Temporary Debris Storage (TDS) Site Monitoring
U.S. Army Corps of Engineers and County of Maui Department of Environmental Management
November 25, 2025

The Temporary Debris Storage (TDS) site located in Olowalu is estimated to have received 380,493 tons of ash and debris, reaching just over half of its original design capacity. The TDS site was designed to protect the soil, groundwater, and the ocean. It was closely monitored by USACE, County of Maui, and Hawai'i Department of Health (DOH) to ensure no impacts to the surrounding area or the marine environment from the ash and debris, along with any leachate or rainwater run-off generated.

A Stormwater Pollution Prevention Plan (SWPPP) was developed outlining activities to prevent contamination of the surrounding area from site operations. The SWPPP complied with applicable state and federal requirements.

On January 21, 2024, the County of Maui approved Ordinance #5596, also known as "Bill #120." Among other recordkeeping, operational and planning requirements, the ordinance required the following specific monitoring at the TDS site:

1) Leachate quantity, quality, and treatment processes, if required
2) Run-off, including nearby waterways
3) Air quality for toxins and contaminants

The data from this monitoring must be made publicly available, which is the purpose of this section. Quarterly reports have been developed and submitted to the Maui County Council as follows:

Report	Dates
1	1/21/2024 – 4/21/2024
2	4/21/2024 – 7/20/2024
3	7/19/2024 – 10/17/2024
4	10/18/2024 – 1/15/2025
5	1/16/2025 – 4/16/2025
6	4/17/2025 – 7/15/2025
7	7/16/2025 – 10/14/2025

The quarterly reports are posted here.

1) Leachate

Due to the dry conditions in West Maui, baseline sampling of run-off water was collected directly from a leachate basin two days after a significant storm event on January 9, 2024. Approximately 3" of rain fell over 24 hours during this storm event, generating approximately 500,000 gallons of run-off, which was collected in the leachate basin. At the time of the storm, no ash or debris had been placed in the TDS site working area, so the run-off represented typical precipitation run-off un-impacted by waste, therefore considered typical of what normally runs off the natural soils present in the area.

Since the preliminary, baseline sampling event, USACE sampled the leachate basin if there was a 1" or greater storm event. The results from the last sample taken on October 9, 2025, are found in Table 1.

The leachate basin was removed in mid-November, with the remaining leachate removed with sediment that had collected at the bottom. The protective liner was also removed for shredding and disposal at the PDS. Therefore, no additional leachate samples will be taken.

Table 1 shows the analytes and parameters analyzed by environmental laboratories, along with the results from samplings conducted by USACE to date. Not all parameters shown below were analyzed by the laboratory during each event, as additional parameters were added at the request of DOH and Maui County after the baseline sampling event on January 11, 2024.

Table 1. Leachate monitoring analytes and parameters.

