U	0.180 U	0.240 U	0.240 U

VOC (µg/L)	Incident Specific Parameters	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: C22B005	SDG: C22B005	SDG: DA41416	SDG: DA41474	SDG: C22B005	SDG: DA41474	SDG: DA41304
1,1,1-Trichloroethane	11	11	200	200	0.119 U	0.119 U	0.288 U	0.500 U	0.119 U	0.500 U	0.500 U
1,1,2-Trichloroethane	5	5	3	5	0.288 U	0.288 U	0.128 U	0.500 U	0.288 U	0.500 U	0.500 U
1,1-Dichloroethene	7	7	7	7	0.128 U	0.128 U	0.318 U	0.500 U	0.128 U	0.500 U	0.500 U
1,2,4-Trichlorobenzene	70	70	70	70	0.318 U	0.318 U	0.272 U	0.500 U	0.318 U	0.500 U	0.500 U
1,2-Dichlorobenzene	10	10	600	600	0.272 U	0.272 U	0.0884 U	0.500 U	0.272 U	0.500 U	0.500 U
1,2-Dichloroethane	5	5	5	5	0.129 U	0.129 U	0.245 U	0.500 U	0.0884 U	0.500 U	0.500 U
1,2-Dichloropropane	5	5	5	5	0.129 U	0.129 U	0.0846 U	0.500 U	0.129 U	0.500 U	0.500 U
1,4-Dichlorobenzene	5	5	75	None	0.245 U	0.245 U	0.165 U	0.500 U	0.245 U	0.500 U	0.500 U
Benzene	5	5	5	5	0.0846 U	0.0846 U	0.146 U	0.500 U	0.0846 U	0.500 U	0.500 U
Carbon Tetrachloride	5	5	5	5	0.165 U	0.165 U	0.0570 U	0.500 U	0.165 U	0.500 U	0.500 U
Chlorobenzene	25	25	100	100	0.146 U	0.146 U	0.0570 U	0.500 U	0.146 U	0.500 U	0.500 U
cis-1,2-Dichloroethene	70	70	70	70	0.0570 U	0.0570 U	0.141 U	0.500 U	0.0570 U	0.500 U	0.500 U
Ethylbenzene	700	7.3	700	700	0.141 U	0.141 U	0.317 U	0.500 U	0.141 U	0.500 U	0.500 U
m,p-Xylene	10000	13	None	None	0.317 U	0.317 U	2.15 U	0.500 U	0.317 U	0.500 U	0.500 U
Methylene chloride	5	5	5	5	2.15 U	2.15 U	0.157 U	0.500 U	2.15 U	0.500 U	0.500 U
o-Xylene	10000	13	None	None	0.157 U	0.157 U	0.224 U	0.500 U	0.157 U	0.500 U	0.500 U
Styrene	10	10	100	100	0.224 U	0.224 U	0.125 U	0.500 U	0.224 U	0.500 U	0.500 U
Tetrachloroethene (PCE)	5	5	5	5	0.125 U	0.125 U	0.120 U	0.500 U	0.125 U	0.500 U	0.500 U
Toluene	1000	9.8	1000	1000	0.120 U	0.120 U	0.0958 U	0.500 U	0.120 U	0.500 U	0.500 U
trans-1,2-Dichloroethene	100	100	100	100	0.0958 U	0.0958 U	0.0574 U	0.500 U	0.0958 U	0.500 U	0.500 U
Trichloroethene (TCE)	5	5	5	5	0.0574 U	0.0574 U	0.611 U	0.500 U	0.0574 U	0.500 U	0.500 U
Vinyl chloride	2	2	2	2	0.611 U	0.611 U	--	0.500 U	0.611 U	0.500 U	0.500 U
Xylenes, Total	10000	13	10000	10000	--	--	0.500 U	0.500 U	--	0.500 U	0.500 U

Residential Sampling Report for Flushing Zone  
C3 Zone Residential DW Sampling  
Chemistry Results  
Drinking Water Sampling, JBPHH, Oahu Hawaii

Location ID:  
Location Type:  
Residence:

C3-CROM4943  
Residence  
4943 Crommelin Street

C3-CROM4945  
Residence  
4945 Crommelin Street

C3-CROM4953  
Residence  
4953 Crommelin Street

C3-CROM4953  
Residence  
4953 Crommelin Street

C3-FORD2158  
Residence  
2158 Ford Island Way

C3-FORD2160  
Residence  
2160 Ford Island Way

C3-FORD2166  
Residence  
2166 Ford Island Way

Field Sample ID:  
Sample Date:  
Sample Type:

220126C3GT10  
2022-01-26  
N

220126C2BT10  
2022-01-26  
N

220126C3GT01  
2022-01-26  
N

220126C3GT06  
2022-01-26  
N

220126C3KT05  
2022-01-26  
N

220126C3KT04  
2022-01-26  
N

220126C3KT03  
2022-01-26  
N

DOH		Environmental Action Levels Table D-1A	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels			
Incident Specific Parameters	Groundwater Action Levels				SDG:	SDG:	SDG:
SVOC (µg/L)					DA41345	DA41304	810132911
2-Methylnaphthalene	4.7	10	None	None	0.240 U	0.240 U	0.0190 U
Benzo(a)pyrene	0.06	0.06	0.2	0.2	0.00950 U	0.00960 U	0.00970 U
Bis(2-ethylhexyl)phthalate	3	3	6	6	0.380 U	0.380 U	0.580 U
Naphthalene	12	17	None	None	0.240 U	0.240 U	0.0190 U

DOH		Environmental Action Levels Table D-1A	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels			
Incident Specific Parameters	Groundwater Action Levels				SDG:	SDG:	SDG:
VOC (µg/L)					DA41347	DA41304	810132911
1,1,1-Trichloroethane	11	11	200	200	0.500 U	0.500 U	0.200 U
1,1,2-Trichloroethane	5	5	3	5	0.500 U	0.500 U	0.200 U
1,1-Dichloroethene	7	7	7	7	0.500 U	0.500 U	0.200 U
1,2,4-Trichlorobenzene	70	70	70	70	0.500 U	0.500 U	0.200 U
1,2-Dichlorobenzene	10	10	600	600	0.500 U	0.500 U	0.200 U
1,2-Dichloroethane	5	5	5	5	0.500 U	0.500 U	0.200 U
1,2-Dichloropropane	5	5	5	5	0.500 U	0.500 U	0.200 U
1,4-Dichlorobenzene	5	5	75	None	0.500 U	0.500 U	0.200 U
Benzene	5	5	5	5	0.500 U	0.500 U	0.200 U
Carbon Tetrachloride	5	5	5	5	0.500 U	0.500 U	0.100 U
Chlorobenzene	25	25	100	100	0.500 U	0.500 U	0.200 U
cis-1,2-Dichloroethene	70	70	70	70	0.500 U	0.500 U	0.200 U
Ethylbenzene	700	7.3	700	700	0.500 U	0.500 U	0.200 U
m,p-Xylene	10000	13	None	None	0.500 U	0.500 U	0.500 U
Methylene chloride	5	5	5	5	0.500 U	0.500 U	0.400 U
o-Xylene	10000	13	None	None	0.500 U	0.500 U	0.200 U
Styrene	10	10	100	100	0.500 U	0.500 U	0.200 U
Tetrachloroethene (PCE)	5	5	5	5	0.500 U	0.500 U	0.200 U
Toluene	1000	9.8	1000	1000	0.500 U	0.500 U	0.200 U
trans-1,2-Dichloroethene	100	100	100	100	0.500 U	0.500 U	0.200 U
Trichloroethene (TCE)	5	5	5	5	0.500 U	0.500 U	0.200 U
Vinyl chloride	2	2	2	2	0.500 U	0.500 U	0.200 U
Xylenes, Total	10000	13	10000	10000	0.500 U	0.500 U	0.500 U