Parameter	Method*	1/11/2024 (Baseline)	1/30/2024	2/8/2024	2/13/2024	2/20/2024	4/15/2024	5/20/2024	2/3/2025	10/9/2025	Units
TSS	SM 2540D	316	46	32	8	-	39	23	5.9	10	mg/L
TDS	EPA 2540C	NS	NS	289	315	-	670	730	NS	NS	mg/L
TOC	EPA 5310C	NS	NS	7.96	9.16	-	7.0	11	NS	NS	mg/L
COD	EPA 410.4	NS	NS	15.5	12	-	38	59	35	27	mg/L
Turbidity	EPA 180.1	650	103	NS	NS	-	80	11	14	7.1	NTU
Total Alkalinity	EPA 2320B	NS	NS	69.9	74.1	-	44	42	NS	NS	mg/L
Nitrogen-Total	EPA 351.2	NS	NS	15.9	16.5	-	22	21	1.4	1.3	mg/L
Nitrates	EPA 353.2	NS	10.1	14.4	15	-	21	15	17	17	mg/L
Nitrites	EPA 353.2	NS	0.369	0.74	0.59	-	0.32	1.5	0.27	0.14	mg/L
Oil & Grease	EPA 1664B	< 5.0	3.9	< 5.0	9	-	1.5	1.4	2.6	3.0	mg/L
TPH	EPA 1664B	< 5.0	NS	NS	NS	-	4.1	4.0	NS	NS	mg/L
DRO (C10-28)	EPA 8015D	NS	NS	NS	NS		250	290	NS	NS	µg/L
Chlorine	EPA 330.4	NS	< 0.01	0.317	0.283	-	ND	ND	NS	NS	mg/L
Hex Chromium	EPA 218.6	NS	0.185	NS	NS	-	NS	NS	NS	NS	mg/L
Cyanide-Total	EPA 9012A	NS	NS	NS	NS	-	0.021	ND	ND	ND	mg/L
Carbonate		NS	NS	1.2	5	-	6	5.6	NS	NS	mg/L
Ammonia	EPA 350.1	NS	NS	NS	NS	-	ND	0.11	0.066	0.081	mg/L
Sulfide	EPA 9034	NS	NS	0.057	0.058	-	ND	ND	ND	ND	mg/L
Sulfate	EPA 300.0	NS	NS	107	121	-	230	240	NS	NS	mg/L
Dioxins / Furans (2,3,7,8-TCDD)	8290A	NS	-	-	< 1.9	< 2.0	ND	< 2.1	NS	NS	pg/L
PCBs (total)	8082A	NS	NS	ND	ND	ND	ND	ND	NS	NS	ug/L
Herbicides (2,4-D)	8151A	NS	NS	NS	ND	ND	0.78	ND	NS	NS	µg/L
Pesticides	8081B	NS	-	-	NS	ND	ND	ND	NS	NS	µg/L
VOCs	8260D	NS	ND	-	ND	ND	ND	ND	ND	ND	µg/L
SVOCs	8270D/E	NS	-	-	NS	ND	ND	ND	NS	NS	µg/L
DO	EPA 360.1	NS	NS	9.53	9.91		6.5	5.0	8.5	6.5	mg/L
pH	EPA 9040C	NS	NS	8.21	8.88	-	7.4	8.5	NS	7.1	
Total Metals (ICP)	6010D										
Beryllium		< 0.010	0.00048	-	< 0.0015	0.030	ND	ND	NS	NS	mg/L
Vanadium		0.13	0.019	-	0.013	0.92	0.017	0.011	NS	NS	mg/L
Chromium		0.136	0.013	-	0.0075	0.56	0.024	0.0055	ND	ND	mg/L
Cobalt		0.026	0.0033	-	0.0019	0.4	0.0028	0.0020	NS	NS	mg/L
Nickel		0.078	0.011	-	0.0063	0.38	0.0085	ND	NS	NS	mg/L
Copper		0.042	0.007	-	0.0047	0.23	ND	ND	NS	NS	mg/L
Zinc		< 0.100	0.017	-	0.0052	0.49	0.0048	ND	NS	NS	mg/L
Arsenic		< 0.010	0.0027	-	0.0027	<0.16	ND	ND	ND	ND	mg/L
Selenium		< 0.010	< 0.005	-	< 0.025	<0.16	ND	ND	ND	ND	mg/L
Molybdenum		< 0.010	0.0021	-	0.0024	<0.02	0.0074	0.0061	NS	NS	mg/L
Silver		< 0.010	NS	-	< 0.008	<0.04	ND	ND	ND	ND	mg/L
Cadmium		< 0.010	NS	-	< 0.0035	<0.01	ND	ND	ND	ND	mg/L
Antimony		< 0.010		-	< 0.0011	<0.16	ND	ND	NS	ND	mg/L
Barium		0.251	0.04	-	0.025	2.6	0.037	0.025	0.030	0.053	mg/L
Mercury	7470A	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.085	0.14	ND	ND	ND	mg/L
Thallium		< 0.010	NS	-	NS	<0.12	ND	ND	NS	NS	mg/L
Lead		< 0.010	0.00096	-	0.0042	<0.071	ND	ND	ND	ND	mg/L

Note: Lab methods may vary. Data from parameters included in the baseline event not sampled in subsequent sampling events is not included.