Residential Sampling Report for Flushing Zone  
C3 Zone Residential DW Sampling  
Chemistry Results  
Drinking Water Sampling, JBPHH, Oahu Hawaii

Notes:

-- indicates that the sample was Not Analyzed for the analyte

Results highlighted yellow exceed the ISP  
Results in purple font also exceed the EALs  
Results in green font also exceed the DOH MCL  
Results in blue font also exceed the EPA MCL  
Results from G1/G3 sampling, where the G3 result is greater than the G1 result, have a red border and the associated G1/G3 result in parentheses for comparison

µg/L = Micrograms per Liter

March 10, 2022

From: Naval Facilities Engineering Systems Command Representative, IDWS Team  
To: Interagency Drinking Water System Team

SUBJ: ZONE C3 EXCEEDANCE INVESTIGATION SUMMARY AND RESAMPLE RESULTS

Ref: (a) DoH's Guidance on the Approach to Amending the Public Health Advisory, Addendum 1 dtd 12 FEB 2022

Encl: (1) Zone C3 ISP or MCL Exceedance Report  
(2) AECOM Bis (2-ethylhexyl) phthalate Exceedance Results Memo dtd 08 MAR 2022  
(3) SGS Corrective Action Summary Form dtd 07 MAR 2022  
(4) Zone C3 ISP or MCL Exceedance Resample Report  
(5) National Primary Drinking Water Regulation, EPA 816-F-09-004  
(6) DoH SVOC Sample Results for Zone C3  
(7) DoH TPH Sample Results for Zone C3

1. This letter documents the investigation into exceedances of incident specific parameters (ISP) and Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs) in Zone C3. Enclosure (1) documents exceedances for building (non-residences) sampling test results for the ISP total organic carbon (TOC) of 2 parts per million and bis (2-ethylhexy) phthalate with a MCL of 6 ppb.

2. The IDWST reviewed the TOC distribution and building sample results in their entirety. The exceedances of the ISP in buildings ranged between 2 ppm and 8 ppm. The Navy informed the IDWST that building managers have been informed to run their water to improve water quality if there is low water usage in the building. This is in addition to the flushing that was previously done by the Navy. The additional flushing will decrease water quality impacts from stagnant water. The IDWST determined that no further action was required beyond the long term monitoring sampling for Zone C3.

3. Bis (2-ethylhexyl) phthalate, which is also referred to as di (2-ethylhexyl) phthalate, was detected at a value 26.4J ppb at Building 366 (sample ID 220131C3ET01) taken on January 31, 2022 as documented in enclosure (1). The letter J is a data qualifier the laboratory uses to denote that the number is an estimated concentration because something in the sample interfered with the analysis. The sample result at Building 366 was in exceedance of the MCL of 6 ppb. This type of exceedance has been encountered before in other zones. Investigation into this matter determined that laboratory contamination contributed to the detection of this analyte. Enclosure (2) documents this investigation and states: "the weight of evidence suggests are all the exceedance results are false positives attributable to laboratory contamination, and therefore no further action is warranted at this time." Enclosure (2) was updated on March 8, 2022 to include building 366 with its corresponding address of 690 Cushing St. on the original memo dated February 20, 2022. Enclosure (3) is a corrective action summary from the laboratory, SGS Wheat Ridge, acknowledging the laboratory contamination and the immediate steps taken to prevent future

SUBJ: ZONE C3 EXCEEDANCE INVESTIGATION SUMMARY AND RESAMPLE  
RESULTS

occurrences. As an additional line of evidence and a precaution, the IDWST members directed that the building be sampled, flushed and resampled again to confirm that the analyte was below the MCL. Sample ID C3-TW-0014953-22056-N taken on February 25, 2022 and sample ID C3-TW-0014953-22056-N-R1 taken on February 26, 2022 were both non-detect for bis (2-ethylhexyl) phthalate as documented in enclosure (4). Enclosure (5) provides the potential health effects from long-term exposure to di (2-ethylhexyl) phthalate, which is also referred to as bis (2-ethylhexyl) phthalate, above the MCL.

4. Enclosures (6) and (7) are the test results for samples taken by DoH. There were no exceedances above the MCL or exceedances above the ISP that required further action. The Navy and DoH laboratory reports will be made publicly available at <https://jbphh-safewaters.org/> upon amendment of the health advisory for Zone C3.

5. I certify under penalty of law that I have personally examined and I am familiar with the information submitted and the submitted information is true, accurate, and complete.

MENO.MICHAELWAYNE.JR. Digitally signed by  
MENO.MICHAELWAYNE.JR.1088310035  
Date: 2022.03.10  
12:38:15 -10'00'

M. W. Meno  
Captain, U.S. Navy Civil Engineer Corps



Zone C3 Exceedance Report  
C3 Zone Residential DW Sampling  
Chemistry Results  
Drinking Water Sampling, JBPHH, Oahu Hawaii

Location ID:										
Location Type:										
Residence:	C3-BLDG0014	C3-BLDG0134	C3-BLDG0155	C3-BLDG0214	C3-BLDG0366	C3-BLDG0392	C3-BLDG067B	C3-BLDG067B		
	Non-Residence	Non-Residence	Non-Residence	Non-Residence	Non-Residence	Non-Residence	Non-Residence	Non-Residence	Non-Residence	Non-Residence
	Building 14,SPECIAL PROJECTS SHOP (X55)	Building 134,PUBLIC TOILET	Building 155,STRUCTURAL & FABRICATION	Building 214,ELECTRICAL/ELE CTRONIC SHOPS	Building 366,PUBLIC TOILET	Building 392,WELDING SCHOOL (X26)	Building 67B,SHOP ADMIN	Building 67B,SHOP ADMIN	Building 67B,SHOP ADMIN	Building 67B,SHOP ADMIN
Field Sample ID:	220131C3FT01	220131C3ET03	220131C3FT04	220131C3GT04	220131C3ET01	220131C3FT05	220131C3FT02	220131C3FT03		
Sample Date:	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31
Sample Type:	N	N	N	N	N	N	N	N	N	N

GENCHEM (mg/L)	Incident Specific Parameters	2	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	None	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: 35693852	SDG: DA41416	SDG: C22B005	SDG: 2.18 J	SDG: C22B005	SDG: DA41416R	SDG: C22B005	SDG: 6.37 J	SDG: 35693852	SDG: 35693851
			Total Organic Carbon	None	None	None	--	--	--	--	--	--	--	--	--	--
HG (µg/L)	Incident Specific Parameters	2	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	0.025	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: 35693852	SDG: DA41416	SDG: 35693851	SDG: --	SDG: 35693857	SDG: DA41416R	SDG: 35693851	SDG: --	SDG: 35693852	SDG: 35693851
			Mercury	--	--	--	--	--	--	--	--	--	--	--	--	--
METAL (µg/L)	Incident Specific Parameters	1300	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	2.9	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: 35693852	SDG: DA41416	SDG: 35693851	SDG: 277	SDG: 35693857	SDG: DA41416	SDG: 35693851	SDG: 16.3	SDG: 35693852	SDG: 35693851
			Copper	--	--	--	--	--	--	--	--	--	--	--	--	--
SVOC (µg/L)	Incident Specific Parameters	6	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	5.6	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: 35693852	SDG: DA41416	SDG: 35693851	SDG: 8.20	SDG: 35693857	SDG: DA41416	SDG: 35693851	SDG: 26.4 J	SDG: 35693852	SDG: 35693851
			Bis(2-ethylhexyl)phthalate	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

-- indicates that the sample was Not Analyzed for the analyte

Results highlighted yellow exceed the ISP  
Results in purple font also exceed the EALS  
Results in green font also exceed the DOH MCL  
Results in blue font also exceed the EPA MCL  
Results from G1/G3 sampling, where the G3 result is greater than the G1 result, have a red border and the associated G1/G3 result in parentheses for comparison

µg/L = Micrograms per Liter

Zone C3 Exceedance Report  
C3 Zone Residential DW Sampling  
Chemistry Results  
Drinking Water Sampling, JBPHH, Oahu Hawaii

Location ID:										
Location Type:										
Residence:										
Field Sample ID:	C3-BLDG1443	C3-BLDG1670	C3-BLDG1670	C3-BLDG1670	C3-BLDG1678	C3-BLDG1701	C3-BLDG1916	C3-BLDG2192	C3-CROM4935	
	Non-Residence Building 1443.QUALITY ASSURANCE OFFICE	Non-Residence Building 1670.SERVICE SHOPS GROUP	Non-Residence Building 1670.SERVICE SHOPS GROUP	Non-Residence Building 1670.SERVICE SHOPS GROUP	Non-Residence Building 1678,PUBLIC TOILET	Non-Residence Building 1701,MULTI MEDIA BUILDING	Non-Residence Building 1916.SHIP SERVICES SUPPORT BUILDING	Non-Residence Building 2192.PRODUCTION SUPPORT BLDG EAST	Residence 4935 Crommelin Street	
Sample Date:	220131C3GT05	220131C3GT07	220131C3GT08	220131C3GT02	220131C3ET05	220131C3ET04	220131C3GT06	220131C3ET04	220126C3GT02	
	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-31	2022-01-26	
Sample Type:	N	N	FD	N	N	N	N	N	N	

GENCHEM (mg/L)	Incident Specific Parameters	2	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	None	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	None	Environmental Protection Agency Maximum Contaminant Levels	SDG: C22B005	SDG: 35693857	SDG: 35693857	SDG: DA41416	SDG: DA41474	SDG: C22B005	SDG: DA41474	SDG: DA41304
Total Organic Carbon							None	6.41 J	--	--	--	--	7.13 J	--	--
HG (µg/L)	Incident Specific Parameters	2	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	0.025	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	2	Environmental Protection Agency Maximum Contaminant Levels	SDG: 35693857	SDG: 35693857	SDG: 35693857	SDG: DA41416	SDG: DA41474	SDG: 35693857	SDG: DA41474	SDG: DA41304
Mercury							2	--	--	--	--	--	--	--	--
METAL (µg/L)	Incident Specific Parameters	1300	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	2.9	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	1300	Environmental Protection Agency Maximum Contaminant Levels	SDG: 35693857	SDG: 35693857	SDG: 35693857	SDG: DA41416	SDG: DA41474	SDG: 35693857	SDG: DA41474	SDG: DA41304
Copper							1300	65.9	31.3	31.9	28.5	128	44.5	174	14.2
Lead							15	--	--	--	--	--	--	--	--
SVOC (µg/L)	Incident Specific Parameters	6	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	3	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	6	Environmental Protection Agency Maximum Contaminant Levels	SDG: 35693857	SDG: 35693857	SDG: 35693857	SDG: DA41416	SDG: DA41474	SDG: 35693857	SDG: DA41474	SDG: DA41304
Bis(2-ethylhexyl)phthalate							6	--	--	--	--	--	--	--	--

Section 2b.3 Exceedance Investigation Summary and Results

Zone C3 Exceedance Report  
C3 Zone Residential DW Sampling  
Chemistry Results  
Drinking Water Sampling, JBPHH, Oahu Hawaii

Location ID: C3-CROM4943 C3-CROM4945 C3-CROM4953 C3-CROM4953 C3-FORD2158 C3-FORD2160 C3-FORD2166  
Location Type: Residence Residence Residence Residence Residence Residence Residence  
Residence: 4943 Crommelin Street 4945 Crommelin Street 4953 Crommelin Street 4953 Crommelin Street 2158 Ford Island Way 2160 Ford Island Way 2166 Ford Island Way

Field Sample ID: 220126C3GT10 220126C2BT10 220126C3GT01 220126C3GT06 220126C3KT05 220126C3KT04 220126C3KT03  
Sample Date: 2022-01-26 2022-01-26 2022-01-26 2022-01-26 2022-01-26 2022-01-26 2022-01-26  
Sample Type: N N N N N N N

GENCHEM (mg/L)		Incident Specific Parameters	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: DA41345	SDG: DA41347	SDG: DA41304	SDG: DA41304	SDG: 810132911	SDG: 810132911	SDG: 810132911
Total Organic Carbon		2	None	None	None	--	--	--	--	--	--	--
HG (µg/L)		Incident Specific Parameters	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: DA41345	SDG: DA41347	SDG: DA41304	SDG: DA41304	SDG: 810132911	SDG: 810132911	SDG: 810132911
Mercury		2	0.025	2	2	--	--	--	0.0590 J	--	--	--
METAL (µg/L)		Incident Specific Parameters	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: DA41345	SDG: DA41347	SDG: DA41304	SDG: DA41304	SDG: 810132911	SDG: 810132911	SDG: 810132911
Copper		1300	2.9	1300	1300	30.9	30.6	13.2	22.7	26.0	22.0	11.0
Lead		15	5.6	15	15	--	--	--	--	--	--	--
SVOC (µg/L)		Incident Specific Parameters	DOH Environmental Action Levels Table D-1A Groundwater Action Levels	DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: DA41345	SDG: DA41347	SDG: DA41304	SDG: DA41304	SDG: 810132911	SDG: 810132911	SDG: 810132911
Bis(2-ethylhexyl)phthalate		6	3	6	6	--	--	--	--	--	--	--

Section 2b.3 Exceedance Investigation Summary and Results

March 8, 2022

NAVFAC Hawaii  
400 Marshall Road  
JBPHH HI 96860-3139

**Subject: Red Hill Bulk Fuel Storage Facility  
Bis(2-ethylhexyl)phthalate Exceedance Results**

Attention Engineering Working Group:

The table below summarizes the bis(2-ethylhexyl) phthalate (B2EHP) exceedance results with respect to the Incident-Specific Parameter concentrations for this analyte in multiple samples. Mass spectral and chromatographic data were reviewed to determine if the detections were supported by the raw data. All the detections appear to meet qualitative and quantitative method criteria.