Abbreviations & Symbols:

<: less than
COD: chemical oxygen demand
EPA: United States Environmental Protection Agency
ND: non-detect or below limits of detection
NTU: nephelometric turbidity unit
SVOC: semi-volatile organic compound
TOC: total organic carbon
TPH: total petroleum hydrocarbons – oil
VOC: volatile organic compound
µg/L: micrograms per liter
pg/L: picograms per liter
mg/L: milligrams per liter
NS: not sampled
PCB: polychlorinated biphenyl
TCDD: Tetrachlorodibenzo-P-dioxin
TDS: total dissolved solids
TSS: total suspended solids
LOQ: limit of quantitation

2) Nearby Waterways

Because there were no observable releases of leachate from the TDS site, there was no need to sample surface water in creeks or drainage ditches adjacent to the TDS site.

DOH continues nearshore water quality monitoring, with data available on the DOH website. DOH continues to affirm that these data show that there are no ash/debris or fire-related chemicals present in the surface water at concentrations of human health concern and are consistent with background levels.

3) Air Quality

There are several air monitoring stations (a.k.a. 'PurpleAir Sensors' and 'DustTrak' monitors) in the vicinity of the TDS site, which are operated, maintained, and monitored by either DOH or a contractor to USACE. The air monitoring equipment provides data for both Particulate Matter (PM) 2.5 and 10, which correspond to the size of the particulate matter in micrometers (or microns), which represent one millionth of a meter. The measurement units for PM are expressed in micrograms/cubic meter, or $\mu g/m^3$, which is basically the weight of the total dust particles (in micrograms) in a defined area of space (one cubic meter). The smaller the particles (i.e., 2.5 microns), the deeper into the respiratory tract and lungs the particles can penetrate and either cause or exacerbate existing respiratory health problems. More information on the health effects of particulate matter pollution can be found here.

The locations of the PurpleAir monitors operated by DOH are found in Figure 1. Monitoring data can be viewed at DOH's Maui Data Portal.

Figure 1. Locations of air monitors near Olowalu.

In addition, a contractor to USACE collected air monitoring samples following a DOH-approved plan at the TDS site. A summary of data collected at various locations around the TDS site (monitors were not always placed in the same location depending on wind conditions) are found in Table 2. Dust monitoring was paused at the end of April, as the TDS site working area was temporarily capped and ceased operations. Monitoring resumed in mid-June 2025 when excavation and hauling of ash/debris from the TDS site to the PDS at the Central Maui Landfill started. Monitoring ended on November 13, 2025, as ash/debris transfer operations were completed and both the ash/debris storage and leachate basin were removed.

DATE	Average PM10 (ug/m^3)	Average PM2.5 (ug/m^3)	Monitor #s
23-Jan to 20-Oct	see previous reports		
21-Oct	4	2.5	1,2
22-Oct	16.5	8.5	1,2
23-Oct	12.5	6	1,2
25-Oct	10.5	6	1,2
26-Oct	9.5	5	1,2
27-Oct	9	5	1,2
28-Oct	11.5	6	1,2
29-Oct	16.5	9	1,2
30-Oct	11.5	7.5	1,2
31-Oct	14.5	8.5	1,2
1-Nov	11	7.5	1,2
2-Nov	15	9	1,2
3-Nov	17	11	1,2
4-Nov	17	10.5	1,2
5-Nov	14.5	5.5	1,2
6-Nov	9.5	6	1,2
7-Nov	17.5	10.5	1,2
8-Nov	19.5	12.5	1,2
9-Nov	13	7	1,2
10-Nov	64	21.5	1,2
11-Nov	12.5	7.5	1,2
12-Nov	5.5	4	1,2
13-Nov	13	8	1,2

Table 2. Air monitoring data collected at the TDS site.