SDG	Laboratory Sample ID	Field Sample ID	Zone	Address	Date Collected	Date Extracted	Date Analyzed	Sample B2EHP Result	MB B2EHP Result	Units
DA41377	DA41377-4	220129B1AT03	B1	Trip Blank	1/29/2022	02/01/22	02/02/22	13.2	17.3	ug/L
DA41377R	DA41377-5R	220129B1AT04	B1	2855 B Kae Loop	1/29/2022	02/01/22	02/02/22	42.4	17.3	ug/L
DA41416R	DA41416-2R	220131C3ET01	C3	690 Cushing St. (BLDG0366)	1/31/2022	02/04/22	02/04/22	26.4	11.7	ug/L
DA41509R	DA41509-7R	220202D4DT01	D4	551 Mamala Bay Dr	2/2/2022	02/05/22	02/07/22	3	0.60 U	ug/L
DA41509R	DA41509-2R	220202D4DT03	D4	386 Mamala Bay Dr	2/2/2022	02/05/22	02/07/22	4.2	0.60 U	ug/L
DA41509	DA41509-6	220202D4AT07	D4	Trip Blank	2/2/2022	02/04/22	02/05/22	21.6	11.7	ug/L
DA41510	DA41510-4	220202H1FT05	H1	Trip Blank	2/2/2022	02/04/22	02/05/22	28.9	0.64 J	ug/L
DA41395R	DA41395-2R	220129F2CT03	F2	3349 Catlin Drive	01/29/22	02/04/22	02/04/22	23.8	11.7	ug/L
DA41395R	DA41395-5R	220129F2CT01	F2	811 Murray Dr	01/29/22	02/04/22	02/04/22	18.3	11.7	ug/L
DA40816AR	DA40816-38	220111-D1-CT01	D1	1206 Mead Pl	01/11/22	01/17/22	01/18/22	6.3	0.58 J	ug/L

ug/L = micrograms per liter U = the analyte was not detected J = estimated values

B2EHP is a common laboratory contaminant and used as a plasticizer in many plastic materials, including tubing commonly used by laboratories. B2EHP contamination of laboratory extraction equipment and glassware surfaces is a common cause of false positive sample results in semi-volatile methods such as EPA 525.2

The pattern of exceedance results occurs at a single laboratory (SGS-Wheat Ridge) and within a relatively narrow window of time (all laboratory extractions between 02/01/22 and 02/05/22, except for one on 01/17/22). Eight out of ten exceedance results are associated with preparatory batches having B2EHP detections in the method blanks (MB). In six of those eight cases the MB result is more than 40% of the sample result for B2EHP.

Although three of the ten exceedance results are from Trip Blanks, many of the associated field samples collected and shipped together did not contain detectable B2EHP, indicating that the field sampling procedures or containers themselves are an unlikely source of the contamination.

An investigation of the SGS-Wheat Ridge 525.2 QC results for all Red Hill samples confirmed that 23% of the MB records in EDMS contained reported concentrations of B2EHP ranging from 0.58 to 17.3 ug/L. Many of the associated matrix spikes in these batches exceeded control limits for B2EHP by up to 800% indicating sporadic cases of B2EHP contamination in all QC samples.

During a review of the laboratory raw data it was noted that all of the highest concentration B2EHP detections are associated with bis (2-ethylhexyl) adipate (B2EHA) detections at concentrations ~ 3% of the B2EHP. B2EHA is another common plasticizer and sometimes used as a replacement for phthalates such as B2EHP. The pattern of B2EHP + B2EHA association in samples from very different field locations is another indicator that the contamination has a common source and is from inside the laboratory, not from the drinking water samples.

The overall pattern of erratic detections in in a single laboratory over a narrow window of time indicates that intermittent laboratory contamination explains all of the reported B2EHP exceedances in the table above, including those results where the associated method blank appeared to be clean or the MB is < 10X the sample result.

The weight of evidence suggests are all the exceedance results are false positives attributable to laboratory contamination, and therefore no further action is warranted at this time.

Questions regarding this letter should be addressed to the DW Task Manager, Reid Campbell.

Yours sincerely,



Robert Kennedy  
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c: Reid Campbell, AECOM Task Manager  
Ken Vinson, AECOM Senior VP Program Manager  
Jim Refermat, AECOM Senior Program Chemist  
Contracting Officer  
Victor Gonzalez, NAVFAC

ENCL (2)



## Corrective Action Summary Form

Date: 3/7/2022 12:02:58 PM Tracking No: AMSOP\_372022\_640

CA Title: Phthalate Contamination in 525 Analysis

Department: Organic Prep Originator: Jason Savoie

Responsible Party: Jason Savoie Date Completed: 3/7/2022

### Description:

B2EHP is a common laboratory contaminant and used as a plasticizer in many plastic materials, including tubing commonly used by laboratories. B2EHP contamination of laboratory extraction equipment and glassware surfaces is a common cause of false positive sample results in semi-volatile methods such as EPA 525.2

The pattern of exceedance results occurs at a single laboratory (SGS-Wheat Ridge) and within a relatively narrow window of time (all laboratory extractions between 02/01/22 and 02/05/22, except for one on 01/17/22). Eight out of ten exceedance results are associated with preparatory batches having B2EHP detections in the method blanks (MB). In six of those eight cases the MB result is more than 40% of the sample result for B2EHP.

Although three of the ten exceedance results are from Trip Blanks, many of the associated field samples collected and shipped together did not contain detectable B2EHP, indicating that the field sampling procedures or containers themselves are an unlikely source of the contamination.

An investigation of the SGS-Wheat Ridge 525.2 QC results for all Red Hill samples confirmed that 23% of the MB records in EDMS contained reported concentrations of B2EHP ranging from 0.58 to 17.3 ug/L. Many of the associated matrix spikes in these batches exceeded control limits for B2EHP by up to 800% indicating sporadic cases of B2EHP contamination in all QC samples.

During a review of the laboratory raw data it was noted that all of the highest concentration B2EHP detections are associated with bis (2-ethylhexyl) adipate (B2EHA) detections at concentrations ~ 3% of the B2EHP. B2EHA is another common plasticizer and sometimes used as a replacement for phthalates such as B2EHP. The pattern of B2EHP + B2EHA association in samples from very different field locations is another indicator that the contamination has a common source and is from inside the laboratory, not from the drinking water samples.

The overall pattern of erratic detections in a single laboratory over a narrow window of time indicates that intermittent laboratory contamination explains all of the reported B2EHP exceedances, including those results where the associated method blank appeared to be clean or the MB is < 10X the sample result.

The weight of evidence suggests all the exceedance results are false positives attributable to laboratory contamination.

### Root Cause:

The laboratory has done some investigating but has been unable to identify the source of the contaminant. Due to the random nature of the occurrence throughout the analysis we do not suspect a contaminated solvent, surrogate, or other reagent which were all confirmed by screening on the GCMS but expect some sort of surface contact with the contaminant.

### Immediate Fix:

Hold on 525 Analysis and Investigation – The laboratory immediately put a temporary hold on the analysis for 525 when identifying that the B2EHP contamination was a problem. All solvents, surrogates, and reagents used for analysis were screened by GCMS. The laboratory also screened our SPE cartridges prior to our conditioning procedure and although B2EHP was detected, results were within acceptable levels for analysis. The nitrile gloves as well as pipette bulbs were allowed to come in brief contact with solvent and analyzed by GCMS which also were within acceptable levels. After confirming that solvent and reagents were acceptable for analysis, the laboratory performed extraction and analysis on six method blanks before continuing with the 525 analysis. All six method blanks were less than the MDL for B2EHP. None of the laboratory screens pointed to a definitive source for the B2EHP contamination.

### Corrective Action:



# Corrective Action Summary Form

Date: 3/7/2022 12:02:58 PM Tracking No: AMSOP\_372022\_640

CA Title: Phthalate Contamination in 525 Analysis

Department: Organic Prep Originator: Jason Savoie

Responsible Party: Jason Savoie Date Completed: 3/7/2022

Retraining of Staff – Although the B2EHP contamination has been sporadic, there was a period in late January into early February where the contamination began to show more frequently than previously observed. During this period the laboratory had brought on additional staffing to support the ongoing project and individual technique or lack of awareness to phthalates may have contributed to the increase in contamination. The phthalate contamination was communicated to staff performing analysis and contact with all plastic and rubber materials were minimized and/or eliminated where possible.

Glass Bottle Top Dispensers – All solvents were moved to enclosed glass bottle top dispensers that are compatible with the solvents they contain. Solvents from these bottles are routinely screened by GCMS to confirm that they are suitable for the 525 analysis.

Glass Luer Lock Syringes – The laboratory is taking measures to minimize the use of rubber transfer pipette bulbs as the sample can come in contact with the inside of the bulb if not handled correctly. Glass luer lock syringes will be substituted as a means to retrieving the sample from the concentration vessel and bringing to a 1ml final volume.

Bottle Custody Seals – The laboratory observed that the adhesive from the custody seals on the sample bottle leaves behind a residue when removed. During the analysis the bottle is inverted into a collection funnel and this portion of the bottle can come in contact with the sample. The laboratory does have a procedure to remove the residue from the bottle prior to transferring to the collection funnel but has taken greater measures to remove the residue and clean the surface of the bottle prior to analysis. Although the lab has not confirmed the adhesive from the labels as a source of the phthalate contamination we have requested that future bottles be prepared without the custody seal.

Confirmation Analysis – Client samples with results greater than the project screening limits have been re-extracted for confirmation despite acceptable QC.

## **Comments:**

Although the laboratory has been unable to identify a single source for the B2EHP contamination we continue to monitor this analyte in our laboratory QC as well as client samples. Since the above corrective actions were put in place the laboratory has observed a significant decrease in the occurrence of B2EHP at or greater than the RL in the 525 analysis.

## **Followup:**

Not applicable.

Zone C3 Exceedance Resample Report  
C3 Zone Residential DW and Distribution Resampling  
Chemistry Results

Drinking Water Sampling, JBPHH, Oahu Hawaii

Location ID:	C3-BLDG0366	C3-BLDG0366
Location Type:	Non-Residence	Non-Residence
Residence:	Building 366,PUBLIC TOILET	Building 366,PUBLIC TOILET
Field Sample ID:	C3-TW-0014953-22056-N	C3-TW-0014953-22056-NR1
Sample Date:	2022-02-25	2022-02-26
Sample Type:	N	N

SVOC (µg/L)	Incident Specific Parameters	DOH		DOH Safe Drinking Water Branch (SDWB) Regulatory Constituents	Environmental Protection Agency Maximum Contaminant Levels	SDG: DA42355	SDG: DA42368
		Groundwater Action Levels	Table D-1A				
1-Methylnaphthalene	10	10		None	None	0.240 U	0.250 U
2-Methylnaphthalene	10	10		None	None	0.240 U	0.250 U
Benzo(a)pyrene	0.2	0.06		0.2	0.2	0.00950 U	0.0100 U
Bis(2-ethylhexyl)phthalate	6	3		6	6	0.380 U	0.400 U
Naphthalene	17	17		None	None	0.240 U	0.250 U

Notes:
















-- indicates that the sample was Not Analyzed for the analyte

Results highlighted yellow exceed the ISP  
Results in purple font also exceed the EALs  
Results in green font also exceed the DOH MCL  
Results in blue font also exceed the EPA MCL  
Results from G1/G3 sampling, where the G3 result is greater than the G1 result, have a red border and the associated G1/G3 result in parentheses for comparison

µg/L = Micrograms per Liter


















# National Primary Drinking Water Regulations



Contaminant	MCL or TT <sup>1</sup> (mg/L) <sup>2</sup>	Potential health effects from long-term <sup>3</sup> exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L) <sup>2</sup>
 Acrylamide	TT <sup>4</sup>	Nervous system or blood problems; increased risk of cancer	Added to water during sewage/ wastewater treatment	<b>zero</b>
 Alachlor	0.002	Eye, liver, kidney, or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops	<b>zero</b>
 Alpha/photon emitters	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation	<b>zero</b>
 Antimony	0.006	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	<b>0.006</b>
 Arsenic	0.010	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards; runoff from glass & electronics production wastes	<b>0</b>
 Asbestos (fibers >10 micrometers)	7 million fibers per Liter (MFL)	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits	<b>7 MFL</b>
 Atrazine	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops	<b>0.003</b>
 Barium	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	<b>2</b>
 Benzene	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills	<b>zero</b>
 Benzo(a)pyrene (PAHs)	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines	<b>zero</b>
 Beryllium	0.004	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries	<b>0.004</b>
 Beta photon emitters	4 millirems per year	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation	<b>zero</b>
 Bromate	0.010	Increased risk of cancer	Byproduct of drinking water disinfection	<b>zero</b>
 Cadmium	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints	<b>0.005</b>
 Carbofuran	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa	<b>0.04</b>

## LEGEND



Contaminant	MCL or TT <sup>1</sup> (mg/L) <sup>2</sup>	Potential health effects from long-term <sup>3</sup> exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L) <sup>2</sup>
 Carbon tetrachloride	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities	<b>zero</b>
 Chloramines (as Cl <sub>2</sub> )	MRDL=4.0 <sup>1</sup>	Eye/nose irritation; stomach discomfort; anemia	Water additive used to control microbes	<b>MRDLG=4<sup>1</sup></b>
 Chlordane	0.002	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide	<b>zero</b>
 Chlorine (as Cl <sub>2</sub> )	MRDL=4.0 <sup>1</sup>	Eye/nose irritation; stomach discomfort	Water additive used to control microbes	<b>MRDLG=4<sup>1</sup></b>
 Chlorine dioxide (as ClO <sub>2</sub> )	MRDL=0.8 <sup>1</sup>	Anemia; infants, young children, and fetuses of pregnant women: nervous system effects	Water additive used to control microbes	<b>MRDLG=0.8<sup>1</sup></b>
 Chlorite	1.0	Anemia; infants, young children, and fetuses of pregnant women: nervous system effects	Byproduct of drinking water disinfection	<b>0.8</b>
 Chlorobenzene	0.1	Liver or kidney problems	Discharge from chemical and agricultural chemical factories	<b>0.1</b>
 Chromium (total)	0.1	Allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits	<b>0.1</b>
 Copper	TT <sup>5</sup> ; Action Level=1.3	Short-term exposure: Gastrointestinal distress. Long-term exposure: Liver or kidney damage. People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level	Corrosion of household plumbing systems; erosion of natural deposits	<b>1.3</b>
 <i>Cryptosporidium</i>	TT <sup>7</sup>	Short-term exposure: Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	<b>zero</b>
 Cyanide (as free cyanide)	0.2	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories	<b>0.2</b>
 2,4-D	0.07	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops	<b>0.07</b>
 Dalapon	0.2	Minor kidney changes	Runoff from herbicide used on rights of way	<b>0.2</b>
 1,2-Dibromo-3-chloropropane (DBCP)	0.0002	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards	<b>zero</b>
 o-Dichlorobenzene	0.6	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories	<b>0.6</b>
 p-Dichlorobenzene	0.075	Anemia; liver, kidney, or spleen damage; changes in blood	Discharge from industrial chemical factories	<b>0.075</b>
 1,2-Dichloroethane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	<b>zero</b>