USACE established an 'Action Limit' of 35 for Particulate Matter (PM 2.5) and 150 for Particulate Matter (PM 10). Engineering and/or operating controls such as water sprays and limiting truck speed were implemented in the event of any exceedance of an Action Limit.

Finally, USACE conducted personnel air monitoring according to an Air Monitoring and Sampling Plan (AMSP) using personal air cartridges directly on workers. The results were evaluated against criteria based on the Occupational Safety and Health Administration (OSHA) Permissible Exposure Levels (PELs) and/or the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs). All sampling results collected from excavator operators and laborers did not find any exceedances of these health-based criteria, so this activity was largely discontinued in late June 2024.

4) Groundwater

To comply with Bill 120, USACE installed temporary groundwater monitoring wells (MW) adjacent to the TDS site. An upgradient (uphill) MW and downgradient (downhill) MW were installed at the TDS site in June – July 2024 as shown in Figures 2 & 3. A well completion report was submitted to the County by USACE in August 2024 with specific construction details. These wells will be decommissioned in late December 2025.

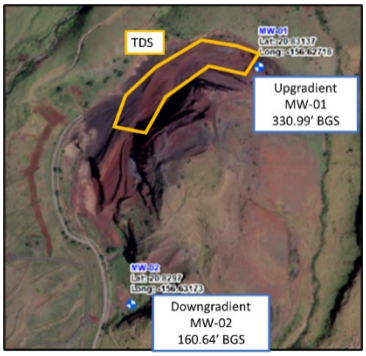

Figure 2. Locations of groundwater monitoring wells.

Figure 3. Groundwater monitoring well MW-02.

Samples were collected and analyzed quarterly (every 3 months, see Table 3), which is a typical frequency for waste storage and disposal facilities. Results from the last quarterly groundwater sampling event in mid-November 2025 are pending and will be shared in the next update.

Table 3. Quarterly groundwater monitoring events.

Sampling Event	Date
1 (initial)	7/7/2024
2	10/8/2024*
3	2/8/2025
4	5/5/2025
5	8/5/2025
6 (final)	November 2025

*A re-sampling for this event was held in 12/2024.

The first samples taken on July 7, 2024, were considered 'baseline' samples, since MW-01 and MW-02 were newly installed, and there were no previous sampling data from them to compare. The analysis includes the analytes and parameters found in Table 4, which includes contaminants or indicators of contaminants present in the TDS leachate in 2025 (see Section 1, Table 1).

Table 4. Analytes and parameters for groundwater samples (2025).

Major cations & anions	7/7/2024 MW-01 Q3 2024 (Baseline)	2/8/2025 MW-01 Q1 2025	5/5/2025 MW-01 Q2 2025	8/5/2025 MW-01 Q3 2025	7/7/2024 MW-02 Q3 2024 (Baseline)	2/8/2025 MW-02 Q1 2025	5/5/2025 MW-02 Q2 2025	8/5/2025 MW-02 Q3 2025	Units
Magnesium	12000	12000	11000	11000	17000	16000	15000	15000	ug/L
Sodium	78000	71000	64000	67000	130000	120000	110000	120000	ug/L
Calcium	15000	14000	13000	13000	21000	21000	21000	21000	ug/L
Potassium	5400	5100	4600	4700	7600	7400	7100	7100	ug/L
Chloride	100	110	110	110	190	200	170	210	mg/L
Carbonate	ND	ND	6.0	6.0	ND	6.0	6.0	6.0	mg/L
Sulfate	19	16	16	17	25	26	27	29	mg/L
Major Indicators									
TDS	210	280	290	300	350	480	450	460	mg/L
TOC	4.6	1.9	1.5	0.90	0.58	1.4	1.1	0.97	mg/L
Total Alkalinity	69	60	60	56	67	61	63	61	mg/L
Ammonia (as Nitrogen)	0.09	0.090	0.09	0.086	0.05	0.090	0.09	0.076	mg/L
Iron	140	65	170	190	380	660	2700	1100	ug/L
Field Parameters									
pH	7.2	7.3	7.4	7.6	7.5	7.6	7.5	7.7	S.U.
Turbidity	2.5	2.3	12	7.2	18	16	60	95	NTU
Metals									
Arsenic	ND	1.7	0.74	1.7	ND	1.7	1.7	1.7	ug/L
Lead	ND	0.17	0.5	0.24	ND	3.2	0.5	0.25	ug/L
Antimony	ND	0.5	0.5	0.5	ND	0.5	0.5	0.5	ug/L
Cobalt	0.84	0.54	0.69	0.23	0.19	0.4	0.17	0.4	ug/L
Copper	2.5	0.67	0.93	0.86	0.72	1.2	1.1	0.9	ug/L