## LEGEND














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RADIONUCLIDES

Contaminant	MCL or TT <sup>1</sup> (mg/L) <sup>2</sup>	Potential health effects from long-term <sup>3</sup> exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L) <sup>2</sup>
 1,1-Dichloroethylene	0.007	Liver problems	Discharge from industrial chemical factories	<b>0.007</b>
 cis-1,2-Dichloroethylene	0.07	Liver problems	Discharge from industrial chemical factories	<b>0.07</b>
 trans-1,2-Dichloroethylene	0.1	Liver problems	Discharge from industrial chemical factories	<b>0.1</b>
 Dichloromethane	0.005	Liver problems; increased risk of cancer	Discharge from industrial chemical factories	<b>zero</b>
 1,2-Dichloropropane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	<b>zero</b>
 Di(2-ethylhexyl) adipate	0.4	Weight loss, liver problems, or possible reproductive difficulties	Discharge from chemical factories	<b>0.4</b>
 Di(2-ethylhexyl) phthalate	0.006	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories	<b>zero</b>
 Dinoseb	0.007	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables	<b>0.007</b>
 Dioxin (2,3,7,8-TCDD)	0.00000003	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories	<b>zero</b>
 Diquat	0.02	Cataracts	Runoff from herbicide use	<b>0.02</b>
 Endothall	0.1	Stomach and intestinal problems	Runoff from herbicide use	<b>0.1</b>
 Endrin	0.002	Liver problems	Residue of banned insecticide	<b>0.002</b>
 Epichlorohydrin	TT <sup>4</sup>	Increased cancer risk; stomach problems	Discharge from industrial chemical factories; an impurity of some water treatment chemicals	<b>zero</b>
 Ethylbenzene	0.7	Liver or kidney problems	Discharge from petroleum refineries	<b>0.7</b>
 Ethylene dibromide	0.00005	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer	Discharge from petroleum refineries	<b>zero</b>
 Fecal coliform and <i>E. coli</i>	MCL <sup>6</sup>	Fecal coliforms and <i>E. coli</i> are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes may cause short term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, and people with severely compromised immune systems.	Human and animal fecal waste	<b>zero<sup>6</sup></b>

## LEGEND



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ENCL (5)

Contaminant	MCL or TT <sup>1</sup> (mg/L) <sup>2</sup>	Potential health effects from long-term <sup>3</sup> exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L) <sup>2</sup>
 Fluoride	4.0	Bone disease (pain and tenderness of the bones); children may get mottled teeth	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories	<b>4.0</b>
 <i>Giardia lamblia</i>	TT <sup>7</sup>	Short-term exposure: Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	<b>zero</b>
 Glyphosate	0.7	Kidney problems; reproductive difficulties	Runoff from herbicide use	<b>0.7</b>
 Haloacetic acids (HAA5)	0.060	Increased risk of cancer	Byproduct of drinking water disinfection	<b>n/a<sup>9</sup></b>
 Heptachlor	0.0004	Liver damage; increased risk of cancer	Residue of banned termiticide	<b>zero</b>
 Heptachlor epoxide	0.0002	Liver damage; increased risk of cancer	Breakdown of heptachlor	<b>zero</b>
 Heterotrophic plate count (HPC)	TT <sup>7</sup>	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment	<b>n/a</b>
 Hexachlorobenzene	0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer	Discharge from metal refineries and agricultural chemical factories	<b>zero</b>
 Hexachloro-cyclopentadiene	0.05	Kidney or stomach problems	Discharge from chemical factories	<b>0.05</b>
 Lead	TT <sup>5</sup> ; Action Level=0.015	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities; Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits	<b>zero</b>
 <i>Legionella</i>	TT <sup>7</sup>	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems	<b>zero</b>
 Lindane	0.0002	Liver or kidney problems	Runoff/leaching from insecticide used on cattle, lumber, and gardens	<b>0.0002</b>
 Mercury (inorganic)	0.002	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands	<b>0.002</b>
 Methoxychlor	0.04	Reproductive difficulties	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, and livestock	<b>0.04</b>
 Nitrate (measured as Nitrogen)	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	<b>10</b>

## LEGEND



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RADIONUCLIDES



Contaminant	MCL or TT <sup>1</sup> (mg/L) <sup>2</sup>	Potential health effects from long-term <sup>3</sup> exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L) <sup>2</sup>
 Nitrite (measured as Nitrogen)	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	<b>1</b>
 Oxamyl (Vydate)	0.2	Slight nervous system effects	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes	<b>0.2</b>
 Pentachlorophenol	0.001	Liver or kidney problems; increased cancer risk	Discharge from wood-preserving factories	<b>zero</b>
 Picloram	0.5	Liver problems	Herbicide runoff	<b>0.5</b>
 Polychlorinated biphenyls (PCBs)	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer	Runoff from landfills; discharge of waste chemicals	<b>zero</b>
 Radium 226 and Radium 228 (combined)	5 pCi/L	Increased risk of cancer	Erosion of natural deposits	<b>zero</b>
 Selenium	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum and metal refineries; erosion of natural deposits; discharge from mines	<b>0.05</b>
 Simazine	0.004	Problems with blood	Herbicide runoff	<b>0.004</b>
 Styrene	0.1	Liver, kidney, or circulatory system problems	Discharge from rubber and plastic factories; leaching from landfills	<b>0.1</b>
 Tetrachloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from factories and dry cleaners	<b>zero</b>
 Thallium	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories	<b>0.0005</b>
 Toluene	1	Nervous system, kidney, or liver problems	Discharge from petroleum factories	<b>1</b>
 Total Coliforms	5.0 percent <sup>8</sup>	Coliforms are bacteria that indicate that other, potentially harmful bacteria may be present. See fecal coliforms and <i>E. coli</i>	Naturally present in the environment	<b>zero</b>
 Total Trihalomethanes (TTHMs)	0.080	Liver, kidney, or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection	<b>n/a<sup>9</sup></b>
 Toxaphene	0.003	Kidney, liver, or thyroid problems; increased risk of cancer	Runoff/leaching from insecticide used on cotton and cattle	<b>zero</b>
 2,4,5-TP (Silvex)	0.05	Liver problems	Residue of banned herbicide	<b>0.05</b>
 1,2,4- Trichlorobenzene	0.07	Changes in adrenal glands	Discharge from textile finishing factories	<b>0.07</b>