Abbreviations & Symbols:
mg/L: milligrams per liter
MW: monitoring well
ND: non-detect or below detection limit
NTU: nephelometric turbidity unit
TDS: total dissolved solids
TOC: total organic carbon
µg/L: micrograms per liter

The baseline sampling data from MW-01 and MW-02 will be used to evaluate any changes or impacts to groundwater from the TDS site in subsequent quarterly sampling events. All groundwater data is evaluated by the County of Maui and DOH to determine whether there are any impacts to groundwater from the TDS site, and if so, what action(s) may be necessary after closure and removal of the TDS site to address them. Due to the thick liner (80 mil, or 0.08 inches) underlying all ash and debris in the TDS and the leachate basin to prevent infiltration, along with the distance between these bottom liners and the uppermost groundwater level (between 150 – 350 feet), it is unlikely that the TDS site will have any impact on groundwater.

5) Background Soils

The TDS site was divided into five decision units—or set areas—from which soil samples were collected and analyzed for target contaminants to define pre-existing soil conditions. Analytical results from this assessment, conducted on January 28-29, 2024, are summarized in Table 5.

Once the protective liner was removed in mid-November 2025, post-construction samples were taken in similar locations to determine if the TDS site operations had any impact on the underlying soils. The pre-construction and post-construction data will be compared and evaluated by the County of Maui and Hawaii DOH to determine whether any action (i.e., further excavation, cleanup) is necessary prior to final grading of the TDS site. Results from the post-construction sampling event in mid-November 2025 are pending and will be shared in the next update.

Table 5. Analytical results from background soil sampling at TDS site.

Constituent (mg/kg)	DU-1 (mg/kg)	DU-2 (mg/kg)	DU-3 (mg/kg)	DU-4 (mg/kg)	DU-5 (mg/kg)
Antimony	0.18	0.19	0.19	0.19	0.19
Arsenic	1.4	1.5	0.73	0.584	0.94
Barium	15	15	32	40	39
Berylium	0.56	0.66	0.6	0.75	0.66
Cadmium	0.093	0.13	0.094	0.099	0.1
Chromium	0.81	1	0.84	0.53	7
Cobalt	1.1	1.4	1.2	1.2	3
Copper	1.6	4.9	1.6	0.86	4.9
Lead	2.1	1	1.1	0.97	2.2
Molybdenum	0.51	0.54	0.5	0.67	0.9
Nickel	0.79	1	0.92	0.53	9
Selenium	4.9	5.4	3.6	3.2	3.7
Silver	0.046	0.021	0.047	0.048	0.047
Thallium	0.14	0.15	0.14	0.14	0.14
Vanadium	1.2	1.4	1.2	1.0	8.5
Zinc	48	51	44	49	52
Mercury	0.010	0.011	0.0096	0.010	0.011
Oil Range Organics	18	26	30	29	30
Gasoline Range Organics	2.9	1.1	1.6	1.7	1.5
Diesel Range Organics	32	33	28	30	16

Abbreviations: DU: decision unit mg/kg: milligrams per kilogram