## LEGEND



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ENCL (5)

Contaminant	MCL or TT <sup>1</sup> (mg/L) <sup>2</sup>	Potential health effects from long-term <sup>3</sup> exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L) <sup>2</sup>
 1,1,1-Trichloroethane	0.2	Liver, nervous system, or circulatory problems	Discharge from metal degreasing sites and other factories	<b>0.2</b>
 1,1,2-Trichloroethane	0.005	Liver, kidney, or immune system problems	Discharge from industrial chemical factories	<b>0.003</b>
 Trichloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from metal degreasing sites and other factories	<b>zero</b>
 Turbidity	TT <sup>7</sup>	Turbidity is a measure of the cloudiness of water. It is used to indicate water quality and filtration effectiveness (e.g., whether disease-causing organisms are present). Higher turbidity levels are often associated with higher levels of disease-causing microorganisms such as viruses, parasites, and some bacteria. These organisms can cause short term symptoms such as nausea, cramps, diarrhea, and associated headaches.	Soil runoff	<b>n/a</b>
 Uranium	30µg/L	Increased risk of cancer, kidney toxicity	Erosion of natural deposits	<b>zero</b>
 Vinyl chloride	0.002	Increased risk of cancer	Leaching from PVC pipes; discharge from plastic factories	<b>zero</b>
 Viruses (enteric)	TT <sup>7</sup>	Short-term exposure: Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	<b>zero</b>
 Xylenes (total)	10	Nervous system damage	Discharge from petroleum factories; discharge from chemical factories	<b>10</b>

## LEGEND



DISINFECTANT



DISINFECTION BYPRODUCT



INORGANIC CHEMICAL



MICROORGANISM



ORGANIC CHEMICAL



RADIONUCLIDES

## NOTES

## 1 Definitions

- Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
- Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
- Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- Maximum Residual Disinfectant Level (MRDL):** The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

2 Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million (ppm).

3 Health effects are from long-term exposure unless specified as short-term exposure.

4 Each water system must certify annually, in writing, to the state (using third-party or manufacturers certification) that when it uses acrylamide and/or epichlorohydrin to treat water, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows: Acrylamide = 0.05 percent dosed at 1 mg/L (or equivalent); Epichlorohydrin = 0.01 percent dosed at 20 mg/L (or equivalent).

5 Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10 percent of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead is 0.015 mg/L.

6 A routine sample that is fecal coliform-positive or E. coli-positive triggers repeat samples—if any repeat sample is total coliform-positive, the system has an acute MCL violation. A routine sample that is total coliform-positive and fecal coliform-negative or E. coli-negative triggers repeat samples—if any repeat sample is fecal coliform-positive or E. coli-positive, the system has an acute MCL violation. See also Total Coliforms.

7 EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water to (1) disinfect their water, and (2) filter their water or meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:

- Cryptosporidium:** 99 percent removal for systems that filter. Unfiltered systems are required to include Cryptosporidium in their existing watershed control provisions.

- Giardia lamblia:** 99.9 percent removal/inactivation
- Viruses:** 99.9 percent removal/inactivation
- Legionella:** No limit, but EPA believes that if *Giardia* and viruses are removed/inactivated, according to the treatment techniques in the surface water treatment rule, *Legionella* will also be controlled.
- Turbidity:** For systems that use conventional or direct filtration, at no time can turbidity (cloudiness of water) go higher than 1 nephelometric turbidity unit (NTU), and samples for turbidity must be less than or equal to 0.3 NTU in at least 95 percent of the samples in any month. Systems that use filtration other than the conventional or direct filtration must follow state limits, which must include turbidity at no time exceeding 5 NTU.
- HPC:** No more than 500 bacterial colonies per milliliter
- Long Term 1 Enhanced Surface Water Treatment:** Surface water systems or ground water systems under the direct influence of surface water serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced Surface Water Treatment Rule provisions (e.g. turbidity standards, individual filter monitoring, *Cryptosporidium* removal requirements, updated watershed control requirements for unfiltered systems).
- Long Term 2 Enhanced Surface Water Treatment:** This rule applies to all surface water systems or ground water systems under the direct influence of surface water. The rule targets additional *Cryptosporidium* treatment requirements for higher risk systems and includes provisions to reduce risks from uncovered finished water storages facilities and to ensure that the systems maintain microbial protection as they take steps to reduce the formation of disinfection byproducts. (Monitoring start dates are staggered by system size. The largest systems (serving at least 100,000 people) will begin monitoring in October 2006 and the smallest systems (serving fewer than 10,000 people) will not begin monitoring until October 2008. After completing monitoring and determining their treatment bin, systems generally have three years to comply with any additional treatment requirements.)
- Filter Backwash Recycling:** The Filter Backwash Recycling Rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.
- No more than 5.0 percent samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliforms or E. coli. If two consecutive TC-positive samples, and one is also positive for E. coli or fecal coliforms, system has an acute MCL violation.

9 Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:

- Haloacetic acids:** dichloroacetic acid (zero); trichloroacetic acid (0.3 mg/L)
- Trihalomethanes:** bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L)

### NATIONAL SECONDARY DRINKING WATER REGULATION

National Secondary Drinking Water Regulations are non-enforceable guidelines regarding contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, some states may choose to adopt them as enforceable standards.

Contaminant	Secondary Maximum Contaminant Level
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 (color units)
Copper	1.0 mg/L
Corrosivity	Noncorrosive
Fluoride	2.0 mg/L
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.10 mg/L
Sulfate	250 mg/L
Total Dissolved Solids	500 mg/L
Zinc	5 mg/L

FOR MORE INFORMATION ON EPA'S  
SAFE DRINKING WATER:



visit: [epa.gov/safewater](https://epa.gov/safewater)



call: (800) 426-4791

#### ADDITIONAL INFORMATION:

To order additional posters or other ground water and drinking water publications, please contact the National Service Center for Environmental Publications at: **(800) 490-9198**, or email: [nscep@bps-lmit.com](mailto:nscep@bps-lmit.com).



OFFICE OF GROUND WATER  
AND DRINKING WATER

DOH SVOCs-Results  
Navy Water System Incident  
Red Hill, Post-Flushing, Flushing Area C3

Date Collected	Location Name	Street Name	Closest Cross Street	Analyte	Results	Lab Qualifier	Validator Qualifier	Results Unit	Zone	Feature Type
1/9/2022	010922-21-03	Hospital Way	Cushing St	2,4-DDD	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	2,4-DDE	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	2,4-DDT	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	2,4-Dinitrotoluene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	2,6-Dinitrotoluene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	4,4-DDD	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	4,4-DDE	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	4,4-DDT	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Acenaphthene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Acenaphthylene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Acetochlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Alachlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Alpha-BHC	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	alpha-Chlordane	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Anthracene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Atrazine	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Benz(a)Anthracene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Benzo(a)pyrene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Benzo(b)Fluoranthene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Benzo(g,h,i)Perylene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Benzo(k)Fluoranthene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Beta-BHC	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Bromacil	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Butachlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Butylbenzylphthalate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Caffeine by method 525mod	ND	U(R7)	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Chlorobenzilate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Chloroneb	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Chlorothalonil(Draconil,Bravo)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Chlorpyrifos (Dursban)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Chrysene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Delta-BHC	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Di-(2-Ethylhexyl)adipate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Di(2-Ethylhexyl)phthalate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Diazinon (Qualitative)	ND	U	UJ	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Dibenz(a,h)Anthracene	ND	U	U	ug/L	C3	Distribution

DOH SVOCs-Results  
Navy Water System Incident  
Red Hill, Post-Flushing, Flushing Area C3

Date Collected	Location Name	Street Name	Closest Cross Street	Analyte	Results	Lab Qualifier	Validator Qualifier	Results Unit	Zone	Feature Type
1/9/2022	010922-21-03	Hospital Way	Cushing St	Dichlorvos (DDVP)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Dieldrin	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Diethylphthalate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Dimethoate	ND	U(LE)	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Dimethylphthalate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Di-n-Butylphthalate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Di-N-octylphthalate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Endosulfan I (Alpha)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Endosulfan II (Beta)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Endosulfan Sulfate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Endrin	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Endrin Aldehyde	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	EPTC	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Fluoranthene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Fluorene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	gamma-Chlordane	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Heptachlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Heptachlor Epoxide (isomer B)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Hexachlorobenzene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Hexachlorocyclopentadiene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Indeno(1,2,3,c,d)Pyrene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Isophorone	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Lindane	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Malathion	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Methoxychlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Metolachlor	ND	U(LE)	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Metribuzin	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Molinate	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Naphthalene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Parathion	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Pendimethalin	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Permethrin (mixed isomers)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Phenanthrene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Propachlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Pyrene	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Simazine	ND	U	U	ug/L	C3	Distribution

DOH SVOCs-Results  
Navy Water System Incident  
Red Hill, Post-Flushing, Flushing Area C3

Date Collected	Location Name	Street Name	Closest Cross Street	Analyte	Results	Lab Qualifier	Validator Qualifier	Results Unit	Zone	Feature Type
1/9/2022	010922-21-03	Hospital Way	Cushing St	Terbacil	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Terbutylazine	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Thiobencarb (ELAP)	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	trans-Nonachlor	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	Trifluralin	ND	U	U	ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	1-Methylnaphthalene	NI			ug/L	C3	Distribution
1/9/2022	010922-21-03	Hospital Way	Cushing St	2-Methylnaphthalene	NI			ug/L	C3	Distribution

Exceeds the ISP

**Bold= Detected**



DOH TPH-Results  
Navy Water System Incident  
Red Hill, Post-Flushing, Flushing Area C3

Date Collected	Location Name	Street Name	Closest Cross Street	Analyte	Results	Lab Qualifier	Validator Qualifier	Results Unit	Results Category	Zone	Feature Type	Sheen Present	Odor
1/9/2022	010922-21-03	Hospital Way	Cushing St	C8-C44	<b>110</b>		J	ug/L	Detected	C3	Distribution	No	NO ODOR
1/9/2022	010922-21-03	Hospital Way	Cushing St	Diesel Range Organics (DRO)-C10-C28	<b>36</b>	J	J	ug/L	Detected	C3	Distribution	No	NO ODOR
1/9/2022	010922-21-03	Hospital Way	Cushing St	Gas Range Organics C8-C10	ND	U	UJ	ug/L	Not Detected	C3	Distribution	No	NO ODOR
1/9/2022	010922-21-03	Hospital Way	Cushing St	Oil Range Organics (C28-C40)	<b>40</b>	J	J	ug/L	Detected	C3	Distribution	No	NO ODOR
1/9/2022	010922-21-03	Hospital Way	Cushing St	TPH-g	ND	U	U	ug/L	Not Detected	C3	Distribution	No	NO ODOR

Exceeds the ISP  
Bold= Detected



**DEPARTMENT OF THE NAVY**  
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND, HAWAII  
400 MARSHALL ROAD  
JBPHH, HAWAII 96860-3139

11000  
Ser PWO/00102  
February 28, 2022

Interagency Drinking Water System Team

**SUBJECT: CERTIFICATION OF IRRIGATION LINE FLUSHING – JOINT BASE  
PEARL HARBOR-HICKAM - ZONE C3**

ENCL: (1) Dept. of Health Irrigation System Flushing Guidance

On behalf of the United States Department of the Navy, operator of the Joint Base Pearl Harbor-Hickam Public Water System (PWS ID No. 360 Water System), and in connection with and pursuant to the removal action required by the DOH Hazard Evaluation and Emergency Response Office Incident Case No. 20211128-1848, the undersigned certifies that the Navy has made all necessary inquiry into their Water System and represents and warrants as set forth below.

Landscape irrigation systems in Zone C3, generally known as the Shipyard, have been operated and flushed following Enclosure (1), and subsequent to the approved distribution line flushing conducted in December, 2021.

The undersigned has due authority to deliver this Certification on behalf of the Navy.

Sincerely,

HARMEYER.RANDA

LL.ERNEST.1186692

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Digitally signed by  
HARMEYER.RANDALL.ERNEST.118  
6692663  
Date: 2022.02.28 09:07:17 -10'00'

R. E. HARMEYER

Captain, CEC, U.S. Navy

Public Works Officer

By Direction

of the Commanding Officer

### DOH guidance for active irrigation line purging/flushing

Given the minimal quantities and concentration of fuel contamination in the irrigation lines, along with the expected degradation due to time, the following guidance lines are being provided:

#### System operator responsibility:

- Determine what the irrigation system pipe size is (for volume calculations).
- Calculate the approximate amount of time needed to complete 3 volumetric turnovers of the subject line (est. duration per foot).
- Assess how long each line will need to be purged/flushed based on the above estimates.
- Notify community.
- Cover or otherwise minimize any spray from the system (traffic cone) in order to prevent contact.
- Purge irrigation system under supervision for the estimated duration.
- Allow ground to absorb and dry.
- Notify residents to avoid area for the next 24 hours.
- Prevent/minimize any runoff.
- Prevent contact with the irrigation water.

### DOH Guidance for Active Irrigation Line Purging and Flushing

Given the minimal quantities and concentration of fuel contamination in the irrigation lines, along with the expected degradation due to time, the following guidance lines are being provided:

System operator responsibility:

- Determine what the irrigation system pipe size is (for volume calculations).
- Calculate the approximate amount of time needed to complete 3 volumetric turnovers of the subject line (est. duration per foot).
- Assess how long each line will need to be purged/flushed based on the above estimates.
- Notify community.
- Cover or otherwise minimize any spray from the system (traffic cone) in order to prevent contact.
- Purge irrigation system under supervision for the estimated duration.
- Allow ground to absorb and dry.
- Notify residents to avoid area for the next 24 hours.
- Prevent/minimize any runoff.
- Prevent contact with the irrigation water.

Navy/Army must develop a standard operating procedure incorporating the above guidance and provide training to personnel responsible for execution of the irrigation line purging/flushing.